4 Digit Multi Panel Meters

M4NN Series

INSTRUCTION MANUAL

TCD210072AA

Autonics

Thank you for choosing our Autonics product.
Read and understand the instruction manual and manual thoroughly before using the product.
For your safety, read and follow the below safety considerations before using.
For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.
Keep this instruction manual in a place where you can find easily.
The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice.
Follow Autonics website for the latest information.

Safety Considerations

- Observe all 'Safety Considerations' for safe and proper operation to avoid hazards.
- ⚠ symbol indicates caution due to special circumstances in which hazards may occur.

⚠ Warning Failure to follow instructions may result in serious injury or death.

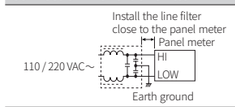
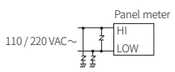
01. Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss. (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime / disaster prevention devices, etc.)
Failure to follow this instruction may result in personal injury, economic loss or fire.
02. Do not use the unit in the place where flammable / explosive / corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact or salinity may be present.
Failure to follow this instruction may result in explosion or fire.
03. Install on a device panel to use.
Failure to follow this instruction may result in fire.
04. Do not connect, repair, or inspect the unit while connected to a power source.
Failure to follow this instruction may result in fire.
05. Check 'Connections' before wiring.
Failure to follow this instruction may result in fire.
06. Do not disassemble or modify the unit.
Failure to follow this instruction may result in fire.

⚠ Caution Failure to follow instructions may result in injury or product damage.

01. When connecting the power / measurement input and relay output, use AWG 24 (0.20 mm²) to AWG 20 (0.50 mm²) cable or over and tighten the terminal screw with a tightening torque of 0.74 to 0.90 N·m.
Failure to follow this instruction may result in fire or malfunction due to contact failure.
02. Use the unit within the rated specifications.
Failure to follow this instruction may result in fire or product damage.
03. Use a dry cloth to clean the unit, and do not use water or organic solvent.
Failure to follow this instruction may result in fire.
04. Keep the product away from metal chip, dust, and wire residue which flow into the unit.
Failure to follow this instruction may result in fire or product damage.

Cautions during Use

- Follow instructions in 'Cautions during Use'.
  Otherwise, It may cause unexpected accidents.
- 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.
- Keep away from high voltage lines or power lines to prevent inductive noise.
  In case installing power line and input signal line closely, use line filter or varistor at power line and shielded wire at input signal line.
  Do not use near the equipment which generates strong magnetic force or high frequency noise.

Connection with the line filter	Connection with the varistor
	

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

Ordering Information

This is only for reference, the actual product does not support all combinations.
For selecting the specified model, follow the Autonics webstie.

M 4 N N - ❶ - 1 ❷

❶ Input type
DV: DC voltage
DA: DC current
AV: AC voltage
AA: AC current

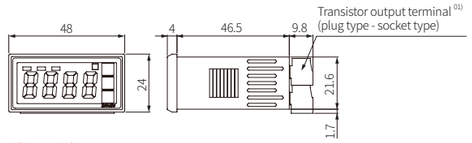
❷ Preset output
N: Indicator
1: NPN open collector
2: PNP open collector

Product Components

- Product (+ bracket)
- Unit sticker
- Instruction manual

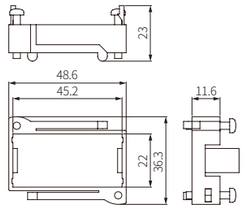
Dimensions

- Unit: mm, For the detailed drawings, follow the Autonics website.

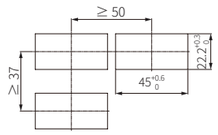


01) Except indicator

■ Bracket

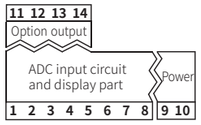


■ Panel cut-out



Cautions during Wiring

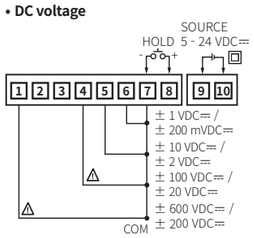
- Input and output are insulated from the power.



