

Autonics PANEL METER MT4W SERIES

M A N U A L



It indicates an upgraded part.

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.

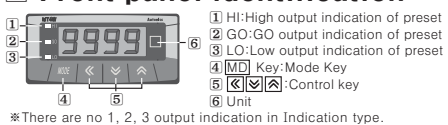
Warning

- In case of using this unit with machineries (Nuclear power control, medical equipment, vehicle, train, airplane, combustion apparatus, entertainment or safety device etc.), it requires installing fail-safe device, or contact us for information on type required. It may result in serious damage, fire or human injury.
- 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

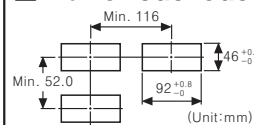
- This unit shall not be used outdoors. It might shorten the life cycle of the product or give an electric shock.
- When wire connection, No.20AWG(0.50mm²) should be used and screw bolt on terminal block with 0.74N·m to 0.90N·m strength. It may result in malfunction or fire due to contact failure.
- 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 an 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. It may cause explosion.
- Do not inflow dust or wire dregs 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

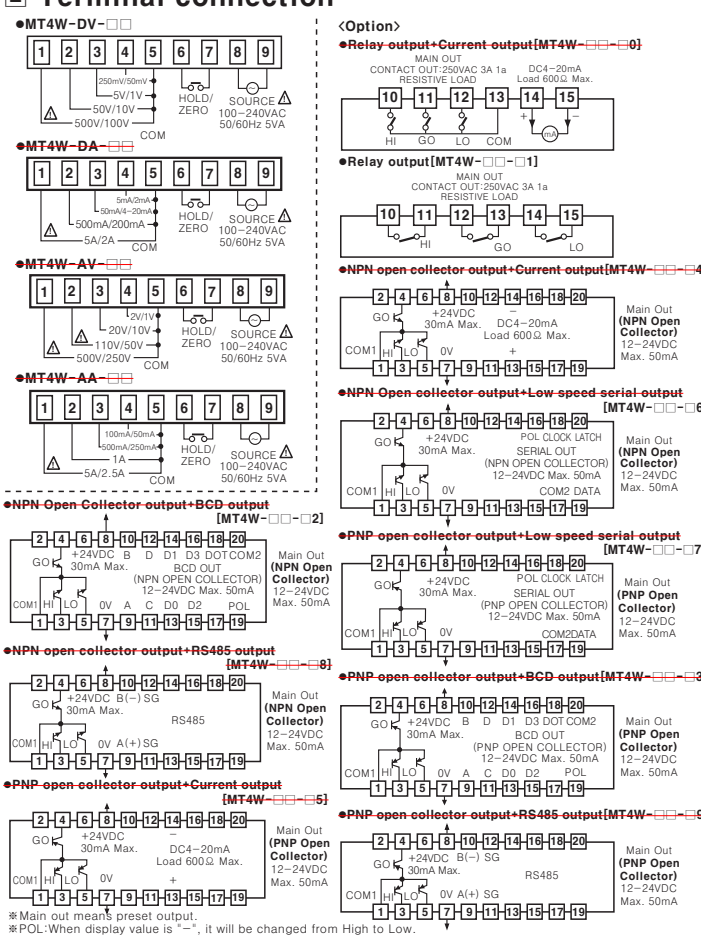


*There are no 1, 2, 3 output indication in Indication type.

