

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.

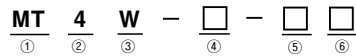
Warning

- 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.
- 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.

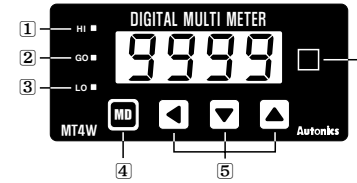
Ordering information



①Series	MT Multi Meter	
②Digit	4 4Digit(9999)	
③Size	W DIN W96 × H48mm	
④Input specification	DV DC Volt	
	DA DC Ampere	
	AV AC Volt	
	AA AC Ampere	
⑤Power supply	4 100-240VAC 50/60Hz	
⑥Output (Main Output + Sub output)	Main output (Comparison value output)	Sub output(Display value output)
	N No output function	X
	1 Relay triple output(HI, GO, LO)	X
	2 NPN open collector triple output	BCD Dynamic output
	3 PNP open collector triple output	BCD Dynamic output
	4 NPN open collector triple output	PV retransmission(4-20mADC) output
	5 PNP open collector triple output	PV retransmission(4-20mADC) output
	6 NPN open collector triple output	Low speed serial output
	7 PNP open collector triple output	Low speed serial output
8 NPN open collector triple output	RS485 communication output	
9 PNP open collector triple output	RS485 communication output	

*The above specification are changeable without notice anytime.

Front panel identification



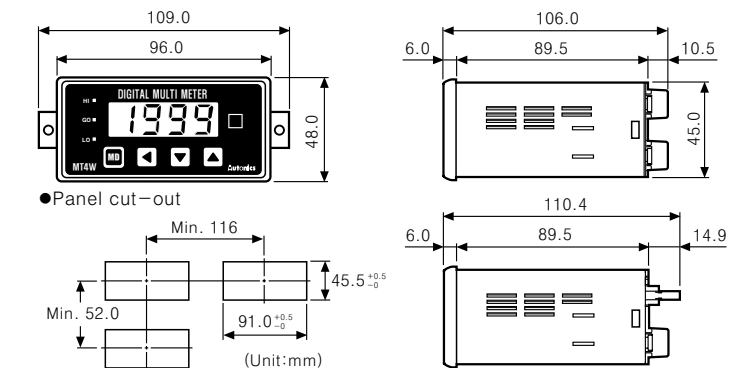
- HI : High output indication of preset
 - GO : GO output indication of preset
 - LO : Low output indication of preset
 - [MD] Key : Mode Key
 - [] Key : Control key
 - Unit
- *There are no 1, 2, 3 output indication in Indication type.

Specifications

Model	MT4W	
Power supply	100-240VAC 50/60Hz(90 to 110% of rated voltage)	
Power consumption	5VA	
Display method	7Segment LED Display(Red)	
Display accuracy	(Note1) DC type:F·S±0.1% Rdg±2digit, 23°C±5°C, AC type:F·S±0.3% Rdg±3digit, 35 to 85%Rh	
Input	VDC/ADC, VAC/AAC	
Max. input	110% for input spec.	
A/D conversion method	Dual slope intergal method	
Sampling cycle	100ms(Resolution 1/12000)	
Max. indication	-1999 to 9999(4digit)	
Preset output	Relay output	• Contact capacity : 250VAC 3A, 30VDC 3A • Relay contact : N.O(1a)
	NPN open collector output PNP open collector output	12-24VDC ±2V 50mA Max. (Resistive load)
Sub output (Trans-mission output)	RS485 communication output	• Baud rate : 1200/2400/4800/9600 bps • Transmission code : ASC II Code(7Bit) • Transmission method : 2wires half duplex • Synchronization method : Start-stop synchronization
	Serial output	NPN open collector output, 12-24VDC Max. 50mA (Resistive load)
	BCD output	Resolution: 8000 division(Load resistance max. 600Ω)
AC measuring method	Selectable RMS or AVG	
Hold function	Outer hold function	
Insulation resistance	Min. 100MΩ(500VDC) between external terminal and case	
Dielectric strength	2000VAC for 1minute between external terminal and case	
Noise	±2kV the square wave noise(pulse width:1μs) by the noise simulator	
Vibration	Mechanical	0.75mm amplitude at frequency of 10 to 55Hz in each of X, Y, Z directions for 1hour
	Malfunction	0.5mm amplitude at frequency of 10 to 55Hz in each of X, Y, Z directions for 2hours
Shock	Mechanical	100m/s ² (10G) in X, Y, Z directions for 3 times
	Malfunction	300m/s ² (30G) in X, Y, Z directions for 3 times
Relay life cycle	Mechanical	Min. 20,000,000 times
	Electrical	Min.100,000 times(250VAC 3A resistive load)
Ambient temperature	-10 to 50°C(at non-freezing status)	
Storage temperature	-20 to 60°C(at non-freezing status)	
Ambient humidity	35 to 85%RH	
Weight	Approx. 211g	

