

Autonics 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.

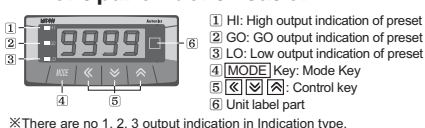
Caution for your safety

- 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.

- 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.

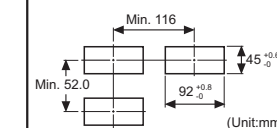
- ### Caution
- This unit shall not be used outdoors. It might shorten the life cycle of the product or cause electric shock. Use this product indoors only. Do not use the product outdoors or at locations subject to the temperatures or humidity outside. (Example : rain, dirt, frost, sunlight, condensation, etc.)
 - When connecting wire, AWG 20(0.50mm²) 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

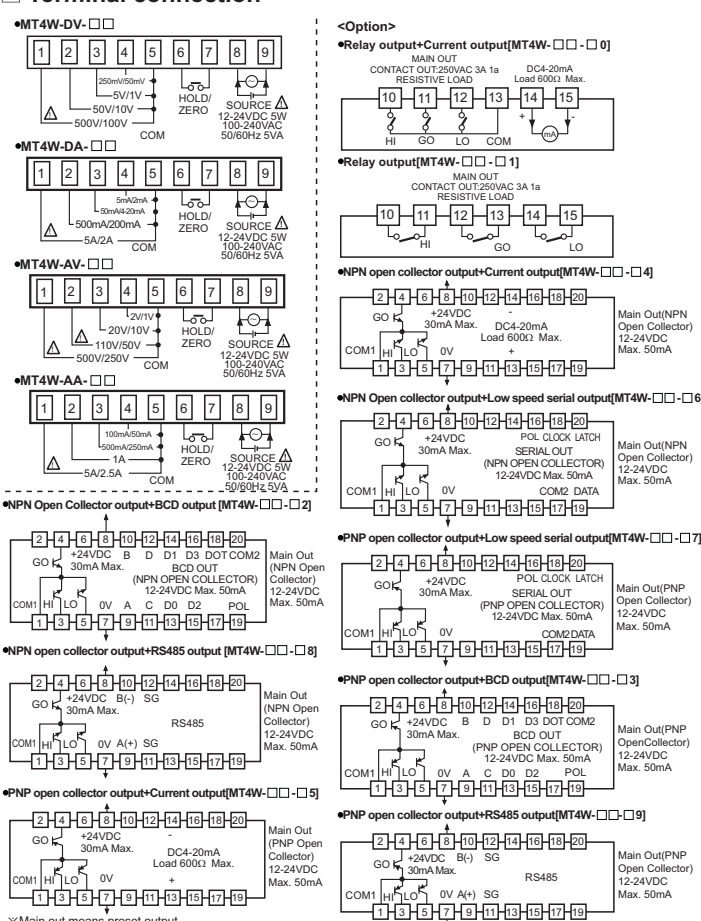


There are no 1, 2, 3 output indication in Indication type.

Panel cut-out

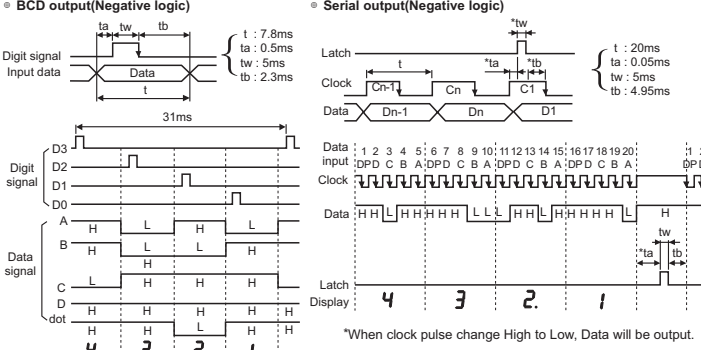


Terminal connection



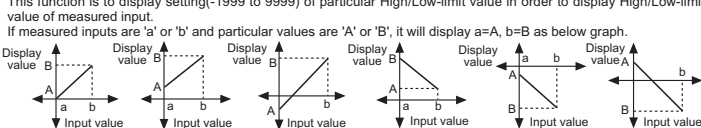
Main out means preset output. *POL: When display value is "-", it will be changed from High to Low.

