PANEL METER MT4W SERIES

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

Caution for your safety

XPlease keep these instructions and review them before using this unit.

XPlease observe the cautions that follow

Marning Serious injury may result if instructions are not followed

⚠ Caution Product may be damaged, or injury may result if instructions are not followed. XThe following is an explanation of the symbols used in the operation manual.

 Δ caution: Injury or danger may occur under special conditions.

⚠ Warning

- 1. In case of using this unit with machinery(Ex: nuclear power control, medical equpment, ship, vehicle, train, airplane, combustion apparatus, safety device, crime/disaster prevention equipment, etc) which may cause damages to human life or property, it is required to install fail-safe device. It may cause a fire, human injury or damage to property.

 2. It must be mounted on the Panel. It may cause electric shock.

 3. Do not connect terminals when it is power on. It may cause electric shock.

 4. Do not disassemble and modify this unit. Please contact us if it is required. It may cause electric shock or a fire.

 5. Please check the number of terminal when connect power line or measured input. It may cause a fire.

⚠ Caution

- 1. 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, dirty, frost, sunlight, condensation, etc.)

 2. 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.

 3. Please observe the rated specification.
 It might shorten the life cycle of the product and cause a fire.
 4. 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.
 5. 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.
 6. Do not use this unit at place where there are flammable or explosive gas, humidity, direct ray the sun, radiant heat, vibration, impact etc.

 It may cause explosion.

- It may cause explosion.

 7. Do not inflow dust or wire dregs into inside of this unit.
- It may cause a fire or mechanical trouble.

 8. Please connect properly after checking the polarity of measurement terminals. It may cause a fire or explosion.

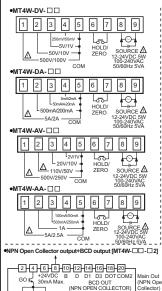
Front panel identification



 I HI: High output indication of preset
 2 GO: GO output indication of preset
 3 LO: Low output indication of preset 4 MODE Key: Mode Key
5 🔘 🔄 Control key

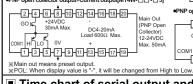
Panel cut-out Min. 116 Min. 52.0 92 +0.8

Terminal connection

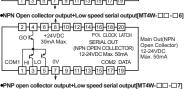


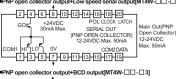
2 4 6 8 10 12 14 16 18 20 60 1 30mA Max. NPN OFEN COLLECTOR) 12 24 VDC Max. 50mA 12 24 VDC Max. 50mA 10 0 0 2 POL 1 3 5 7 9 111 13 15 17 19 output+RS485 output [MT4W- 🗆 - 🗆 8]

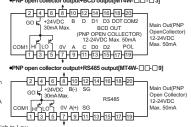




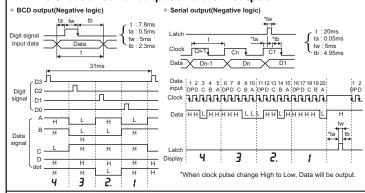
PRelay output+Current output[MT4W-□□-□0] MAIN OUT CONTACT OUT-250VAC 3A 1a RESISTIVE LOAD DC4-20mA RESISTIVE LOAD DO5000 Max. 10 11 12 13 14 15 GO LO COM Relay output[MT4W- 🗆 🗆 - 🗆 1] 10 11 12 13 14 15 HI GO LO NPN open collector output+Current output[MT4W-□□-□4] -2 4 6 8 10 12 14 16 18 20 GO +24VDC 30mA Max. DC4-20mA Load 600Ω Max.





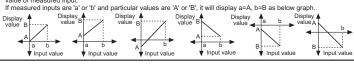


■ Time chart of serial output and BCD output



■ Prescale function[PA1 : H-5[/L-5[]

This function is to display setting(-1999 to 9999) of particular High/Low-limit value in order to display High/Low-limit



Error display function

Display	Description				
нннн	Flashes when measurement input is exceeded the max.allowable input (110%)				
LLLL	Flashes when measuremnet input is exceeded the min.allowable input (-10%)				
d-HH	Flashes when display input is exceeded H-5C set value Flashes when display input is exceeded L-5C set value				
d-LL					
F-HH	Flashes when input frequency is exceeded the max. display value of measured range				
□ u E r Flashes when it exceeds zero range (±99)					
*The above specifications are subject to change without notice.					

