

# PANEL METER MT4W SERIES

M A N U A L



Thank you very much for selecting Autonics products.  
For your safety, please read the following before using.

### Caution for your safety

- Please keep these instructions and review them before using this unit.
- Please observe the cautions that follow;
  - Warning** Serious injury may result if instructions are not followed.
  - Caution** Product may be damaged, or injury may result if instructions are not followed.
- The following is an explanation of the symbols used in the operation manual.
- caution: Injury or danger may occur under special conditions.

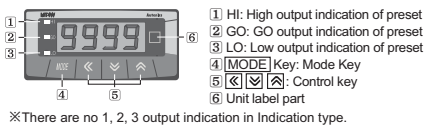
### Warning

- In case of using this unit with machinery (Ex: nuclear power control, medical equipment, ship, vehicle, train, airplane, combustion apparatus, safety device, crime/disaster prevention equipment, etc) which may cause damage to human life or property, it is required to install fail-safe device. It may cause a fire, human injury or damage to property.
- It must be mounted on the Panel. It may cause electric shock.
- Do not connect terminals when it is power on. It may cause electric shock.
- Do not disassemble and modify this unit. Please contact us if it is required. It may cause electric shock or a fire.
- Please check the number of terminal when connect power line or measured input. It may cause a fire.

### Caution

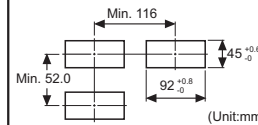
- This unit shall not be used outdoors. It might shorten the life cycle of the product or cause electric shock. Use this product indoors only. Do not use the product outdoors or at locations subject to the temperatures or humidity outside. (Example : rain, dirt, frost, sunlight, condensation, etc.)
- When connecting wire, AWG 20(0.50mm<sup>2</sup>) should be used and screw bolt on terminal block with 0.74N·m to 0.90N·m strength. It may cause malfunction or a fire due to contact failure.
- Please observe the rated specification. It might shorten the life cycle of the product and cause a fire.
- Do not use the load beyond the rated switching capacity of Relay contact. It may cause insulation failure, contact melt, contact failure, relay broken, fire etc.
- In cleaning the unit, do not use water or organic solvent. And use dry cloth. It might cause an electric shock or fire that will result in damage to the product.
- Do not use this unit at place where there are flammable or explosive gas, humidity, direct ray sun, radiant heat, vibration, impact etc. It may cause explosion.
- Do not inflow dust or wire drogs into inside of this unit. It may cause a fire or mechanical trouble.
- Please connect properly after checking the polarity of measurement terminals. It may cause a fire or explosion.

### Front panel identification

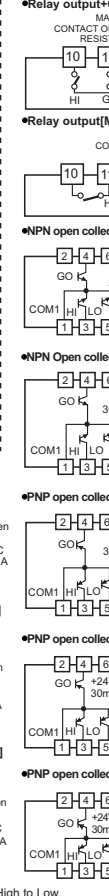
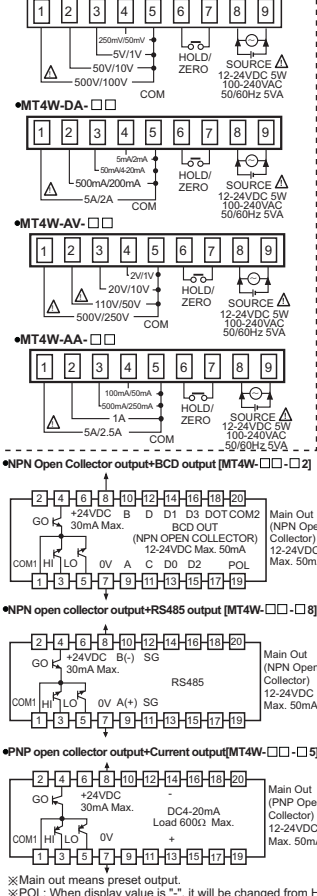


※ There are no 1, 2, 3 output indication in Indication type.

