Autonics

PANEL METER
M4NN SERIES
M A N U A L

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

■ Caution for your safety

※Please keep these instructions and review them before using this unit.

※Please observe the cautions that follow;
⚠Warning Serious injury may result if instructions are not followed.
⚠Caution Product may be damaged, or injury may result if instructions are not followed.

※The following is an explanation of the symbols used in the operation manual.
⚠Caution: Injury or danger may occur under special conditions.

⚠ Warning

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 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

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, use AWG 20(0.50mm²) and tighten screw bolt on terminal block with 0.74 to 0.90N·m strength.**
   It may cause a malfunction or 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 oil-based detergent. And use dry cloth.**
   It may cause a fire and 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 mechanical malfunction.
8. **Please wire properly after checking the polarity of measurement terminals.**
   It may cause a fire or explosion.

■ Ordering information

M 4 N N – DV – 1 N

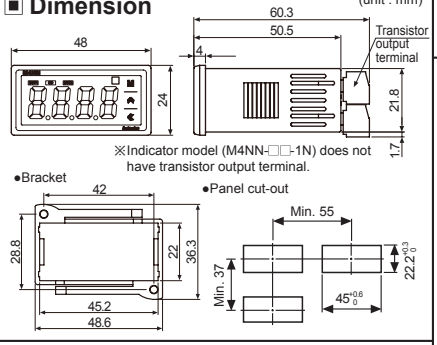
Control output	N	Indicator (without output function)
	1	NPN open collector output
	2	PNP open collector output
Power supply	1	5-24VDC
Input	DV	DC Voltage(minus input)
	DA	DC Current(minus input)
	AV	AC Voltage
	AA	AC Current
Type	N	New type
Size	N	DIN W48×H24mm
Digit	4	9999(4digit)
Item	M	Multi Meter

■ Panel identification

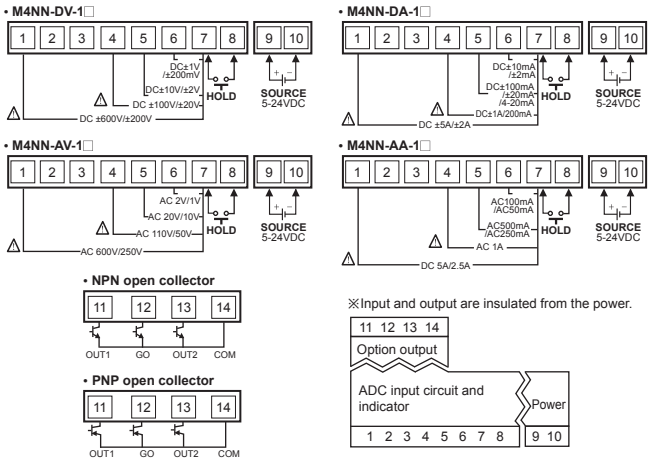
1. **Measured value display**
2. **Ⓜ :** MODE key
3. **▲ :** Up key
4. **◀ :** Shift key
5. **OUT1(Red):**
   OUT1 output indicator of preset
6. **GO(Green):**
   GO output indicator of preset
7. **OUT2(Red):**
   OUT2 output indicator of preset
8. **Unit sticker**

■ Dimension

(unit : mm)



■ Connections and insulated block diagram



■ Monitoring max./min. value [PA 0 group: HPEAK/LPEAK, PA 2 group: PEAK]

It monitors Max./Min. value of display value based on current display value and then display the data in HPEAK mode and LPEAK mode of parameter 0 group. Set delay time(0 to 30 sec.) in PEAK mode of parameter 2 group in order to avoid 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 set time.
When ◀ ▲ keys are pressed at HPEAK and LPEAK mode of parameter 0 group, it will be initialized.
※ HPEAK, LPEAK parameters are not displayed when monitoring delay time [PEAK] of parameter 2 group is set as as 0 sec. [00 S].