※Error display is released automatically whe it is in the measured and display range.
※LLLL' is displayed when the measured input is 4-20mA.

After flashing 'buEr' 2 times when it exceet the zero range, it returns to RUN mode.

■ Specifications					
Model		MT4W-□□-4□	MT4W-□□-1□		
Power supply		100-240VAC 50/60Hz(90 to 110% of rated voltage)	12-24VDC(90 to 110% of rated voltage)		
Power co	nsumption	5VA	5W		
Display r	nethod	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		DC Voltage/Current, AC Voltage/Current, AC Fr	equency		
Max. allo	wable input	110% for each measured input range			
A/D conve	ersion method	Practical over sampling using successive approximation ADC.			
Sampling	g cycle	50ms(DC), 16.6ms(AC 60Hz)			
Max. indication range		-1999 to 9999(4Digit)			
Preset output		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)		■ RS485 communication output ≠ Baud rate:1200/2400/4800/9600, Communication method: 2-wire half duplex, Synchronous: Asynchronous method, Protocol: Modbus type ■ SerialBCD output ≠ NPN Open collector cutput, 12-24VDC Max. 50mA(Resistive load) ■ 4-20mAoutput ≠ Resolution: 1:2000 division(Load resistance max. 600Ω), Response time:Max. 450ms			
AC measu	rement 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)			
Environ -ment	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		CG .W.	(6		

Environment resistance is rated at no freezing or condensation

■ Specification of measured input and range [PA 1:/ n-r]

Type	Measured input and range		Input impedance	Display range [5 £nd]	Prescale Display range[SCAL]
DC Volt	0-500V	[5000]	4.33315ΜΩ	0.0 to 500.0(Fixed)	
	0-100V	[100]	4.33315ΜΩ	0.0 to 100.0(Fixed)	
	0-50V	[500]	433.15kΩ	0 to 50.00(Fixed)]
	0-10V	[100]	433.15kΩ	0.00 to 10.00(Fixed)]
	0-5V	[Su]	43.15kΩ	0.00 to 5.000(Fixed)	dot Display range
	0-1V	[[u]	43.15kΩ	0.000 to 1.000(Fixed)	□ -1999 to 9999
	0-250mV	[0.25u]	2.15kΩ	0.00 to 250.00(Fixed)	□.□ -199.9 to 999.9
	0-50mV	[50ñu]	2.15kΩ	0.00 to 50.00(Fixed)	0.00 -19.99 to 99.99
	0-5A	[SA]	0.01Ω	0.000 to 5.000(Fixed)	0.000 -1.999 to 9.999
	0-2A	[2 <i>R</i>]	0.01Ω	0.000 to 2.000(Fixed)	(Display range is variable according
	0-500mA	[0.5A]	0.1Ω	0.0 to 500.0(Fixed)	to decimal point position.)
DC	0-200mA	[0.2A]	0.1Ω	0.00 to 200.0(Fixed)]
Ampere	0-50mA	[50AA]	1.0Ω	0.00 to 50.00(Fixed)	
	4-20mA	[4-20]	1.0Ω	00.00 to 20.00(Fixed)	l
	0-5mA	[SñA]	10.0Ω	0.000 to 5.000(Fixed)	×Please wire the proper terminal it its
	0-2mA	[2ñA]	10.0Ω	0.000 to 2.000(Fixed)	max. input within 30 to 100% of the
	0-500V	[5000]	4.987ΜΩ	0.0 to 500.0(Fixed)	input terminal. When it is higher than input, it may cause terminal breakdown
	0-250V	[250]	4.987MΩ	0.0 to 250.0(Fixed)	and over display range. The accuracy
	0-110V	[110P]	1.087MΩ	0.0 to 440.0(Fixed)	is decreased when it is connected
AC Volt	0-50V	[50v]	1.087MΩ	0.00 to 50.00(Fixed)	to the terminal under 30%.
AC VOIL	0-20V	[200]	200kΩ	0.00 to 20.00(Fixed)	
	0-10V	[100]	200kΩ	0.00 to 10.00(Fixed)	
	0-2V	[20]	20kΩ	0.000 to 2.000(Fixed)	
	0-1V	[/u]	20kΩ	0.000 to 1.000(Fixed)	
	0-5A	[SA]	0.01Ω	0.000 to 5.000(Fixed)	×110P is standard specification
AC	0-2.5A	[2.5A]	0.01Ω	0.000 to 2.500(Fixed)	440V/110VAC P.T.
	0-1A	[IR]	0.05Ω	0.000 to 1.000(Fixed)	
Ampere	0-500mA	[0.5A]	0.1Ω	0.0 to 500.0(Fixed)	
,poro	0-250mA	[0.25A]	0.1Ω	0.00 to 250.0(Fixed)	
	0-100mA	[QIA]	0.5Ω	0.00 to 100.0(Fixed)	
	0-50mA	[50ñA]	0.5Ω	0.00 to 50.0(Fixed)	
Display cycle delay function IPA 2 : 4!5/1					