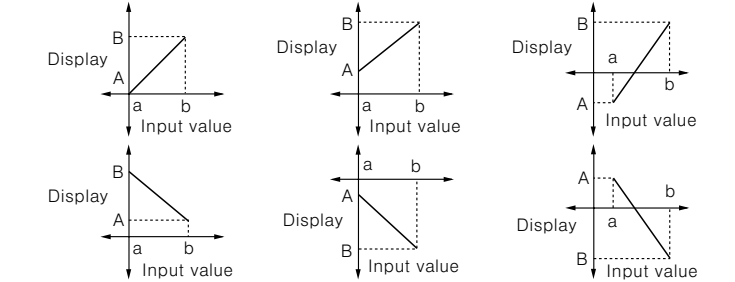
* (Note1)DC/AC type F·S±0.3% Rdg±2digit(0 to 50°C)
DC/AC type F·S±0.5% Rdg±3digit(-10 to 0°C)

Dimensions



Prescale function[PA1 : H-5C/L-5C mode]

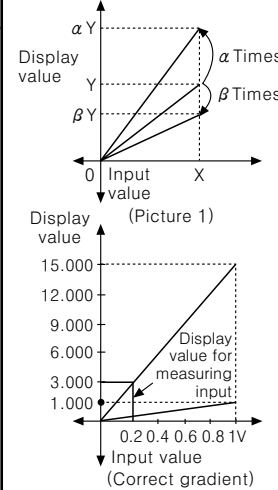
This function is to display setting(-1999 to 9999) of particular High/Low-limit value in order to display High/Low-limit value of measuring input. If measuring inputs are A or B and particular values are A or B, it will display a=A, b=B as below graph.



Gradient correction function

[PA1 : I nbH mode]

This function is to correct a gradient of Prescale value and display value. (Picture 1)Display value Y can be as α, β times against X input value by correction function [I nbH]. And also can be used as correction function of max. display value(H-5C). Adjustment range is 0.100 to 5.000 and multiply current gradient.



- Ex)Input:200mVDC, Display:3.000 for MT4W-DV
- Select 0 to 1VDC for measuring input in Parameter 1.
 - Standard specification in input : 0 to 1VDC and 1.000 therefore it has to be 15.000(H-5C) for 1VDC(Input) in order to display 3.000 for 200mVDC(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-5C=15.000

Setting	H-5C	L-5C	I nbH	Other
①	Disable	0.000	1.000	---
②	7.500	0.000	2.000	It will be the same display value.
③	5.000	0.000	3.000	
④	3.750	0.000	4.000	
⑤	3.000	0.000	5.000	

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

This function is for correcting display value error of measuring input.
I nbL : ±99[Adjust deviation of Low value],
I nbH : 5.000 to 0.100[Correct gradient(%) of High value]
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 I nbL(When Low display value is □□ 1.2 in 0V input)
*The offset correction range of I nbL is for D0⁻⁹, D1⁻¹ digit within -50 to +50 regardless of decimal point. And when High display value is 500.5 against 500V input, the offset correction value will be 5000/5005=0.999.
In this time if you put 0.999 in I nbH, it is able to correct the gradient of High display value. (It does not calculate the decimal point)

Error display function

- HHHH : When measuring input is out of Max. allowable input range.
 - LLLL : When measuring input is out of Min. allowable input range.
 - d-HH : When display value is out of Max. display range(9999), then flickering.
 - d-LL : When display value is out of Max. display range(-1999), then flickering.
- *When HHHH or LLLL displayed, it can not enter into Parameter.
(It is able to enter into parameter within rated measuring range.)