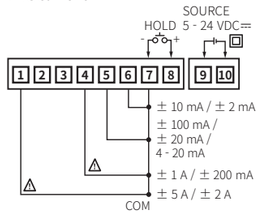
Connections

■ Input

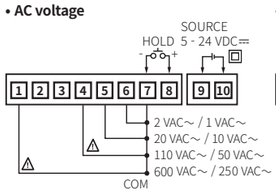
• DC voltage



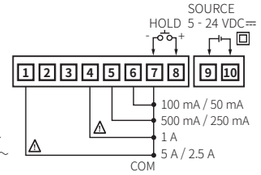
• DC current



• AC voltage

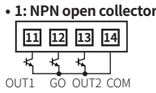


• AC current

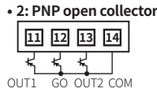


■ Output

• 1: NPN open collector



• 2: PNP open collector



Specifications

Model	M4NN-DV-1□	M4NN-DA-1□	M4NN-AV-1□	M4NN-AA-1□
Input type	DC voltage	DC current	AC voltage 01)	AC current 01)
Max. allowable input	Dependent on the input type			
+DC input	≈ -10 to 110 % F.S. for each measured input range		-	
-DC input	≈ -110 to 110 % F.S. for each measured input range		-	
AC input	-		≈ 110 % F.S. for each measured input range	
Display method	7-segment (red) LED (character height: 11 mm)			
Display accuracy	Dependent on the ambient temperature			
23 ± 5 °C	± 0.1 % F.S. rdg ± 2-digit	± 0.1 % F.S. rdg ± 2-digit 02)	± 0.3 % F.S. rdg ± 3-digit	± 0.3 % F.S. rdg ± 3-digit
-10 to 50 °C	± 0.5 % F.S. rdg ± 3-digit	± 0.5 % F.S. rdg ± 3-digit 03)	± 0.5 % F.S. rdg ± 3-digit	± 0.5 % F.S. rdg ± 3-digit 03)
Display cycle	0.1 to 5.0 sec (select per 0.1 sec)			
Display scale	-1999 to 9999 (4-digit)			
A / D conversion method	Practical oversampling using successive approximation ADC			
Sampling cycle	50 ms		16.6 ms	
Resolution	1 / 12,000			
Preset output	NPN / PNP open collector output model			
Load voltage	≤ 30 VDC⎓			
Load current	≤ 100 mA			
Residual voltage	NPN open collector output: ≤ 1 VDC⎓ / PNP open collector output: ≤ 2 VDC⎓			
Unit weight (packaged)	≈ 46.8 g (≈ 83.7 g)		≈ 46.9 g (≈ 83.8 g)	
Approval	CE EAC		CE EAC	

01) Available frequency display
02) 5 A terminal: ± 0.3 % F.S. rdg ± 3-digit
03) 5 A terminal: ± 1 % F.S. rdg ± 3-digit

Power supply	5 - 24 VDC⎓ ± 10 % (low-limit: 5 VDC⎓ fixed)
Power consumption	≤ 3 W
Insulation resistance	≥ 100 MΩ (500 VDC⎓ megger)
Dielectric strength	Between all terminals and case: 2,000 VAC~ 50 / 60 Hz for 1 min
Noise immunity	± 2 kV square wave noise (pulse width: 1 μs) by the noise simulator
Vibration	0.75 mm double amplitude at frequency of 10 to 55 Hz (for 1 minute) in each X, Y, Z direction for 2 hours
Vibration (malfunction)	0.5 mm double amplitude at frequency of 10 to 55 Hz (for 1 minute) in each X, Y, Z direction for 10 min
Shock	300 m/s² (≈ 30 G) in each X, Y, Z direction for 3 times
Shock (malfunction)	100 m/s² (≈ 10 G) in each X, Y, Z direction for 3 times
Ambient temperature	-10 to 50 °C, storage: -20 to 60 °C (no freezing or condensation)
Ambient humidity	35 to 85 %RH, storage: 35 to 85 %RH (no freezing or condensation)
Insulation type	Symbol: ⧈, double or reinforced insulation (dielectric strength between the measurement input part and the power part: 1 kV)
Connection	Plug type - socket type terminal

Mode Setting

RUN → [M] 2 sec → Parameter 1 group → [M] 3 sec →
RUN → [M] 4 sec → Parameter 2 group → [M] 3 sec →
RUN → [M] → Parameter 0 group → [M] 3 sec →
RUN → [◀] + [▲] 3 sec → Zero adjustment → Auto →
RUN → [M] + [▲] + [◀] 5 sec → Reset → [M] →

Parameter Setting

- Some parameters are activated / deactivated depending on the model or setting of other parameters. Refer to the description of each parameter.
- If any key is not entered for 60 sec in each parameter, it returns to RUN mode.
- [M] key: Saves current setting value and moves to the next parameter.
  [◀] key: Checks fixed value / Changes setting digits.
  [▲] key: Changes setting values.

