

# Autonics PANEL METER MT4W SERIES

**M A N U A L**



It indicates an upgraded part.



Thank you very much for selecting Autonics products. For your safety, please read the following before using.

## Caution for your safety

- \*Please keep these instructions and review them before using this unit.
- \*Please observe the cautions that follow:
- Warning** Serious injury may result if instructions are not followed.
- Caution** Product may be damaged, or injury may result if instructions are not followed.
- \*Refer to an explanation of the symbols used in the operation manual.
- ▲caution: Injury or danger may occur under special conditions.

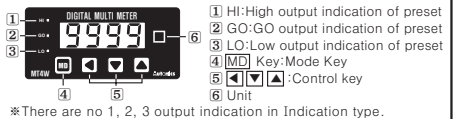
## Warning

- In case of using this unit with machineries(Nuclear power control, medical equipment, vehicle, train, airplane, combustion apparatus, entertainment or safety device etc.), it requires installing fail-safe device, or contact us for information on type required. It may result in serious damage, fire or human injury.
- It must be mounted on Panel. It may give an electric shock.
- Do not connect terminals when it is power on. It may give an electric shock.
- Do not disassemble and modify this unit, when it requires. If needs, please contact us. It may give an electric shock and cause a fire.
- Please check the number of terminal when connect power line or measuring input. It may cause a fire.

## Caution

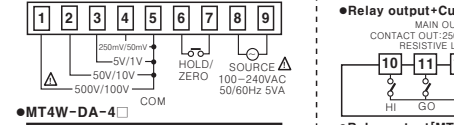
- This unit shall not be used outdoors. It might shorten the life cycle of the product or give an electric shock.
- When wire connection, No.20AWG(0.50mm<sup>2</sup>) should be used and screw bolt on terminal block with 0.74N·m to 0.90N·m strength. It may result in malfunction or fire due to contact 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 oil-based detergent. It might cause an electric shock or fire that will result in damage to the product.
- Do not use this unit at place where there are flammable or explosive gas, humidity, direct ray the sun, radiant heat, vibration, impact etc. It may cause explosion.
- Do not inflow dust or wire dregs into inside of this unit. It may cause a fire or mechanical trouble.
- Please connect properly after checking the polarity of measuring terminals. It may cause a fire or explosion.

## Front panel identification

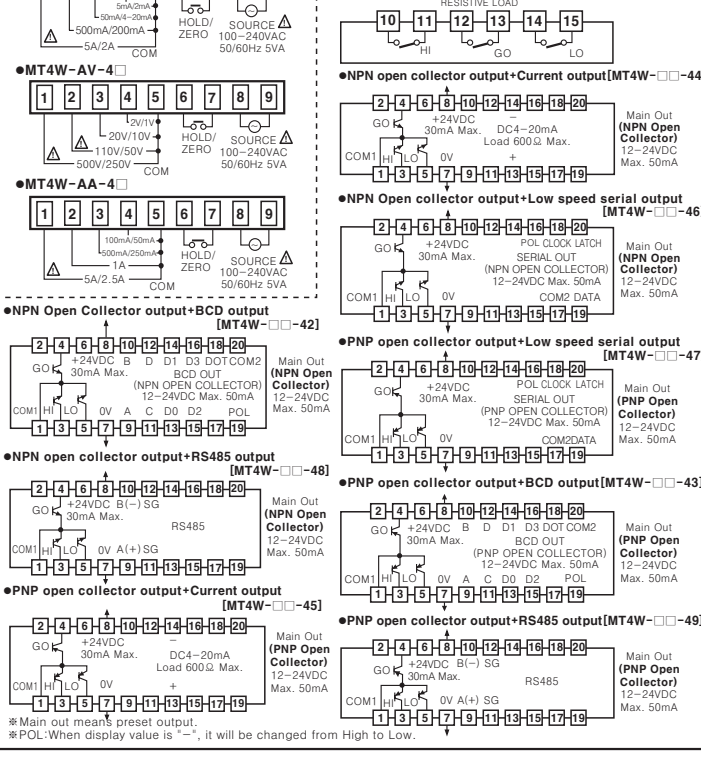


\*There are no 1, 2, 3 output indication in Indication type.

