

PANEL METER MT4W SERIES



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, crane/disaster prevention equipment, etc.) which may cause damages to human life or property, it is required to install fail-safe device.
- It must be mounted on Panel. It may give an electric shock.
- Do not connect terminals when it is power on. It may give an electric shock.
- Do not disassemble and modify this unit, when it requires. If needs, please contact us. It may give an electric shock and cause a fire.
- Please check the number of terminal when connect power line or measuring input. It may cause a fire.

Caution

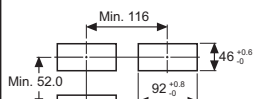
- This unit shall not be used outdoors. It might shorten the life cycle of the product or give an electric shock.
- When wire connection, AWG 20(0.50mm²) should be used and screw bolt on terminal block with 0.74N·m to 0.90N·m strength.
- Please observe specification rating. It might shorten the life cycle of the product and cause a fire.
- Do not use the load beyond 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 oil-based detergent. 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 the sun, radiant heat, vibration, impact etc.
- Do not inflow dust or wire drops into inside of this unit. It may cause a fire or mechanical trouble.
- Please connect properly after checking the polarity of measuring 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

MT4W-DV-□□

- Relay output+Current output[MT4W-□□-□□]

MT4W-DA-□□

- Relay output[MT4W-□□-□□-□□]

MT4W-AV-□□

- NPN open collector output+Current output[MT4W-□□-□□]

MT4W-AA-□□

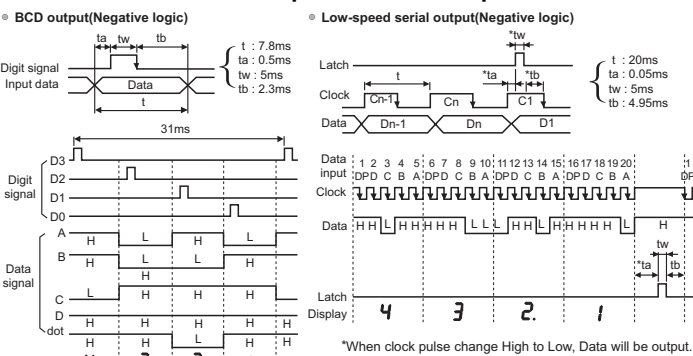
- NPN Open Collector output+Low speed serial output[MT4W-□□-□□]

NPN Open Collector output+BCD output[MT4W-□□-□□]

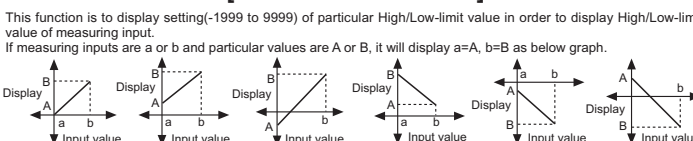
- NPN open collector output+Low speed serial output[MT4W-□□-□□]
- NPN open collector output+BCD output[MT4W-□□-□□]
- NPN open collector output+RS485 output[MT4W-□□-□□]
- NPN open collector output+Current output[MT4W-□□-□□]
- NPN open collector output+BCD output[MT4W-□□-□□]
- NPN open collector output+RS485 output[MT4W-□□-□□]

※ 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



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



Error display function

Display	Description
HHH	Flashes when measured input is exceeded the max. allowable input (110%)
LLL	Flashes when measured input is exceeded the min. allowable input (-10%)
H-H	Flashes when display input is exceeded H-SC setting value
L-L	Flashes when display input is exceeded L-SC setting value
F-H	Flashes when input frequency is exceeded the max. display value of measuring range
0uE	Flashes when it exceeds zero range (± 99)

※ Error display is released automatically when it is in the measuring and display range.
※ "LLL" is displayed when the measured input is exceeded the min. allowable input (-10%).
※ After flashing "uE" 2 times when it exceeds the zero range, it returns to RUN mode.

The above specifications are subject to change without notice.

