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.

⚠Caution

1. **In case of using this unit with machineries(Nuclear power control, medical equipment, vehicle, train, airplane, burn-up equipment, 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
2. **It must be mounted on Panel.**
   It may give an electric shock.
3. **Do not connect terminals when it is power on.**
   It may give an electric shock.
4. **Do not disassemble and modify, when it requires. If needs, please contact us.**
   It may give an electric shock and cause a fire.
5. **Please check the number of terminal when connect power line or measuring input.**
   It may cause a fire.

⚠Waning

1. **This equipment shall not be used outdoors.**
   It might shorten the life cycle of the product or give an electric shock.
2. **When wire connection for power input and measuring input, the tightening strength for screw bolt on terminal block should be over than 0.74N • m ~ 0.90N • m.**
   It may result in malfunction or fire due to contact failure.
3. **Please observe specification rating.**
   It might shorten the life cycle of the product and cause a fire.
4. **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 this product.
5. **Do not use this unit at place where there are flammable or explosive gas, humidity, direct ray of sun, radiant heat, vibration, impact etc.**
   It may cause explosion.
6. **Do not use inflow dust or wire dregs into inside of this unit.**
   It may cause a fire or mechanical trouble.
7. **Please connect properly after checking the polarity of measuring terminals.**
   It may cause a fire or explosion.

▣ Ordering information

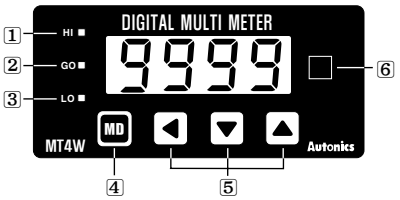
MT 4 W − □ − □ □
① ② ③ ④ ⑤ ⑥

①Item	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 (Comparision value output)	Sub output(Display value output)
	N	No output function	X
	1	Relay triple output(H, GO, L)	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 transmission(4−20mADC) output
	5	PNP open collector triple output	PV transmission(4−20mADC) output
	6	NPN open collector triple output	Low speed serial output
	7	PNP open collector triple output	Low speed serial output
※Output(1 to 9) :Option	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.**

▣ Part name



1 HI : High output indication of preset
2 GO : GO output indication of preset
3 LO : Low output indication of preset
4 MD Key : Mode Key
5 ◀ ▼ ▲ : Control key
6 Unit

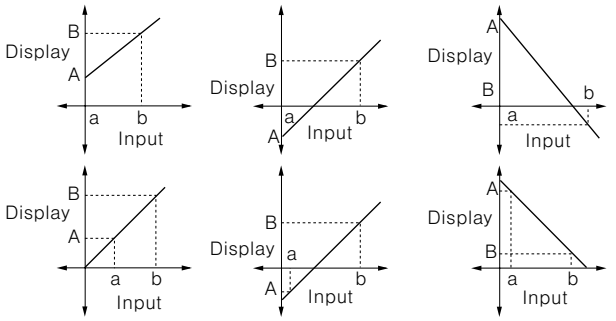
▣ Specification

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, AC type:F • S ±0.3% Rdg ±3digit } 23℃ ±5℃, 35 to 85%Rh
Input		VDC/ADC, VAC/AAC
Operating method		Dual integral type
Sampling cycle		100ms(Resolution 1/12000)
Max. indication		−999 to 9999(4digit)
Preset output	Realy output	• Contact capacity : 250VAC 3A, 30VDC 3A • Relay contact : N.O(1a)
	NPN open collector output	12−24VDC ±2V 50mA Max. (Resistive load)
	PNP open collector output	
Sub output (Trans−mission output)	RS485 communi−cation output	• Transmission speed : 2400/4800/9600bps • Transmission code : ASC Ⅱ Code(7Bit) • Communication method : 2wires half dual • Tuning method : Sub−synchronization
	Serial output	NPN open collector output, 12−24VDC Max. 50mA (Resistive load)
	BCD output	
	4−20mA 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 stength		2000VAC for 1minute between external terminal and case
Noise		±2kV the square wave noise(pulse width:1㎲) by the noise simulator
Vibra−tion	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/s² (10G) in X, Y, Z directions for 3 times
	Malfunction	300m/s² (30G) in X, Y, Z directions for 3 times
Ambient temperature		−10 to 50℃(at non−freezing status)
Storage temperature		−20 to 60℃(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℃)
DC/AC type F • S ±0.5% Rdg ±3digit(−10 to 0℃)