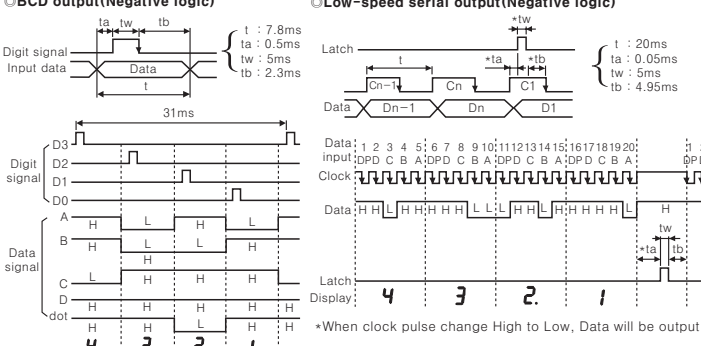
## Panel cut-out



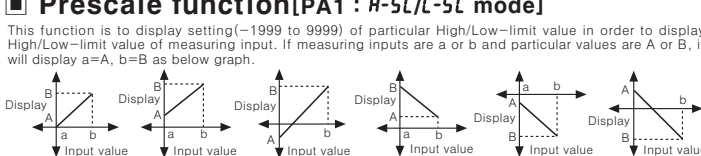
## Terminal connection



## Time chart of serial output and BCD output



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



## Error display function

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

\*The above specification are changeable without notice anytime.

## Specifications

| Series                           | MT4W  |  |
|----------------------------------|---|--|
| Power supply                     | 100~240VAC 50/60Hz(90 to 110% of rated voltage)   |  |
| Power consumption                | 5VA   |  |
| Display method                   | 7Segment LED Display(Red)   |  |
| Display accuracy                 | 23°C ±5°C<br>35~85%RH   | DC Type: Voltage/Current: ±0.1% F.S. ±2Digit<br>AC Type: Voltage/Current: ±0.3% F.S. ±3Digit, Frequency: ±0.1% F.S. ±2Digit                        |
| Input                            | -10°C~50°C  | DC/AC Type: Voltage/Current: ±0.5% F.S. ±3Digit, Frequency: ±0.6% F.S. ±2Digit<br>When ±1.0% F.S. ±3Digit only for 5A terminal of MT4W-DA, AA Type |
| Max. input                       | 110% for input spec.  |  |
| A/D conversion method            | Succession approximation method+Double integral method  |  |
| Sampling cycle                   | 50ms(DC), 16.6ms(AC 60Hz)   |  |
| Max. indication range            | 1/12.000  |  |
| Max. indication digit            | -1999~9999(4Digit)  |  |
| Preset output                    | <ul style="list-style-type: none"> <li>Relay output: Contact capacity: 250VAC 3A, 30VDC 3A/Contact composition: N.O(1a)</li> <li>NPN/PNP Open Collector output: 12~24VDC ±2V 50mA Max. (Load resistance)</li> </ul>   |  |
| Sub output (Transmission output) | <ul style="list-style-type: none"> <li>RS485 communication output: Baud rate: 1200/2400/4800/9600, Transmission method: 2-wires half duplex, Transmission code: ASCII Codes (8BIT), Tuning method: Sub-synchronization, Protocol: Modbus type</li> <li>Serial/BCD output: NPN Open collector output, 12~24VDC Max. 50mA (Resistive load)</li> <li>4~20mA output: Resolution: 8000 division (Load resistance max. 600Ω)</li> </ul> |  |
| AC measuring function            | Selectable RMS or AVG   |  |
| Frequency measuring function     | Measurement range: 0.100~9999Hz(Fixed decimal point type)   |  |
| Hold function                    | Outer hold function   |  |
| Ambient temperature              | -10~50°C (at non-freezing status)   |  |
| Storage temperature              | -20~60°C (at non-freezing status)   |  |
| Ambient humidity                 | 35~85%RH  |  |

