PANEL METER MT4W SERIES

INSTRUCTION MANUAL





Thank you for choosing our Autonics products. Please read the following safety considerations before use.

Safety Considerations

XPlease observe all safety considerations for safe and proper product operation to avoid hazards.

※Safety considerations are categorized as follows. **↑ Warning** Failure to follow these instructions may result in serious injury or death.

▲ Caution Failure to follow these instructions may result in personal injury or product damage.

- 1. Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss. (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crimeldisaster prevention devices, etc.) Failure to follow this instruction may result in fire, personal injury, or economic loss.

 2. Install on a device panel to use. Failure to follow this instruction may result in electric shock or fire.

 3. Do not connect, repair, or inspect the unit while connected to a power source. Failure to follow this instruction may result in electric shock or fire.

 4. Check 'Connections' before wiring. Failure to follow this instruction may result in electric shock or fire.

 5. Do not disassemble or modify the unit. Failure to follow this instruction may result in electric shock or fire.

- 1. When connecting the power/measurement input and relay output, use AWG 24(0.20mm²) to AWG 15(1.65mm²) cable and tighten the terminal screw with a tightening torque of 0.98 to 1.18N·m.

 Use proper cables for the rated load current.

 Failure to follow this instruction may result in fire or malfunction due to contact failure.

 2. Use the unit within the rated specifications.

 Failure to follow this instruction may result in fire or product damage.

 3. Use dry cloth to clean the unit, and do not use water or organic solvent.

 Failure to follow this instruction may result in electric shork or fire

- 3. Use ary cloth to clean the unit, and do not use water or organic solvent.

 Failure to follow this instruction may result in electric shock or fire.

 4. Do not use the unit in the place where flammable/explosive/corrosive gas, humidity, direct sunlight, radiant heat, vibration, impact, or salinity may be present.

 Failure to follow this instruction may result in fire or explosion.

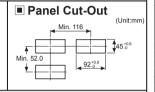
 5. Keep metal chip, dust, and wire residue from flowing into the unit.

 Failure to follow this instruction may result in fire or product damage.

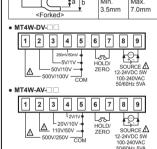
Front Panel Identification



HI: High output indication of preset 2 GO: GO output indication of preset 6 3 LO: Low output indication of preset 4 MIDDE MODE Key
 S 区划会 Control key
 Unit label part
 Where are no 1, 2, 3 output indication in Indication type.



Connections

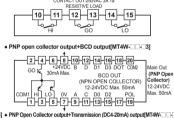


1 2 3 4 5 6 7 8 9 SOURCE 12-24VDC 5W 100-240VAC 50/60Hz 5VA HOLD/ ZERO 1 2 3 4 5 6 7 8 9

CONTAC

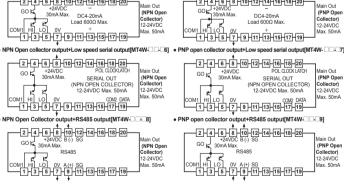
• MT4W-DA-

on>
y output+Transmission (DC4-20mA) output[MT4W-|---| • Relay output[MT4W-|---| MAIN OUT MAIN OUT CONTACT OUT:250VAC 3A 1a RESISTIVE LOAD 10 11 12 13 14 15 GO LO COM NPN Open Collector output+BCD output[MT4W-□ □-□2] 22 4 6 8 16 16 12 12 14 16 18 20 30 17 30 10 10 3 DOT COM2 30 10 A Max. (NPN OPEN COLLECTOR) 12 2 4 10 C DO 2 POL 1 3 5 7 1 9 11 13 15 17 19

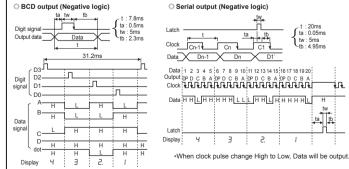


2 4 6 8 10 12 14 16 18 20

2 4 8 8 10 12 14 16 18 20 - 24 VOC DC4-20mA Load 600Ω Max. DC4-20mA 13 15 17 19 - 11 13 15 17 19 NPN Open collector output+Low speed serial output[MT4W-□ -- 6] 2 4 6 8 10 12 14 16 18 20 POL CLOCKLATCH