▣ Prescale function

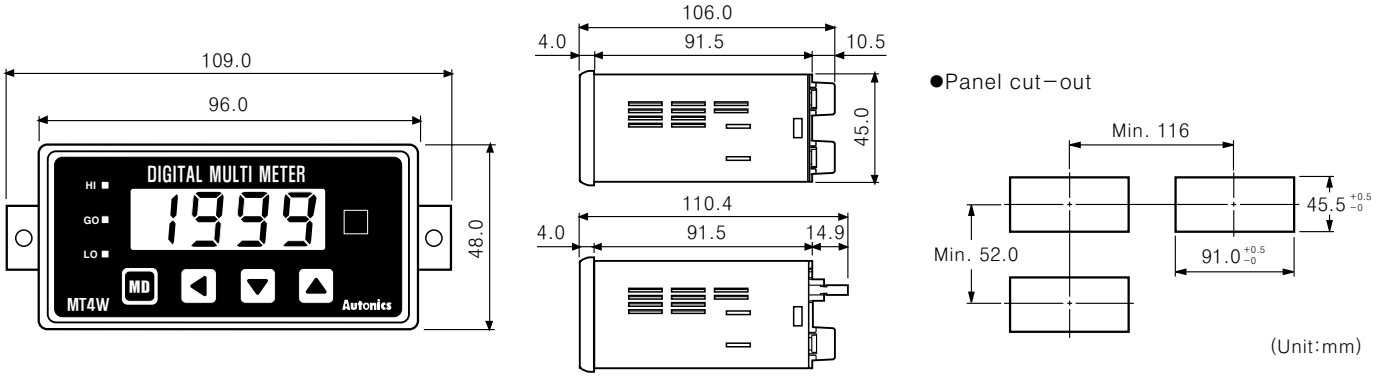
This function is to display setting(−999 to 9999) of particular High/Low−limit value in order to display High/Low−limit value of measuring input.
If measuring inputs are a or b and particular values are A or B, it will display a=A, b=B as below graph.



▣ Correction function(Parameter 1:*I nb.H*/*I nb.L* Mode)

This function is for correcting display value error of measuring input.
I nb.L : ±50 [Adjust deviation of Low value],
I nb.H : 0.900 to 1.100 [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 nb.L***(When Low display value is □□ 1.2 in 0V input)
※The offset correction range of ***I nb.L*** is for D0, D1 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 nb.H***, it is able to correct the gradient of High display value. (It does not calculate the decimal point)

▣ Dimension



▣ Terminal ordering by output specification

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

※There is no sub-output when preset output is Relay output.
There is one sub-output when preset output is transistor output.

▣ Input range for the sensor

Type	Measuring input [Display]	Standard[Stnd]		Free scale[SCAL]		
		Max.	Display range	Min. [L-SC]	Max. [H-SC]	Range
DC VOLT	0 to 500V [500U]	500.0	0 to 500.0(Fixed)	0.0	500.0	-999 to 9999(Variable)
	0 to 100V [100U]	100.0	0 to 100.0(Fixed)	0.0	100.0	-999 to 9999(Variable)
	0 to 50V [50U]	50.00	0 to 50.00(Fixed)	0.00	50.00	-999 to 9999(Variable)
	0 to 10V [10U]	10.00	0 to 10.00(Fixed)	0.00	10.00	-999 to 9999(Variable)
	0 to 5V [5U]	5.000	0 to 5.000(Fixed)	0.000	5.000	-999 to 9999(Variable)
	0 to 1V [1U]	1.000	0 to 1.000(Fixed)	0.000	1.000	-999 to 9999(Variable)
	0 to 50mV [0.05U]	50.00	0 to 50.00(Fixed)	0.00	50.00	-999 to 9999(Variable)
DC AMPERE	0 to 5A [5A]	5.000	0 to 5.000(Fixed)	0.000	5.000	-999 to 9999(Variable)
	0 to 500mA [0.5A]	500.0	0 to 500.0(Fixed)	0.0	500.0	-999 to 9999(Variable)
	0 to 20mA [20mA]	20.00	0 to 20.00(Fixed)	0.00	20.00	-999 to 9999(Variable)
	0 to 2mA [2mA]	2.000	0 to 2.000(Fixed)	0.000	2.000	-999 to 9999(Variable)
AC VOLT	0 to 500V [500U]	500.0	0 to 500.0(Fixed)	0.0	500.0	-999 to 9999(Variable)
	0 to 110V [110P]	440.0	0 to 440.0(Fixed)	0.0	440.0	-999 to 9999(Variable)
	0 to 50V [50U]	50.00	0 to 50.00(Fixed)	0.00	50.00	-999 to 9999(Variable)
	0 to 5V [5U]	5.000	0 to 5.000(Fixed)	0.000	5.000	-999 to 9999(Variable)
AC AMPERE	0 to 5A [5A]	5.000	0 to 5.000(Fixed)	0.000	5.000	-999 to 9999(Variable)
	0 to 1A [1A]	1.000	0 to 1.000(Fixed)	0.000	1.000	-999 to 9999(Variable)
	0 to 500mA [0.5A]	500.0	0 to 500.0(Fixed)	0.0	500.0	-999 to 9999(Variable)
	0 to 50mA [50mA]	50.00	0 to 50.00(Fixed)	0.00	50.00	-999 to 9999(Variable)

