# **Autonics PANEL METER** MT4N SERIES

(€

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

★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.

### 

1. In case of using this unit with machinery (Ex: nuclear power control, medical equipment, 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 shorts.

- 2.It must be mounted on the panier.
  It may cause electric shock.
  3.Do not connect, inspect or repair terminals when it is power on.
  It may cause electric shock.
  4.Do not disassemble or modify this unit. Please contact us if it is required.
  It may cause a fire or electric shock.
  5.Please check the number of terminal when connecting power or measured input.

#### It may cause a fire

### **⚠** Caution

A 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, AWG20(0.50mm²) should be used and tighten screw bolt on terminal block with 0.74N·m to 0.90N·m strength.
It may cause a 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.

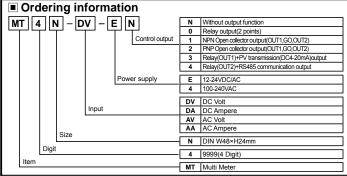
4.Do not use beyond of the rated switching capacity of relay contact.
It may cause insulation failure, contact melt, contact failure, relay broken and fire etc.

5.In cleaning the unit, do not use water or an organic solvent. And use dry cloth.
It may cause a fire and give an electric shock.

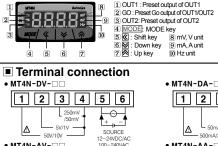
6.Do not use this unit in place where flammable or explosive gas, humidity, direct ray of the light, radiant heat, vibration or impact, etc. exists.
It may cause a fire or explosion.

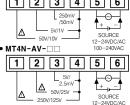
7.Do not inflow dust or wire dregs into the unit.
It may cause a fire or explosion.

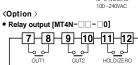
Explain the property after checking the polarity of measurement terminals.
It may cause a fire or explosion.

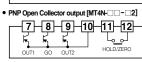


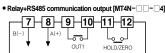
Front panel identification



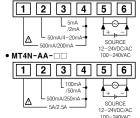








# • MT4N-DA-□□



**↓**□

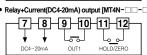
Panel cut-out

Min. 55

(Unit: mm)

22.2-0

• •	NPN Open Collector output [MT4N 1]					
ſ	<b>-</b> [7]-	8	9-	10 11 12		
	K	K	5	HOLD/ZERO		
Į	OUT1	GO	OUT2	HOLD/ZERO		
	PolavaCur	ront/Di	C/L-20m/	\\ output [MT/N=\\\\-\\\\-\\\\\\		



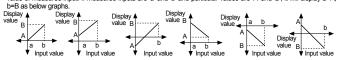
Initialization function

# ■ Prescale function [PA1: H-5[/L-5[]

This function is to display setting(-1999 to 9999) of particular High/Low-lin value of measured input. If measured inputs are 'a' and 'b' and particular b=B as below graphs.

Display \( Display \)
value \( B \)

Display \( Value \)
Value \( B \)
Value \( B \)
Value \( B \)
Value \( B \)



## **■** Error display function

Display	Description	This function is to initialize parameter as factor
нннн	Flashes when measured input is exceeded the max.allowable input(110%)	default.
LLLL	Flashes when measured input is exceeded the min.allowable input(-10%)	Press <b>€</b> + <b>⊗</b> + <b>⊗</b> for over 5 sec.
d-HH	Flashes when display input is exceeded H-5[ setting value	
d-LL	Flashes when display input is exceeded L-5[ setting value	MODE MODE
F-HH	Flashes when input frequency is exceeded the max. display value of measured range	MT4N-DV 50 X Flash
ouEr	Flashes when it exceeds zero range(±99)	MT4N-AV 250 in ord
[ouEr]	djusting error is returning to measurement mode after   flashes twice.	MT4N-DA 500 return

# ■ Display cycle delay function [PA2:d/5.b]

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 5.5 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.

## ■ Startup compensation timer function [PA2:5Ŀ8Ŀ]

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

## User manual for communication

ite (www.autonics.com) to download the user manual for communication of MT series. \* The above specifications are subject to change without notice.