■ Minus input display setting [PA1 group: nInU]

- When minus input is unnecessary, or when display 0 not to display minus input due to display minus input due to unstable input value around 0, set oFF this minus input display function.
- When setting oFF, low-limit value of input range is set 0 and it displays minus input as 0.
- The low-limit value of L-SC, oU□L, L-rG parameters is changed based on "0". Min. display value is "0" and H-SC/H-rG parameters display max. value of the input range.
  The InbH/InbL/oU□t/HYS□/oU□H parameters are initialized to factory default.

※In case of DC Current measurement input model, when measured input range [In-r] is set as 4-20, this parameter is not displayed.

■ AC frequency measurement [PA1 group: dISP]

It measures input signal frequency when it is an AC input. It uses fixed decimal point by dot parameter setting of parameter 1 group, measured range can be changed by setting and measured range of decimal point position is as below chart. It is available to adjust upper gradient at InbH and InbE of parameter 1 group. 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

Decimal point position	0.0000	000.0	00.00	0
Measurement range	0.100 to 9.999Hz	0.10 to 99.99Hz	0.1 to 999.9Hz	1 to 9999Hz

※ Accuracy of frequency measurement: Below 1kHz, F.S. ±0.1rdg ±2digit. From 1 to 10kHz, F.S. ±0.3rdg ±2digit.
- InbH: 0.100 to 9.999 (gradient adjustment of high-limit value)
- InbE: 10^{-2}, 10^{-1}, 10^{0}, 10^{1} (index adjustment of InbH)

■ Error display

Display	Description
HHHH	Flashes when measured input is exceeded the max.allowable input(+110%)
LLLL	Flashes when measured input is exceeded the min.allowable input (minus input oN : -110%, oFF : -10%)
d-HH	Flashes when display input is exceeded max. display range (9999)
d-LL	Flashes when display input is exceeded min. display range (-1999)

Display	Description
F-HH	Flashes when input frequency is exceeded the max. measured range(10kHz) and display range (9999)
PF-H	Flashes when power factor display value to measured input is over than LAG 0.50
PF-L	Flashes when power factor display value to measured input is less than LEAD -0.50

※Error is cleared when the input value is within measurement range or display range.

※ The above specifications are subject to change without notice.

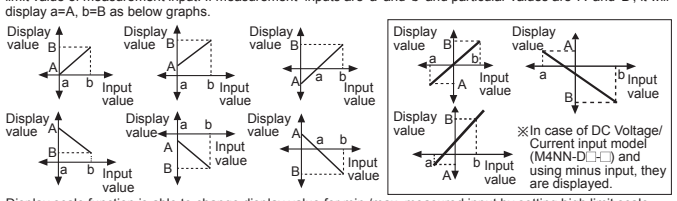
■ Specifications

Model	M4NN-DV-1□	M4NN-DA-1□	M4NN-AV-1□	M4NN-AA-1□
Power supply	DC Voltage	DC Current	AC Voltage, Frequency	AC Current, Frequency
Max. allowable input	-110 to 110% of each measured input range (when not using minus input: -10 to 110%)		Approx. 110% of each measured input range	
Power supply	5-24VDC			
Allowable voltage range	90 to 110% of the rated voltage (5V is fixed for lower limit)			
Power consumption	Max. 3W			
Display method	7 Segment LED Display(red), Character height : 11mm			
Display accuracy	In 23±5℃ - DC type: ±0.1% F.S. ±2digit, AC type : ±0.3% F.S. ±3digit ※ 5A terminal of DA, AA type: Within ±0.3% F.S. ±3digit In -10 to 50℃ - DC/AC type: ±0.5% F.S. ±3digit, Frequency: ±0.5% F.S. ±3digit ※ 5A terminal of DA, AA type: Within ±1% F.S. ±3digit			
Display cycle	0.1 to 5.0 sec. (selecatable by 0.1 sec.)			
A/D conversion method	Practical oversampling using successive approximation ADC			
Sampling cycle	50ms(resoultion 1/12,000)		16.6ms(resoultion 1/12,000)	
Max. display range	-1999 to 9999(4 digit)			
Preset output※1	NPN/PNP open collector output: Max. 12 to 24VDC ±2V 50mA(load resistance)			
AC measurement※2	—		Average value(AVG) measurement	
Frequency measurement※2	—		Measured range: 0.100 to 9999Hz (variable by decimal point position)	
Insulation resistance	Min. 100MΩ(at 500VDC megger)			
Dielectric strength	2000VAC for 1 minute (between external terminal and case)			
Noise resistance	±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		
	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/s²(approx. 10G) in X, Y, Z directions for 3 times		
	Malfunction	300m/s²(approx. 30G) in X, Y, Z directions for 3 times		
Environment	Ambient temp.	-10 to 50℃, storage: -20 to 60℃		
	Ambient humi.	35 to 85%RH, storage: 35 to 85%RH		
Connection type	Plug/Socket terminal block (accessory)			
Insulation type	Double insulation or reinforced insulation (mark: ⊡, Dielectric strength between the measuring input part and the power part : 1kV)			
Weight※3	Approx. 83.6g (approx. 46.8g)	Approx. 83.7g (approx. 46.7g)	Approx. 83.8g (approx. 46.9g)	Approx. 83.8g (approx. 46.9g)