Terminal ordering by output specification

Output terminal	Preset output			Sub output			
	Relay output	NPN open collector output	PNP open collector output	RS485 output	Serial output	BCD output	4-20mA output
Terminal Type	○	○	○	○	○	○	○
20PIN HIROSE	○	○	○	○	○	○	○

*Preset output and Retransmission output are option according to structure of output.

Specification and range

Type	Measuring input and range	Input impedance	Standard [5end] Display range(Fixed)	Prescale [5CAL] Display range(Variable)
DC Volt	0-500V [500V]	5.2MΩ	0 to 500.0(Fixed)	-1999 to 9999 -199.9 to 999.9 -19.99 to 99.99 -1.999 to 9.999
	0-100V [100V]	5.2MΩ	0 to 100.0(Fixed)	
	0-50V [50V]	520kΩ	0 to 50.00(Fixed)	
	0-10V [10V]	520kΩ	0 to 10.00(Fixed)	
	0-5V [5V]	52kΩ	0 to 5.000(Fixed)	
	0-1V [1V]	52kΩ	0 to 1.000(Fixed)	
DC Ampere	0-50mV [0.05V]	10kΩ	0 to 50.00(Fixed)	
	0-5A [5A]	0.01Ω	0 to 5.000(Fixed)	
	0-500mA [0.5A]	0.1Ω	0 to 500.0(Fixed)	
	0-20mA [20mA]	2.5Ω	0 to 20.00(Fixed)	
	4-20mA [4-20]	2.5Ω	0 to 20.00(Fixed)	
	0-2mA [2mA]	25Ω	0 to 2.000(Fixed)	
AC Volt	0-500V [500V]	5.5MΩ	0 to 500.0(Fixed)	(Display point will be different according to decimal point position.)
	0-110V [110V]	1.2MΩ	0 to 440.0(Fixed)	
	0-50V [50V]	550kΩ	0 to 50.00(Fixed)	
AC Ampere	0-5V [5V]	52kΩ	0 to 5.000(Fixed)	
	0-5A [5A]	0.01Ω	0 to 5.000(Fixed)	
	0-1A [1A]	0.05Ω	0 to 1.000(Fixed)	
	0-500mA [0.5A]	0.1Ω	0 to 500.0(Fixed)	
	0-50mA [50mA]	1Ω	0 to 50.00(Fixed)	

Factory specification

Parameter	Mode	MT4W-DV	MT4W-DA	MT4W-AV	MT4W-AA
PA 1 (Parameter 1)	I n-t	---	---	AU5	AU5
	I n-r	500V	5A	500V	5A
	d15P	5end	5end	5end	5end
	5end	500.0	5.000	500.0	5.000
	I nbH	1.000	1.000	1.000	1.000
PA 2 (Parameter 2)	I nbL	0000	0000	0000	0000
	oUt.t	oFF	oFF	oFF	oFF
	HYS	0 1	0 1	0 1	0 1
	PEL.t	0 0	0 0	0 0	0 0
	d15.t	0.2 5	0.2 5	0.2 5	0.2 5
	Rd-rS	0 1	0 1	0 1	0 1
	bPS	9600	9600	9600	9600
	LoC	oFF	oFF	oFF	oFF
PA 0 (Parameter 0)	HSE.t	500.0	5.000	500.0	5.000
	LSE.t	0	0	0	0
	HPE.t	0	0	0	0
	LPE.t	0	0	0	0

*I n-t, oUt.t, HYS, Rd-rS, bPS, HSE.t, LSE.t may be not displayed according to specification.