Display cycle delay function [PA 2 : d / 5.t]

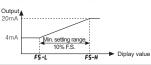
In some applications the measured input may fluctuate which in turn causes the display to fluctuate. By adjusting the display cycle delay function time at $d \mid 5.t$. of parameter 2, the operator can adjust the display time within a range of 0.1 sec to 5 sec.. For example, if the operator sets the 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 ■ Initialization function [PA 0: H.PEL/L.PEL, PA 2: PELLE]

It monitors Max./Min. display value based on the current displays value and then displays the data at #PEL, UFEL of parameter 0. Set the delay time(0 to 30sec), at PEL 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 www key at **HPEL**, **LPEL** of parameter 0, the monitored data is initialized. *Monitoring function is not displayed when the delay time is set as "00 5" at PEEL 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 under F5-L and 20mA at over F5-H.



Error correction function [PA1: I nb.H / I nb.L]

If 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)
Diplay value=(Measured value x1 nb.H) +1 nb.L

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 1 nb.L 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 "50 1.0", calculate 500.0/501.0(the desired display value/ the display value), and set the 0.998 correction value as the 1 nbH to display "500.0" by adjusting the gradient of

imesThe offset correction range of I nb.L is within -99 to for D⁻⁰, D⁻¹ digit regardless of dicimal point.

AC frequency measurement

This function is to initialize parameter as factory difault.

9E5

Press **K**+₩+ **for over 5sec.**

Ini E

function [PA1: d15P]

I THE I THE

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		
*Accuracy of frequency measurement: Below 1kHz, F.S. ± 0.1rdg ± 2digit. From 1kHz to 10kHz, F.S ± 0.3rdg ± 2digit						
@ المام (3.100 to 9.999[Gradient adjustment of high value]						
31 nb.E:10-2, 10-1, 10-0, 10 1[Index adjustment of I nb.H]						

■ Zero adjustment function

It adjusts the indication value of the ontioanl config

(Picture 1)

It adjusts the indication 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 measurement terminal is displayed and the adjusted value is saved at I nbL automatically.

peration	Input correc -tion value	Front side key	Input external signal	
escription escription escription PR 1: Direct input correc -tion value method at I nb.L.		at the at	Short-circuit Hold terminal of external No. 6, 7 over min. 50m.	
Refer to description [Error correction function],				

. 3 description [■ Error correction function], [■ Error display function] and [■ Parameter 2] for function and error.