※1: Indicator model(M4NN-□□-1N) does not have output function.
※2: AC, Frequency measurement functions are only for AC measurement type.
※3: The weight is with packaging and the weight in parentheses is only unit weight.
※Environment resistance is rated at no freezing or condensation.

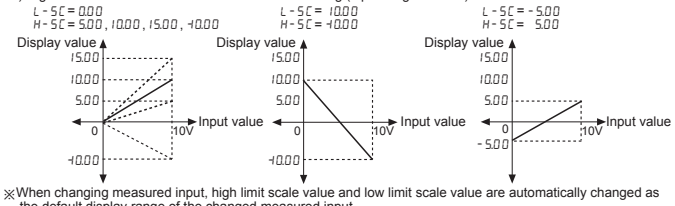
■ Prescale [PA1 group: H-SC/L-SC]

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



Display scale function is able to change display value for min./max. measured input by setting high limit scale H-SC and low limit scale L-SC in parameter 1 group.

Ex) High limit scale value and low limit scale value setting (input range= 0-10V)



※When changing measured input, high limit scale value and low limit scale value are automatically changed as the default display range of the changed measured input.

■ Error correction [PA 1 group: InbH/InbL]

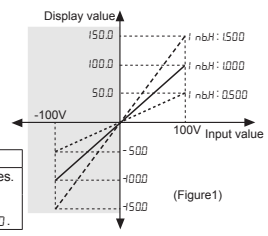
It corrects display value error of measurement input.
InbL : -99 to 99 (adjust deviation of low-limit value)
InbH : 0.100 to 9.999 (correct gradient of high-limit value)
Display value=(Measured value × InbH) + InbL
Ex) When the measured range is 0 to 500V, and the display range is 0 to 500.0. If the low display value is 12 to 0V input, set -12 as InbL value to display 0.0 by adjusting offset of the low-limit value.
The display value to 500V measured input varies by adjusting the offset of low-limit value. If this display value is 50.10, calculate 500.0/501.0 (desired display value/the display value), and set the 0.998 correction value as the InbH to display 5000 by adjusting gradient of high-limit value.
※ The offset correction range of InbL is within -99 to 99 for D^0, D^{-1} digit regardless of decimal point position [dot].
※ **High limit error correction function is available as "Gradient correction" and low limit error correction function is available as "Zero adjustment".**

■ Gradient correction [PA 1 group: InbH]

This function is to adjust gradient of standard display value or scale value for the input value within the measured input range. By adjusting gradient, it is available as "High limit error correction function".
As the below(Figure 1), in case of display gradient 1 for the measured input 100V, this function is to adjust display value by adjusting the gradient as 1.5 times or 0.5 times.
• Set range: 0.100 to 9.999, factory default: 1.000 (unit: multiply)

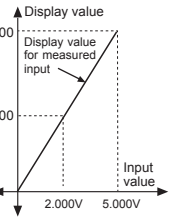
Ex1) Gradient adjustment
①When the measured input is 100.0V in order to display 150.0, set gradient correction set value [InbH] as 1500.
This value is also applied for minus input. When the measured input is -100.0V, it displays -150.0.
②When the measured input is -100.0V in order to display -50.0, set gradient correction set value [InbH] as 0.500.
This value is also applied for plus input. When the measured input is 100.0V, it displays 50.0.