▣ Factory specification

Parameter	Mode	MT4W-DV	MT4W-DA	MT4W-AV	MT4W-AA
PA 1 (Parameter 1)	In-t	———		AUG	AUG
	In-r	500U	5A	500U	5A
	diSP	Stnd	Stnd	Stnd	Stnd
	Stnd	500.0	5.000	500.0	5.000
	Inb.H	1.000	1.000	1.000	1.000
	Inb.L	0000	0000	0000	0000
PA 2 (Parameter 2)	oUt.t	oFF	oFF	oFF	oFF
	HYS	01	01	01	01
	PEU.t	01	01	01	01
	diS.t	0.5 S	0.5 S	0.5 S	0.5 S
	AdrS	01	01	01	01
	bPS	9600	9600	9600	9600
	LoC	oFF	oFF	oFF	oFF
PA 0 (Parameter 0)	H.SEt	500.0	5.000	500.0	5.000
	L.SEt	0	0	0	0
	H.PEU	0	0	0	0
	L.PEU	0	0	0	0

※In-t, oUt.t, HYS, AdrS, bPS, H.SEt, L.SEt are not indicated according to specification.

▣ Preset output mode(Parameter 2:oUt.t mode)

Mode	Output operation	Operation
OFF	LO HI	No output
L.St	ON / ON H OFF / LO GO	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 H ON / GO HI	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 H OFF H ON / LO GO HI	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 H ON OFF H ON / GO LO HI	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 / ON H OFF / LO GO	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 wil be ON.

※"H" means hysteresis and able to set 1 to 99 at "HYS" mode in Parameter 2 among above comparison output chart.

▣ Display cycle delay function

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 diS.t mode of Parameter 2(Selectable 0.5S/1.0S/2.0S/3.0S/4.0S/5.0S).
If select 5.0S, it will be the measuring input value on an average for 5sec., then display it every 5sec.

▣ Monitoring function for Peak display value

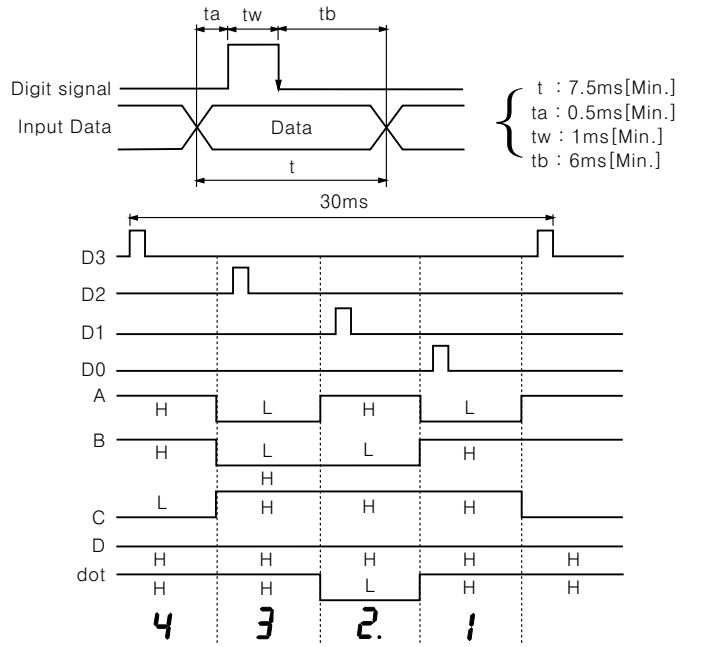
This is to observe Max./Min. value of display value by current display value and then displays in H.PEU mode and L.PEU mode of parameter 0. Set delay time(0 to 30sec.) in PEU.t mode of parameter 2 in order to prevent malfunction caused by initial over current or over voltage, when it monitor the peak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