Model		MT4N				
Power supply		12-24 VDC/AC	100-240 VAC			
Power consumption		DC: 3W, AC: 5VA	5VA			
Display m	ethod	7 Segment LCD Display, Character height: 9mm				
Display accuracy		23°C ± 5°C № DC Type: F.S.±0.1% rdg±2digit / AC Type: F.S.±0.3% rdg±3digit DCAC Type: Within F.S.±0.3% rdg±3digit only for Current 5A terminal -10°C to 50°C № DC/AC Type: F.S.±0.5% rdg±3digit				
Input spec	cification	DC Voltage/Current, AC Voltage/Current, AC Frequency				
Max. allov	vable input	110% F.S. for each measured input ra	inge			
A/D conve	rsion method	Practical oversampling using success	ive approximation ADC			
Sampling	cycle	50ms(DC), 16.6ms(AC)				
Max. disp	lay range	-1999 to 9999(4 Digit)				
Preset out	put	Relay output Contact capacity: 125VAC 0.3A, 30VDC 1A/Contact composition: N.O(1a)     NPN/PNP Open Collector output 22–24VDC ±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 method: Sub-synchronization, Protocol: Modbus type DC4-20mA output © Resolution: 12,000 division(Load resistance max. 600.0)				
AC measur	rement function	Selectable RMS or AVG				
Frequency measurer	y nent function	Measurement range: 0.100 to 9999Hz (Differ according to decimal point position)				
Hold func	tion*1	Includes(Outer hold function)				
Insulation	resistance	Min. 20MΩ(at 500VDC megger)				
Dielectric :	strength	1000VAC for 1 minute (Between external terminal and case) 2000VAC for 1 minute (Between external terminal and case)				
Noise stre	ngth	±2kV the square wave noise(pulse width: 1μs) by the noise simulator				
Vibration	Mechanical	0.75mm amplitude at frequency of 10 to 55Hz(for 1 min.) in each of X, Y, Z direction for 2 hours				
NIDIBION	Malfunction	0.5mm amplitude at frequency of 10 to 55Hz(for 1 min.) in each of X, Y, Z direction for 10 minutes				
Shock	Mechanical	100m/s <sup>2</sup> (Approx. 10G) in X, Y, Z directions for 3 times				
OI IUUK	Malfunction	300m/s²(Approx. 30G) in X, Y, Z directions for 3 times				
Environ-	Ambient temperature	-10 to 50°C, Storage: -20 to 60°C				
ment	Storage 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 part: 1kV)				
Approval		C€	T-			
Unit weight		Approx. 64a	•			

X 1: The indicator has no Hold function.

### \* Environment resistance is rated at no freezing or condensation. ■ Specification of measured input and range [PA1: Internal ]