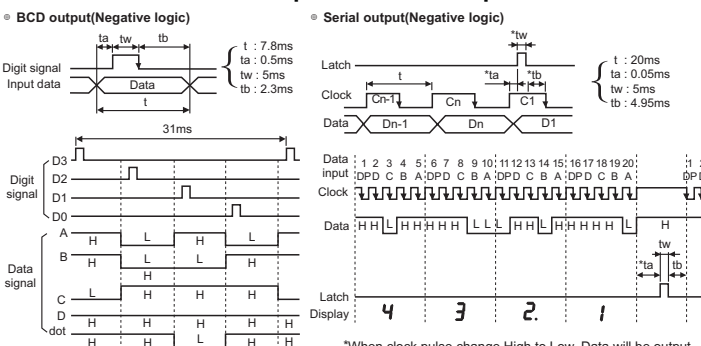
### Panel cut-out



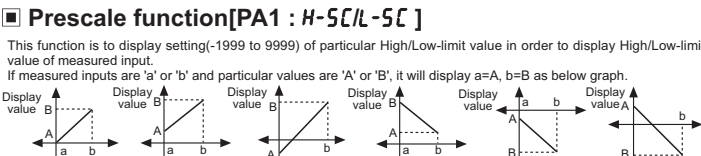
### Terminal connection



### Time chart of serial output and BCD output



### Prescale function[PA1: H-SC/L-SC]



### Error display function

Display	Description
HHHH	Flashes when measurement input is exceeded the max. allowable input (100%).
LLLL	Flashes when measurement input is exceeded the min. allowable input (-10%).
HLH	Flashes when display input is exceeded H-SC set value.
HL	Flashes when display input is exceeded L-SC set value.
F-HH	Flashes when input frequency is exceeded max. display value of measured range.
0uE	Flashes when it exceeds zero range (±99).

### Specifications

Model	MT4W-□□-□□	MT4W-□□-1□
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)	
Display accuracy	23°C±5°C ⇨ DC Type: F.S.±0.1% rdg±2digit / AC Type: F.S.±0.3% rdg±3digit (Frequency: F.S.±0.1% rdg±2digit) F.S.±0.3% rdg±3digit max. only for 5A terminal DC/AC Type: F.S.±0.5% rdg±3digit	
Input	DC Voltage/Current, AC Voltage/Current, AC Frequency	
Max. allowable input	110% for each measured input range	
A/D conversion method	Practical over sampling using successive approximation ADC.	
Sampling cycle	50ms(DC), 16.6ms(AC 60Hz)	
Max. indication range	-1999 to 9999(4Digit)	
Preset output	<ul style="list-style-type: none"> <li>Relay output ⇨ Contact capacity: 250VAC 3A, 30VDC 3A/Contact composition: N.O.(1A) &amp; NPN/PNP Open Collector output ⇨ 12-24VDC ±2V 50mA Max.(Load resistance)</li> <li>RS485 communication output ⇨ Baud rate: 1200/2400/4800/9600, Communication method : 2-wire half duplex, Synchronous : Asynchronous method, Protocol : Modbus type, Serial/BCD output ⇨ NPN Open collector output, 12-24VDC Max. 50mA(Resistive load)</li> <li>4-20mA output ⇨ Resolution : 12,000 division(Load resistance max. 600Ω), Response time: Max. 450ms</li> </ul>	
Sub output (Transmission output)		
AC measurement function	Selectable RMS or AVG	
Frequency measurement function	Measured range: 0.100 to 9999Hz(Variable by decimal point position)	
Hold function	Includes(External hold function)	
Environment	<ul style="list-style-type: none"> <li>Ambient temperature: -10 to 50°C, Storage: -20 to 60°C</li> <li>Ambient humidity: 35 to 85%RH, Storage: 35 to 85%RH</li> </ul>	
Insulation type	Double insulation or reinforced insulation (Dielectric strength between the measuring input part and the power parts : 1kV)	
Approval	CE, CE	
Weight	Approx. 21g	

※ Environment resistance is rated at no freezing or condensation.