▣ Transmission function(Sub output)

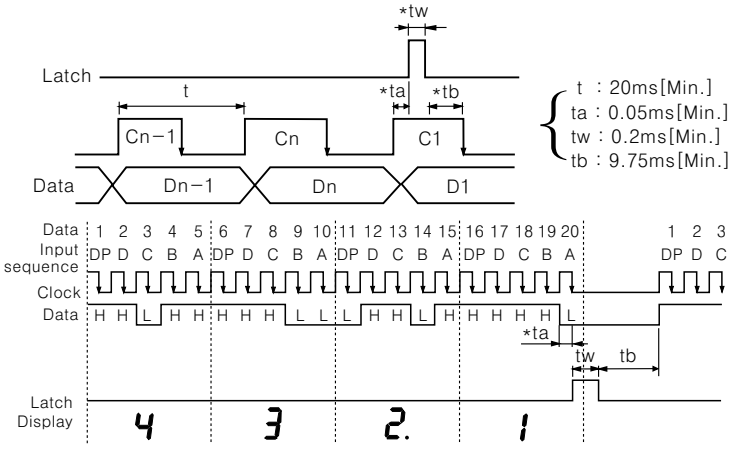
① RS485 communication output(32 chennel)
It is able to transmit by selecting modulation speed(Transmitted number of signal per 1sec.) of serial transmission.
(Selectable 1200, 2400, 4800, 9600bps)
② Serial low-speed output
It outputs Data, Latch, Clock signal as low-frequency(50Hz) in order to match current display value for PLC connection.
③ Current output(40 to 20mADC)
It outputs 4 to 24mADC against High/Low-limit scale.
(Resolution:8,000 division)
④ 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)**

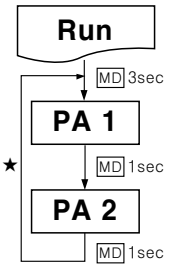


◎ **Low-speed serial(Negative logic)**



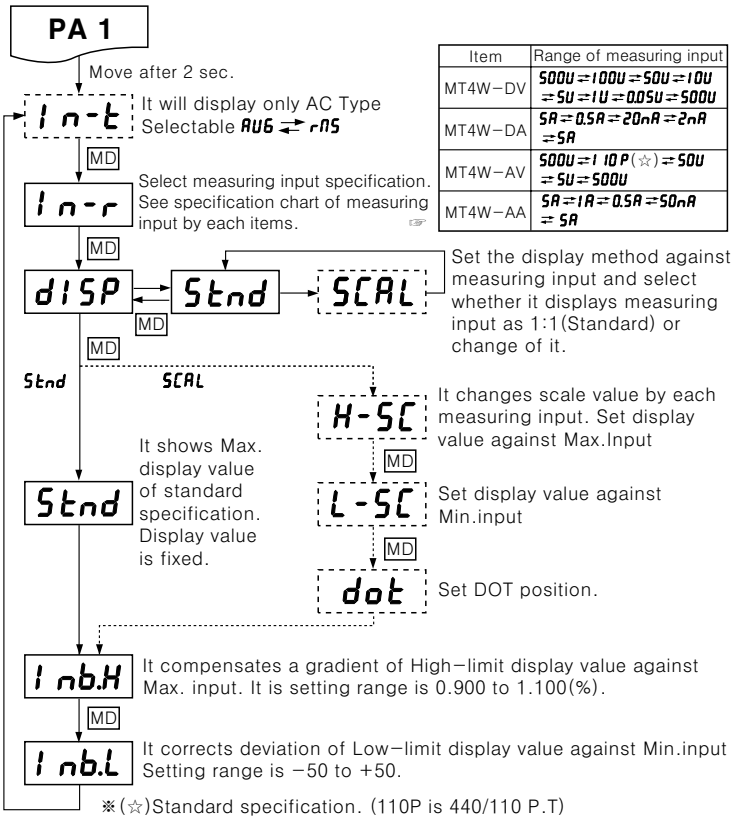
*When clock pulse changed High to Low, Data will be fixed.