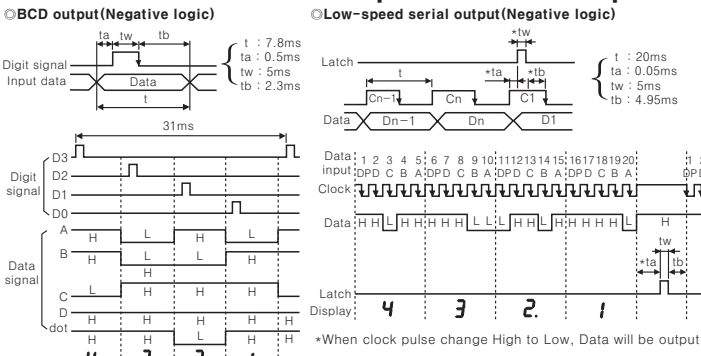
Panel cut-out



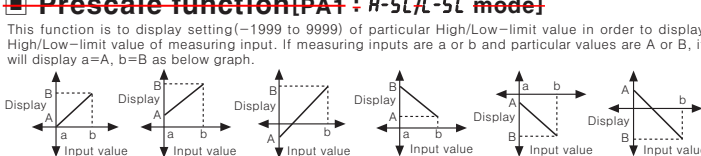
Terminal connection



Time chart of serial output and BCD output



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



Error display function

Display	Description	Remarks
HHHH	Measuring input exceeds available max. input range: 110% F · S	*LLLL-Indication is only for 4-20mA input terminal of MT4W-DA model.
LLLL	Measuring input exceeds available min. input range: 10% F · S	
d-LL	Indication value for measuring input exceeds max. indication range: 9999	*Zero point adjusting error is returning to measuring mode after "overE" is flickering 2 times.
F-LL	Indication value for measuring input exceeds max. indication range: 1999	
d-HH	Indication value for measuring frequency exceeds max. measuring range: 9999	*Refer to "Measuring AC frequency function" for frequency measuring range.
ovEr	Exceeds zero adjusting range: 99	

*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)	±2-24VDC(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~50°C DC/AC Type: F.S.±0.5% rdg±3digit	
Input	VDC/Current, VAG/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 ~ 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, Transmission method: 2wires half duplex, Transmission code: ASCII Code(8Bit), Tuning method: Sub-synchronization, Protocol: Modbus-type *Serial/BCD output: NPN Open collector output: 12-24VDC Max. 50mA(Resistive load) *4-20mA output: Resolution: 8000 division(Load resistance max. 600Ω), Response time: Max. 450ms	
AC measuring function	Selectable RMS or AVG	
Frequency measuring function	Measurement range: 0.100~9999Hz(Differ according to decimal point position)	
Hold function	Includes(Outer hold function)	
Ambient temperature	-10~50°C(at non-freezing status)	
Storage temperature	-20~60°C(at non-freezing status)	
Ambient humidity	35~85%RH	
Insulation type(*1)	□	
Approval	CE, RoHS	
Weight	Approx. 211g	

*(*1) □ Mark indicated that equipment protected throughout by double insulation or reinforced insulation.