■ Gradient correction function [PA1 : I ¬b.H] Diplay value 15.000

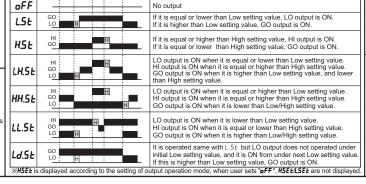
It corrects the gradient of prescale value and display value. (Picture 1) Display value Y can be used as α, β times against X input value by correction function[*I nbH*] and used as correction function of max. display value(H-SC). Adjustment range is 0.100 to 5.000 and multiply current

Ex)Input:200mVDC, Display:3.000 for MT4W-DV type ①Select 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-5L) for 1VDC(Input) in order to display 3.000 for DC200mV(Input) But it is unable due to setting range is 9,999 (3) In this case, please check below chart Please set as I nb.H×H-SE=15.000

α Υ ····· Oliplay value γ ···· γ ··· γ ·· γ ···	α time β time	5.0	000	Indication value for measured input
Setting method	Setting method H-SC		I nb.H	Note
1	Unavailable	0.000	1.000	-
2	7.500	0.000	2.000	In this case, any
3	5.000	0.000	3.000	setting methods
4	3.750	0.000	4.000	display the same display value.
6	3.000	0.000	5.000	

■ Preset output mode[PA 2 : ⴰⵍⵍⴰఓ]



H: Hysterisis

■ Startup compensation timer function [PA 2: 5 \ B \ L]

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

■ Parameter					
Parameter			Function	Note	
	In-t	Input type	Selectable RMS/AVG in AC type	Available AC type only.	
	In-r	Input range	Selection of input range	-	
	dISP	Display	Selection of display type	Selectable Stnd / SCAL / FrE9	
	Stnd	Standard	Standard scale range	Display Max. display value of 5 bnd	
	Fr E9 Frequency		Frequency display	Available AC type only.	
PA 1	SCAL	Scale	Scale range	These are displayed at SCRL .	
(Para-	H-5[High scale	Set max. value of display range	It sets max. display value/	
meter 1)	L-5C	Low scale	Set min. value of display range	min. display value(-1999 to 9999)	
	dot Dot		Set decimal point position	It is dispayed at 5ERL /FrE9only and se the decimal point position	
	I nb.H Input bias high		Correct High-limit value of display value	Stnd/SCRL :Correction range 0.100 to 5.000 Fr E9 :Correction range 0.100 to 9.999	
	I nb.L	Input bias low	Correct Low-limit value of display value	Set range : -99 to +99	
	Inb.E	Input bias exponent	Set display index of frequency mode	Set range: 10 ⁻² / 10 ⁻¹ / 10 ⁰ / 10 ¹	
	l	Out type	Set operation mode of preset output	Selectable of F / L.SE / H.SE / L.H.SE / H.H.SE / L.L.SE / L.d.SE	
		Hysteresis	Set hysteresis value	Set range : 1 to 10% F.S.	
	5E R.E Startup compensation time		Set startup compensation time.	Set range: 00 to 99.9sec.	
		Peak time	Set monitoring delay time for peak value(sec)	Set range : 00sec to 30sec	
PA 2	d15.E	Display time	Set sampling time(sec.)	0.1 to 5.0 sec.(Variable by 0.1sec.)	
(Para- meter 2)	EEro	Zero Key	Set usage of front side zero adjustment key	no: Not use front side zero adjustment key 9E5: Use front side zero adjustment key	
meter 2)	Eu In Event Input		Set external terminal(6, 7) function	HoL d: Use external terminal as Hold terminal = Er 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.	
	F5-L	Full scale Low	Set the lower value output point or PV output	Max. set range: Max. F5-H 10%	
		Address	Set communication address	Set range:01 to 99	
		Bit per second	Set baudrate(bps)	Selectable 1200/2400/4800/9600	
	LoC		Set lock function	Selectable of f/Lo[1/Lo[2/Lo[3	
	HSEL High set		Set High setting value	Setting range can be set within the display range of 5 <i>End</i> / 5CRL	
PA 0 (Para-	L.SEL Low set		Set Low setting value		
meter 0)		High peak	Max. value by data monitoring	Initializes the monitored data value by pressing	
	LPEL	Low peak	Min. value by data monitoring	any one of 🔇 🖾 🙈 keys.	
Parameter setting Parameter 0					

Parameter setting



(Filtray key is not entered for 60 sec. in each parameter, it returns to RUN mode.