▣ Parmeter setting



※If press MD key continuously during it is running, it will display PA1(Parameter1) after 3sec.
※If press MD key for 4sec. continuously during it is running, it will change PA1 to PA2. (If press MD key continuously, it will return PA1 as like "★" mark.)
※When it display PA1 or PA2, if release MD key, it will enter in to Parameter.
※After display PA1 or PA2 for 2 sec, then it goes in to the first mode. (See below how to set parameter)

▣ Parameter 1



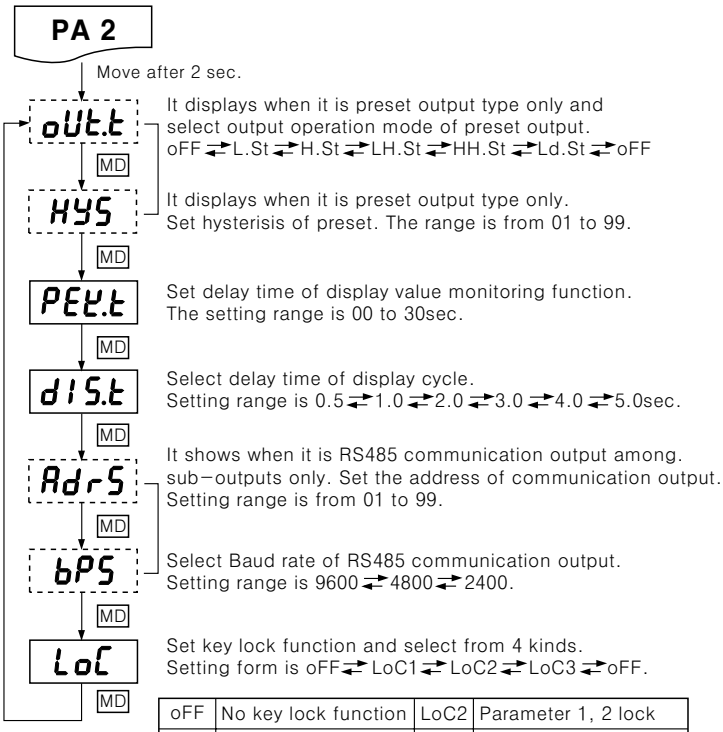
Item	Range of measuring input
MT4W−DV	500U⇄100U⇄50U⇄10U ⇄5U⇄1U⇄0.05U⇄500U
MT4W−DA	5A⇄0.5A⇄20mA⇄2mA ⇄5A
MT4W−AV	500U⇄110P(☆)⇄50U ⇄5U⇄500U
MT4W−AA	5A⇄1A⇄0.5A⇄50mA ⇄5A

※(☆)Standard specification. (110P is 440/110 P.T)

▣ Parameter

Para−meter	Display		Function	Note
PA 1 (Para−meter 1)	In-t	Input type	Selectable RMS/AVG in AC type	Indication in AC type only
	In-r	Input range	Selection of measuring input	
	dISP	Display	Selection of display type	Selectable Stnd or SCAL
	Stnd	Standard	Standard scale range	Display Max. display value of Stnd.
	SCAL	Scale	Scale range	These mode indicates at SCAL. It sets max. display value, Dot and min. display value. (−999 to 9999)
	H-SC	High scale	Set Max. value of display range	
	L-SC	Low scale	Set Min. value of display range	
	dot		Set Dot position	
	InbH		Compensate High−limit value of display value(%).	Set range 0.900 to 1.100(%)
	InbL		Compensate Low−limit value of display value(%).	Set range −50 to +50
PA 2 (Para−meter 2)	oUt.t	Out type	Setting of preset function	Selectable oFF/L.St/H.St /LH.St/HH.St/Ld.St
	HYS	Hysteresis	Set hysteresis value	Set range compensating 01 to 99
	PEt.t	Peak time	Set monitoring delay time	Set range compensating 01 to 30sec
	dIS.t	Display time	Selectable sampling time (sec)	Selectable 0.5/1.0/2.0/3.0 /4.0/5.0
	AdrS	Address	Set communication address	Set range 01 to 99
	bPS	Bit per second	Set baudrate(bps)	Selectable 2400/4800/9600
	LoC	Lock	Set lock function	Selectable Lock1/Lock2/Lock3
PA 0 (Para−meter 0)	HSEt	High set	Set High setting value	Setting range −999 to 9999
	LSEt	Low set	Set Low setting value	
	HPEt	High peak	Max. value by data monitoring	Return to initial status by pressing ◀ key
	LPEt	Low peak	Min. value by data monitoring	

