

# 4-Digit Multi Panel Meters



## MT4N Series PRODUCT MANUAL

For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.

The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice.

### Features

- Various input / output options (by model)
  - Input options: DC voltage, DC current, AC voltage, AC current
  - Output options: RS485 communication output, transmission output (DC 4 - 20 mA), NPN / PNP open collector output, relay contact output (default option: indicator / no output)
- Maximum allowed input: 50 VDC $\equiv$ , DC 500 mA, 250 VAC $\sim$ , AC 5A
- Display range: -1999 to 9999
- High / low-limit display scale function
- AC frequency measurement (range: 0.1 to 9999 Hz)
- Various functions: peak display value monitoring, display cycle delay, zero-point adjustment, peak display value correction, PV transmission output (DC 4 - 20 mA) scale, etc.
- Power supply: 12 - 24 VDC $\equiv$  / VAC $\sim$ , 100 - 240 VAC $\sim$

### Safety Considerations

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

**$\triangle$  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 or electric shock.
- 04. Do not connect, repair, or inspect the unit while connected to a power source.**  
Failure to follow this instruction may result in fire or electric shock.
- 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 or electric shock.

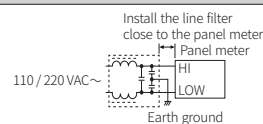
**$\triangle$  Caution** Failure to follow instructions may result in injury or product damage.

- 01. When connecting the power / measurement input and relay output, use AWG 24 (0.20 mm<sup>2</sup>) to AWG 16 (1.30 mm<sup>2</sup>) cable or over and tighten the terminal screw with a tightening torque of 0.78 to 0.98 N m. Use the wiring suitable for the load current capacity.**  
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 or electric shock.
- 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.

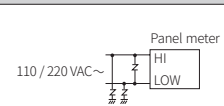
### Cautions during Use

- 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.
- Use twisted pair wire for communication line.
- 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 website.

MT 4 N - ① - ② ③

### ① Input type

DV: DC voltage<sup>01)</sup>

DA: DC current

AV: AC voltage<sup>02)</sup>

AA: AC current<sup>02)</sup>

### ② Power supply

E: 12 - 24 VDC $\pm$   $\pm$  10 %,

12 - 24 VAC $\sim$   $\pm$  10 % 50 / 60 Hz

4: 100 - 240 VAC $\sim$   $\pm$  10 % 50 / 60 Hz

### ③ Preset output + Sub output

	Preset output	Sub output
N	None (indicator)	
0	Relay (OUT1 / 2)	-
1	NPN open collector (OUT1 / 2, GO)	-
2	PNP open collector (OUT1 / 2, GO)	-
3	Relay (OUT1)	Transmission (DC 4 - 20 mA)
4	Relay (OUT1)	RS485 communication
5	Relay (OUT1 / 2)	Transmission (DC 4 - 20 mA)

01) To measure the current over DC 500 mA, please select DV type because the shunt should be used.

02) In case of selecting frequency display, no output will be provided even if it is output support model.

## Product Components

• Product

• Instruction manual

## Manual

For proper use of the product, refer to the manuals and be sure to follow the safety considerations in the manuals.

Download the manuals from the Autonics website.

## Software

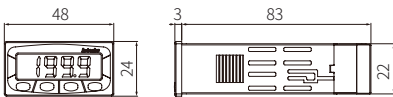
Download the installation file and the manuals from the Autonics website.

### ■ DAQMaster

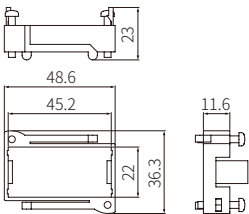
It is the comprehensive device management program for Autonics' products, providing parameter setting, monitoring and data management.

## Dimensions

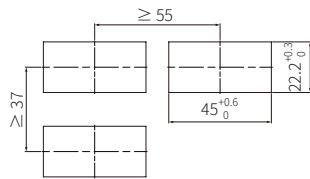
• Unit: mm, For the detailed drawings, follow the Autonics website.



### ■ Bracket

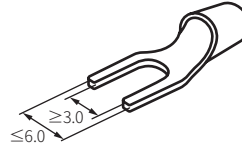


### ■ Panel cut-out



## Cautions during Wiring

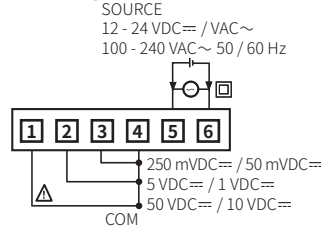
• Unit: mm, Use terminals of size specified below.



