Autonics

SMALL MULTI PANEL METER M4NN SERIES

INSTRUCTION MANUAL





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

Safety Considerations

Please observe all safety considerations for safe and proper product operation to avoid hazards ★▲ symbol represents caution due to special circumstances in which hazards may occur.

Marning 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

▲ Warning

- 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, crime/disaster prevention devices, etc.)
 Failure to follow this instruction may result in fire, personal injury, or economic loss.
- Failure to follow this instruction may result in fire, personal injury, or economic roso.

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

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

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

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

▲ Caution

- 1. When connecting the power/measurement input, use AWG 24(0.20mm²) to AWG 20(0.50mm²) cable and tighten the terminal screw with a tightening torque of 0.74 to 0.90N·m.

 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 fire.

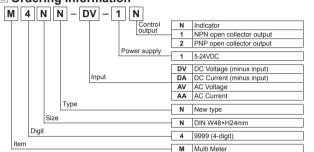
 1. Do not use the unit in the place where flammable/explosive/corrosive gas, humidity, direct sunlight, radiant heat, vibration, impact, or salinity may be present.

 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.

Ordering Information



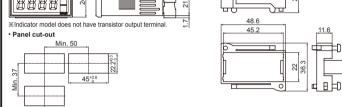
Unit Description



- _3 2. M : MODE key _4 3. ⊠ : Up key 4. ☑ : Shift key
- 1. Measured value display 5. OUT1 (red): OUT1 output indicator of preset 6. GO (green): GO output indicator of preset7. OUT2 (red): OUT2 output indicator of preset

11.6

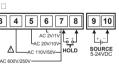
Dimension (unit: mm) 9.8 Transistor output terminal

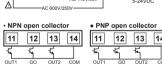


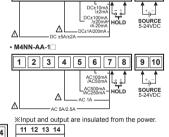
■ Connections and Insulated Block Diagram • M4NN-DV-1 • M4NN-DA-1



1 2 3 4 5 6 7 8 9 10







1 2 3 4 5 6 7 8 9 10

11 12 13 14 Option output and indicator

■ Monitoring Max./Min. Value [PA 0 group: HPEE/LPEE, PA 2 group: PEEE]

It monitors Max./Min. value of display value based on current display value and then display the data in HPEP mode and LPEP mode of parameter 0 group. Set delay time (0 to 30 sec) in PEPP 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

Order to avoid caused by initial overcurrent or overvottage, when monitoring the peak value. Detay time is 0 to 30 sec and it starts to monitor the peak value after set time.

When \(\begin{align*} \begin{align*} \ext{Wey are pressed at \(\mathcal{PEV} \) and \(\mathcal{PEV} \) mode of parameter 0 group, it will be initialized.

\(\mathcal{WEV} \) \(\mathcal{PEV} \) parameters are not displayed when monitoring delay time \(\begin{align*} \mathcal{PEV} \) parameter 2 group is set as \(\mathcal{PEV} \) and \(\mathcal{PEV}

■ Minus Input Display Setting [PA1 group: āl all]

When minus input is unnecessary, or when display 0 not to display minus input due to display minus input due to display minus input due to unstable input value around □, set ₀FF this minus input display function. When setting of F, low-limit value of input range is set 0 and it displays minus input as □. The low-limit value of t. −St, o⊔□⊥, t. −t. parameters is changed based on "0". Min. display value is "0" and H-5t/H-r. □ parameters display max. value of the input range. The 1 nahh naLh□□H-hy5t□□□H parameters are initialized to factory default. Xin case of DC Current measurement input model, when measured input range [i n-r] is set as 4-20, this parameters is not displayed.

■ AC Frequency Measurement [PA1 group: dl 5P]

It measures input signal frequency when it is an AC input. It uses fixed decimal point by <code>dob</code> 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 <code>! nb# and ! nbE</code> 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	0.000	0.00	0.0	0		
Measurement range	0.100 to 9.999Hz	0.10 to 99.99Hz	0.1 to 999.9Hz	1 to 9999Hz		

X Accuracy of frequency measurement: Below 1kHz, F.S. ±0.1rdg ±2digit. From 1 to 10kHz, F.S. ±0.3rdg ±2digit. • I nbH: 0.100 to 9.999 (gradient adjustment of high-limit value)
• I nbE: 10², 10¹, 10⁰, 10¹ (index adjustment of I nbH)