▣ Parameter 2



oFF	No key lock function	LoC2	Parameter 1, 2 lock
LoC1	Parameter 1 lock	LoC3	Parameter 0, 1, 2 lock

▣ Parameter 0

Run

MD Key touch

H.SEt — Set preset High-limit value. (When set the preset only)
※Change to set with ◀ ▼ ▲ keys.

MD

L.SEt — Set preset Low-limit value. (When set the preset only)
※Change to set with ◀ ▼ ▲ keys.

MD

H.PEU — It shows High-limit monitoring value during it is operating.
It will be initialized by pressing ◀ key.

MD

L.PEU — It shows Low-limit monitoring value during it is running.
It will be initialized by pressing ◀ key.

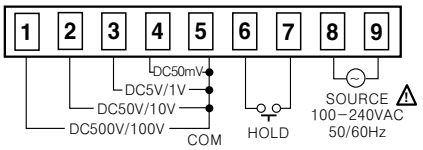
※When the display value against measuring input reaches to be stable after supplying initial power, please initialize LPEU mode before using this unit. (If do not reset it, it can display Low-limit value as "0" cause of Peak value of Low-limit value is 0.)

▣ Change the parameter setting value

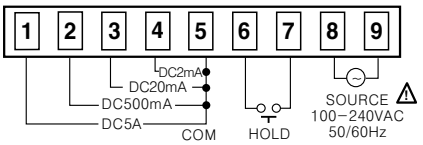
1. Press the MD Key continuously while it is running, then release the MD key at the parameter you want.
2. Press MD key at the parameter in order to change the mode of parameter. (See the Parameter 1, 2, 0)
3. The setting value and mode is flickering repeatedly.
   Ex) In-r ↔ 500U — It shows that setting value is changeable to flicker it only.
4. When the current setting value and mode are flickering, if press ▶ key, only the current setting value is flickering.
   Ex) In-r ↔ 500U ◀ 500U — It shows that setting value is changeable to flicker it only.
5. When the setting value is flickering, change the setting value with ▲ or ▼ key.
   Ex) In-r ↔ 500U ◀ 500U ▼ 1 10P ▼ 50U ▼ 5U — It shows how to change the measuring input of AC Type.
6. After confirm the setting value by MD key, setting value and mode are flickering repeatedly.
7. When it is completed, it will return from Parameter with pressing MD key for 3sec.

▣ Terminal connection

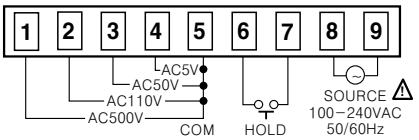
●MT4W-DV



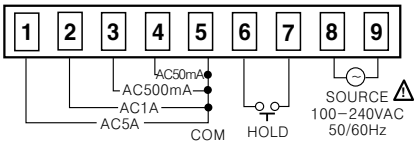
●MT4W-DA



●MT4W-AV

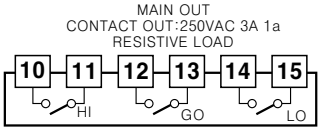


●MT4W-AA



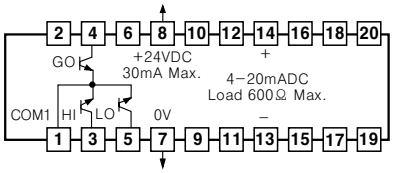
〈Option〉

●Relay output



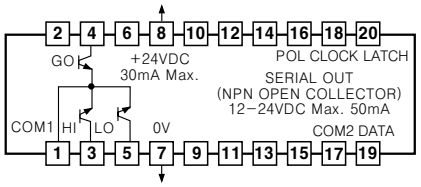
●NPN open collector output + Current output