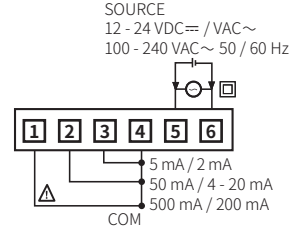
## Connections

### ■ Input

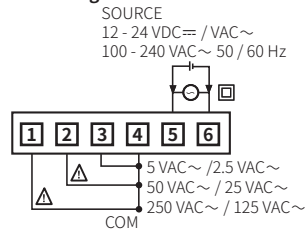
#### • DC voltage



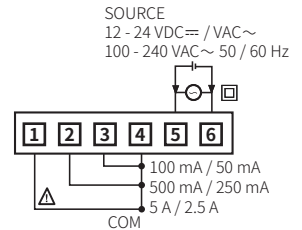
#### • DC current



#### • AC voltage

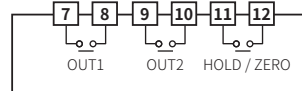


#### • AC current

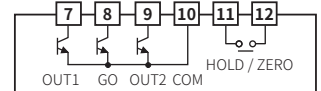


### ■ Output

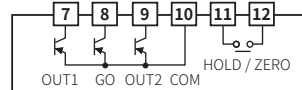
#### • 0: Relay



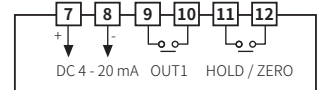
#### • 1: NPN open collector



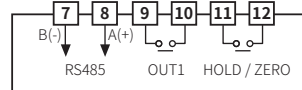
#### • 2: PNP open collector



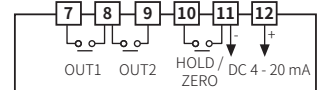
#### • 3: Relay + Transmission (DC 4 - 20 mA)



#### • 4: Relay + RS485 communication



#### • 5: Relay + Transmission (DC 4 - 20 mA)



## Specifications

<b>Model</b>	MT4N-DV-□□	MT4N-DA-□□	MT4N-AV-□□	MT4N-AA-□□
<b>Input type</b>	DC voltage	DC current	AC voltage <sup>01)</sup>	AC current <sup>01)</sup>
<b>Max. allowable input</b>	110 % F.S. for each measured input range			
<b>Display method</b>	7-segment (red) LCD (character height: 9 mm)			
<b>Display accuracy</b>	Dependent on the ambient temperature			
23 ± 5 °C	± 0.1 % F.S. rdg ± 2 digit <sup>02)</sup>		± 0.3 % F.S. rdg ± 3 digit	
-10 to 50 °C	± 0.5 % F.S. rdg ± 3 digit			
<b>Max. display range</b>	-1999 to 9999 (4 digit)			
<b>A / D conversion method</b>	Practical oversampling using successive approximation ADC			
<b>Sampling cycle</b>	50 ms	16.6 ms		
<b>Unit weight (packaged)</b>	≈ 64 g (≈ 127 g)			
<b>Approval</b>	CE ENEC			

01) Available frequency display

02) 5 A terminal: ± 0.3 % F.S. rdg ± 3 digit

<b>Pre-set output</b>	None (indicator) / Relay / NPN open collector / PNP open collector output model
Relay	Contact capacity: 125 VAC ~ 0.3 A, 30 VDC ~ 1 A Contact composition: N.O (1a)
NPN / PNP open collector	Output capacity: ≤ 12 - 24 VDC ~ ± 2 VDC ~, 50 mA resistive load
<b>Sub output</b>	None (indicator) / Transmission (DC 4 - 20 mA) / RS485 communication output model
Transmission (DC 4 - 20 mA)	Resolution: 1/12,000 (load resistance: ≤ 600 Ω) Response time: ≤ 450 ms
RS485 communication	Protocol: Modbus RTU