Preset output mode[PA 2 : oUt.t mode]

Mode	Output operation	Operation
OFF	LO HI	No output
L.St	ON HI OFF LO	If it is equal or smaller than Low set, LO output will be ON. If it is bigger than Low set, GO output will be ON.
H.St	ON OFF HI GO	If it is equal or bigger than High set, HI output will be ON. If it is equal or smaller than High set, GO output will be ON.
LH.St	OFF ON OFF ON	If it is equal or smaller than Low set and equal or bigger than High set, the output will be ON. If it is bigger than Low set and smaller than High set, GO output will be ON.
HH.St	ON OFF HI ON OFF HI ON	If it is equal or bigger than Low set and equal or bigger than High set value, output will be ON. If it is smaller than Low set and High set, GO output will be ON.
Ld.St	ON HI OFF LO	This operation is the same as L.St. But it doesn't operate at initial Low set value, it will operate at next Low set value. If this higher than Low set value, Go output will be ON.

*"H" means hysteresis and able to set 1 to 99 at "HYS" mode in Parameter 2 among above comparison output chart.
*It is only able to set Preset setting range within range of standard type[5end] and L-SC setting range of H-SC/L-SC. It will be changed as display range according to [I nbH], preset setting range is not changed.

Display cycle delay function [PA 2 : d15.t mode]

It is difficult to 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 can be changed in d15.t mode of Parameter 2(Selectable 0.1s/0.2s/0.5s/1.0s/2.0s/4.0s). If select 4.0s, it will be the measuring input value on an average for 4sec., then display it every 5sec.

Monitoring function for Peak display value [PA 0 : HPE.t/LPE.t mode]

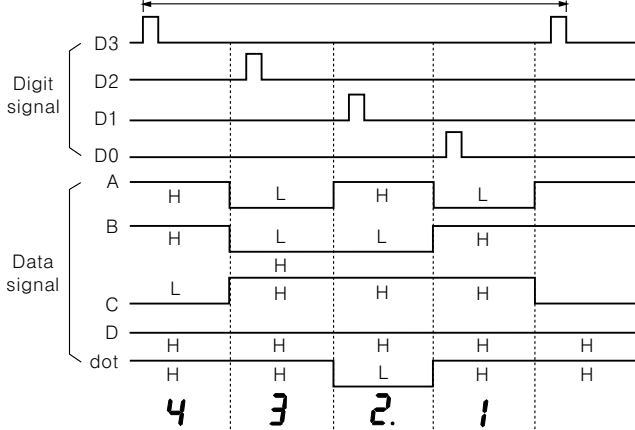
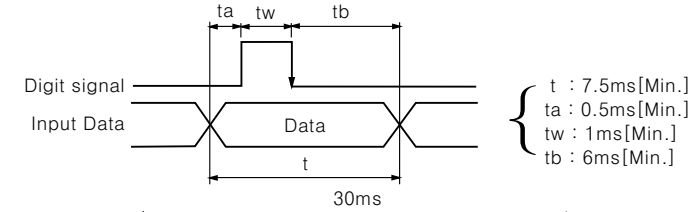
This is to observe Max./Min. value of display value by current display value and then displays in HPE.t mode and LPE.t mode of parameter 0. Set delay time(0 to 30sec.) in PEL.t mode of parameter 2 in order to prevent malfunction caused by initial over current or over voltage, when it monitor the peak value. So it will monitor the value of peak after delay time. If press [] key at HPE.t and LPE.t mode of parameter 0, monitoring data will be initialized.

Retransmission function(Sub output)