Specification and range

Type	Measuring input and range	Input impedance	Standard [5end]	Prescale [SCAL]
DC Volt	0-500V	500Ω	4.33315MΩ	0.0-500.0(Fixed)
	0-100V	100Ω	4.33315MΩ	0.0-100.0(Fixed)
	0-50V	50Ω	433.15kΩ	0-50.00(Fixed)
	0-10V	10Ω	433.15kΩ	0.00-10.00(Fixed)
	0-5V	5Ω	43.15kΩ	0.00-5.000(Fixed)
	0-1V	1Ω	43.15kΩ	0.000-1.000(Fixed)
	0-250mV	0.25Ω	2.15kΩ	0.00-250.0(Fixed)
	0-50mV	50mΩ	2.15kΩ	0.00-50.00(Fixed)
	0-5A	5A	0.01Ω	0.000-5.000(Fixed)
	0-2A	2A	0.01Ω	0.000-2.000(Fixed)
DC Ampere	0-500mA	0.5A	0.4±5%	0.0-500.0(Fixed)
	0-200mA	0.2A	0.4±5%	0.00-200.0(Fixed)
	0-50mA	0.05A	0.4±5%	0.00-50.00(Fixed)
	0-5mA	0.005A	0.4±5%	0.00-5.000(Fixed)
	0-2mA	0.002A	0.4±5%	0.00-2.000(Fixed)
	0-500V	500Ω	4.987MΩ	0.0-500.0(Fixed)
	0-250V	250Ω	4.987MΩ	0.0-250.0(Fixed)
	0-110V	110Ω	1.087MΩ	0.0-110.0(Fixed)
	0-50V	50Ω	1.087MΩ	0.00-50.00(Fixed)
	0-20V	20Ω	200kΩ	0.00-20.00(Fixed)
AC Volt	0-50V	50Ω	1.087MΩ	0.00-50.00(Fixed)
	0-20V	20Ω	200kΩ	0.00-20.00(Fixed)
	0-10V	10Ω	200kΩ	0.00-10.00(Fixed)
	0-2V	2Ω	20kΩ	0.00-2.000(Fixed)
	0-1V	1Ω	20kΩ	0.000-1.000(Fixed)
	0-5A	5A	0.01Ω	0.000-5.000(Fixed)
	0-2.5A	2.5A	0.01Ω	0.000-2.500(Fixed)
	0-1A	1A	0.05Ω	0.000-1.000(Fixed)
	0-500mA	0.5A	0.4±5%	0.0-500.0(Fixed)
	0-250mA	0.25A	0.4±5%	0.00-250.0(Fixed)
AC Ampere	0-500mA	0.5A	0.4±5%	0.0-500.0(Fixed)
	0-250mA	0.25A	0.4±5%	0.00-250.0(Fixed)
	0-100mA	0.1A	0.4±5%	0.00-100.0(Fixed)
	0-50mA	0.05A	0.4±5%	0.00-50.0(Fixed)
	0-20mA	0.02A	0.4±5%	0.00-20.00(Fixed)
	0-10V	10Ω	200kΩ	0.00-10.00(Fixed)
	0-2V	2Ω	20kΩ	0.00-2.000(Fixed)
	0-1V	1Ω	20kΩ	0.000-1.000(Fixed)
	0-5A	5A	0.01Ω	0.000-5.000(Fixed)
	0-2.5A	2.5A	0.01Ω	0.000-2.500(Fixed)

(Display point will be different according to decimal point position.)

*Please connect proper terminal with max. input voltage is in 30-100% of the input voltage. When it is bigger than input voltage, it causes 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 : dISk mode]

It is difficult to read as display value follows the measuring input value. Display when the measuring input value is fluctuating. In this case it is able to make display value stable by delaying display cycle. Display cycle displaying time can be changed in dISk mode of Parameter 2. If select 4.0s, the display value is displayed every 4sec. averaging input value for 4sec.

Monitoring function for Peak display value [PA 0 : HPEL/LPEL mode, PA 2 : PEEL mode]

It is to observe Max./Min. value of display value by current display value and then display the data in HPEL mode and LPEL mode of parameter 0. Set delay time (0 to 30sec.) in PEEL 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 0-30sec. and it will monitor the peak value after setting time. If press [H] key at HPEL and LPEL mode of parameter 0, monitoring data will be initialized.

*Monitoring function is not indicated when set the PEk.1 of parameter 2 as "0".

Initialization function

It initializes parameter setting state. When it press [H] key over 5 seconds at the same time in measuring mode, former changed state is canceled and it changes as initial state.

Current output (DC4-20mA) Scale adjusting function [PA2: FS-H / FS-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 between FS-H(FS-H) and FS-L(FS-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 FS-L and 20mA at over FS-H.



Measuring AC frequency function [PA1: dISP mode]

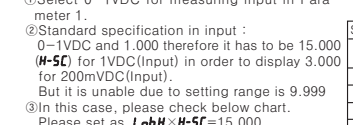
It measures input signal frequency when it is an AC input. It uses fixed decimal point(PA1: dot mode), measuring range can be changed by setting and measuring range of decimal point place is as below. It is available to adjust the upper indication with [PA1: InbH mode] and [PA1: InbL mode]. In order to measure frequency normally, input signal, over 10% F · S of measuring range should be supplied. Please select the proper point of measuring terminal.