■ Error Display

Display	Description	Display	Description		
нннн	Flashes when measured input is exceeded the max. allowable input (+110%)	F-HH	Flashes when input frequency is exceeded the max. measured range (10kHz) and		
	lashes when measured input is exceeded		display range (9999)		
LLLL	the min. allowable input (minus input on : -110%, of F : -10%)	PE-U Flashes	Flashes when power factor display value to measured input is over than LAG 0.50		
д-нн	Flashes when display input is exceeded max. display range (9999)	PF-L	Flashes when power factor display value to measured input is less than LEAD -0.50		
d-LL	Flashes when display input is exceeded min.		,		

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

%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,

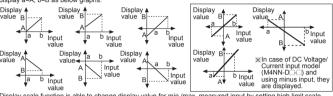
Specifications

Model		M4NN-DV-1	M4NN-DA-1	M4NN-AV-1	M4NN-AA-1			
Measurement input		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						
Power supply 5-24VDC								
Allowable :	voltage range	90 to 110% of the rated voltage (5V is fixed for lower limit)						
Power co	r consumption Max. 3W							
Display method 7-segment LED display (red) (character height: 11mm)								
Display a	accuracy	23°C±5°C - DC input: ±0.1% F.S. ±2digit, AC input: ±0.3% F.S. ±3digit %5A terminal of current input: Within ±0.3% F.S. ±3digit -10 to 50°C - DC/AC intput: ±0.5% F.S. ±3digit, Frequency: ±0.5% F.S. ±3digit %5A terminal of current input: Within ±1% F.S. ±3digit						
Display of	cycle	0.1 to 5.0 sec (selecatable by 0.1 sec)						
	rsion method	Practical oversampling using successive approximation ADC						
Sampling	cycle	50ms (resolution 1/12,	(000)	16.6ms (resolution 1/1	2,000)			
Max. dis	olay range	-1999 to 9999 (4-digit)						
Preset o		NPN/PNP open collector output: *Load voltage: max. 30VDC= *Load current: max. 100mA *Residual voltage: max. 1VDC= (NPN), max. 2VDC (PNP)						
AC meas	surement ^{×2}	 		Average value (AVG) measurement				
Frequency measurement**2		_		Measured range: 0.100 to 9999Hz (variable by decimal point position)				
Insulation resistance		Over 100MΩ (at 500VDC megger)						
Dielectric strength		2000VAC for 1 min (between all terminals and case)						
Noise immunity		±2kV the square wave noise (pulse width: 1μs) by the noise simulator						
		0.75mm amplitude at frequency of 10 to 55Hz (for 1 min) in each X, Y, Z direction for 2 hours						
vibiation		0.5mm amplitude at frequency of 10 to 55Hz (for 1 min) in each X, Y, Z direction for 10 min						
Shock		100m/s² (approx. 10G) in each X, Y, Z direction for 3 times						
OHOCK		300m/s² (approx. 30G) in each X, Y, Z direction for 3 times						
-ment	Ambient temperature	-10 to 50°C, storage: -20 to 60°C						
	Ambient humidity	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)						
Approva		C€						

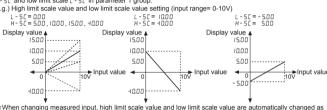
※1: Indicator model (M4NN-□□-1N) does not have output function.
※2: AC, Frequency measurement functions are only for AC measurement type.
※3: The weight is with packaging and the weight in parenthesis is only unit weight.
※Environment resistance is rated at no freezing or condensation.

■ Display Scale [PA1 group: H-5[/L-5[]

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.



E.g.) 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: Inb.H/Inb.L]

- EFFOR COTTECTION [PA 1 group: Indifferent | Indifferent |
- function is available as "Zero adjustment".

■ Gradient Correction [PA 1 group: / ¬Ь.Н]

This function is to adjust gradient of standard display value or scale value for the input value within the mean 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.

Setting range: 0.100 to 9.999, factory default: 1.000 (unit: multiply)

Display value

150.0

100.0

50.0

500

€1 nbH: ISOO

и пън: 0500

40.0100.0

E.g. 1) Gradient adjustment
① When the measured input is 100.0V in order to display 150.0, set

gradient correction set value [* n.b./] as [\$50].

This value is also applied for minus input. When the measured input is -100.0V, it displays +500.

ByWhen the measured input is -100.0V in order to display -500, set gradient correction set value [* n.b./] as 0.500.