■ Parameter 1 group

Parameter		Display	Defaults	Setting range	Display condition
1-1	Input range	in-r	600u	[DC voltage model], [AC voltage model] • Refer to Input Range and Display Range	-
			5A	[DC current model], [AC current model] • Refer to Input Range and Display Range	-
1-2	Minus input display	ainU	on	[DC voltage model], [DC current model] ON, OFF	1-1 Input range: except 4-20mA
1-3	Display method	diSP	Stnd	STND: standard, SCAL: scale, FREQ: frequency[01], PF: power factor[02]	-
1-4	High-limit display value gradient correction	inbH	1000	0.100 to 9.999 %	1-3 Display method: STND
1-5	Low-limit display value deviation correction	inbL	00	-99 to 99	
1-6	Decimal point position	dot	0	0, 0.0, 0.00, 0.000	1-3 Display method: SCAL & * 1-6 Decimal point position: 0.0, 0.00, 0.000
1-7	High-limit scale	H-SC	-	Display value against max. measurement input*	
1-8	Low-limit scale	L-SC	-	Display value against min. measurement input*	
1-9	High-limit display value gradient correction	inbH	1000	0.100 to 9.999 %	
1-10	Low-limit display value deviation correction[03]	inbL	00	-99 to 99	
1-11	Decimal point position[04]	dot	0	0, 0.0, 0.00, 0.000	1-3 Display method: FREQ
1-12	High-limit display value gradient correction	inbH	1000	0.100 to 9.999	
1-13	Exponent of INB	inbE	100	10 0: 10^0, 10-1: 10^{-1}, 10-2: 10^{-2}, 10 1: 10^1	
1-14	High-limit input value	H-rG	-	Max. value of input range	1-3 Display method: PF
1-15	Low-limit input value	L-rG	-	Min. value of input range	

01) Displays at AC voltage or AC current model only.
02) Displays at DC voltage or DC current model only.
03) Low-limit display value deviation correction range is within -99 to 99 for D^0, D^{-1} digit regardless of decimal point position.
04) Display range is variable according to decimal point position.

Dot	Display range	Frequency measurement range
0	-1999 to 9999	1 to 9999 Hz
0.0	-199.9 to 999.9	0.1 to 999.9 Hz
0.00	-19.99 to 99.99	0.10 to 99.99 Hz
0.000	-1.999 to 9.999	0.100 to 9.999 Hz

■ Parameter 2 group

Parameter		Display	Defaults	Setting range	Display condition
2-1	OUT1 operation mode	oUt	oFF	[Preset setting model] OFF, HI, LO, HL, HL-G • Refer to Output Operation Mode	-
2-2	OUT2 operation mode	oUt2	oFF	[Preset setting model] OFF, HI, LO, HL, HL-G • Refer to Output Operation Mode	-
2-3	OUT1 hysteresis	HYS.1	-	[Preset setting model] Within 10 % of max. display range, digit	2-1 OUT1 operation mode: except OFF
2-4	OUT2 hysteresis	HYS.2	-	[Preset setting model] Within 10 % of max. display range, digit	2-2 OUT2 operation mode: except OFF
2-5	Peak monitoring delay time	PEAt	005	[Preset setting model] 00 to 30 sec	-
2-6	Display cycle	dISt	0.2 5	[Preset setting model] 0.1 to 5.0 sec	-
2-7	Lock	LoC	oFF	[Preset setting model] OFF: unlock, LOC1: lock parameter 1, LOC2: lock parameter 1, 2, LOC3: lock parameter 0, 1 and 2	-