<b>Power supply</b>	12 - 24 VDC ~ ± 10 %, 12 - 24 VAC ~ ± 10 % 50 / 60 Hz / 100 - 240 VAC ~ ± 10 % 50 / 60 Hz model
<b>Power consumption (DC / AC voltage)</b>	3 W / 5 VA <sup>01)</sup>
<b>Power consumption (AC voltage)</b>	5 VA
<b>Insulation resistance</b>	≥ 20 MΩ (500 VDC ~ megger)
<b>Dielectric strength (DC / AC voltage)</b>	Between external terminal and case: 1,000 VAC ~ 50 / 60 Hz for 1 min
<b>Dielectric strength (AC voltage)</b>	Between external terminal and case: 2,000 VAC ~ 50 / 60 Hz for 1 min
<b>Noise immunity</b>	± 2 kV square wave noise (pulse width: 1 μs) by the noise simulator
<b>Vibration</b>	0.75 mm double amplitude at frequency of 10 to 55 Hz (for 1 min) in each X, Y, Z direction for 2 hours
<b>Vibration (malfunction)</b>	0.5 mm double amplitude at frequency of 10 to 55 Hz (for 1 min) in each X, Y, Z direction for 10 min
<b>Shock</b>	300 m/s <sup>2</sup> (≈ 30 G) in each X, Y, Z direction for 3 times
<b>Shock (malfunction)</b>	100 m/s <sup>2</sup> (≈ 10 G) in each X, Y, Z direction for 3 times
<b>Ambient temp.</b>	-10 to 50 °C, storage: -20 to 60 °C (no freezing or condensation)
<b>Ambient humi.</b>	35 to 85 %RH, storage: 35 to 85 %RH (no freezing or condensation)
<b>Insulation type</b>	Symbol: □, double or reinforced insulation (dielectric strength between the measurement input part and the power part: 1 kV)

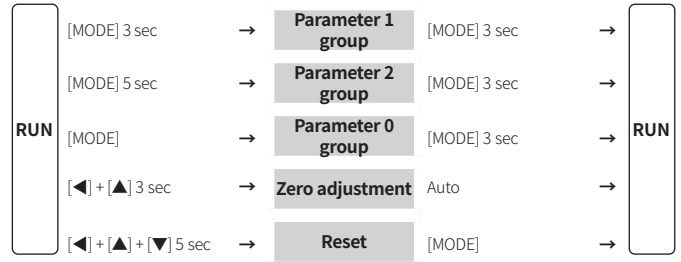
01) Except MT4N-□□-E5: 5 W / 8 VA

## Communication Interface

### ■ RS485

<b>Comm. protocol</b>	Modbus RTU
<b>Application standard</b>	Compliance with EIA RS485
<b>Max. connection</b>	31-unit (address: 01 to 99)
<b>Comm. synchronous method</b>	Asynchronous
<b>Comm. method</b>	2-wire half duplex
<b>Comm. distance</b>	≤ 800 m
<b>Comm. speed</b>	1,200 / 2,400 / 4,800 / 9,600 / 19,200 / 38,400 bps
<b>Start bit</b>	1-bit (fixed)
<b>Data bit</b>	8-bit (fixed)
<b>Parity bit</b>	None, Even, Odd
<b>Stop bit</b>	1-bit, 2-bit
<b>EEPROM life cycle</b>	≈ 1,000,000 operations (Erase / Write)