Time chart of serial output and BCD output



*When clock pulse change High to Low, Data will be output.

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



Error display function

Display	Description	Note
HHHH	Flashes when measurement input is exceeded the max. allowable input (110%)	*Error display is released automatically when it is in the measured and display range.
LLLL	Flashes when measurement input is exceeded the min. allowable input (-10%)	*"L.L.L.L" is displayed when the measured input is 4-20mA.
H-HH	Flashes when display input is exceeded H-SC set value	*After flashing "H-HH" 2 times when it exceeds the zero range, it returns to RUN mode.
L-L	Flashes when display input is exceeded L-SC set value	
F-HH	Flashes when input frequency is exceeded the max. display value of measured range	
0uE	Flashes when it exceeds zero range (±99)	

*The above specifications are subject to change without notice.

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	
Input	-10°C to 50°C ≡ DC/AC Type: F.S.±0.5% rdg±3digit	
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"> Relay output ≡ Contact capacity: 250VAC 3A, 30VDC 3A/Contact composition: N.O.(1a) NPN/PNP Open Collector output ≡ 12-24VDC ± 2V 50mA Max.(Load resistance) 	
Sub output (Transmission output)	<ul style="list-style-type: none"> 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) 4-20mA output ≡ Resolution: 12,000 division(Load resistance max. 600Ω), Response time: Max. 450ms 	
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	Ambient temperature: -10 to 50°C, Storage: -20 to 60°C Ambient humidity: 35 to 85%RH, Storage: 35 to 85%RH	
Insulation type	Double insulation or reinforced insulation (Dielectric strength between the measuring input part and the power parts : 1kV)	
Approval	CE, RoHS, CE	
Weight	Approx. 211g	

*Environment resistance is rated at no freezing or condensation.

Specification of measured input and range [PA1 : I n n r]

Type	Measured input and range	Input impedance	Display range [5ndt]	Prescale Display range [5CR L]
DC Volt	0-500V [500u]	4.33315MΩ	0.0 to 500.0(Fixed)	
	0-100V [100u]	4.33315MΩ	0.0 to 100.0(Fixed)	
	0-50V [50u]	433.15kΩ	0.0 to 50.00(Fixed)	
	0-10V [10u]	43.15kΩ	0.00 to 10.00(Fixed)	
	0-5V [5u]	4.315kΩ	0.00 to 5.000(Fixed)	
	0-250mV [025u]	2.15kΩ	0.00 to 250.0(Fixed)	
	0-50mV [50m]	0.215kΩ	0.00 to 50.00(Fixed)	
	0-5A [5A]	0.01Ω	0.00 to 5.000(Fixed)	
	0-2A [2A]	0.01Ω	0.00 to 2.000(Fixed)	
	0-500mA [05A]	0.1Ω	0.00 to 500.0(Fixed)	
DC Ampere	0-200mA [02A]	0.1Ω	0.00 to 200.0(Fixed)	
	0-50mA [05A]	1.0Ω	0.00 to 50.00(Fixed)	
	4-20mA [4-20]	1.0Ω	0.00 to 20.00(Fixed)	
	0-5mA [5mA]	10.0Ω	0.00 to 5.000(Fixed)	
	0-2mA [2mA]	10.0Ω	0.00 to 2.000(Fixed)	
	0-500V [500u]	4.987MΩ	0.0 to 500.0(Fixed)	
	0-250V [250u]	4.987MΩ	0.0 to 250.0(Fixed)	
	0-110V [110P]	1.987MΩ	0.0 to 440.0(Fixed)	
	0-50V [50u]	1.987MΩ	0.00 to 50.00(Fixed)	
	0-20V [20u]	200kΩ	0.00 to 20.00(Fixed)	
AC Volt	0-10V [10u]	200kΩ	0.00 to 10.00(Fixed)	
	0-2V [2u]	20kΩ	0.00 to 2.000(Fixed)	
	0-1V [1u]	20kΩ	0.00 to 1.000(Fixed)	
	0-5A [5A]	0.01Ω	0.00 to 5.000(Fixed)	
	0-2.5A [25A]	0.01Ω	0.00 to 2.500(Fixed)	
	0-1A [1A]	0.05Ω	0.00 to 1.000(Fixed)	
	0-500mA [05A]	0.1Ω	0.00 to 500.0(Fixed)	
	0-250mA [025A]	0.1Ω	0.00 to 250.0(Fixed)	
	0-100mA [01A]	0.5Ω	0.00 to 100.0(Fixed)	
	0-50mA [05A]	0.5Ω	0.00 to 50.0(Fixed)	

(Display range is variable according to decimal point position.)