## Specification and range

| Type      | Measuring input and range | Input impedance | Standard [5end]    | Prescale [SCAL]          |
|-----------|---------------------------|-----------------|--------------------|--------------------------|
| DC Volt   | 0~500V [500u]             | 4.33315MΩ       | 0.0~500.0(Fixed)   | Display range [Variable] |
|           | 0~100V [100u]             | 4.33315MΩ       | 0.0~100.0(Fixed)   |                          |
|           | 0~50V [50u]               | 433.15kΩ        | 0.0~50.0(Fixed)    |                          |
|           | 0~10V [10u]               | 43.315kΩ        | 0.0~10.0(Fixed)    |                          |
|           | 0~5V [5u]                 | 4.3315kΩ        | 0.0~5.000(Fixed)   |                          |
|           | 0~1V [1u]                 | 433.15kΩ        | 0.000~1.000(Fixed) |                          |
|           | 0~250mV [0.25u]           | 2.15kΩ          | 0.00~250.0(Fixed)  |                          |
|           | 0~50mV [50m]              | 2.15kΩ          | 0.00~50.00(Fixed)  |                          |
|           | 0~5A [5A]                 | 0.01Ω           | 0.000~5.000(Fixed) | -1999~9999(Variable)     |
|           | 0~20mA [20A]              | 0.01Ω           | 0.000~2.000(Fixed) | -1999~9999(Variable)     |
| DC Ampere | 0~500mA [0.5A]            | 0.1Ω            | 0.00~500.0(Fixed)  | -1999~9999(Variable)     |
|           | 0~200mA [0.2A]            | 0.1Ω            | 0.00~200.0(Fixed)  | -1999~9999(Variable)     |
|           | 0~50mA [0.05A]            | 1.0Ω            | 0.00~50.00(Fixed)  | -1999~9999(Variable)     |
|           | 0~2mA [2mA]               | 10.0Ω           | 0.000~2.000(Fixed) |                          |
|           | 0~500V [500u]             | 4.987MΩ         | 0.0~500.0(Fixed)   |                          |
|           | 0~250V [250u]             | 4.987MΩ         | 0.0~250.0(Fixed)   |                          |
|           | 0~110V [110u]             | 1.087MΩ         | 0.0~440.0(Fixed)   |                          |
|           | 0~50V [50u]               | 1.087MΩ         | 0.0~50.00(Fixed)   |                          |
|           | 0~20V [20u]               | 200kΩ           | 0.00~20.00(Fixed)  |                          |
|           | 0~10V [10u]               | 200kΩ           | 0.00~10.00(Fixed)  |                          |
| AC Volt   | 0~20V [20u]               | 200kΩ           | 0.00~20.00(Fixed)  |                          |
|           | 0~10V [10u]               | 200kΩ           | 0.00~10.00(Fixed)  |                          |
|           | 0~2V [2u]                 | 20kΩ            | 0.000~2.000(Fixed) |                          |
|           | 0~1V [1u]                 | 20kΩ            | 0.000~1.000(Fixed) |                          |
|           | 0~5A [5A]                 | 0.01Ω           | 0.000~5.000(Fixed) |                          |
|           | 0~2.5A [2.5A]             | 0.01Ω           | 0.000~2.500(Fixed) |                          |
|           | 0~1A [1A]                 | 0.05Ω           | 0.000~1.000(Fixed) |                          |
|           | 0~500mA [0.5A]            | 0.1Ω            | 0.0~50.0(Fixed)    |                          |
|           | 0~250mA [0.25A]           | 0.1Ω            | 0.00~250.0(Fixed)  |                          |
|           | 0~100mA [0.1A]            | 0.5Ω            | 0.00~100.0(Fixed)  |                          |
| AC Ampere | 0~50mA [0.05A]            | 0.5Ω            | 0.00~50.0(Fixed)   |                          |

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

\*Please connect proper terminal with max. input voltage is in 30~100% of the input voltage. When it is bigger than input voltage, it cause the terminal breakdown and over-range indication. The accuracy is decreased when it is connected to the terminal under 30%.