## Mode Setting



## 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.
- After returning to RUN mode, press the [MODE] key within 2 sec, it returns to previous parameter.
- [MODE] 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	Mark	Defaults	Setting range	Display condition
1-1 Input range	I n r	5 0	[DC voltage model] • Refer to Input Range and Display Range	-
		5 0 0	[DC current model] • Refer to Input Range and Display Range	-
		2 5 0	[AC voltage model] • Refer to Input Range and Display Range	-
		5	[AC current model] • Refer to Input Range and Display Range	-
1-2 Display method	d i s p	5 t n d	STND: standard, SCAL: scale, FREQ: frequency <sup>01)</sup>	-
1-3 Measurement method	I n t	t r n s	[AC voltage model], [AC current model] T.RMS: True RMS, A.RMS: Average RMS, AVG • True RMS = $\sqrt{\frac{A_1^2 + A_2^2 + \dots + A_n^2}{n}}$ • Average RMS = $\frac{A_1 + A_2 + \dots + A_n}{n}$ × Waveform rate (n = number of display values per cycle, A = display value)	1-2 Display method: STND, SCAL
1-4 Max. display value (fixed)	5 t n d	5 0 0 0	[DC voltage model] Max. value of display range	1-2 Display method: STND
		5 0 0 0	[DC current model] Max. value of display range	
		2 5 0 0	[AC voltage model] Max. value of display range	
		5 0 0 0	[AC current model] Max. value of display range	
1-5 High-limit display value gradient correction	I n b H	1 0 0 0	0.100 to 5.000 %	1-2 Display method: STND
1-6 Low-limit display value deviation correction	I n b L	0 0	-99 to 99	
1-7 Decimal point position	d o t	0 0 0	[DC voltage model] 0, 0.0, 0.00, 0.000	1-2 Display method: SCAL & * 1-7 Decimal point position: 0.0, 0.00, 0.000
		0 0	[DC current model], [AC voltage model] 0, 0.0, 0.00, 0.000	
		0 0 0 0	[AC current model] 0, 0.0, 0.00, 0.000	
1-8 High-limit scale	H - 5 C	-	Display value against max. measurement input*	1-2 Display method: SCAL & * 1-7 Decimal point position: 0.0, 0.00, 0.000
1-9 Low-limit scale	L - 5 C	-	Display value against min. measurement input*	
1-10 Display unit	d U n t	u	[DC voltage model], [AC voltage model] MV, V, OFF	1-2 Display method: FREQ
		A	[DC current model], [AC current model] MA, A, HZ, OFF	
1-11 High-limit display value gradient correction	I n b H	1 0 0 0	0.100 to 5.000 %	1-2 Display method: FREQ
1-12 Low-limit display value deviation correction <sup>02)</sup>	I n b L	0 0	-99 to 99	
1-13 Decimal point position <sup>03)</sup>	d o t	0 0	[AC voltage model] 0, 0.0, 0.00, 0.000	1-2 Display method: FREQ
		0 0 0 0	[AC current model] 0, 0.0, 0.00, 0.000	
1-14 High-limit display value gradient correction	I n b H	1 0 0 0	0.100 to 9.999	1-2 Display method: FREQ
1-15 Exponent of INB	I n b E	1 0 - 0	10-0: 10 <sup>0</sup> , 10-1: 10 <sup>-1</sup> , 10-2: 10 <sup>-2</sup> , 10-1: 10 <sup>-1</sup>	

01) Displays at AC voltage or AC current model only.

02) Low-limit display value deviation correction range is within -99 to 99 for D<sup>0</sup>, D<sup>1</sup> digit regardless of decimal point position.

03) 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 0 0	-19.99 to 99.99	0.10 to 99.99 Hz
0 0 0 0	-1.999 to 9.999	0.100 to 9.999 Hz

## Parameter 2 group

Parameter	Mark	Defaults	Setting range	Display condition
2-1 OUT1 operation mode	oU lE	oFF	[OUT1 output model] OFF, HI, LO, HL, HL-G • Refer to Output Operation Mode	-
2-2 OUT2 operation mode	oU 2E	oFF	[OUT2 output model] OFF, HI, LO, HL, HL-G • Refer to Output Operation Mode	-
2-3 OUT1 hysteresis	HYS 1	000 1	[Except indicator model] Within 10% of max. display range, digit	2-1 OUT1 operation mode: except OFF
2-4 OUT2 hysteresis	HYS 2	000 1	[Except indicator model] Within 10% of max. display range, digit	2-2 OUT2 operation mode: except OFF
2-5 Startup compensation time	St RkE	000	[Except indicator model] 0.0 to 99.9 sec	-
2-6 Peak monitoring delay time	PE kE	00 5	00 to 30 sec	-
2-7 Display cycle	d t SkE	0.2 5	0.1 to 5.0 sec	-
2-8 Current value display part color	CoL r	rEd	RED: red / red, GRN: green / green, YEL: yellow / yellow, R-G: red / green, G-R: green / red • Display: normal / error occurs	-
2-9 Keys for zero adjustment	ZE r o	no	NO, YES • YES: Press the [◀] + [▲] keys for 3 sec to adjust zero.	-
2-10 External input terminal	E u L n	HoL d	[Except indicator model] HOLD, ZERO • If the external input terminal is short-circuited for 50 ms or more, it operates with the set function.	-
2-11 High-limit value of transmission output	F5 - H	5000	[DC voltage & Transmission (DC 4 - 20 mA) output model] Max. value of display range	-
		5000	[DC current & Transmission (DC 4 - 20 mA) output model] Max. value of display range	
		2500	[AC voltage & Transmission (DC 4 - 20 mA) output model] Max. value of display range	
		5000	[AC current & Transmission (DC 4 - 20 mA) output model] Max. value of display range	
2-12 Low-limit value of transmission output	F5 - L	0000	[DC voltage & Transmission (DC 4 - 20 mA) output model] Min. value of display range	-
		0000	[DC current & Transmission (DC 4 - 20 mA) output model] Min. value of display range	
		00	[AC voltage & Transmission (DC 4 - 20 mA) output model] Min. value of display range	
		0000	[AC current & Transmission (DC 4 - 20 mA) output model] Min. value of display range	
2-13 Comm. Address	Ad r 5	0 1	[RS485 communication output model] 01 to 99	-
2-14 Comm. speed	bP 5	9600	[RS485 communication output model] 38.4k, 19.2k, 9600, 4800, 2400, 1200 bps	-
2-15 Parity bit	Pr t Y	no n E	[RS485 communication output model] NONE, EVEN, ODD	-
2-16 Stop bit	St P	2	[RS485 communication output model] 2, 1 bit	-
2-17 Response waiting time	r 5 u kE	5	[RS485 communication output model] 5 to 99 sec	-
2-18 Lock	Lo k	oFF	OFF: unlock, LOC1: lock parameter 1, LOC2: lock parameter 1, 2, LOC3: lock parameter 0, 1 and 2	-