Туре	Measured input and range		Input impedance	Display range [5End] Prescale Display		ale Display range [5[RL]
	0-50V	[50V]	434.35kΩ	0.00 to 50.00(Fixed)		
	0-10V	[IDV]	434.35kΩ	0.00 to 10.00(Fixed)	1	
DC	0-5V	[5V]	43.35kΩ	0.000 to 5.000(Fixed)	i	
Volt	0-1V	[ /V]	43.35kΩ	0.000 to 1.000(Fixed)	dot	Display range
	0-250mV	[250mV]	2.15kΩ	0.0 to 250.0(Fixed)	1 0	-1999 to 9999
	0-50mV	[50mV]	2.15kΩ	0.00 to 50.00(Fixed)	0.0	-199.9 to 999.9
	0-500mA	[500 mA]	0.1Ω	0.0 to 500.0(Fixed)	0.00	-19.99 to 99.99
	0-200mA	[200mA]	0.1Ω	0.0 to 200.0(Fixed)	0.000	-1.999 to 9.999
DC	0-50mA	[50mA]	1.1Ω	0.00 to 50.00(Fixed)	to 20.00(Fixed) according to decimal point position.)	
Ampere	4-20mA	[4-20mA]	1.1Ω	4.00 to 20.00(Fixed)		
	0-5mA	[5mA]	11.1Ω	0.000 to 5.000(Fixed)		
	0-2mA	[2mA]	11.1Ω	0.000 to 2.000(Fixed)		
	0-250V	[250V]	1.109ΜΩ	0.0 to 250.0(Fixed)	XPlease wire the proper terminal to its max. input within 30 to 100% of the input terminal.   When it is higher than input, it may cause terminal breakdown and over display	
	0-125V	[125V]	1.109ΜΩ	0.0 to 125.0(Fixed)		
AC	0-50V	[50V]	222ΜΩ	0.00 to 50.00(Fixed)		
Volt	0-25V	[25V]	222ΜΩ	0.00 to 25.00(Fixed)		
	0-5V	[5V]	22ΜΩ	0.000 to 5.000(Fixed)		
	0-2.5V	[2.5V]	22ΜΩ	0.000 to 2.500(Fixed)		
	0-5A	[5A]	0.01Ω	0.000 to 5.000(Fixed)	range. The accuracy is decreased when it is connected to the terminal under 30%.	
	0-2.5A	[2.5A]	0.01Ω	0.000 to 2.500(Fixed)		
AC	0-500mA	[500mA]	0.1Ω	0.0 to 500.0(Fixed)		
Ampere	0-250mA	[250mA]	0.1Ω	0.0 to 250.0(Fixed)		
	0-100mA	[100mA]	0.5Ω	0.0 to 100.0(Fixed)		
	0-50mA	[50mA]	0.5Ω	0.00 to 50.00(Fixed)		

### ■ Monitoring max./min. display value function [PA 0: H PE L / L PE L , PA 2: PE L ]

It monitors max/min. value of display value based on the current displays value and then displays the data at HPEŁ, LPEŁ of parameter 0. Set the delay time(0 to 30 sec.) at PEŁŁ of parameter 2 in order to prevent malfunction caused by initial overcurrent or overvoltage, when monitoring the peak value. Delay time is 0 to 30 sec. and it starts to monitor the peak value after the set time. When pressing any one of \$\mathbb{E}\$ (\$\mathbb{E}\$) (\$\mathbb{E}\$

### Current output(DC4-20mA) Scale adjustment function

[PA2:F5-H/F5-L] s current output for the display value at the output currer

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% F5.(When it sets as under 10% F5.k, it changed as over 10% F5. automatically)Preset display value is fixed to output as 4mA at under F5-L and 20mA at over F5-H.

# Output 20mA Min. setting range 10% F.S. FS-L

# Error correction function

[PA1:1 nb.H/1 nb.L]

[PA 1: l n b H l n b L] It corrects display value error of measured input. I n b L :  $\pm 39$  (Adjust deviation of low value) I n b H: 5 .000 to 0 .100(Correct gradient(%) of high value) Display value=(Measured value × l n b H + l b L. When the measured range is 0 to 500V, and the display range is 0 to 500V. and the display range is 0 to 500V. and the display range is 0 to 500V input, set -12 as the l n b L value to display 0 D D D by adjusting the offset of the low value. If this display value is 00 D0 D1 this display value is 00 D10 (the desired display value) the display value), and set the 00.98 correction value as the l n b D1 of splay 00 D1 by adjusting the gradient of the high value

X The offset correction range of Inb.L is within -99 to +99

# ■ AC frequency measurement function [PA 1: dl 5P]

It measures input signal frequency when it is AC input. It uses fixed decimal point[PA1: doi:], measured range can be changed by setting and measured range of decimal point position is as below hart. It is available to adjust the upper gradient at [PA1: nbH] and [PA1: nbE]. In order to measure frequency normally, input signal, over 10% F.S. of the measured range, should be supplied. Please select the proper point of measurement terminal.