*Please wire the proper terminal it its max. input within 100 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 : d i S t]

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 d i S t 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 : HPEL/PLEL, PA2 : PELL]

It monitors Max./Min. display value based on the current displays value and then displays the data at HPEL/PLEL of parameter 0. Set the delay time(0 to 30sec) at PELL 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] [L] keys at HPEL/PLEL of parameter 0, the monitored data is initialized.

*Monitoring function is not played when the delay time is set as "0.5" at PELL 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 : I nbH / I nbL]

It corrects display value error of measured input. I nbL ± 99(Adjust deviation of low value) I nbH ± 99(Adjust deviation of high value) Display value=(Measured value x I nbH) + I nbL When the measured range is 0 to 500V, and the display range is 0 to 500.0, if the low display value is "1.2" to 0V input, set "12" as the I nbL 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 500.0/501.0(the desired display value/the display value), and set the 0.998 correction value as the I nbH to display "500.0" by adjusting the gradient of the high value.

*The offset correction range of I nbL is within -99 to for D², D¹ digit regardless of decimal point.

Gradient correction function [PA1 : I nbH]

It corrects the gradient of prescale value and display value. (Picture 1) Display value Y can be used as α, β times against X input value by correction function(I nbH) and used as correction function of max. display value(H-SC). Adjustment range is 0.100 to 5.000 and multiply current gradient.

Ex) Input: 200mVDC, Display: 3.000 for MT4W-DV type
 Select 0.1VDC(1V) for measured input in Parameter 1.
 *Standard 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 unable due to setting range is 9.999
 *In this case, please check below chart.
 Please set as I nbH=H-SC=15.000

Preset output mode[PA2 : o u t t]

Mode	Output operation	Operation
HSEt	Hysteresis	H: Hysteresis
oFF	No output	No output
LSt	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	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.	
LHSt	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	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	LO output is ON when it is lower than Low setting value. HI output is ON when it is equal or lower than High setting value. GO output is ON when it is higher than Low/High setting value.	
LdSt	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.	

*HSEt is displayed according to the setting of output operation mode, when user sets "oFF", HSEt/LEt are not displayed.

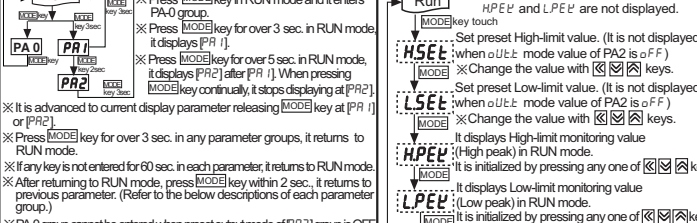
Startup compensation timer function [PA2 : S t A r t]