## Parameter 0 group

Parameter	Mark	Defaults	Setting range	Display condition
0-1 OUT1 high-limit output setting value	oU 1H	5000	[DC voltage model], [DC current model] -5 to 110% of display range	2-1 OUT1 operation mode: except OFF
		2500	[AC voltage model] 0 to 110% of display range	
		5000	[AC current model] 0 to 110% of display range	
0-2 OUT1 low-limit output setting value	oU 1L	0000	[DC voltage model] -5 to 110% of display range	2-1 OUT1 operation mode: except OFF
		0000	[DC current model] -5 to 110% of display range [AC voltage model] 0 to 110% of display range	
		0000	[AC current model] 0 to 110% of display range	
0-3 OUT2 high-limit output setting value	oU 2H	5000	• Same as setting range of OUT1 high-limit output setting value	2-2 OUT2 operation mode: except OFF
		2500		
		5000		
0-4 OUT2 low-limit output setting value	oU 2L	0000	• Same as setting range of OUT1 low-limit output setting value	2-2 OUT2 operation mode: except OFF
		0000		
		0000		
0-5 Display max. peak value <sup>(1)</sup>	HPE k	00	[DC voltage model] Max. peak value in run mode	2-1 OUT1 operation mode: except OFF or 2-2 OUT2 operation mode: except OFF & 2-6 Peak monitoring delay time: except 00
		0000	[AC current model] Max. peak value in run mode	
0-6 Display min. peak value <sup>(1)</sup>	LPE k	000	[DC voltage model] Min. peak value in run mode	2-1 OUT1 operation mode: except OFF or 2-2 OUT2 operation mode: except OFF & 2-6 Peak monitoring delay time: except 00
		00	[DC current model], [AC voltage model] Min. peak value in run mode	
		0000	[AC current model] Min. peak value in run mode	

01) 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 <sup>(1)</sup>	
0 - 50 VDC≐	0.00 to 50.00	50	433.48 kΩ
0 - 10 VDC≐	0.00 to 10.00	10	433.48 kΩ
0 - 5 VDC≐	0.000 to 5.000	5	43.48 kΩ
0 - 1 VDC≐	0.000 to 1.000	1	4.348 kΩ
0 - 250 mVDC≐	0.0 to 250.0	250	2.28 kΩ
0 - 50 mVDC≐	0.00 to 50.00	50	2.28 kΩ

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 <sup>(1)</sup>	
0 - 500 mA	0.0 to 500.0	500	0.22 Ω
0 - 200 mA	0.0 to 200.0	200	0.22 Ω
0 - 50 mA	0.00 to 50.00	50	2.22 Ω
4 - 20 mA	4.00 to 20.00	4 - 20	2.22 Ω
0 - 5 mA	0.000 to 5.000	5	22.22 Ω
0 - 2 mA	0.000 to 2.000	2	22.22 Ω

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 <sup>(1)</sup>	
0 - 250 VAC~	0.0 to 250.0	250	1.086 MΩ
0 - 125 VAC~	0.0 to 125.0	125	1.086 MΩ
0 - 50 VAC~	0.00 to 50.00	50	199.12 kΩ
0 - 25 VAC~	0.00 to 25.00	25	199.12 kΩ
0 - 5 VAC~	0.000 to 5.000	5	19.912 kΩ
0 - 2.5 VAC~	0.000 to 2.500	2.5	19.912 kΩ