	InbH	Note
①	1.500	※Shaded part of Figure 1 is not displayed for the below cases. ●AC input model ●DC input model and minus input [InU] is set as oFF. ●DC Current model and Input range [In-r] is set as 4-20.
②	0.500	



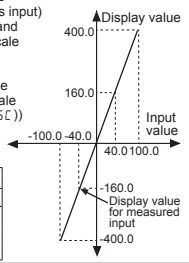
Ex2) Display scale setting [L-SC/H-SC] and gradient adjustment [InbH] (AC input)
①When the measured input AC 2.000V at the input range AC 0 to 5.000V and it displays 5.000, set decimal point position [dot] as 0.000 before setting the scale value.
②When the measured input is AC 2.000V in order to display 5.000, 12.500 should be displayed when max. input value is 5.000V. However, it cannot set because the max. set value is 9.999.
Set as gradient correction set value [InbH]×high scale value [H-SC]=12.500 as the following table.
③After this set is finished, it displays 5.000 when the measured input is 2.000V.

H-SC	L-SC	InbH	Note
12.500	0.000	1.000	**Unavailable** to set because max. set value of H-SC is 9.999
6.250	0.000	2.000	In this case, any setting methods display the same display value.
3.125	0.000	4.000	
2.500	0.000	5.000	



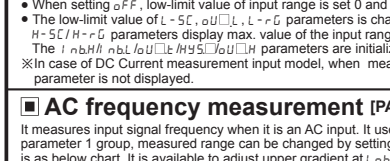
Ex3) Display cale setting [L-SC/H-SC] and gradient adjustment [InbH] (DC minus input)
①When the measured input DC -40mA at the input range DC -100.0 to 100.0mA and it displays -160.0, set decimal point position [dot] as 0.000 before setting the scale value.
②When the measured input is DC -40mA in order to display -160.0, -400.0 should be displayed when min. input value is -100.0mA. However, it cannot set because the min. set value is -199.9. Set as gradient correction set value [InbH]×low scale value [L-SC] = -400.0 as the following table. Set high-limit scale value as (-(L-SC)) value. If high scale value is set at first, set low scale value as (-(H-SC)) value.
③After this setting is finished, it displays -160.0 when the measured input is DC-40.0mA.

H-SC	L-SC	InbH	Note
400.0	-400.0	1.000	**Unavailable** to set because max. set value of L-SC is -199.9
200.0	-199.9	2.000	In this case, any setting methods display the same display value.
100.0	-100.0	4.000	
80.0	-80.0	5.000	



■ Power factor(PF) display [PA1 group: H-rG/L-rG]

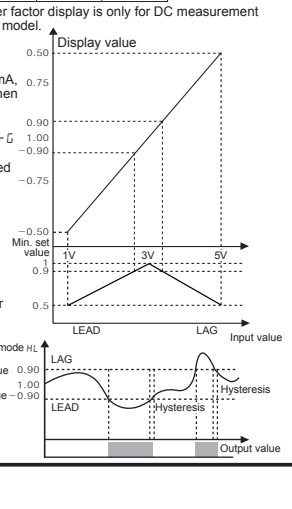
- This function displays LEAD and LAG by analog output signal from the power factor transducer.
- It is available to accept several outputs of the power factor transducer by high-limit[H-rG]/low-limit[L-rG] analog output value setting in the power factor transducer.
- Power factor value is displayed as cosØ value -0.50(LEAD) to 1.00 to 0.50 (LAG).
- LEAD is when current phase leads voltage phase, LAG is when current phase lags behind voltage phase. LEAD and LAG are invalid power.
- Set range: From min. to max. selected value from measurement input [In-r].
  Ex) When setting 200.0 in In-r, H-rG and L-rG are available to set from -199.9 to 200.0.
  When setting 10.0, H-rG and L-rG are available to set from -100.0 to 10.00. (※H-rG > L-rG)



<Factory default>

Model	H-rG	L-rG
M4NN-DV	600	-600
M4NN-DA	5.00	-5.00

※Power factor display is only for DC measurement input model.