Measured range					
ecimal point position	0.000	0.00	0.0		
annumana ant	0.100.40	0.10.40	0.1.40		

9.999Hz 99.99Hz 999.9Hz 9999Hz Accuracy of frequency measurement:
 Below 1kHz, F.S. ±0.1rdg ±2digit.
 From 1kHz to 10kHz, F.S. ±0.3rdg ±2digit. @ I nb.H: 0.100 to 9.999(Gradient adjustment of high value)

③ I nb.E: 10<sup>-2</sup>, 10<sup>-1</sup>, 10<sup>0</sup>, 10<sup>1</sup> (Index adjustment of I nb.H)

## Zero adjustment function

It adjusts the display value of the optional configured input value as zero by force, zero point error can be adjusted with 3 ways as below.

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 at saved in Inb.L automatically.

Oper- ation	correction value	Front key	Input external signal
Des- cription v	correction	Press both	Short-circuit external Hold terminal no.11, 12 over min.50m. ※It is enable to use in option mode.

Kefer to description "

Error correction function, 

display function, 

Parameter 2" for function and error.

(Figure1)

X Input value

# ■ Gradient correction function [PA1: Inb.H]

It corrects the gradient of prescale value and display value. (Figure 1)Display value Y can be adjusted as  $\alpha$ ,  $\beta$  times against X input value by correction  $_{
m U}$  rigure  $_{
m I}$   $_{
m I}$   $_{
m I}$   $_{
m I}$   $_{
m I}$  value Y can be adjusted as  $_{
m G}$ ,  $_{
m I}$  fitnes against X input value by correction function [INB,H] and used as correction function of max. display value [H-5C]. Adjustment range is 0.100 to 5.000 and multiply current gradient.

Ex) To display "3.000" in DC 200mV input for measured input specification as 0 to 1V,  $\odot$  Select 0-1VDC for measured input in Parameter 1. ②Standard 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.

③In this case, please check below chart. Please set as I nb.H×H-5€ = 15.000

(Example of gradient corre 15.000 12.000 3.000 Display value t measured inpu 6.000 · 

	Setting method		L-5E	Inb.H	Note
	1	Unavailable	0.000	1.000	-
e for iput	2	7.500	0.000	2.000	
	3	5.000	0.000	3.000	In this case, any setting methods display the same
	4	3.750	0.000	4.000	display value.
t value	6	3.000	0.000	5.000	

## ■ Preset output mode [PA2: oU 1.₺ /oU2.₺]

Mode	Output operation	Operation		
oFF	OUT1 output No output	No output		
ні	OUT1.H Hysterisis	Period ON: Display value≥OUT1.H Period OFF: Display value≤OUT1.H-Hys		
Lo	OUT1.L OUT1 output	Period ON: Display value≤OUT1.L Period OFF: Display value≥OUT1.L+HYS		
HL	OUT1.H OUT1.L OUT1 output	Period ON: Display value≤OUT1.L or Display value≥OUT1.H Period OFF: Display value≥OUT.L+Hys or Display value≤OUT.H+Hys		
HL - G	OUT1.H OUT1.L OUT1 output	Period ON: OUT1.L≤Display value≤OUT1.H+Hys Period OFF: Display value≤OUT.L+Hys or Display value≥OUT.H+Hys		

X Set output mode separately for each OUT1/OUT2.

SECUTION 2 are operated individually depending on output operation mode.

SECUTION 2 are operated individually depending on output operation mode.

SECUTION 3 are operated individually depending on output operation mode.

SECUTION 3 are operated individually depending on output operation mode.

SECUTION 3 are operated individually depending on output operation mode.