Specifications

Model	MT4W-□□-□□	MT4W-□□-□□
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	
	-10°C to 50°C ≈ DC/AC Type: F.S.±0.5% rdg±3digit	
Input	VDC/Current, VAC/Current, AC Frequency	
Max. input	110% for input spec.	
A/D conversion method	Practical over sampling using successive approximation ADC.	
Sampling cycle	50ms(DC), 16.6ms(AC 60Hz)	
Max. indication range	1/12,000	
Max. indication digit	-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, Transmission method: 2-wires half duplex, Transmission code: ASCII Code(8Bit), Tuning method: 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 measuring function	Selectable RMS or AVG	
Frequency measuring function	Measurement range: 0.100 to 9999Hz(Differ according to decimal point position)	
Hold function	Includes(Outer hold function)	
Environment	Ambient temperature: -10 to 50°C, Storage: -20 to 60°C	
Insulation type	35 to 85%RH, Storage: 35 to 85%RH	
Approval	CE, RoHS	CE
Weight	Approx. 211g	

※ "1" "□" Mark indicated that equipment protected throughout by double insulation or reinforced insulation.
※ Environment resistance is rated at no freezing or condensation.

Specification of measured input and range

Type	Measuring input and range	Input impedance	Standard [5end]	Prescale [5CAL]
DC Volt	0-500V [500u]	4.33315MΩ	0.0 to 500.0(Fixed)	Display range [Variable]
	0-100V [100u]	4.33315MΩ	0.0 to 100.0(Fixed)	
	0-50V [50u]	433.15kΩ	0.0 to 50.0(Fixed)	
	0-10V [10u]	43.15kΩ	0.0 to 10.0(Fixed)	
	0-5V [5u]	4.315kΩ	0.0 to 5.0(Fixed)	
	0-1V [1u]	43.15kΩ	0.0 to 1.0(Fixed)	
	0-250mV [25u]	2.15kΩ	0.0 to 250.0(Fixed)	-1999 to 9999(Variable)
	0-50mV [5u]	2.15kΩ	0.0 to 50.0(Fixed)	-199.9 to 99.9(Variable)
	0-5A [5A]	0.01Ω	0.000 to 5.000(Fixed)	-199.9 to 99.9(Variable)
	0-2A [2A]	0.01Ω	0.000 to 2.000(Fixed)	-19.99 to 9.99(Variable)
	0-500mA [0.5A]	0.1Ω	0.0 to 500.0(Fixed)	(Display point will be different according to decimal point position.)
	DC Ampere	0-200mA [0.2A]	0.1Ω	0.0 to 200.0(Fixed)
AC Volt	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]	1.087MΩ	0.0 to 440.0(Fixed)	
	0-50V [50u]	1.087MΩ	0.0 to 50.0(Fixed)	
	0-20V [20u]	200kΩ	0.0 to 20.0(Fixed)	
	0-10V [10u]	200kΩ	0.0 to 10.0(Fixed)	
	0-2V [2u]	20kΩ	0.0 to 2.0(Fixed)	
	0-1V [1u]	20kΩ	0.0 to 1.0(Fixed)	
	0-5A [5A]	0.01Ω	0.000 to 5.000(Fixed)	
	0-2.5A [2.5A]	0.01Ω	0.000 to 2.500(Fixed)	
	0-1A [1A]	0.05Ω	0.000 to 1.000(Fixed)	
	DC Ampere	0-500mA [0.5A]	0.1Ω	0.0 to 500.0(Fixed)
	0-250mA [0.25A]	0.1Ω	0.0 to 250.0(Fixed)	
	0-100mA [0.1A]	0.5Ω	0.0 to 100.0(Fixed)	
	0-50mA [0.05A]	0.5Ω	0.0 to 50.0(Fixed)	

※ Please connect proper terminal with max. input voltage is in 30 to 100% of the input voltage. When it is bigger than input voltage, it cause the terminal breakdown and over-range indication. The accuracy is decreased when it is connected to the terminal under 30%.

Display cycle delay function [PA 2: d15t 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 d15t 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 function for Peak display value [PA 0: HPEE/LPEE mode, PA 2: PEE mode]

It is to observe Max./Min. value of display value by current display value and then display the data in HPEE mode and LPEE mode of parameter 0. Set delay time(0 to 30sec.) in PEE mode of parameter 2 in order to prevent malfunction caused by initial over current or over voltage, when it monitor the peak value. Delay time is 0 to 30sec. and it will monitor the peak value after setting time. If press [PEE] key at HPEE and LPEE mode of parameter 0, monitoring data will be initialized.
※ Monitoring function is not indicated when set the PEE mode of parameter 2 as "0".

Current output(DC4-20mA) Scale adjusting function [PA 2: F5-H / F5-L mode]

It set current output for preset indication value at the current output DC4-20mA. It set output indication value for 4mA and 20mA. Min. setting range from F5-H(F5-H) and F5-L(F5-L) is 10% F.S. (When it set as under 10% F.S., it changed as over 10% F.S. automatically). Preset indication value is outputted fixedly as 4mA at under F5-L and 20mA at over F5-H.