### Specification of measured input and range [PA1: In-r]

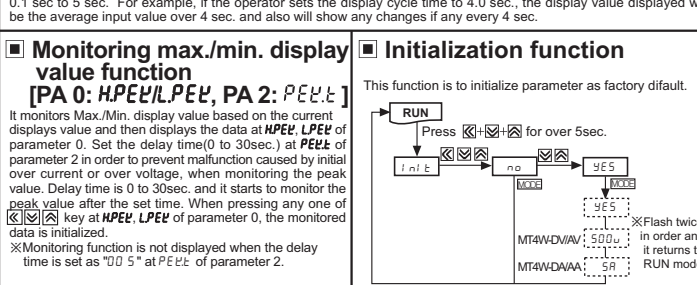
Type	Measured input and range	Input impedance	Display range [5nd]	Prescale Display range [5CR]
DC Volt	0-500V [50u]	4.33315MΩ	0.0 to 500.0(Fixed)	
	0-100V [10u]	4.33315MΩ	0.0 to 100.0(Fixed)	
	0-50V [5u]	433.15kΩ	0.0 to 50.0(Fixed)	
	0-10V [1u]	43.15kΩ	0.0 to 10.0(Fixed)	
	0-5V [5u]	43.15kΩ	0.0 to 5.000(Fixed)	
	0-250mV [25u]	2.15kΩ	0.00 to 1.000(Fixed)	
	0-50mV [5u]	2.15kΩ	0.00 to 50.000(Fixed)	
	0-5A [5A]	0.01Ω	0.000 to 5.000(Fixed)	
	0-2A [2A]	0.01Ω	0.000 to 2.000(Fixed)	
DC Amper	0-500mA [50A]	0.1Ω	0.0 to 500.0(Fixed)	
	0-200mA [20A]	0.1Ω	0.00 to 200.0(Fixed)	
	0-50mA [50mA]	1.0Ω	0.0 to 50.00(Fixed)	
	4-20mA [4-20]	1.0Ω	0.000 to 20.00(Fixed)	
	0-5mA [5mA]	10.0Ω	0.000 to 5.000(Fixed)	
	0-2mA [2mA]	10.0Ω	0.000 to 2.000(Fixed)	
	0-500V [50u]	4.987MΩ	0.0 to 500.0(Fixed)	
	0-250V [25u]	4.987MΩ	0.0 to 250.0(Fixed)	
	0-110V [110P]	1.987MΩ	0.0 to 440.0(Fixed)	
AC Volt	0-50V [5u]	1.987MΩ	0.00 to 50.00(Fixed)	
	0-20V [2u]	200kΩ	0.00 to 20.00(Fixed)	
	0-10V [1u]	200kΩ	0.00 to 10.00(Fixed)	
	0-2V [2u]	20kΩ	0.000 to 2.000(Fixed)	
	0-1V [1u]	20kΩ	0.000 to 1.000(Fixed)	
	0-5A [5A]	0.01Ω	0.000 to 5.000(Fixed)	
	0-2.5A [25A]	0.01Ω	0.000 to 2.500(Fixed)	
	0-1A [1A]	0.05Ω	0.000 to 1.000(Fixed)	
	0-500mA [50A]	0.1Ω	0.0 to 500.0(Fixed)	
AC Amper	0-500mA [50A]	0.1Ω	0.00 to 50.00(Fixed)	
	0-250mA [25A]	0.1Ω	0.00 to 25.00(Fixed)	
	0-100mA [10A]	0.5Ω	0.00 to 10.00(Fixed)	
	0-50mA [50mA]	0.5Ω	0.00 to 5.00(Fixed)	
	0-20mA [20mA]	0.5Ω	0.00 to 2.00(Fixed)	
	0-5A [5A]	0.01Ω	0.000 to 5.000(Fixed)	
	0-2.5A [25A]	0.01Ω	0.000 to 2.500(Fixed)	
	0-1A [1A]	0.05Ω	0.000 to 1.000(Fixed)	
	0-500mA [50A]	0.1Ω	0.0 to 50.0(Fixed)	

※ Please wire the proper terminal it its max. input within 10 to 100% of the input terminal. When it is higher than input, it may cause terminal breakdown and over display range. The accuracy is decreased when it is connected to the terminal under 30%.