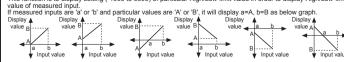


Time Chart Of Serial Output And BCD Output



■ Prescale Function [PA1: H-5E/L-5E]

This function is to display setting (-1999 to 9999) of particular High/Lov



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-5E set value
d-LL	Flashes when display input is exceeded L-5E set value
F-HH	Flashes when input frequency is exceeded the max. display value of measured range
ouEr	Flashes when it exceeds zero range (±99)

Error display is released automatically when it is in the measured and display range.
**LLLL' is displayed when the measured input is 4-20mA.
**After flashing 'OVER' 2 times when it exceeds the area range. when it exceeds the zero range, it returns to RUN mode.

*The above specifications are subject to change and some models may be discontinued without notice.
*Be sure to follow cautions written in the instruction manual and the technical descriptions (catalog, homepage).

■ Specificat	ions				
Model	MT4W4	MT4W1			
Power supply	100-240VAC∼ 50/60Hz	12-24VDC==			
Allowable voltage range	90 to 110%				
Power consumption	5VA	5W			
Display method	7 Segment LED display (red) (Character heigh	nt: 14.2mm)			
	23°C±5°C - DC Type: F.S.±0.1% rdg±2digit / AC Type: F.S.±0.3% rdg±3digit				
Display accuracy	DC/AC Type: F.S.+0.3% rdg +3digit max. only for 5A terminal				
	-10°C to 50°C - DC/AC Type: F.S.±0.5% rdg±3	digit			
Input	DC Voltage/Current, AC Voltage/Current, AC F	requency			
Max. allowable input	110% for each measured input range				
A/D conversion method	Practical over sampling using successive appr	roximation ADC.			
Sampling cycle	DC type: 50ms, AC type: 16.6ms	·			
Max. indication range	-1999 to 9999 (4digit)				
Preset output	• Relay output - Contact capacity: 250VAC~ 3A, 30VDC= 3A/Contact composition: N.O (1a)				
riesei ouipui	NPN/PNP Open Collector output - 12-24VDC== ±2V 50mA Max. (Load resistance)				
	• RS485 communication output - Baud rate:1200/2400/4800/9600, Communication method: 2-wire half				
Sub output	duplex, Synchronous method: Asynchronous method, Protocol: Modbus type				
(Transmission output)					
	• DC4-20mA output - Resolution: 12,000 division (Load resistance max. 600Ω), Response time:Max. 450ms				
Insulation resistance	Over 100MΩ (at 500VDC megger) between external terminal and case				
Dielectric stength	2,000VAC for 1minute between external terminal and case				
Noise immunity	±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 X, Y, Z direction for 2 hours				
Malfunction	0.5mm amplitude at frequency of 10 to 55Hz (for 1 min) in each X, Y, Z direction for 10 min				
Shock Mechanical	100m/s² (approx. 10G) in each X, Y, Z direction				
Malfunction	300m/s² (approx. 30G) in each X, Y, Z direction for 3 times				
Relay Mechanical	Min. 20,000,000 operations				
life cycle Malfunction	Min. 100,000 operations (250VAC 3A Load current)				
Ambient temperature	-10 to 50°C, Storage: -20 to 60°C				
-ment Ambient humidity	35 to 85%RH, Storage: 35 to 85%RH				
Inculation type	Double insulation or reinforced insulation				
Insulation type	(Mark: 🔲 , dielectric strength between the measuring input part and the power part: 1kV)				
Approval	(€ c 91) _{us}	C€			

■ Measurement Input [PA 1: | n-r]

※1: The weight includes packaging. The weight in parenthesis is for unit only.
※ Environment resistance is rated at no freezing or condensation.