This value is also applied for plus input. When the measured input is -100.0V is displayed. is 100.0V, it displays 50.0.

scale value.

When the measured input is AC 2.000V in order to display 5000, 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 [nbh] *high scale value [H-50]=12.500
s the following table.

After this set is finished, it displays 5000 when the measured input is 2.000V.

 H-5E
 L-5E
 I лын
 Note

 12.500
 0.000
 1.000
 Unavailable to set because max. set value of H-5E is 9999

 6.250
 0.000
 2.000

 3.125
 0.000
 4.000

 2.500
 0.000
 5.000
 E.g. 3) Display scale setting [L - 5L/H - 5L] and gradient adjustment [L -bH] (DC minus input) (5) When the measured input DC -40mA at the input range DC -100.0 to 100.0mA and it displays 4500, set decimal point position [dbt] as 0,000 before setting the scale **▲**Display value

it displays 4500, set decimal point positor to got; be used to should value.

@When the measured input is DC -40mA in order to display +500, -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 [1 nbH]*low scale value [2 nbH]*low scale value [1 nbH]*low scale value as (-(1 -50)) value. If high scale value is set at first, set low scale value as (-(1 -50)) value.

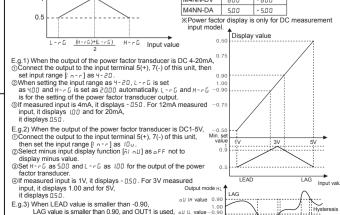
@After this setting is finished, it displays +500 when the measured input is DC-40.0mA. -100.0 -40.0 400.0 -400.0 1.000 Unavailable to set because max. set value of L - 5[is +99.9] 200.0 1-19.9 2.000 100.0 1-100.0 4.000 In this case, any setting methods display the same display value.

■ Power Factor [PF] Display [PA1 group: H--G/L--G]

- 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[\(\frac{1}{2} \triangle \)] flow-limit[\(\frac{1}{2} \triangle \)] 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.

- Setting range: From min. to max. selected value from measurement input [1 n r].

E.g.) When setting 2000 in Inner, HerC and LerC are available to set from 499.9 to 2000. When setting 100, HerC and LerC are available to set from 40.00 to 10.00. (%HerC > LerC) <Factory default> Model H-rG L-rG M4NN-DV 600 -600 value cosØ



①Set ou it as HL at parameter 2 group. ②Set ou it as 0.90 and ou it as - 0.90

■ Measurement Input [PA 1 group : / n - r] Measured input Display Display range 4.694MΩ -600 to 600 4.694MΩ -199.9 to 200.0 794kΩ -100.0 to 100.0 *For DC input, not to display minus เทราะ บะ เทรุมน, not to display minus input, set minus input [ค๋ / ค๋/] of parameter 1 group as oFF.

g.) When the display range is -600 to 600V, set ลิ๋ / ค๋/ of parameter 1 group as oFF and this display range is 0 to 600V. 794kΩ -19.99 to 20.00 79kΩ -10.00 to 10.00 79kΩ -1.999 to 2.000 7.5kΩ -1.000 to 1.000 7.5kΩ -199.9 to 200.0 Voltage dob Display range -1999 to 9999
 -199.9 to 999.9 0.00 -19.99 to 99.99 0.000 -1.999 to 9.999 (the setting range varies depending on the decimal point setting) *Connect to the input terminals whose 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 30% of the input terminal range, displa accuracy is degraded.
When the max. input value is over the 100%, it may result in input terminal damage. AC Voltage
 224kΩ
 0.00 to 10.00

 24kΩ
 0.000 to 2.000

 24kΩ
 0.000 to 1.000
 For the range setting of AC voltage
 0.01Ω
 0.000
 to
 5.000

 0.01Ω
 0.000
 to
 2.500

 0.05Ω
 0.000
 to
 1.000
 when setting as 0 to 110V [I IIIP] and using P.T for 440V/110VAC, 110V is input and 440V is displayed 2.5 R automatically by the set scale value for P.T users' convenience. 0.0 to 100.0

0.5Ω 0.00 to 50.00 **When "HHHH" or "LLLL" is flashes with a certain measurement input, disconnect power supply and then check the cables.

■ Display Cycle Delay [PA 2 group: dl 5.₺]

SOAR

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 $d \in S_k$ 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

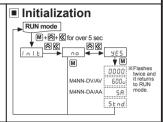
- Forces the display value of measured input to 0 (Zero).