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 current model

Input range	Display range		Input impedance
	Diaplay method: STND (fixed)	Diaplay method: SCAL <sup>(1)</sup>	
0 - 5 A	0.000 to 5.000	5	0.01 Ω
0 - 2.5 A	0.000 to 2.500	2.5	0.01 Ω
0 - 500 mA	0.0 to 500.0	500	0.19 Ω
0 - 250 mA	0.0 to 250.0	250	0.19 Ω
0 - 100 mA	0.0 to 100.0	100	1.01 Ω
0 - 50 mA	0.00 to 50.00	50	1.01 Ω

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		No output	
HI		OU1.H ≤ Display value	OU1.H - HYS.1 ≥ Display value
LO		OU1.L ≥ Display value	OU1.L + HYS.1 ≤ Display value
HL		OU1.L ≥ Display value / OU1.H ≤ Display value	OU1.L + HYS.1 ≤ Display value / OU1.H - HYS.1 ≥ Display value
HL-G		OU1.L ≤ Display value / OU1.L ≤ OU1.H + HYS.1	OU1.L - HYS.1 ≥ Display value / OU1.H + HYS.1 ≤ Display value

## Reset

- Press the [◀] + [▲] + [▼] keys for over 5 sec. in run mode, INIT and NO flash alternately for 0.5 sec in turn.
- Change the setting value as YES by pressing the direction keys.
- Press the [MODE] key to reset all parameter values as default and to return to run mode.

## 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 <sup>01)</sup>	Flashes when measurement input is exceeded the min. allowable input (-10 %)	
d-HH	Turns ON when display input is exceeded high-limit scale setting value	Reset within the display range.
d-LL	Turns ON when display input is exceeded low-limit scale setting value	
F-HH	Turns ON when input frequency is exceeded the max. display value of measured range	-
o u E r	Flashes twice when it exceeds zero range (±99) and returns to run mode	Reset within the zero range.

01) Displays at DC input model only.

## Function Description

### Display method: frequency

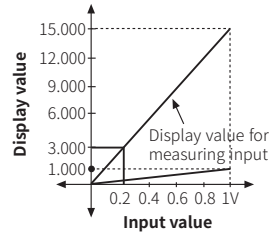
It measures input signal frequency when it is AC input. In order to measure frequency normally, input signal, over 10 % F.S. of the rated input range, should be supplied. Otherwise, it may not be measured normally. The measurement range differs depending on the decimal point position. It is available to adjust the high-limit display value gradient correction and exponent of INB at parameter setting.

- Accuracy of frequency measurement: below 1 kHz, F.S. ± 0.1 % rdg ± 2-digit, from 1 k to 10 kHz, F.S. ± 0.3 % rdg ± 2-digit

### High-limit display value gradient correction

This function is to correct a gradient of High / Low-limit scale value. And also can be used as correction function of high-limit scale value. Adjustment range is setting value and multiply current gradient.

- E.g.: To display 3.000 when 200 mVDC for input range 0-1 VDC



H-SC	L-SC	INB.H	Result
-	0.000	1.000	Disable
7.500	0.000	3.000	200 mVDC = 3.000
5.000	0.000	2.000	
3.750	0.000	4.000	
3.000	0.000	5.000	

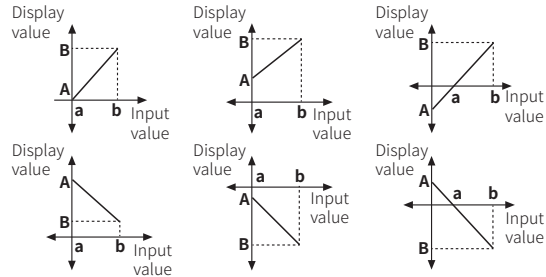
- Select input range = 1, decimal point position = 0.000 for measurement input in Parameter 1.
- It has to be 15.000 at high-limit scale for 1 VDC= in order to display 3.000 for 200 mVDC=.
- But if is disable due to setting range is 9.999.
- In this case, please set as high-limit display value gradient correction × high-limit scale = 15.000.

### High / Low-limit scale value

This function is to display setting of particular High / Low-limit value in order to display High / Low-limit value of measured input.