Ex1) When the output of the power factor transducer is DC 4-20mA,
①Connect the output to the input terminal 5(+), 7(-) of this unit, then set input range [In-r] as 4-20.
②When setting the input range as 4-20, L-rG is set as 4.00 and H-rG is set as 20.00 automatically. L-rG and H-rG is for the setting of the power factor transducer output.
③If measured input is 4mA, it displays -0.50. For 12mA measured input, it displays 1.00 and for 20mA, it displays 0.50.

Ex2) When the output of the power factor transducer is DC1-5V,
①Connect the output to the input terminal 5(+), 7(-) of this unit, then set the input range [In-r] as 1.0.
②Select minus input display function [InU] as oFF not to display minus value.
③Set H-rG as 5.00 and L-rG as 1.00 for the output of the power factor transducer.
④If measured input is 1V, it displays -0.50. For 3V measured input, it displays 1.00 and for 5V, it displays 0.50.

Ex3) When LEAD value is smaller than -0.90, LAG value is smaller than 0.90, and OUT1 is used, ①Set oU1t as HL at parameter 2 group. ②Set oU1H as 0.90 and oU1L as -0.90 at parameter 0 group.
※ oU2t is also same setting as oU1t.

■ Input type and range [PA 1 group : In-r]

Type	Measured input range	Display	Input impedance	Display range [Stnd]
DC Voltage	-600-600V	600.0	4.694MΩ	-600 to 600
	-200-200V	200.0	4.694MΩ	-199.9 to 200.0
	-100-100V	100.0	794kΩ	-100.0 to 100.0
	-20-20V	20.0	794kΩ	-19.99 to 20.00
	-10-10V	10.0	79kΩ	-10.00 to 10.00
	-2-2V	2.0	79kΩ	-1.999 to 2.000
	-1-1V	1.0	7.5kΩ	-1.000 to 1.000
	-200-200mV	0.20	7.5kΩ	-199.9 to 200.0
DC Current	-5-5A	5A	0.01Ω	-5.00 to 5.00
	-2-2A	2A	0.01Ω	-1.999 to 2.000
	-1-1A	1A	0.1Ω	-1.000 to 1.000
	-200-200mA	0.2A	0.1Ω	-199.9 to 200.0
	-100-100mA	0.1A	1.1Ω	-100.0 to 100.0
	-20-20mA	20mA	1.1Ω	-19.99 to 20.00
	4-20mA	4-20	1.1Ω	4.00 to 20.00
	-10-10mA	10mA	11.1Ω	-10.00 to 10.00
	-2-2mA	2mA	11.1Ω	-1.999 to 2.000
AC Voltage	0-600V	600.0	5.011MΩ	0.0 to 600.0
	0-250V	250.0	5.011MΩ	0.0 to 250.0
	0-110V	※110P	1.111MΩ	0.0 to 440.0
	0-50V	50.0	1.11MΩ	0.00 to 50.00
	0-20V	20.0	224kΩ	0.00 to 20.00
	0-10V	10.0	224kΩ	0.00 to 10.00
	0-2V	2.0	24kΩ	0.000 to 2.000
	0-1V	1.0	24kΩ	0.000 to 1.000
AC Current	0-5A	5A	0.01Ω	0.000 to 5.000
	0-2.5A	2.5A	0.01Ω	0.000 to 2.500
	0-1A	1A	0.05Ω	0.000 to 1.000
	0-500mA	0.5A	0.1Ω	0.0 to 500.0
	0-250mA	0.25A	0.1Ω	0.0 to 250.0
	0-100mA	0.1A	0.5Ω	0.0 to 100.0
	0-50mA	50mA	0.5Ω	0.00 to 50.00