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

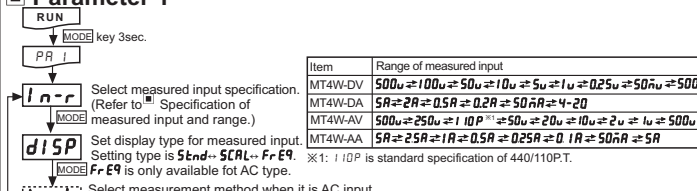
Parameter

Parameter	Display	Function	Note	
PA 1 (Parameter 1)	I n n r	Input type	Selectable RMS/AVG in AC type Available AC type only.	
	I n r	Input range	Selection of input range	
	d i S P	Display	Selection of display type	
	5ndt	Standard	Standard scale range	Display Max. display value of 5ndt
	FrE9	Frequency	Frequency display	Available AC type only.
	5CR L	Scale	Scale range	These are displayed at 5CR L
	H-SC	High scale	Set max. value of display range	It sets max. display value/ min. display value(-1999 to 9999)
	L-SC	Low scale	Set min. value of display range	
	dot	Dot	Set decimal point position	It is displayed at 5CR L, FrE9 only and set the decimal point position
	I nbH	Input bias high	Correct High-limit value of display value	5ndt/5CR L Correction range 0.100 to 5.000 FrE9 Correction range 0.100 to 9.999
PA 2 (Parameter 2)	I nbL	Input bias low	Correct Low-limit value of display value	Set range : -99 to +99
	I nbE	Input bias exponent	Set display index of frequency mode	Set range : 10 ² / 10 ¹ / 10 ⁰ / 10 ⁻¹
	o u t t	Out type	Set operation mode of preset output	Selectable oFF / LSt / HSt / LHSt / HHSt / LLSt / LdSt
	HYS	Hysteresis	Set hysteresis value	Set range : 0 to 10% F.S.
	S t A r t	Startup compensation time	Set startup compensation time.	Set range : 00 to 99.9sec.
	PEL t	Peak time	Set monitoring delay time for peak value(sec)	Set range : 00sec to 300sec
	d i S t	Display time	Set sampling time(sec.)	0.1 to 5.0 sec.(Variable by 0.1sec.)
	E r o	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
	E u I n	Event Input	Set external terminal(6, 7) function	H o L d: Use external terminal as Hold terminal E r o: Use external terminal as zero point adjustment terminal
	F5-H	Full scale High	Set the upper value output point or PV output	Min. set range: Min. 10% F.S.

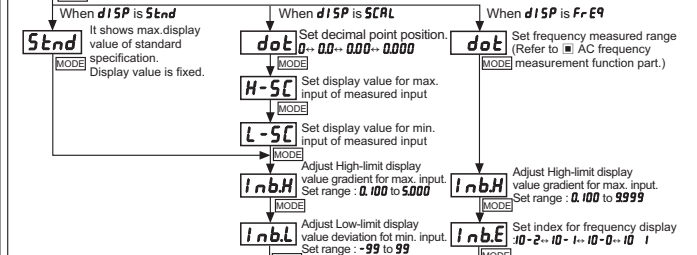
Parameter setting



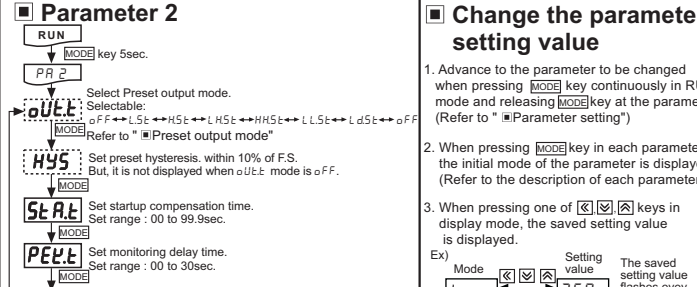
Parameter 0



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] [dot] keys in display mode, the saved setting value is displayed.
 - Ex) Mode [H] [L] [dot] Setting value The saved setting value flashes every 0.5 sec.
- Change the setting value by [H] or [L] key when setting value flashes.
- Change AC type measured input from 250V to 125V.
 - Ex) Mode [H] [L] [dot] Setting value Setting value The saved setting value flashes twice and enters into the next setting.
- It returns RUN mode from parameter by pressing [MODE] key for 3 sec.

User manual for communication

Visit our website (www.autonics.com) to download the user manual for communication of MT series.

Caution for using

- Allowable installation environment
 - Altitude Max. 2000m
 - Installation Category 2
 - 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 thunders 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.

Major products

- Proximity sensors
- Photoelectric sensors
- Area/Door side sensors
- Fiber optic sensors
- Door/Door side sensors
- Pressure sensors
- Counters
- Timers
- Rotary encoders
- Display units
- Power controllers
- Sensor controllers
- Panel meters
- Graphic/Logic panels
- Temperature controllers
- Tachometer/Pulse(Rate) meters
- Temperature/Humidity transducers
- Stepping motors/drivers/motion controllers
- Laser marking system(CO₂, Nd:YAG)
- Laser welding/soldering system

Autonics Corporation
<http://www.autonics.com>

Satisfactory Partner For Factory Automation

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