	Measured in	nut	Input	1				
Туре	and range	put	impedance	Display range [5tnd]	Pre	escale Dis	splay range [5[AL]	
	0-500V	[500]	4.33ΜΩ	0.0 to 500.0 (fixed)				
	0-100V	[1000]	4.33ΜΩ	0.0 to 100.0 (fixed)				
	0-50V	[50]	433.15kΩ	0.00 to 50.00 (fixed)	7	dot	Display range	
DC Volt	0-10V	[100]	433.15kΩ	0.00 to 10.00 (fixed)	7 H	n	-1999 to 9999	
DC VOIL	0-5V	[50]	43.15kΩ	0.000 to 5.000 (fixed)	□ ŀ			
	0-1V	[10]	43.15kΩ	0.000 to 1.000 (fixed)]	0.0	-199.9 to 999.9	
	0-250mV	[0250]	2.15kΩ	0.0 to 250.0 (fixed)] L	0.00	-19.99 to 99.99	
	0-50mV	[50ñu]	2.15kΩ	0.00 to 50.00 (fixed)		0.000	-1.999 to 9.999	
	0-5A	[58]	0.01Ω	0.000 to 5.000 (fixed)] ([(Display range is variable according to decimal point position.)		
	0-2A	[28]	0.01Ω	0.000 to 2.000 (fixed)				
	0-500mA	[0.5 A]	0.1Ω	0.0 to 500.0 (fixed)			, , ,	
DC	0-200mA	[D28]	0.1Ω	0.0 to 200.0 (fixed)				
Ampere	0-50mA	[505A]	1.0Ω	0.00 to 50.00 (fixed)		Connect to the input terminals whos 30% to 100% of the input range includs the max. value of the input range to measure. When the max. input value is under the 30% of the input terminal range, display accuracy is degraded. When the max. input value is over the 100%, it may result in input terminal damage.		
	4-20mA	[4-20]	1.0Ω	4.00 to 20.00 (fixed)				
	0-5mA	[5ñR]	10.0Ω	0.000 to 5.000 (fixed)				
	0-2mA	[855]	10.0Ω	0.000 to 2.000 (fixed)				
	0-500V	[500]	4.98ΜΩ	0.0 to 500.0 (fixed)				
	0-250V	[2500]	4.98ΜΩ	0.0 to 250.0 (fixed)				
	0-110V	[110P]	1.08ΜΩ	0.0 to 440.0 (fixed)	١ ١			
AC Volt	0-50V	[50]	1.08ΜΩ	0.00 to 50.00 (fixed)				
AC VOIL	0-20V	[200]	200kΩ	0.00 to 20.00 (fixed)	T t			
	0-10V	[100]	200kΩ	0.00 to 10.00 (fixed)				
	0-2V	[20]	20kΩ	0.000 to 2.000 (fixed)	T		0 to 440)/// 1001 of	
	0-1V	[10]	20kΩ	0.000 to 1.000 (fixed)		XIn case of 0 to 110V [
	0-5A	[58]	0.01Ω	0.000 to 5.000 (fixed)			itial transformer) for	
	0-2.5A	[2.5 A]	0.01Ω	0.000 to 2.500 (fixed)		440V/110VAC, if 110V is input, and the unit displays 440V		
	0-1A	[IR]	0.05Ω	0.000 to 1.000 (fixed)				
AC Ampere	0-500mA	[0.5 A]	0.1Ω	0.0 to 500.0 (fixed)		automatically by preset scale		
Ampere	0-250mA	[025A]	0.1Ω	0.0 to 250.0 (fixed)	١ ١	alue for l	P.T user's convenient.	
	0-100mA	[D. IR]	0.5Ω	0.0 to 100.0 (fixed)	1			
	0-50mA	[505R]	0.5Ω	0.00 to 50.00 (fixed)				
	HHH" or "LLLL	" is flashes	with a certain m	neasurement input, disconne	ct pov	ver supply	and then check the cabl	

■ Display Cycle Delay Function [PA 2 : at 5.£]

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 a! 5.k. 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 Value Function

DISPIAY VAILE FUNCTION

[PA 0: HPELL.PEL.PA 2: PELL.]