#### Parameter Selectable RMS/AVG in AC type Available AC type only. : Input type Selection of input range Selection of display type Selectable: 5End/5ERL/FrE9 End Standard Display max. display value of 5 t nd Available AC type only. Standard scale range requency display Scale range Set max. value of display range Set min. value of display range Set decimal point position Set display unit These are displayed at 5ERL only . It sets max/min display value(-1999 to 9999). It is displayed in 5ERL/F-E9 only and set the position. Set range: mV / V / mA/A/ Hz / off 5End/5ERL: Correction range: 0.100 to 5.000 F-E9: Correction range: 0.100 to 9.999 dot Dot d-Unt Display unit lamp Correct High-limit gradient of display value I ль.н Input bias high Correct Low-limit gradient of display value Inb.L Input bias low Set range: -99 to +99 Set range: 10<sup>-2</sup>/10<sup>-1</sup>/10<sup>0</sup>/10 In b.E. Input bias exponent Set display index of frequency mode อป I.E Out1 type อป 2.E Out2 type Select output mode of OUT Selectable off/ HI/Lo/ HL/ HL-Selectable oFF/ HI/Lo/HL/HL-G Within 1 to F.S. 10%(Variable depending on set of input range and prescale.) SERL Startup ompens time PELL Peak time dl 5.L Display time CoLr Color Set range: 0.0 to 99.9 sec. Set monitoring delay time for peak va Set sampling time(sec) Select color Set usage of front side zero adjustment key Set range: 00 to 30 sec. 0.1 to 5.0 sec.(Variable by 0.1 sec.) rEal Ern 19EL 1 r-01 Gr no: Not use front side zero adjustment key 95: Sue of front side zero adjustment key 95: Sue of front side zero adjustment key 1a Ja: Use external terminal as Hold termina £Fr o: Use external terminal as zero point adjustment terminal Min. set range: Min. 10% FS. Max. set range: Min. 10% FS. Max. set range: Min. 10% FS. Seterage: 01 to 99 Selectable 12002\*907/88007500 Selectable nof EV.Ern | Odd ∃Ero key F5-H Full scale high Set High-limit value output position of PV output F5-L Full scale low Set Low-limit value output position of PV output Rdr5 Address Set communication address bP5 Bit per second Set baud rate(bps) Selectable nonE/EuEn/odd Selectable I/2 Set parity bit Set stop bit Set range : 5 to 99 Enable lock status Selectable of F/Lo[1/Lo[2/Lo อย เ.ห OUT1 high preset Set value of OUT1 High-limit output Set the range within display range of 5End/5ERL. For MT4N-DV/DA Type, set range of outliffout and outliffout is within -5 to 110%. o ⊔ I.L OUT1 low preset Set value of OUT1 Low-limit output oUZ H OUT2 high preset Set value of OUT2 High-limit output OUT2 low preset Set value of OUT2 Low-limit output H.P.E.P. High peak Max. value by data monitoring L.P.E.P. Low peak Min. value by data monitoring Initializes the monitored one of ( keys. ■ Parameter setting RUN

\*\* Press MODE key for 2 sec. in RUN mode, [ PR 1](Parameter 1) is displayed.

\*\* Press MODE key for 4 sec. in RUN mode, [ PR 2] is displayed after [ PR 1].

\*\* When pressing MODE key continually, it stops displaying at [ PR 2].

 ▼PFI
 X It is advanced to current display parameter releasing MODE key at [PR I] or [PR2].

 MODE key
 X Press MODE key for 3 sec., it is returned to RUN at any position.

 X If any key is not touched for 60 sec. in each parameter, it returns to RUN mode.

 PA I \*\* After return to RUN mode, press MODE key within 2 sec., it returns to previous parameter. (Refer to the below descriptions for set parameter.) PR2

■ Parameter 0

MODE

ου T.H

H.PEL.

Set preset High-limit value of oU I.E. (It is not displayed when oU I.E mode value of PA2 is oFF.)

MODE:

MODE:

MODE:

Khange the value by King King Keys.

Set preset High-limit value of oUZ ±. (It is not displayed when oUZ ± mode value of PAZ is oF +.)

\*\*Change the value by \*\*M \*\*Exp.\*\* \*\*Mode value by \*\*Mode keys.

Set preset Low-limit value of <code>oU2.E</code> (It is not displayed when <code>oU2.E</code> mode value of <code>PAE</code> is <code>oFF.</code>) \*\*Change the value by **@** \*\* keys.

It displays Max. monitoring value (High peak) in RUN mode.