## Display cycle delay function [PA 2: d15t mode]

It is difficult to read as display value follows the measuring input value. Display when the measuring input value is fluctuating. In this case it is able to make display value stable by delaying display cycle. Display cycle displaying time can be changed in d15t mode of Parameter 2. If select 4.0s, the display value is displayed every 4sec. averaging input value for 4sec.

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

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

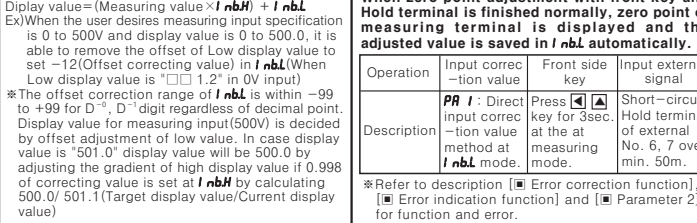
\*Monitoring function is not indicated when set the PEk.1 of parameter 2 as "0".

## Initialization function

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

## Current output (DC4~20mA) Scale adjusting function [PA2: FS-H / FS-L mode]

It set current output for preset indication value at the current output DC4~20mA. It set output indication value for 4mA and 20mA. Min. setting range between FS-H(FS-H) and FS-L(FS-L) is 10% F · S. (When it set as under 10% F · S, it changed as over 10% F · S automatically.) Preset indication value is outputted fixedly as 4mA at under FS-L and 20mA at over FS-H.



## 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))  
Display value = (I nbH) × (Input value) + (I nbL)

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 "0" 1.2" in 0V input)

The offset correction range of I nbL is within -99 to +99 for "0". "D" digit regardless of decimal point. Display value for measuring input(500V) is decided by offset adjustment of low value. In case display value is "501.0" display value will be 500.0 by adjusting the gradient of high display value if 0.998 of correcting value is set at I nbH by calculating 500.0/501.1(Target display value/Current display value)

## Adjusting zero point function

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

When zero point adjustment with front key and Hold terminal is finished normally, zero point of measuring terminal is displayed and the adjusted value is saved in I nbL automatically.

| Operation                           | Input correction value    | Front side key                                   | Input external signal   |
|-------------------------------------|---------------------------|--|---|
| PA 1: Direct input correction value | Method at measuring mode. | Press [PEL] key for 3sec. at the measuring mode. | Short-circuit Hold terminal of external No. 6, 7 over min. 50m. |

## 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 used 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 type

- Select 0~1VDC for measuring input in Parameter 1.
- Standard specification in input: 0~1VDC 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.

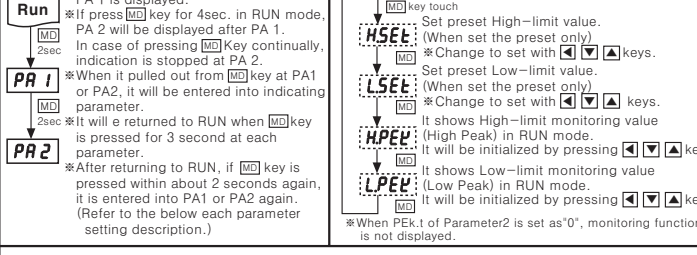
Please set as  $1 \text{ nbH} \cdot \text{H-5C} = 15.000$

\*HSEt will be displayed from the setting of output operation mode, when user set "oFF", HSEt/LSEt does not displayed.