Decimal point position	0.000	0.00	0.0	0
Measurement range	0.100~ 9.999Hz	0.10~ 99.99Hz	0.1~ 999.9Hz	1~ 9999Hz

(*) InbH: 0.100~9.999(Inclination adjustment of high value)
(*) InbL: 10~2, 10~1, 10~0, 10~1(Index adjustment of InbH)

Correction function [PA1: InbH / InbL mode]

This function is for correcting display value error of measuring input. InbH: Adjust deviation of Low value. InbL: 5.000 to 0.100(Correct gradient(% of High value) Display value=(Measuring value × InbH) + InbL)
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 InbL. (When Low display value is "12" in 0V input)
The offset correction range of InbL is within -99 to +99 for D⁰. D¹ 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 at InbH by calculating. 500.0/501.1(Target display value/Current display value)



Adjusting zero point function

It adjusts the indication value of the zero point 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 measuring terminal is displayed and the adjusted value is saved in InbL automatically.

Operation	Input correction value	Front side key	Input external signal
PR 1	Direct input correction value	Press [H] key for 3sec.	Short-circuit Hold terminal of external measuring No. 6, 7 over min. 50m.

*Refer to description [Error correction function] and [Parameter 2] for function and error.

Gradient correction function [PA1: InbH mode]

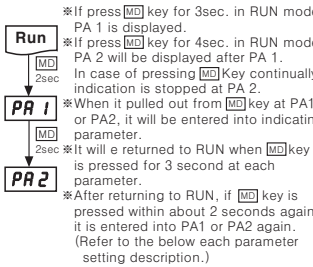
This function is to correct a gradient of prescale value and display value. (Picture 1) Display value Y can be used as α, β times against X input value by correction function InbH. And also can be used as correction function of max. display value(H-SC). Adjustment range is 0.100 to 5.000 and multiply current 200mVDC, Display: 3.000 for MT4W-DV type
① Select 0-1VDC for measuring input in Parameter 1.
② 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 200mVDC(Input). But it is unable due to setting range is 9.999
③ In this case, please check below chart. Please set as InbH · H-SC=15.000

*HSEL will be displayed from the setting of output operation mode, when user set "oFF". HSELSEEL does not displayed.

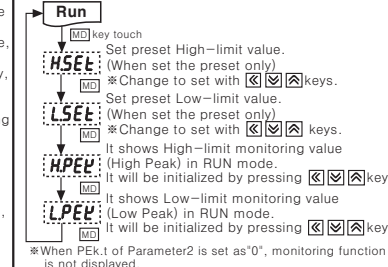
Parameter

Parameter	Display	Function	Note
In-r	Input type	Selectable RMS/AVG in AC type	Available AC type only.
In-r	Input range	Selection of input range	
dISP	Display	Selection of indication type	Selectable 5end / SCAL / FrE9
5end	Standard	Standard scale range	Display Max. display value of 5end
FrE9	Frequency	Frequency display	Available AC type only.
SCAL	Scale	Scale range	These mode indicates at SCAL. It sets max. display value / min. display value (-1999 to 9999)
H-SC	High scale	Set max. value of display range	
L-SC	Low scale	Set min. value of display range	
dot	Dot	Set Dot position	Display only SCAL/FrE9 describe position
InbH	input bias high	Compensate High-limit value of display value	Standard Correction range 0.100~9.999
InbL	input bias low	Compensate Low-limit value of display value	Set range: -99 to +99
InbE	input bias exponent	Set indication index of frequency mode	Set range: 10 ⁻¹ / 10 ⁰ / 10 ¹
oULt	Out type	Set operation mode of preset output	Selectable oFF/LL/SL/HL/SH/ST/LL/SL/Ld/ST
HYS	Hysteresis	Set hysteresis value	Setting range: 1 ~ 10% F · S
PEEL	Peak time	Set monitoring delay time for peak value(sec)	Setting range: 00sec ~ 30sec
dISk	Display time	Set sampling time(sec.)	Variable by 0.1sec unit of 0.1-5.0sec
ZEro	Zero Key	Set usage of front side zero adjustment key	No: Set usage of front side zero adjustment key Yes: Usage of front side zero adjustment key
Eu In	Event Input	Set external terminal(6, 7) function	Hold: Use external terminal as Hold terminal Zero: Use external terminal as zero point adjustment terminal
FS-H	Full scale High	Set the upper value output point or PV output	Min. set range: Min. 10% F · S
FS-L	Full scale Low	Set the lower value output point or PV output	Max. set range: Max. FS-H 10%
Ad-S	Address	Set communication address	Set range: 01-99
bPS	Bit per second	Set baudrate(bps)	Selectable 1200/2400/4800/9600
LoC	Lock	Set lock function	Selectable oFF/Loc1/Loc2/Loc3
HSEL	High set	Set High setting value	Setting range can be set within indication range of 5end/SCAL
LSEL	Low set	Set Low setting value	
HPEL	High peak	Max. value by data monitoring	Return to initial status by pressing [H] key
LPEL	Low peak	Min. value by data monitoring	