Correction function [PA1: 1nbH / 1nbL mode]

This function is for correcting display value error of measuring input.
1nbL: Adjust for deviation of Low value.
1nbH: 5000 to 1000(Correct gradient of High value)
Display value = (Measuring value × 1nbH) ÷ 1nbL
Ex) When the user desires measuring input specification is 0 to 500V and display value is 0 to 500.0, it is able to remove the offset of Low display value to set -12 (Offset correcting value) in 1nbL. (When Low display value is "□□.1.2" in 0V input)
※ The offset correction range of 1nbL is within -99 to +99 for "D", "d" digit regardless of decimal point. Display value for measuring input(500V) is decided by offset adjustment of low value. In case display value is "501.0" display value will be 500.0 by adjusting the gradient of high display value if 0.998 of correcting value is set in 1nbH by calculating 500.0 / 501.1 (Target display value / Current display value)

Gradient correction function [PA1: 1nbH mode]

This function is to correct a gradient of prescale value and display value. (Picture 1) Display value Y can be used as a β times against X input value by correction function [1nbH]. 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: 200mVDC, Display: 3.000 for MT4W-DV type
※ Select 0-1VDC(1V) for measuring input in Parameter 1.
※ Standard specification in 0-1VDC and 1.000 therefore it has to be 15.000 (IN-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 1nbH × H-SC = 15.000

Preset output Mode[PA 2: 0uEt mode]

Mode	Output operation	Operation
HSEt	Hysteresis	H: Hysteresis
oFF	No output	No output
LSt	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	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.	
HLSt	LO output is ON when it is smaller or same with Low set value. HI output is ON when it is bigger or same with High set value. GO output is ON when it is bigger than Low set value, smaller than High set.	
HHSt	LO output is ON when it is bigger or same with Low set value. HI output is ON when it is bigger or same with High set value. GO output is ON when it is smaller than Low set, High set value.	
LLSt	LO output is ON when it is smaller with Low set value. HI output is ON when it is smaller or same with High set value. GO output is ON when it is bigger than Low set, High set value.	
LdSt	It is operated same with LSt but LO output does not operated under initial Low set value. It is ON from under next Low set value. If this is higher than Low set value, GO output will be ON.	

※ HSEt will be displayed from the setting of output operation mode, when user set "oFF", HSEt, LSEt does not displayed.

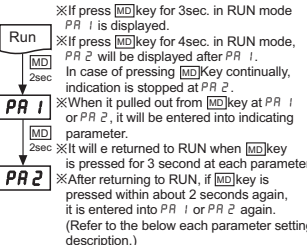
Startup compensation timer function [PA 2: 5tA.t mode]

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 applied.
Setting range: 00.0 to 99.9 (Unit: sec.), Factory default: 00.0