Main Out
(NPN Open Collector)
12-24VDC Max. 50mA



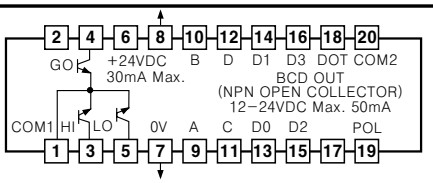
●NPN Open Collector output + Low speed serial output

Main Out
(NPN Open Collector)
12-24VDC Max. 50mA



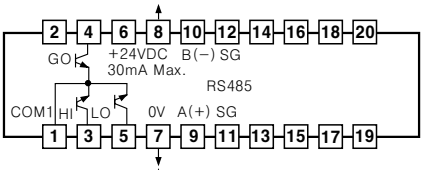
●NPN open collector output + BCD output

Main Out
(NPN Open Collector)
12-24VDC Max. 50mA



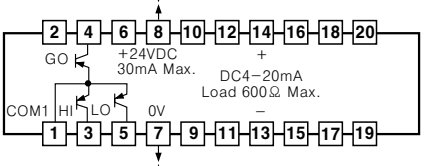
●NPN open collector output + RS485 output

Main Out
(NPN Open Collector)
12-24VDC Max. 50mA



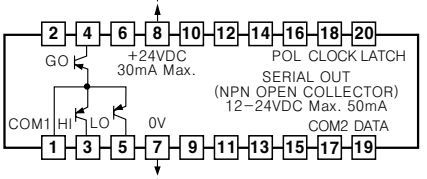
●PNP open collector output + Current output

Main Out
(PNP Open Collector)
12-24VDC Max. 50mA



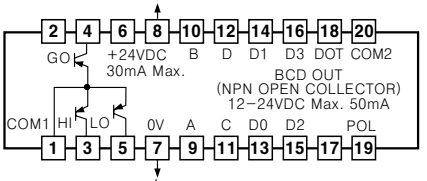
●PNP open collector output + Low speed serial output

Main Out
(PNP Open Collector)
12-24VDC Max. 50mA



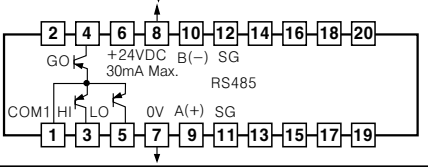
●PNP open collector output + BCD output

Main Out
(PNP Open Collector)
12-24VDC Max. 50mA



●PNP open collector output + RS485 output

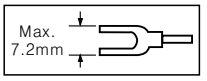
Main Out
(PNP Open Collector)
12-24VDC Max. 50mA



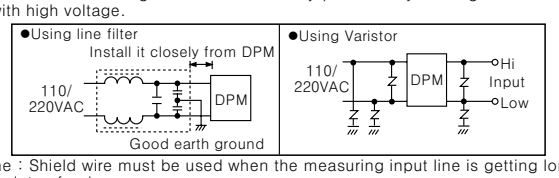
※Main Out is preset output.

▣ Caution for using

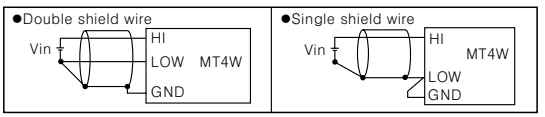
1. Installation environment
   ①If shall be used indoor
   ②Altitude Max. 2000m
   ③Pollution Degree 2
   ④Installation Catergory Ⅱ.



2. In when use AC current/voltage for meter, please connect to measuring input terminal with using 1:1 solution tramsformer.
2. Please use the terminal(M3.5, Max.7.2mm) when connect the AC power source.
3. Please use separated line from high voltage line or power line in order to avoide inductive noise.
4. Please install power switch or circuit breaker in order to cut the power supply.
5. The switch or circuit-breaker should be installed near by users for safety.
6. Be sure to avoid using this unit near by machinery makes strong high frequency noise. (Welding 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 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.



9. Input line : Shield wire must be used when the measuring input line is getting longer or there are lots of noises.



※It may cause malfunction if above instructions are not followed.

▣ Main products

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

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