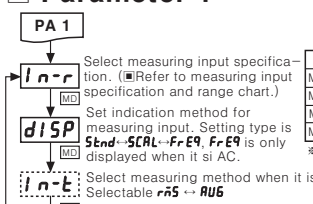
Parameter setting



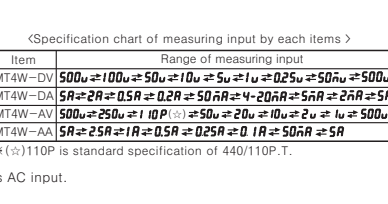
Parameter 0



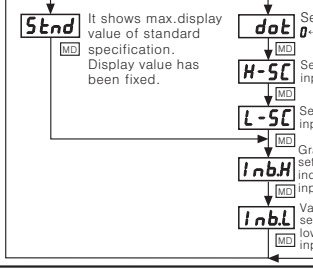
Parameter 1



Parameter 2



Parameter 2

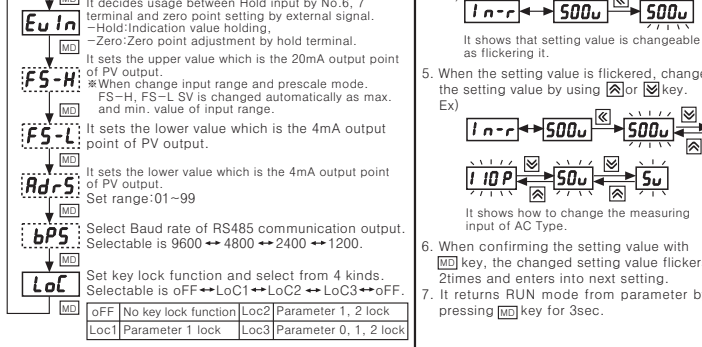


Change the parameter setting value

- Press [H] key continuously in RUN mode, then release the [H] key at the parameter you want. (See "Parameter setting")
- Press [H] 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) [In-r] → [500V]
- When the current setting value and mode are flickered, if press [H] key, only the current setting value is flickered. Ex) [In-r] → [500V] → [500V]
- When the setting value is flickered, change the setting value by using [H] key. Ex) [In-r] → [500V] → [500V]
- When confirming the setting value with [H] key, the changed setting value flickers 2 times and enters into next setting.
- It returns RUN mode from parameter by pressing [H] key for 3sec.

Caution for using

- Allowable installation environment
 - ① It shall be used indoor
 - ② Pollution Degree 2
 - ③ Altitude Max. 2000m
 - ④ Installation Category II.
- Use separate line from high voltage line or power line in order to avoid inductive noise.
- 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 DPM 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 DPM. Therefore, please use noise absorber circuit such as line filter, varistor in external lines when voltage failure is occurred by power relay, magnet S/W and high frequency equipment are operated in same line or surge is occurred by spark of high voltage or the other etc.



Major products

- Proximity sensors
- Area sensors
- Door/Door side sensors
- Rotary encoders
- Switching power supply
- Temperature/ humidity transducers
- Photoelectric sensors
- Fiber optic sensors
- Pressure sensors
- Sensor controllers
- Temperature controllers
- Power control
- Tachometer (Rate) meters
- Indicators
- Counters
- Display units
- Stepping Motors & Drivers & Motion controllers
- Recorders
- Panel meters
- Signal converters
- Timers
- Graphic/Logic panel

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