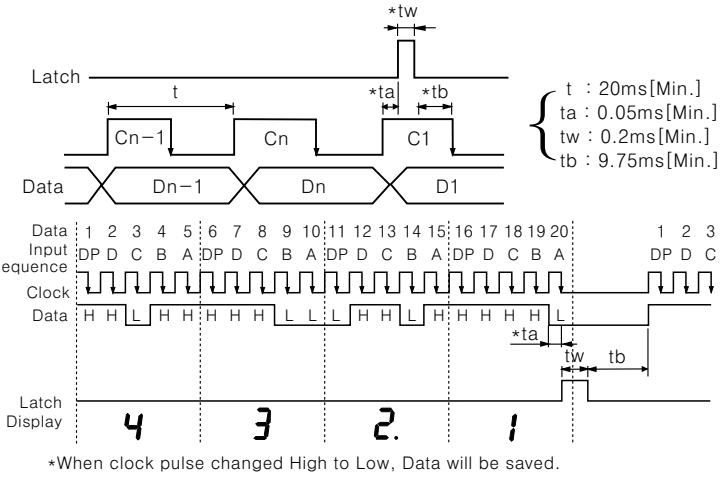
- RS485 communication output(32 channel)
It is able to transmit by selecting modulation speed(Transmitted number of signal per 1sec.) of serial transmission. (Selectable 1200, 2400, 4800, 9600bps)
- Serial low-speed output
It outputs Data, Latch, Clock signal as low-frequency(50Hz) in order to match current display value for PLC connection.
- Current output(4 to 20mADC)
It outputs 4 to 20mADC against High/Low-limit scale. (Resolution:8,000 division)
- BCD output
It outputs display value as BCD Code.
*There is only one sub-output(More than one sub-output is not allowed.)

Time chart of serial output and BCD output

BCD output(Negative logic)



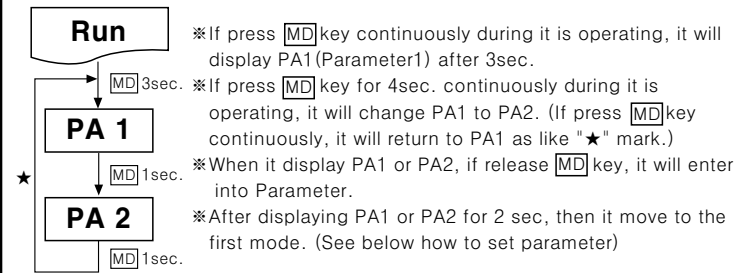
Low-speed serial output(Negative logic)