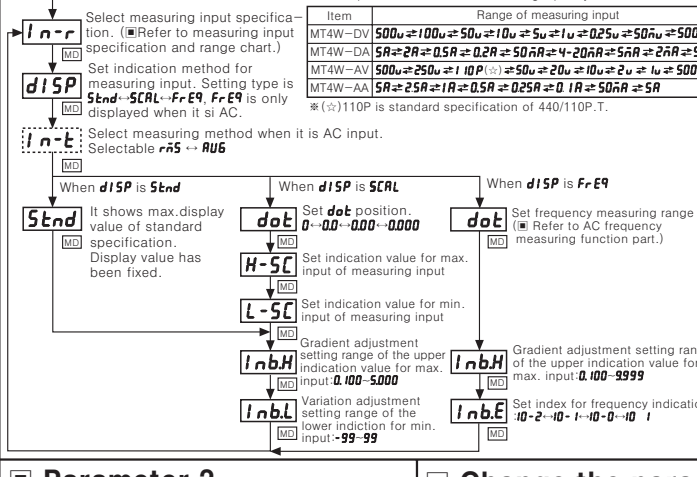
## Parameter

| Parameter | Display             | Function                                      | Note  |
|-----------|---------------------|---|---|
| I n-r     | Input type          | Selectable RMS/AVG in AC type                 | Indication in AC type only  |
| I n-r     | Input range         | Selection of input range                      |   |
| d15P      | Display             | Selection of indication type                  | Selectable 5end / SCAL / FrE9   |
| 5end      | Standard            | Standard scale range                          | Display Max. display value of 5end  |
| FrE9      | Frequency           | Frequency display                             |   |
| SCAL      | Scale               | Scale range                                   | These mode indicates at SCAL. It sets max. display value / min. display value (-1999 to 9999)                 |
| H-5C      | High scale          | Set max. value of display range               |   |
| L-5C      | Low scale           | Set min. value of display range               |   |
| dot       | Dot                 | Set Dot position                              | Display only SCAL/FrE9 describe position  |
| I nbH     | input bias high     | Compensate High-limit value of display value  | SCAL/Correction range 0.100~5.000 FrE9: Correction range 0.100~9.999  |
| I nbL     | input bias low      | Compensate Low-limit value of display value   | Set range: -99 to +99   |
| I nbE     | input bias exponent | Set indication index of frequency mode        | Set range: 10 <sup>-1</sup> / 10 <sup>0</sup> / 10 <sup>1</sup>   |
| oUte      | Out type            | Set operation mode of preset output           | Selectable oFF/LL/SL/HL/SH/ST/LL/SL/Ld/ST   |
| HYS       | Hysteresis          | Set hysteresis value                          | Setting range: 1~10% F · S  |
| PEEL      | Peak time           | Set monitoring delay time for peak value(sec) | Setting range: 00sec ~ 30sec  |
| d15t      | Display time        | Set sampling time(sec.)                       | Variable by 0.1sec unit of 0.1~5.0sec   |
| ZEZY      | Zero Key            | Set usage of front side zero adjustment key   | No: Set usage of front side zero adjustment key<br>Yes: Usage of front side zero adjustment key               |
| Eu In     | Event Input         | Set external terminal(6, 7) function          | Hold: Use external terminal as Hold terminal<br>Zero: Use external terminal as zero point adjustment terminal |
| FS-H      | Full scale High     | Set the upper value output point or PV output | Min. set range: Min. 10% F · S  |
| FS-L      | Full scale Low      | Set the lower value output point or PV output | Max. set range: Max. FS-H 10%   |
| AdrS      | Address             | Set communication address                     | Set range: 001~255  |
| bPS       | Bit per second      | Set baudrate(bps)                             | Selectable 1200/2400/4800/9600  |
| LoC       | Lock                | Set lock function                             | Selectable oFF/Loc1/Loc2/Loc3   |
| HSEt      | High set            | Set High setting value                        | Setting range can be set within indication range of 5end/SCAL   |
| LSEt      | Low set             | Set Low setting value                         |   |
| HPEL      | High peak           | Max. value by data monitoring                 | Return to initial status by pressing [PEL] key  |
| LPEL      | Low peak            | Min. value by data monitoring                 |   |