If measured inputs are a and b and particular values are A and B, it will display a = A, b = B as below graphs.

- When changing input range, it is changed automatically as factory default display range of the input range.



### Zero adjustment

It adjusts the display value of the optional configured input value as zero by force. Zero point error can be adjusted with 3 ways as below.

- Direct input correction value at Low-limit display value deviation correction parameter.
- Set the keys for zero adjustment parameter to YES and press the [◀] + [▲] keys for 3 sec in RUN mode.
- Set the external input terminal parameter to ZERO and short the Hold / Zero terminal for over 50 ms.

### Error correction

It corrects display value error of measured input.

$$\text{Display value} = (\text{Measured value} \times \text{High-limit display value gradient correction}) + \text{Low-limit display value deviation correction}$$

- E.g.: When the Input range 0 to 500 VDC= and the display range is 0 to 500.0

If the low-limit display value is 1.2 to 0 VDC= input, set -12 as deviation correction value to display 0.0 by adjusting offset of the low-limit display value.

The display value to 500 VDC= measured input varies by adjusting the offset of low-limit display value.

If this display value is 501.0, calculate 500.0 / 501.0 (desired display value / the display value), and set the 0.998 correction value as the High-limit display value gradient correction parameter to display 500.0 by adjusting gradient of high-limit value.

### Startup compensation time

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 applied.

### Display cycle

In some applications the measured input may fluctuate which in turn causes the display to fluctuate.

By adjusting the display cycle delay function time the operator can adjust the display time. For example, if the operator sets the display cycle time to 4 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.

### Max. / Min. peak value

It monitors max./min. peak value of display value based on the current displays value and then displays the data at the parameters.

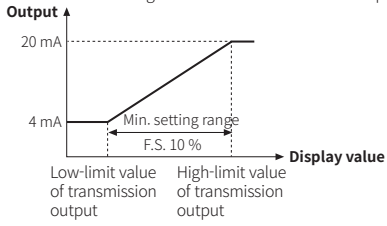
When pressing any one of front keys at the parameters, the monitored data is initialized.

Set the delay time at peak monitoring delay time parameter in order to prevent malfunction caused by initial overcurrent or overvoltage, when monitoring the peak value.

## ■ Transmission (DC 4 - 20 mA) output scale adjustment

It sets transmission output for the display value at the output current DC 4 - 20 mA.  
It sets display value for 4 mA at low-limit value of transmission output and 20 mA at high-limit value of transmission output.

- The range between high-limit value of transmission output and low-limit value of transmission output should be 10 %.
- When min. set interval under 10 % F.S., it changed as over 10 % F.S. automatically.
- Preset display value is fixed to output as 4 mA at under low-limit value of transmission output and 20 mA at over high-limit value of transmission output.



## Segment Table

The segments displayed on the product indicate the following meanings. It may differ depending on the product.

7 segment				11 segment				12 segment				16 segment			
0	0	l	l	0	0	l	l	0	0	l	l	0	0	l	l
1	1	l	J	1	1	l	J	1	1	l	J	1	1	l	J
2	2	l	K	2	2	l	K	2	2	l	K	2	2	l	K
3	3	l	L	3	3	l	L	3	3	l	L	3	3	l	L
4	4	l	M	4	4	l	M	4	4	l	M	4	4	l	M
5	5	l	N	5	5	l	N	5	5	l	N	5	5	l	N
6	6	l	O	6	6	l	O	6	6	l	O	6	6	l	O
7	7	l	P	7	7	l	P	7	7	l	P	7	7	l	P
8	8	l	Q	8	8	l	Q	8	8	l	Q	8	8	l	Q
9	9	l	R	9	9	l	R	9	9	l	R	9	9	l	R
A	A	l	S	A	A	l	S	A	A	l	S	A	A	l	S
b	B	l	T	b	B	l	T	b	B	l	T	b	B	l	T
c	C	l	U	c	C	l	U	c	C	l	U	c	C	l	U
d	D	l	V	d	D	l	V	d	D	l	V	d	D	l	V
E	E	l	W	E	E	l	W	E	E	l	W	E	E	l	W
F	F	l	X	F	F	l	X	F	F	l	X	F	F	l	X
G	G	l	Y	G	G	l	Y	G	G	l	Y	G	G	l	Y
H	H	l	Z	H	H	l	Z	H	H	l	Z	H	H	l	Z