■ Parameter 0 group

Parameter		Display	Defaults	Setting range[01]	Display condition
0-1	OUT1 high-limit output setting value	oUtH	600	[DC voltage model & Preset setting model]	2-1 OUT1 operation mode: except OFF
			5.00	[DC current model & Preset setting model]	
			600.0	[AC voltage model & Preset setting model]	
			5.000	[AC current model & Preset setting model]	
0-2	OUT1 low-limit output setting value	oUtL	-600	[DC voltage model & Preset setting model]	
			-5.00	[DC current model & Preset setting model]	
			000.0	[AC voltage model & Preset setting model]	
			0.000	[AC current model & Preset setting model]	
0-3	OUT2 high-limit output setting value	oUt2H	600	[DC voltage model & Preset setting model]	2-2 OUT2 operation mode: except OFF
			5.00	[DC current model & Preset setting model]	
			600.0	[AC voltage model & Preset setting model]	
			5.000	[AC current model & Preset setting model]	
0-4	OUT2 low-limit output setting value	oUt2L	-600	[DC voltage model & Preset setting model]	
			-5.00	[DC current model & Preset setting model]	
			000.0	[AC voltage model & Preset setting model]	
			0.000	[AC current model & Preset setting model]	
0-5	Display max. peak value[02]	HPEU	0	[DC voltage model] Max. peak value in run mode	2-1 OUT1 operation mode: except OFF or 2-2 OUT2 operation mode: except OFF & 2-5 Peak monitoring delay time: except 00
			0.00	[DC current model] Max. peak value in run mode	
			0.0	[AC voltage model] Max. peak value in run mode	
			0.000	[AC current model] Max. peak value in run mode	
0-6	Display min. peak value[02]	LPEU	0	[DC voltage model] Min. peak value in run mode	
			0.00	[DC current model] Min. peak value in run mode	
			0.0	[AC voltage model] Min. peak value in run mode	
			0.000	[AC current model] Min. peak value in run mode	

01) Setting range of OUT1 / 2 high / low-limit output setting value
[DC voltage model], [DC current model]
1-2 minus input display OFF = -10 to 110 % of display range
1-2 minus input display ON = -110 to 110 % of display range
[AC voltage model], [AC current model]
0 to 110 % of display range
02) Reset: Press any one of [◀], [▲] keys.

Input Range and Display Range

When the max. input value is over the 100 %, it may result in input terminal damage.

■ DC voltage model

Input range	Display range			Input impedance
	Diaplay method: STND (fixed)		Diaplay method: SCAL [01]	
-600 - 600 VDC⎓	-600 to 600	600u		4.69 MΩ
-200 - 200 VDC⎓	-199.9 to 200.0	200u		4.69 MΩ
-100 - 100 VDC⎓	-100.0 to 100.0	100u		794 kΩ
-20 - 20 VDC⎓	-19.99 to 20.00	20u		794 kΩ
-10 - 10 VDC⎓	-10.00 to 10.00	10u		79 kΩ
-2 - 2 VDC⎓	-1.999 to 2.000	2u		79 kΩ
-1 - 1 VDC⎓	-1.000 to 1.000	1u		7.5 kΩ
-200 - 200 mVDC⎓	-199.9 to 200.0	0.2u		7.5 kΩ

Decimals	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

01) Connect to the input terminals whose 30 % to 100 % of the input range includes 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.

■ DC current model

Input range	Display range			Input impedance
	Diaplay method: STND (fixed)		Diaplay method: SCAL [01]	
-5 - 5 A	-5.00 to 5.00	5A		0.01 Ω
-2 - 2 A	-1.999 to 2.000	2A		0.01 Ω
-1 - 1 A	-1.000 to 1.000	1A		0.1 Ω
-200 - 200 mA	-199.9 to 200.0	0.2A		0.1 Ω
-100 - 100 mA	-100.0 to 100.0	0.1A		1.1 Ω
-20 - 20 mA	-19.99 to 20.00	20mA		1.1 Ω
4 - 20 mA	4.00 to 20.00	4-20		1.1 Ω
-10 - 10 mA	-10.00 to 10.00	10mA		11.1 Ω
-2 - 2 mA	-1.999 to 2.000	2mA		11.1 Ω

Decimals	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

01) Connect to the input terminals whose 30 % to 100 % of the input range includes 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.