It monitors Max.Min. display value based on the current displays value and then displays the data at HPEL.LPEL of parameter 0. Set the delay time (0 to 30 sec) at PELL 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 30 sec and it starts to monitor the peak value after the set time. When pressing any one of ⑤ ※ A key at HPELL LPEL of parameter 0, the monitored data is nitialized.

XMonitoring function is not displayed when the delay time is set as "D0 5" at FELL of parameter 2.

Current Output (DC4-20mA) Scale adjustment function

[PA 2: F5-H/F5-L]
It sets current output for the display value at the current output DC 4-20mA.
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% FS.
(When it sets as under 10% FS., it changed as over 10% FS. 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.

4mA

Error Correction Function

EFFOR Correction Function

[PA 1: In b.H IIn b.L]

It corrects display value error of measured input.

In b.L: ±99 [Adjust deviation of low value]

In b.H: 5.000 to 0.100 [Correct gradient (%) of high value]

Diplay value= (Measured value × In b.H) + In b.L

When the measured range is 0 to 500V, and the display range is 0 to 500V. If the low display value is "I.2" to 0V input, set -12 as the InbL value to display "0.0" by adjusting the offset of the low value. If this display value is "50 I.0", calculate 500.0/5010 (the desired display value) the display value, and set the 0.998 correction value as the InbL value; "0.0" by adjusting the offset of the low value. If this display value is the 500V measured input varies by adjusting the offset of the low value. If this display value is the 500V measured input varies by adjusting the offset of the low value. If this display value is the 500V measured input varies by adjusting the gradient of the logh value.

MT4W-DV/AV 500 ** Flash twice in order and it returns to RUN mode ■ AC Frequency Measurement

Initialization Function

This function is to initialize parameter as factory difault.

Press (4+ + A for over 5 sec

Function [PA1: di 5P]

It measures input signal frequency when it is AC input. It uses fixed decimal point[PA1:doE], measured range can be changed by setting and measured range of decimal point position is as below chart. 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 measured range should be supplied. Please select the proper point of measurement terminal.

 Measured 	range				
Decimal point position	0.000	0.00	0.0	0	
Measurement	0.100 to		0.1 to	1 to	
range	9.999Hz	99.99Hz	999.9Hz	9999Hz	
(2) Inb.H: 00.100 to 9.999 [Gradient adjustment of high value]					
③ I nb.E: 10 ⁻² , 10 ⁻¹ , 10 ⁻⁰ , 10 ¹ [Index adjustment of I nb.H]					

Zero Adjustment Function

peration	-tion value	Front side key	signal	
	PR I: Direct input correction value method at I nb.L.	key for 3sec	Short-circuit external Hold terminal no. 6, 7 over min. 50m.	
Refer to description " From Correction Function". " From				

Display Function", " Parameter 2" for function and error.

igh value. K The offset correction range of $I \cap BL$ is within -99 to 99 for D^0 , D^{-1} digit regardless of dicimal point.

It adjusts the indication value of the optional configured input value as zero by force, zero point error can be 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.

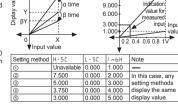
Operation	-tion value	Front side key	signal
	input correction value method	key for 3sec	Short-circuit external Hold terminal no. 6, 7 over min. 50m.
Refer to	description "	rror Correction I	Function", " Er

■ Gradient Correction Function [PA 1: Ind.H] Dipla

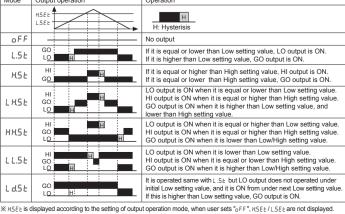
It corrects the gradient of prescale value and display value. (Picture 1) Display value Y can be used as α , β times against X input value by correction function [$I \cap BH$] and used as correction function of max. display value[H = SC]. Adjustment range is 0.100 to 5.000 and multiply current Ex)Input:200mVDC, Display:3.000 for MT4W-DV type