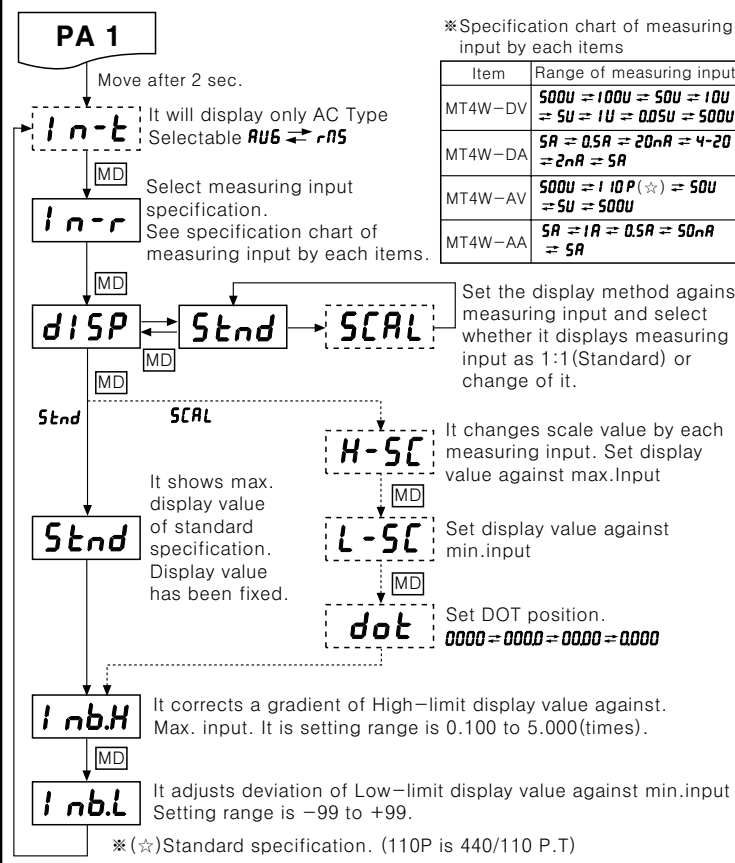
Parameter

Parameter	Display	Function	Note
PA 1 (Parameter 1)	In-t	Input type	Selectable RMS/AVG in AC type
	In-r	Input range	Selection of measuring input
	DISP	Display	Selection of display type
	Stnd	Standard	Standard scale range
	SCAL	Scale	Scale range
	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
	Inb.H	High input bias	Compensate High-limit value of display value(%)
	Inb.L	Low input bias	Compensate Low-limit value of display value(%)
PA 2 (Parameter 2)	Out.t	Out type	Setting of preset function
	HYS	Hysteresis	Set hysteresis value
	PEL.t	Peak time	Set monitoring delay time
	DIS.t	Display time	Selectable sampling time(sec.)
	Adr.S	Address	Set communication address
	bPS	Bit per second	Set baudrate(bps)
	LoC	Lock	Set lock function
PA 0 (Parameter 0)	HSE.t	High set	Set High setting value
	LSE.t	Low set	Set Low setting value
	HPEV	High peak	Max. value by data monitoring
	LPEV	Low peak	Min. value by data monitoring