※ 110P is standard specification 440V/110VAC P.T.

### Display cycle delay function [PA2: d15t]

In some applications the measured input may fluctuate which in turn causes the display to fluctuate. By adjusting the display cycle delay function time at d15t of 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 max./min. display value function [PA0: HPEEL/LEPEL, PA2: PELET]

It monitors Max./Min. display value based on the current displays value and then displays the data at HPEEL/LEPEL of parameter 0. Set the delay time(0 to 30sec), at PELET of parameter 2 in order to prevent malfunction caused by initial over current or over voltage, when monitoring the peak value. Delay time is 0 to 30sec, and it starts to monitor the peak value after the set time. When pressing any one of [H] key at HPEEL/LEPEL of parameter 0, the monitored data is initialized.

※ Monitoring function is not displayed when the delay time is set as "0" of PELET of parameter 2.

### Current output(DC4-20mA) Scale adjustment function [PA2: F5-H / F5-L]

It set current output for the display value at the current output DC4-20mA. It sets display value for 4mA at F5-L and 20mA at F5-H and the range between F5-H and F5-L should be 10% F.S. (When it sets as under 10% F.S. automatically) Preset display value is fixed to output as 4mA at F5-L and 20mA at F5-H.

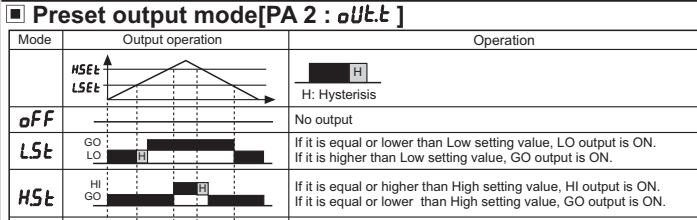
### Error correction function [PA1: InbH / InbL]

It corrects display value error of measured input.
  $InbL \pm 99$  (Adjust deviation of low value)  
 $InbL \pm 0.00$  (100% Correct gradient(%)) of high value  
 Display value = Measured value x  $InbH$  +  $InbL$   
 When the measured range is 0 to 500V, and the display range is 0 to 50.0, if the low display value is "1.2" to 0V input, set "12" as the  $InbL$  value to display "0.0" by adjusting the offset of the low value.

The display value to the 500V measured input varies by adjusting the offset of the low value. If this display value is "50.0", calculate  $500/0.01$  (the desired display value / the display value), and set the 0.98 correction value as the  $InbH$  to display "500.0" by adjusting the gradient of the high value.

※ The offset correction range of  $InbL$  is within -99 to for  $D^5$ ,  $D^4$  digit regardless of decimal point.

### Gradient correction function [PA1: InbH]



### Preset output mode[PA2: ouE]

Mode	Output operation	Operation
HSEt	Relay	H: Hysteresis
off	No output	
LSt	Relay	If it is equal or lower than Low setting value, LO output is ON. If it is higher than Low setting value, GO output is ON.
HSt	Relay	If it is equal or higher than High setting value, HI output is ON. If it is equal or lower than High setting value, GO output is ON.
HLSt	Relay	LO output is ON when it is equal or lower than Low setting value. HI output is ON when it is equal or higher than High setting value. GO output is ON when it is higher than Low setting value, and lower than High setting value.
HHSt	Relay	LO output is ON when it is equal or higher than Low setting value. HI output is ON when it is equal or higher than High setting value. GO output is ON when it is lower than Low/High setting value.
LLSt	Relay	LO output is ON when it is lower than Low setting value. HI output is ON when it is equal or higher than High setting value. GO output is ON when it is higher than Low/High setting value.
LdSt	Relay	It is operated same with LSt, but LO output does not operated under initial Low setting value, and it is ON from under next Low setting value. If this is higher than Low setting value, GO output is ON.