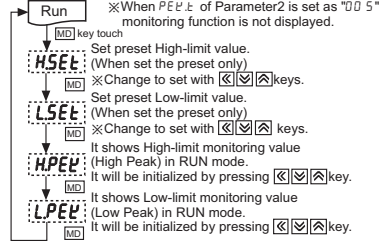
Parameter

Parameter	Display	Function	Note	
PA 1 (Parameter 1)	1n-r	Input type	Selectable RMS/AVG in AC type Available AC type only.	
	1n-r	Input range	Selection of input range	
	dISP	Display	Selection of indication type	Selectable 5end / SCAL / FrEQ
	5end	Standard	Standard scale range	Display Max. display value of 5end
	FrEQ	Frequency	Frequency display	Available AC type only.
	SCAL	Scale	Scale range	These mode indicates at SCAL
	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 Dot position	Display only SCAL/FREQ and set decimal point position
	1nbH	input bias high	Compensate High-limit value of display value	5end/SCAL Correction range 0.100 to 5.000 FrEQ Correction range 0.100 to 9.999
	1nbL	input bias low	Compensate Low-limit value of display value	Set range: -99 to +99
	1nbE	input bias exponent	Set indication index of frequency mode	Set range: 10 ⁻² / 10 ⁻¹ / 10 ⁰ / 10 ¹
PA 2 (Parameter 2)	oUte	Out type	Set operation mode of preset output Selectable oFF / L5t / H5t / LH5t / HH5t / LL5t / Ld5t	
	HYS	Hysteresis	Set hysteresis value	Setting range 1 to 10% F.S.
	5tA.t	Startup compensation time	Set startup compensation time.	Setting range is 00 to 99.9sec.
	PEE	Peak time	Set monitoring delay time for peak value(sec)	Setting range: 00sec to 30sec
	d15t	Display time	Set sampling time(sec.)	Variable by 0.1sec unit of 0.1 to 5.0sec
	ErO	Zero key	Set usage of front side zero adjustment key	0: No use front side zero adjustment key 9: Usage of front side zero adjustment key
	Eu in	Event Input	Set external terminal(6, 7) function	Hold terminal: Use external terminal as Hold terminal ErO: 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.
	F5-L	Full scale Low	Set the lower value output point or PV output	Max. set range: Max. F5-H 10%
	AdS	Address	Set communication address	Set range: 01 to 99
	bPS	Bit per second	Set baudrate(bps)	Selectable 1200/2400/4800/9600
	LoC	Lock	Set lock function	Selectable oFF / LoC1 / LoC2 / LoC3
PA 0 (Parameter 0)	HSEt	High set	Set High setting value	
	LSEt	Low set	Set Low setting value	
	HPEE	High peak	Max. value by data monitoring	
	LPEE	Low peak	Min. value by data monitoring	

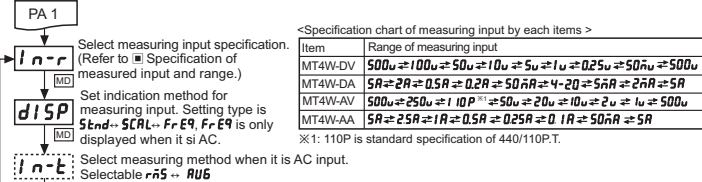
Parameter setting



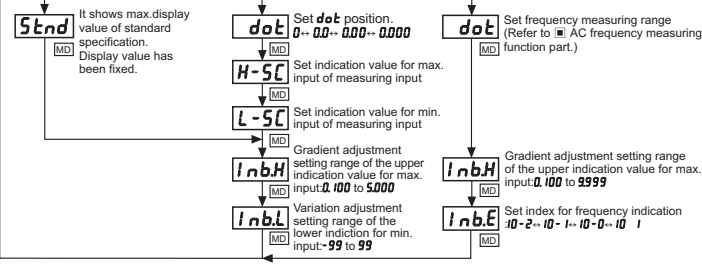
Parameter 0



Parameter 1



Parameter 2



Change the parameter setting value

- Press [M] key continuously in RUN mode, then release the [M] key at the parameter you want. (See "Parameter setting")
- Press [M] key at the parameter in order to change the mode of parameter. (See "Parameter")
- Current setting value and mode in parameter are flickered repeatedly.
Ex) $1n-r \rightarrow 500u$
It shows that current measuring input is 500V.
- When the current setting value and mode are flickered, if press [M] key, only the current setting value is flickered.
Ex) $1n-r \rightarrow 500u \rightarrow 500u$
It shows that setting value is changeable as flickering it.
- When the setting value is flickered, change the setting value by using [M] or [M] key.
Ex) $1n-r \rightarrow 500u \rightarrow 500u$
It shows how to change the measuring input of AC type.
- When confirming the setting value with [M] key, the changed setting value flickers 2 times and enters into next setting.
- It returns RUN mode from parameter by pressing [M] key for 3sec.

Caution for using

- Allowable installation environment
 - If shall be used indoor
 - Altitude Max. 2000m
 - Installation Category II.
 - Please use the terminal(M3.5, Max. 7.2mm) when connecting the AC power supply.
 - Please use separate 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 "HHH" or "LLL" are 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 is occurred by power relay, magnet SW and high frequency equipment are operated in same line or surge is occurred by spark of high voltage or thunder etc.
 - Input line: Shield wire must be used when the measuring input line is getting longer in the place occurring lots of noise.
- ※ It may cause malfunction if above instructions are not followed.

Major products

<ul style="list-style-type: none"> Proximity sensors Area sensors Door/Door side sensors Counters Rotary encoders Power controllers Panel meters Temperature controllers Temperature/Humidity transducers Stepping motors/drivers/motion controllers Laser marking system(CO₂, Nd:YAG) Laser welding/soldering system 	<ul style="list-style-type: none"> Photoelectric sensors Fiber optic sensors Pressure sensors Timers Display units Sensor controllers Graphic/LOGIC panels Tachometer/Pulse(Rate) meters
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