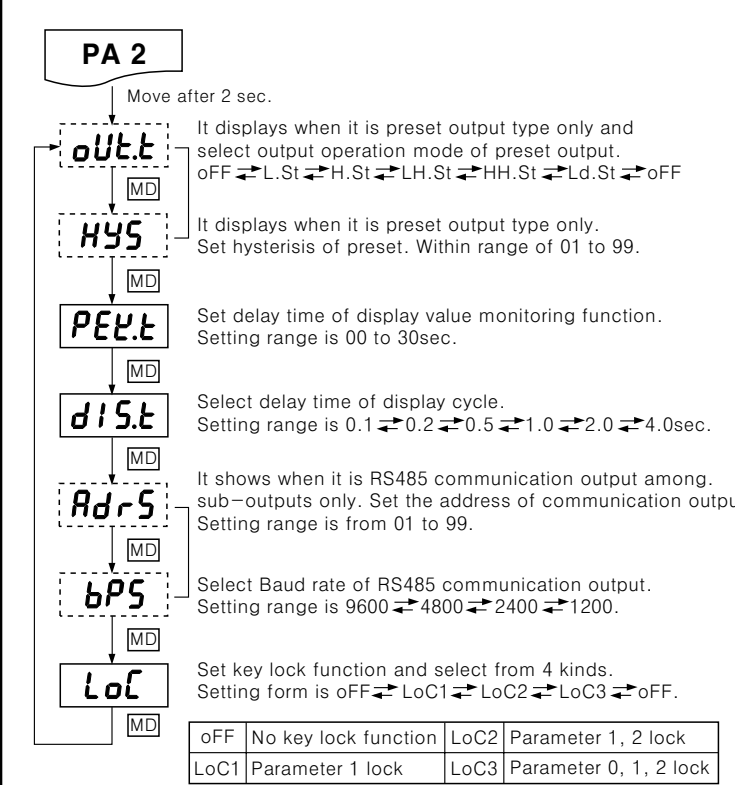
Parameter setting



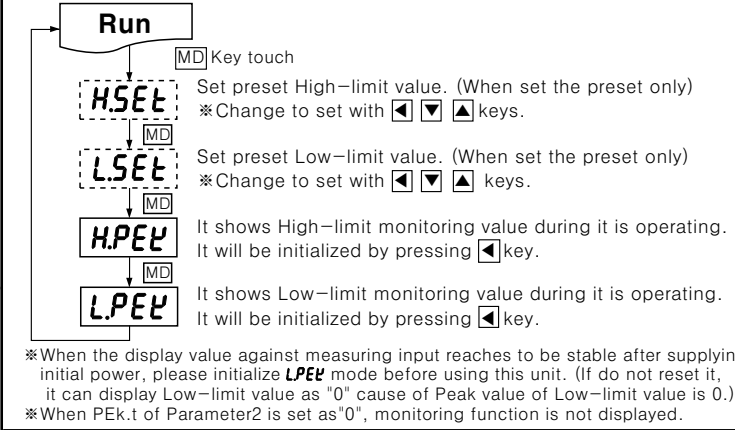
Parameter 1



Parameter 2



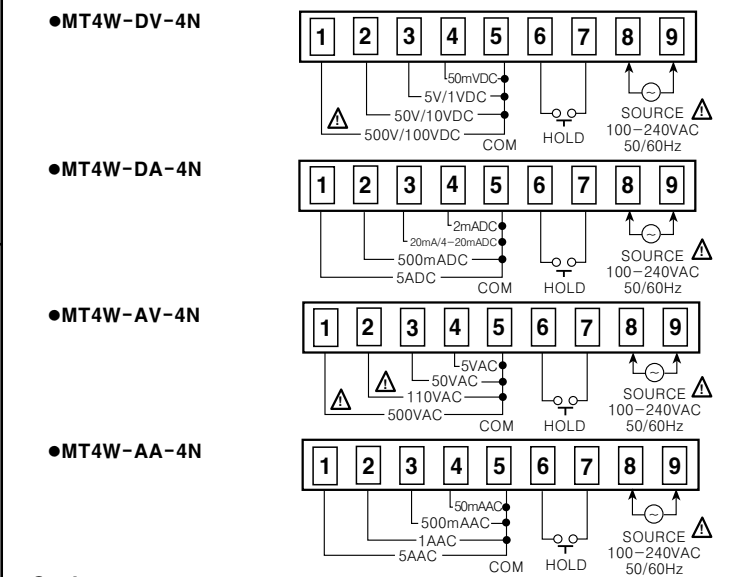
Parameter 0



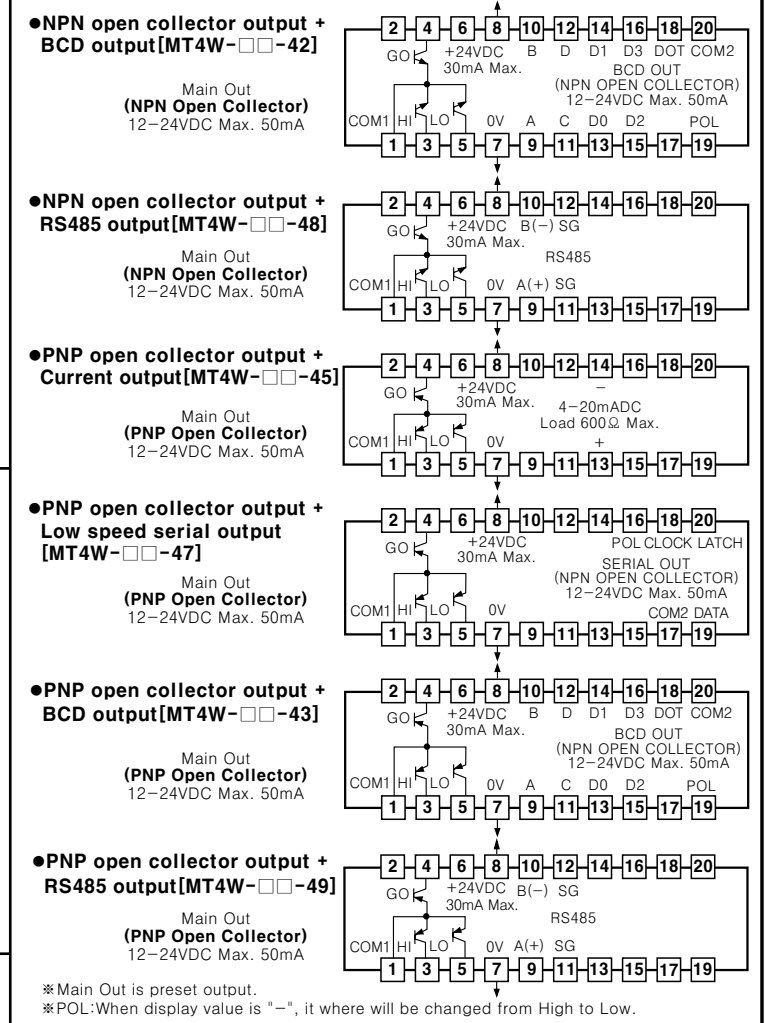
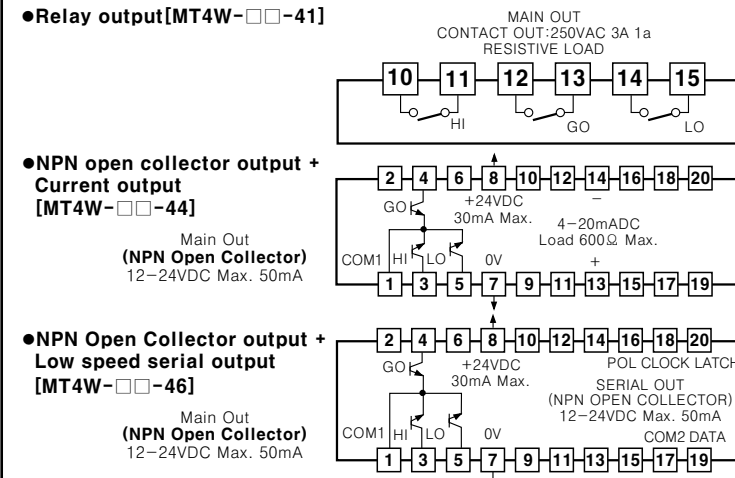
Change the parameter setting value