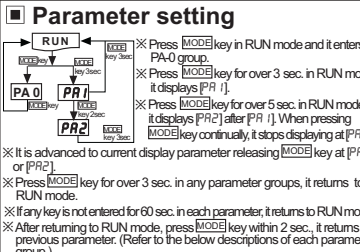
### Startup compensation timer function [PA2: StArE]

This time function limits the operation of an output until the measured input(overvoltage or inrush current) is stable at moment of power on. All outputs are off during startup compensation time setting after power is supplied. Setting range: 0.0 to 99.9 (Unit: sec.), Factory default: 00.0

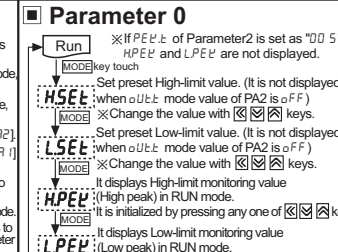
### Parameter

Parameter	Display	Function	Note		
PA1 (Parameter 1)	<b>In-r</b>	Input type	Selectable RMS/AVG in AC type Available AC type only.		
	<b>In-r</b>	Input range	Selection of input range		
	<b>diSP</b>	Display	Selection of display type	Selectable 5tnd / 5CR / FrE9	
	<b>5tnd</b>	Standard	Standard scale range	Display Max. display value of 5tnd	
	<b>FrE9</b>	Frequency	Frequency display	Available AC type only.	
	<b>5CR</b>	Scale	Scale range	These are displayed at 5CR	
	<b>H-SC</b>	High scale	Set max. value of display range	It sets max. display value / min. display value(-1999 to 9999)	
	<b>L-SC</b>	Low scale	Set min. value of display range		
	<b>dot</b>	Dot	Set decimal point position	It is displayed at 5CR, FrE9 only and set the decimal point position	
	<b>InbH</b>	input bias high	Correct High-limit value of display value	5tnd/5CR Correction range 0.100 to 5.000 FrE9 Correction range 0.100 to 9.999	
	<b>InbL</b>	input bias low	Correct Low-limit value of display value	Set range : -99 to +99	
	<b>InbE</b>	input bias exponent	Set display index of frequency mode	Set range : $10^2 / 10^1 / 10^0 / 10^{-1}$	
	<b>ouE</b>	Out type	Set operation mode of preset output	Selectable of FF / L5t / H5t / HL5t / HL5t / L5t / Ld5t	
	<b>HYS</b>	Hysteresis	Set hysteresis value	Set range : 0 to 10% F.S.	
	<b>StArE</b>	Startup compensation time	Set startup compensation time.	Set range : 00 to 99.9sec.	
PA2 (Parameter 2)	<b>PELET</b>	Peak time	Set monitoring delay time for peak value(sec)	Set range : 00sec to 300sec	
	<b>d15t</b>	Display time	Set sampling time(sec.)	0.1 to 5.0 sec.(Variable by 0.1sec.)	
	<b>Ero</b>	Zero Key	Set usage of front side zero adjustment key	0: Not use front side zero adjustment key 1: Use front side zero adjustment key	
	PA0 (Parameter 0)	<b>EuIn</b>	Event Input	Set external terminal(6, 7) function	HiLo: Use external terminal as Hold terminal Ero: Use external terminal as zero point adjustment terminal
		<b>F5-H</b>	Full scale High	Set the upper value output point or PV output	Min. set range: Min. 10% F.S.
		<b>F5-L</b>	Full scale Low	Set the lower value output point or PV output	Max. set range: Max. F5-H 10%
		<b>AdrS</b>	Address	Set communication address	Set range: 01 to 99
		<b>bPS</b>	Bit per second	Set baudrate(bps)	Selectable 1200/2400/4800/9600
	<b>LoL</b>	Lock	Set lock function	Selectable of FF / L5t / H5t / HL5t / L5t	
	<b>HSEt</b>	High set	Set High setting value	Setting range : Same as the display range of 5tnd/5CR	
	<b>LSEt</b>	Low set	Set Low setting value		
	<b>HPEL</b>	High peak	Max. value by data monitoring	Initializes the monitored data value by pressing any one of [H] [L] [E] keys.	
	<b>LEPEL</b>	Low peak	Min. value by data monitoring	It is initialized by pressing any one of [L] [E] [E] keys.	