Note
※ For DC input, not to display minus input, set minus input [InU] of parameter 1 group as oFF. Ex) When the display range is -600 to 600V, set InU of parameter 1 group as oFF and this display range is 0 to 600V.

dot	Display range
0	-1999 to 9999
0.0	-199.9 to 999.9
0.00	-19.99 to 99.99
0.000	-1.999 to 9.999

(display range is variable according to decimal point position.)

※Please wire proper terminal to its max. input voltage within 30 to 100% of input terminal. When it is higher than input voltage, it may cause breakdown of terminal and over display range and the accuracy is decreased when it is connected to the terminal under 30%.

※For the range setting of AC voltage, when setting as 0 to 110V [I10P] and using P.T for 440V/110VAC, 110V is input and 440V is displayed automaticfally by the set scale value for P.T users' convenience.

※Frequency measurement range (AC voltage/current) : 0.100 to 9999Hz

■ Display cycle delay [PA 2 group: dI5t]

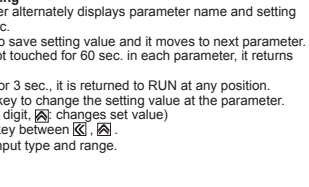
In some applications the measured input may fluctuate which in turn causes the display to fluctuate. By adjusting the display cycle delay function time at dI5t of parameter 2 group, the operator can adjust the display time within a range of 0.1 sec to 5 sec. For example, if the operator sets the display cycle time to 4.0 sec., the display value is displayed the averaged input value over 4 sec. in every 4 sec.

■ Zero adjustment

Forces the display value of measured input to 0(Zero).
- Zero adjustment range : -99 to 99
- Zero adjustment method : Press ◀ and ▲ key in RUN mode for 3 sec.

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 in InbL automatically.
※ If zero adjustment range is exceeded, the error [oVEr] flashes twice and then move to RUN mode, maintaining previous setting value.

■ Initialization



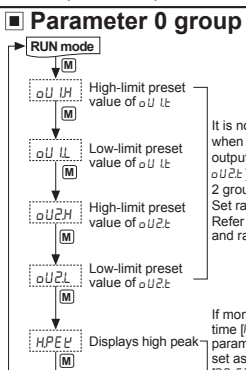
■ Preset output mode [PA 2 group: oU1t/oU2t]

Mode	Output operation	Operation
oFF	OUT1 output / No output	No output
HI	OUT1.H, Hysteresis, OUT1 output	Period ON: Display value ≥ oU1H Period OFF: Display value ≤ oU1H-HYS.1
Lo	OUT1.L, OUT1 output	Period ON: Display value ≤ oU1L Period OFF : Display value ≥ oU1L+HYS.1

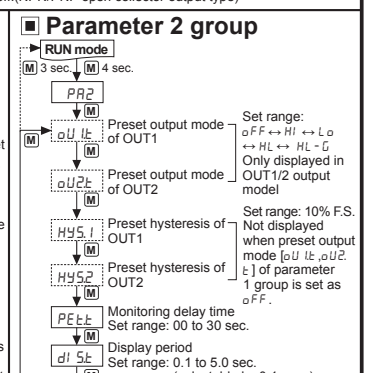
Mode	Output operation	Operation
HL	OUT1.H, OUT1.L, OUT1 output	Period ON : Display value ≤ oU1L Display value ≥ oU1H Period OFF : Display value ≥ oU1L+HYS.1 Display value ≤ oU1H+HYS.1
HL-G	OUT1.H, OUT1.L, OUT1 output	Period ON : Display value ≤ oU1L Display value ≥ oU1H Period OFF : Display value ≤ oU1L-HYS.1 Display value ≥ oU1H+HYS.1