- Press **[MD]** Key continuously while it is operating, then release the **[MD]** key at the parameter you want.
- Press **[MD]** key at the parameter in order to change the mode of parameter. (See the Parameter 1, 2, 0)
- Setting value and mode are flickering repeatedly.
- When the current setting value and mode are flickering, if press **[Left]** key, only the current setting value is flickering.
- When the setting value is flickering, change the setting value with **[Up]** or **[Down]** key.
- After confirming the setting value by **[MD]** key, setting value and mode are flickering repeatedly.
- When setting is completed, it will return from Parameter with pressing **[MD]** key for 3sec.

Terminal connection

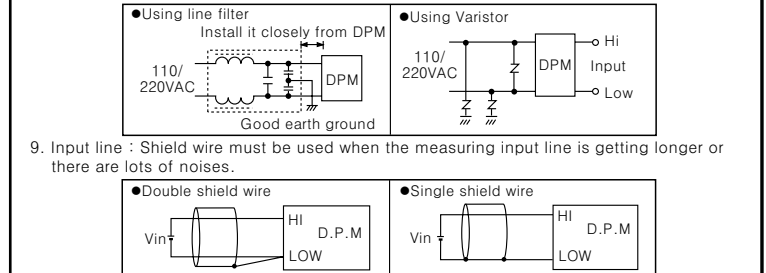


<Option>



Caution for using

- Installation environment
 - If shall be used indoor
 - Altitude Max. 2000m
 - Pollution Degree 2
- Installation Category II.
- Please use the terminal (M3.5, Max.7.2mm) when connect the AC power source.
- 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 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 makes strong high frequency noise. (Welding machine high capacity SCR unit etc.)
- When input applied, if "HHHH" or "LLLL" are displayed, it has some trouble with measuring input, please check the line after power off.
- Noise inflow from power line can be serious problem for products driving of DPM by AC power. Even though there is condenser for protecting noise between lines in power transformer, but this display unit as small size product, it is very difficult to install protection components. Therefore, please install line filter, varistor or noise absorber in external lines when voltage failure occurred by power relay or magnet S/W operation. Spark with high voltage.



It may cause malfunction if above instructions are not followed.

Main products

- COUNTER
- TIMER
- TEMPERATURE CONTROLLER
- PANEL METER
- TACHOMETER/LINE SPEED METER/PULSE METER
- DISPLAY UNIT
- PROXIMITY SENSOR
- PHOTOELECTRIC SENSOR
- FIBER OPTIC SENSOR
- PRESSURE SENSOR
- ROTARY ENCODER
- SENSOR CONTROLLER
- POWER CONTROLLER
- STEPPING MOTOR & DRIVER & CONTROLLER

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