■ AC voltage model

Input range	Display range			Input impedance
	Diaplay method: STND (fixed)		Diaplay method: SCAL [01]	
0 - 600 VAC~	0.0 to 600.0	600u		4.987 MΩ
0 - 250 VAC~	0.0 to 250.0	250u		4.987 MΩ
0 - 110 VAC~ [02]	0.0 to 440.0	110P		1.087 MΩ
0 - 50 VAC~	0.00 to 50.00	50u		1.087 MΩ
0 - 20 VAC~	0.00 to 20.00	20u		200 kΩ
0 - 10 VAC~	0.00 to 10.00	10u		200 kΩ
0 - 2 VAC~	0.000 to 2.000	2u		20 kΩ
0 - 1 VAC~	0.000 to 1.000	1u		20 kΩ

Decimals	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

01) Connect to the input terminals whose 30 % to 100 % of the input range includes 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.
02) In case of 0 to 110 VAC~ of AC voltage range and using P.T (potential transformer) for 440 VAC~ / 110 VAC~, if 110 VAC~ is input, and the unit displays 440 VAC~ automatically by preset scale value for P.T user's convenient.

■ AC current model

Input range	Display range			Input impedance
	Diaplay method: STND (fixed)		Diaplay method: SCAL [01]	
0 - 5 A	0.000 to 5.000	5A		0.01 Ω
0 - 2.5 A	0.000 to 2.500	2.5A		0.01 Ω
0 - 1 A	0.000 to 1.000	1A		0.05 Ω
0 - 500 mA	0.0 to 500.0	0.5A		0.1 Ω
0 - 250 mA	0.0 to 250.0	0.25A		0.1 Ω
0 - 100 mA	0.0 to 100.0	0.1A		0.5 Ω
0 - 50 mA	0.00 to 50.00	50mA		0.5 Ω

Decimals	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

01) Connect to the input terminals whose 30 % to 100 % of the input range includes 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.

Output Operation Mode

- The below describes based on OUT1.
- OUT1 and OUT2 of output operations are same. It operates individually by the set output operation mode.
  GO output turns ON when the OUT1 and OUT2 turn OFF at the same time. (NPN / PNP open collector output type model)
- When changing output operation mode, high-limit / low-limit output setting value, hysteresis are reset.

MODE	Output operation	Preset output	
		ON	OFF
oFF	OUT	No output	
HI	OUT.H, Hys, OUT	OU1.H ≤ Display value	OU1.H - HYS.1 ≥ Display value
Lo	OUT.L, Hys, OUT	OU1.L ≥ Display value	OU1.L + HYS.1 ≤ Display value
HL	OUT.H, OUT.L, Hys, OUT	OU1.L ≥ Display value / OU1.H ≤ Display value	OU1.L + HYS.1 ≤ Display value / OU1.H - HYS.1 ≥ Display value
HL-G	OUT.H, OUT.L, Hys, OUT	OU1.L ≤ Display value ≤ OU1.H + HYS.1	OU1.L - HYS.1 ≥ Display value / OU1.H + HYS.1 ≤ Display value

Reset

01. Press the [M] + [▲] + [◀] keys for over 5 sec. in run mode, parameter INIT is displayed.
02. Displays the setting value as NO by pressing the direction keys.
03. Change the setting value as YES by pressing the direction keys.
04. If you press the [M] key, the following parameters flashes twice in sequence, then all parameter values are reset to the default and return to run mode.
- M4NN-DV/AV: 0000 > 600V > STND
- M4NN-DA/AA: 0000 > 5A > STND

Error

Error display is released automatically when it is in the measured and display range.

Display	Description	Troubleshooting
HHHH	Flashes when measurement input is exceeded the max. allowable input (110 %)	Disconnect power supply and check the cables.
LLLL	Flashes when measurement input is exceeded the min. allowable input (minus input display as ON: -110 % / minus input display as OFF: -10 %)	
d-HH	Flashes when measurement input is exceed the max. display value (9999)	Reset within the display range.
d-LL	Flashes when measurement input is exceed the min. display value (-1999)	
F-HH	Flashes when input frequency is exceed the max. measured range (10 kHz) 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	
ouEr	Flashes twice when it exceeds zero range (±99) and returns to run mode	Reset within the zero range.

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