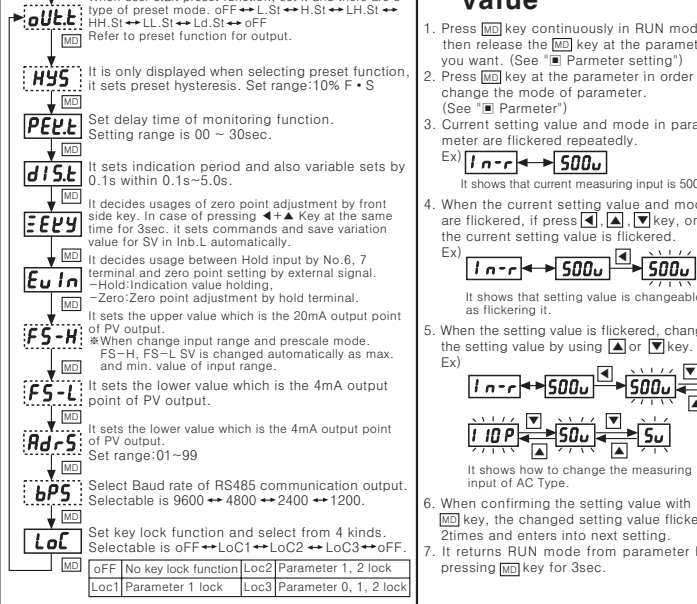
## Parameter setting



## Parameter 1



## Parameter 2



## Change the parameter setting value

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

## Caution for using

- Allowable installation environment
  - ① If shall be used indoor
  - ② Pollution Degree 2
  - ③ Altitude Max. 2000m
  - ④ Installation Category II.
- Please use the terminal(M3.5, Max. 7.2mm) when connecting 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 this unit near by machinery making strong high frequency noise. (High frequency welder & Sewing machine, High capacity SCR unit etc.)
- When input applied, if "HHHH" or "LLLL" are displayed, it has some trouble with measuring input, please check the line after power off.
- Noise inflowing from power line can cause serious problem for DPM driving by AC power supply. Even though there is condenser for protecting noise between lines at primary side of power transformer, but it is very difficult to install protection components at small size product like DPM. Therefore, please use noise absorber circuit such as line filter, varistor in external lines when voltage failure is occurred by power relay, magnet S/W and high frequency equipment are operated in same line or surge is occurred by spark of high voltage or the user etc.

## Main products

- COUNTER
- TIMER
- TEMPERATURE CONTROLLER
- PANEL METER
- TACHO/LINE SPEED/PULSE METER
- DISPLAY UNIT
- PROXIMITY SENSOR
- PHOTOELECTRIC SENSOR
- FIBER OPTIC SENSOR
- PRESSURE SENSOR
- ROTARY ENCODER
- SENSOR CONTROLLER
- POWER CONTROLLER
- STEPPING MOTOR & DRIVER & CONTROLLER
- LASER MARKING SYSTEM(CO<sub>2</sub>, Nd:YAG)

**Autonics Corporation**  
<http://www.autonics.com>  
**Satisfiable Partner For Factory Automation**

**HEADQUARTERS**  
 #1-5, Tongdang-ri, Ulsang-eup, Yangsan-si, Gyeongsang, 626-847, Korea

**INTERNATIONAL SALES :**  
 Bldg. 402 3rd Fl., Bucheon Techno Park, 193, Yakdae-dong, Wonnig-gu, Bucheon-si, Gyeonggi-do, 420-734, Korea  
 TEL: 82-32-616-2730 / FAX: 82-32-329-0728  
 E-mail : sales@autonics.net

EP-KE-77-0009A