©Select 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 [# -5£] for 1VDC (Input) in order to display 3.000 for DC200mV (Input). But it is unable due to setting range is 9.999 In this case, please check below char Please set as I ab.H x H-5[= 15.000



■ Preset Output Mode [PA 2 : oUt.t]



■ Startup Compensation Timer Function[PA 2:5 LRL]

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	Display		Function	Note	
PR I	In-E	Input type	Selectable RMS/AVG in AC type	Available AC type only.	
	In-r	Input range	Selection of input range	_	
	d1 5P	Display	Selection of display type	Setting range: 5tnd, 5CRL, FrE9	
	Stnd	Standard	Standard scale range	Display Max. display value of 5 End	
		Frequency	Frequency display	Available AC type only.	
	SERL	Scale	Scale range	These are displayed at 5 ERL	
	H-50	High scale	Set max. value of display range	It sets max. display value/min. display value	
(Parameter 1)	L-5[Low scale	Set min. value of display range	(-1999 to 9999)	
(r didiriotor i)	dot	Dot	Set decimal point position	It is dispayed at 5 CRL IF r E9 only and set the decimal point position	
	I nb.H	Input bias high	Correct High-limit value of display value	5End/5ERL: 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	Setting range: -99 to +99	
	I nb.E	Input bias exponent	Set display index of frequency mode	Setting range: 10 ⁻² , 10 ⁻¹ , 10 ⁰ , 10 ¹	
	o U Ł.Ł	Out type	Set operation mode of preset output	Setting range: aff, L.5E, H.5E, L.H.5E, HH.5E, LL.5E, L.d.5E	
	H95	Hysteresis	Set hysteresis value	Setting range: 1 to 10% F.S.	
	SERE	Startup compen -sation time	Set startup compensation time.	Setting range: 00 to 99.9sec	
	P E Ł.Ł	Peak time	Set monitoring delay time for peak value (sec)	Setting range: 00 to 30sec	
	d1 5.E	Display time	Set sampling time (sec)	Setting range: 0.1 to 5.0 sec (Variable by 0.1sec)	
PR2	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	
(Parameter 2)	Euln	Event Input	Set external terminal (6, 7) function	HoLd: Use external terminal as Hold terminal EEro: 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%	
	Adr5	Address	Set communication address	Setting range: 01 to 99	
	6P5	Bit per second	Set baudrate (bps)	Setting range: 1200, 2400, 4800, 9600	
	LoC	Lock	Set lock function	Setting range: off, Lo[1, Lo[2, Lo[3	
	H.5 E Ł	High set	Set High setting value	Setting range can be set within the display	
PA 0	L.SEE	Low set	Set Low setting value	range of SEnd/SERL	
(Parameter 0)	H.P E Ľ	High peak	Max. value by data monitoring	Initializes the monitored data value by	
	1000	Low peak	Min. value by data monitoring	pressing any one of (keys.	



Parameter Setting

Parameter Setting

Press № DOE key in RUN mode and it enters PA 0 group.

Press № DOE key for over 3 sec in RUN mode, it displays [PR I] after [PR I].

When pressing № DOE key for over 5 sec in RUN mode, it displays [PR I] after [PR I].

When pressing № DOE key for over 5 sec in RUN mode, it displays [PR I] after [PR I].

When pressing № DOE key for over 5 sec in RUN mode, it displays [PR I] after [PR I].

When pressing № DOE key continually, it stops displaying at [PR I].

When pressing № DOE key continually, it stops displaying at [PR I].

When pressing № DOE key continually, it stops displaying at [PR I].

When pressing № DOE key continually, it stops displaying at [PR I].

When pressing № DOE key continually, it stops displaying at [PR I].