Set Low-limit value for DC 4mA output position of PV output.

oFF Nokey Lock function LoC2 Parameter 1,2 lock LoC1 Parameter 1 lock LoC3 Parameter 0,1,2 lock

mode. itialized by pressing any one of

RUN

# ■ Change the parameter

setting value 1.Advance to the parameter to be changed when pressing MODE key continuously in RUM mode and releasing MODE key at the parameter (Refer to Tell Parameter setting?)

2.When pressing MODE key in each parameter, the initial mode of the parameter is displayed. (Refer to the description of each parameter.)

description of each parameter.)

3. When pressing one of  $\boxed{\mathbb{Z}}$ ,  $\boxed{\mathbb{Z}}$  keys in display mode, the saved setting value is displayed.

Setting

Ex) Mode

W W value

The

Setting value

Value

The saved setting value

Press one

The saved setting value

Press one 

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

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

6. It returns RUM mode from parameter by pressing MODE key for 3 sec.

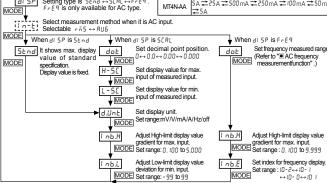
PR I

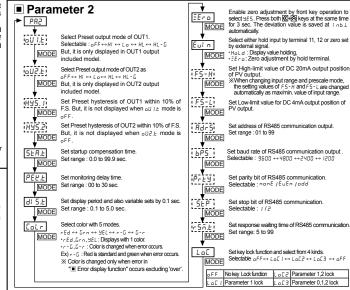
# It displays Min. monitoring value(Low peak) in RUN mode. It is initialized by pressing any one of INCUM mode. INCU Parameter 1

<Measured input specification for each model> Measured input range MT4N-DV 50V ₹10V ₹5V ₹1V ₹250mV ₹50mV ₹50V MT4N-DA 500mA ₹200mA ₹50mA ₹4-20mA ₹5mA 2mA ₹500mA Select measured input specification. (Refer to "

Specification of measured input and range".) MT4N-AV 250V ≠125V ≠50V ₹25V ≠25V ≠25V ≠250V 

input and range .) Set display type for measured input. Setting type is  $SEAD \leftrightarrow SERL \leftrightarrow FrE9$ . Setting type is  $SEAD \leftrightarrow SERL \leftrightarrow FrE9$ .





## Caution for using

(a)Installation CatergoryII

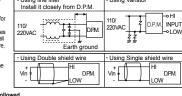
. Allowable installation environment
Off shall be used indoor @Altitude Max. 2000m @Pollution Degree 2 @Installat
Pleases use the entimial(M3.5, Max.6.0mm) when connectting the AC power supply.
Please use separated line from high voltage line or power line in order to avoid inductive noise.
Please install power switch or circuit breaker in order to cut off the power supply.
The switch or circuit breaker should be installed near by users for safety.
Be sure to avoid using the following unit near by machinery making strong high frequency noise
(High frequency welder & Sewing machine, High capacity SCR unit etc.)

(High frequency welder & Sewing machine, High capacity SCR 7. When Input is applied, if "Harth" or "LLLL" is displayed, there is some problem with measured input, please check the line after power off.

8. Noise inflowing from power line can cause serious problem for D-PM. (Digital Panel Meter) driving by AD 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-PM. Therefore, please sets noise absorber circuit such as line filter, variation in external lines when voltage failure occurs by power relay, external SIMs and bith fees internanced are processed in some of the control of the

magnet SW and high frequency equipment are operated in same line or surge occurs by spark of high voltage or thunder etc.

9. Input line: Shield wire must be used when the measuring input line is getting longer in the place occurring lots of noise XIt may cause malfunction if above instructions are not followed.



## ■ Main products

roximity sensors rea sensors Photoelectric sensors

mperaturer so..... vitching power supplies enning motors/drivers/motion controllers Field network devices Laser marking system(CO<sup>2</sup>, Nd:YAG) Laser welding/soldering system

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Autonics Corporation