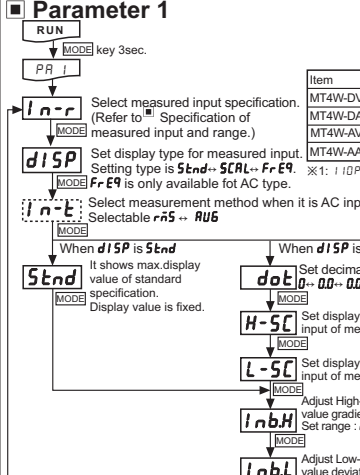
### Parameter setting



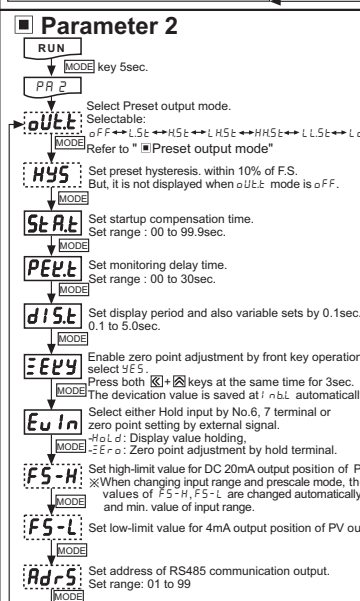
### Parameter 0



### Parameter 1



### Parameter 2



### Change the parameter setting value

- Advance to the parameter to be changed when pressing **MODE** key continuously in RUN mode and releasing **MODE** key at the parameter. (Refer to "Parameter setting")
- When pressing **MODE** key in each parameter, the initial mode of the parameter is displayed. (Refer to the description of each parameter.)
- When pressing one of [H] [L] [E] keys in display mode, the saved setting value is displayed.
- Change the setting value by [H] or [L] key when setting value flashes.
- When confirming the setting value with **MODE** key, the changed setting value flashes twice and enters into the next setting.
- It returns RUN mode from parameter by pressing **MODE** key for 3 sec.

### Caution for using

- Allowable installation environment
    - It shall be used indoor
    - Altitude Max. 2000m
  - Please use the terminal(M3.5, Max.7.2mm) when connecting the AC power supply.
  - Please use separated line from high voltage line or power line in order to avoid inductive noise.
  - Please install power switch or circuit breaker in order to cut off the power supply.
  - The switch or circuit breaker should be installed near by users for safety.
  - Be sure to avoid using this unit near by machinery making strong high frequency noise. (High frequency welder & Sewing machine, High capacity SCR unit, etc.)
  - When input applied, if "HHHH" or "LLLL" is displayed, it has some trouble with measuring input, please check the line after power off.
  - Noise inflowing from power line can cause serious problem for D.P.M. (Digital Panel Meter) driving by AC power supply. Even though there is condenser for protecting noise between lines at primary side of power transformer, but it is very difficult to install protection components at small size product like D.P.M. Therefore, please noise absorber circuit such as line filter, varistor in external lines when voltage failure occurs by power relay, magnet SW and high frequency equipment are operated in same line or surge occurs by spark of high voltage or thunder etc.
  - Input line: Shield wire must be used when the measured input line is getting longer in the place occurring lots of noise.
- ※ It may cause malfunction if above instructions are not followed.

#### Using line filter

Install it closely from D.P.M.

#### Using Varistor

#### Using Double shield wire

#### Using Single shield wire

### Autonics Corporation

http://www.autonics.com

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