When pressing № DOE key continually, it stops displaying at [PR I].

When pressing № DOE key continually, it stops displaying at [PR I].

When pressing № DOE key for over 3 sec in RUN whole, it stops displaying at [PR I].

When pressing № DOE key for over 3 sec in RUN whole, it stops displaying at [PR I].

When pressing № DOE key for over 3 sec in RUN whole, it stops displaying at [PR I].

When pressing № DOE key for over 3 sec in RUN whole, it stops displaying at [PR I].

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When pressing № DOE key for over 3 sec in RUN whole, it stops displaying at [PR I].

When pressing № DOE key for over 3 sec in RUN whole, it stops displaying at [PR I].

Parameter 0



It displays High-limit monitoring value

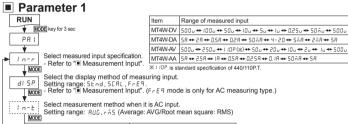
HPEL (High peak) in RUN mode.

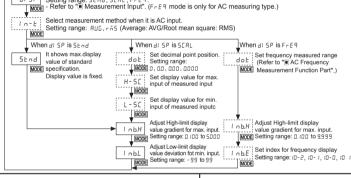
It is initialized by pressing any one of It displays High-limit monitoring value

LPEE! (Low peak) in RUN mode.

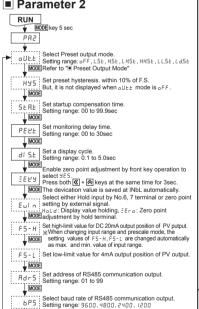
It is initialized by pressing any one of

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Parameter 2



mode, the saved setting value is displayed. Setting value value value Press one Press one Value 0.5 Section 0.5 S 4. Change the setting value by or key when

setting value flashes.

Ex) Change AC type measured input from 250V to 125V.

Setting 250V to 125V. Setting value value 250u 125u

Change The Parameter

Advance to the parameter to be changed when pressing MODE key continuously in RUM mode and releasing MODE key at the parameter. (Refer to "III Parameter Setting")

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

Setting Value

di SP 5. When confitming the setting value with MODE key, the changed setting value flashes twice

and enters into the next setting 6. It returns RUN mode from parameter by pressing MODE key for 3 sec

User Manual For Communication

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

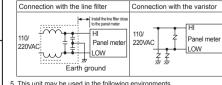
Cautions during Use

Set key lock function and select from 4 kinds. Setting range: off, LoC 1, LoC2, LoC3

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

Follow instructions in "Cautions during Use". Otherwise, It may cause unexpected accidents.
 12-24VDC power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
 Install a power switch or circuit breaker in the easily accessible place for supplying or disconnecting the power.
 In case installing power line and input signal line closely, use line filter or varistor at power line and shielded with the closely.

put signal line. Io not use near the equipment which generates strong magnetic force or high frequency noise



5. This unit may be used in the following environments. ①Indoors (in the environment condition rated in 'Specifications') ②Altitude max. 2,000m 3Pollution degree 2 (4) Installation category II

Major Products

- Photoelectric Sensors Temperature Controllers
 Fiber Optic Sensors Temperature/Humidity Transducers
 Door Sensors SSRs/Power Controllers
 Counters
 Area Sensors Timers
- Area Sensors

 Proximity Sensors

 Pressure Sensors

 Rotary Encoders

 Connector/Sockets

 Switching Mode Power Supplies

 Control Switches/Lamps/Buzzers

 VO Terminal Blocks & Cables

 Stepper Motors/Drivers/Motion Controllers

 Selsor Controllers

 Selsor Controllers

 Selsor Control Switches/Lamps/Buzzers

 VO Terminal Blocks & Cables

 Stepper Motors/Drivers/Motion Controllers

 Field Network Devices

 I aser Marking System (Fiber, Co., Nd; YAG)
- Laser Marking System (Fiber, Co₂, Nd: YAG)
 Laser Welding/Cutting System
- HEADQUARTERS:

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Autonics Corporation

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