 Zero adjustment range : -99 to 99

 Zero adjustment method : Press ﴿ and ﴿ key in RUN mode for 3 sec.
- 0.15 for 3 sec 0.00

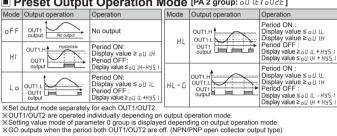
When zero point adjustment with front key and hold terminal is finished normally, zero point of measurement terminal is displayed and the adjusted value is saved in I nbb.

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



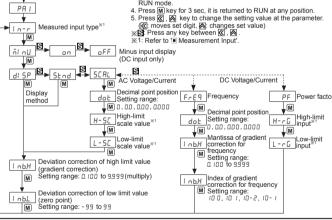
(AC voltage/current) : 0.100 to 9999Hz

■ Preset Output Operation Mode [PA 2 group: all LE / all Z.E.]



Parameter 0 Group Parameter 2 Group ► RUN mode ► RUN mode M 3 sec ↓ M 4 sec PR2 ▼M all IH High-limit preset value of all LE M OUT L Preset output mode of OUT1 M OUT L Preset output mode of FF, MI, Lo, ML, ML - G Only displayed in OUT1/2 output mode oUT1/2 output mode oUT1/2 output mode of output mode output mode output mode of output mode outp M Low-limit preset value of a U Lt Preset output mode _ M H95.1 Preset hysteresis of 10% F.S. Not displayed when preset output mode [ol lt. ol22.] of parameter 1 group is set as of F. Monitoring delay time oUZH High-limit preset value of oUZŁ Hy5.1 Preset If monitoring delay tim [PELL]of parameter 2 group is set as 00 sec [005], these are not displayed. It is initialized by LPEŁ Displays low peak _





■ Factory Default ×1: No								t displayed for indicator model.				
П	Туре	Parameters	M4NN-DV	M4NN-DA	M4NN-AV	M4NN-AA	Type	Parameters		M4NN-DA	M4NN-AV	M4NN-AA
П		In-r	600u	SR	500u	SR	PRD (PA 0 group) PR2 (PA 2 group)	oU I,H ^{×1}	500	5.00	600.0	5.000
П	-	ñi nU	on	on	_			0U I.L *1		- 5.00	0.00.0	0.000
1		d! SP	Stnd	Stnd	Stnd	Stnd		oU2.H ^{×1}		5.00	600.0	5.000
П		dot	0	0	0	0		oU2.L *1		- 5.00	0.00.0	0.000
П	PR I	H-50	600	500	600	5000		HPE L *1		0.00	0.0	0.000
П	(PA 1	L-50	-600	-500	0	0		L.PE L'*1		0.00	0.0	0.000
П	group)	I nb.H	1000	1,000	1000	1,000		oU IL: *1	oFF	oFF	oFF	oFF
П		LobL	00	00	00	00		0U2£ ^{×1}		oFF	oFF	oFF
П		H	600	500				H95.1*1		_	_	_
П		LG	-600	-500				H95.2*1		_	_	_
П			-600					PELL	00 5	00 5	005	00 5
		I n b.E			10.0	10.0		dl S.E	0.2 5	0.2 5	0.2 5	0.2 5
П								LoC	oFF	oFF	oFF	oFF

Cautions during Use

I. Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.

2. 5-24VDC power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.

3. Install a power switch or circuit breaker in the easily accessible place for supplying or disconnecting the power.

4. Keep away from high voltage lines or power lines to prevent inductive noise.

In case installing power line and input signal line. Do not use near the equipment which generates strong magnetic force or high frequency noise.

5. This unit may be used in the following environments. 110/ 220VAC Earth ground

(in the environment condition rated in 'Specifications')
②Altitude max. 2,000m
③Pollution degree 2
④Installation category II

Major Products

| In Major Frooucts | Temperature Controllers | Photoelectric Sensors | Temperature/Humidity Transducers | Door Sensors | SSRs/Power Controllers | Door Side Sensors | Counters | Counters | Proximity Sensors | Proximity Sensors | Pressure Sensors | Pressure Sensors | Pressure Sensors | State | Pressure Sensors | Pressure

aphic/Logic Panels eld Network Devices ser Marking System (Fiber, Co₂, Nd: YAG) ser Welding/Cutting System

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