After returning to RUN mode, press PODE key within 2 sec., it returns to previous parameter. (Refer to the below descriptions of each parameter group.) PA-0 group cannot be entered when preset output mode of [PR2] group is

Run %IFPELL of Parameter2 is set as "00 5",

#PEL and LPEL are not displayed.

Change the parameter

. 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 **(**€, **(**€), **(**€) keys in

display mode, the saved setting value is displayed.

EX

Setting

Value

Change the setting value by

or

key
when setting value flashes.

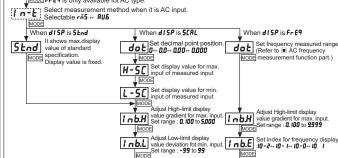
key

Ex) Change AC type measured input from 250V to 125V. Setting Setting Value Press one 250J 125J

When confitming the setting value with MODE key, the changed setting value flashes twice and enters into the next setting.

setting value

Parameter 1 MODE key 3sec.



Parameter 2 RUN MODE key 5sec

Select Preset output mode.

Selectable:

Selectable:

MODE Refer to " Preset output mode"

H**y5** Set preset hysteresis. within 10% of F.S. But, it is not displayed when a U.E.E mode is a FF

Set startup compensation time. Set range : 00 to 99.9sec. Set monitoring delay time. Set range : 00 to 30sec. **d15.b** Set display period and also variable sets by 0.1sec. within 0.1 to 5.0sec.

Enable zero point adjustment by front key operation to select 95.5.

Select either Hold input by No. 6, 7 terminal or zero point adjustment by No. 6, 7 terminal or zero point setting by external signal.

Select either Hold input by No. 6, 7 terminal or zero point setting by external signal.

MODE 95.6 or 25.00 point adjustment by hold terminal.

Set high-limit value for DC 20mA output position of PV putput.

When changing input range and prescale mode, the setting values of 5.5 + 1, 5.5 - 1 are changed automatically as max and min. value of input range.

F5-L Set low-limit value for 4mA output position of PV output. Rdr5 Set address of RS485 communication output Set range: 01 to 99

Select baud rate of RS485 communication output Selectable 9600 ↔ 4800 ↔ 2400 ↔ 1200.

MODE of F No key lock function Loc2 Parameter 1, 2 lock
Loc1 Parameter 1 lock Loc3 Parameter 0, 1, 2 lock Caution for using

User manual for communication

d1 5P

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

It returns RUN mode from param pressing MODE key for 3 sec.

Allowabie installation environment

Off shall be used indoor

Offlothing used indoor

Offloth

6. Be sure to avoid using this unit near by machinery making strong high frequency noise.

6. 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.)

7. When input applied, if "HHHH" or "LLLL" are displayed, it has some trouble with measuring input, please check the line after power off.

8. 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 S.W and high frequency equipment are operated in same line or surge equipment are operated in same line or surge occurs by spark of high voltage or thunder Using Single shield wire Using Double shield wire HI D.P.M. etc.
Input line:Shield wire must be used wher
the measured input line is getting longer
in the place occurring lots of noise. Vin + D.P.M.

XIt may cause malfunction if above instructions are not foll

■ Major products

■ Proximity sensors
■ Area sensors
■ Door/Door side sensors
■ Counters
■ Pressure sensors
■ Time: Rotary encoders

■ Display units Sensor controllers Power controllers

Power controllers
Panel meters
Temperature controllers
Temperature/Humidity transducers
Stepping motors/drivers/motion controllers
Laser marking system(Coz, Nd:'YAG)
Laser welding/soldering system

Autonics Corporation Satisfiable Partner For Factory Automation

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and development : product@autonics.com

The proposal of a product improvement

EP-KE-77-0009K