※ Set output mode separately for each OUT1/OUT2.
※ OUT1/OUT2 are operated individually depending on output operation mode.
※ Setting value mode of parameter 0 group is displayed depending on output operation mode.
※ GO outputs when the period both OUT1/OUT2 are off.(NPN/PNP open collector output type)

■ Parameter 0 group



■ Parameter 2 group



oFF	Unlock	Lo2	Lock PA 1, 2 groups
Lo1	Lock PA 1 group	Lo3	Lock PA 0,1,2 groups

■ Parameter 1 group

※Parameter setting
1. Each parameter alternately displays parameter name and setting value in 0.5 sec.
2. Press Ⓜ key to save setting value and it moves to next parameter.
3. If any key is not touched for 60 sec. in each parameter, it returns to RUN mode.
4. Press Ⓜ key for 3 sec., it is returned to RUN at any position.
5. Press ◀, ▲ key to change the setting value at the parameter. (◀ moves set digit, ▲: changes set value)

※S: Press any key between ◀, ▲.
※1: Refer to ■ Input type and range.

■ Factory default

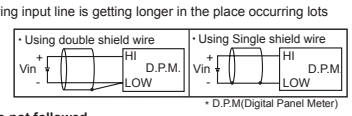
※1: Not displayed for indicator model.

Type	Parameters	M4NN-DV	M4NN-DA	M4NN-AV	M4NN-AA
PA1 (PA 1 group)	In-r	600.0	5A	600.0	5A
	InU	oN	oN	—	—
	dISP	Stnd	Stnd	Stnd	Stnd
	dot	0	0	0	0
	H-SC	600	500	600	5000
	L-SC	-600	-500	0	0
	InbH	1000	1000	1000	1000
	InbL	00	00	00	00
	H-rG	600	500	—	—
	L-rG	-600	-500	—	—
	InbE	—	—	10 0	10 0

Type	Parameters	M4NN-DV	M4NN-DA	M4NN-AV	M4NN-AA
PA0 (PA 0 group)	oU1H※1	600	500	6000	5000
	oU1L※1	-600	-500	0000	0000
	oU2H※1	600	500	6000	5000
	oU2L※1	-600	-500	0000	0000
	HPEA※1	0	000	00	0000
	LPEA※1	0	000	00	0000
PA2 (PA 2 group)	oU1t※1	oFF	oFF	oFF	oFF
	oU2t※1	oFF	oFF	oFF	oFF
	HYS.1※1	—	—	—	—
	HYS2※1	—	—	—	—
	PEAt	00 S	00 S	00 S	00 S
	dISt	02 S	02 S	02 S	02 S
	LoC	oFF	oFF	oFF	oFF

■ Caution for using

1. Please use separated line from high voltage line or powerline in order to avoid inductive noise.
2. Please install power switch or circuit breaker in order to cut off the power supply.
3. The switch or circuit breaker should be installed near by users for safety.
4. 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.)
5. When input is applied, if "HHHH" or "LLLL" is displayed, there is some problem with measured input, please check the line after power off.
6. Input line: Shield wire must be used when the measuring input line is getting longer in the place occurring lots of noise.
7. Allowable installation environment
   ① It shall be used indoor.
   ② Altitude Max. 2,000m.
   ③ Pollution degree 2
   ④ Installation Category II



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

■ Main products

- Photoelectric sensors
- Fiber optic sensors
- Door sensors
- Door side sensors
- Area sensors
- Proximity sensors
- Pressure sensors
- Rotary encoders
- Connector/Sockets
- Switching mode power supplies
- I/O Terminal Blocks & Cables
- Graphic/Logic panels
- Laser marking system(Fiber, CO_2, Nd:YAG)
- Laser welding/soldering system
- Temperature controllers
- Temperature/Humidity transducers
- SSR/Power controllers
- Counters
- Timers
- Panel meters
- Tachometer/Pulse(Rate)meters
- Display units
- Sensor controllers
- Control switches/Lamps/Buzzers
- Stepper motors/drivers/motion controllers
- Field network devices

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EP-KE-77-0023A