

Digital panelmeter

BA1

INSTRUCTION MANUAL

Thank you for purchasing HANYOUNG product.
Please check whether the product is the exactly same as you ordered.
Before using the product, please read this instruction manual carefully.
Please keep this manual where you can view at any time

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Safety information

Before using the product, please read the safety information thoroughly and use it properly. Alerts declared in the manual are classified to Danger, Warning and Caution by their criticality

	DANGER	DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury
	WARNING	WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury
	CAUTION	CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury

DANGER

Do not touch or contact the input/output terminals because it may cause electric shock.

WARNING

- If the user use the product with methods other than specified by the manufacturer, there may be bodily injuries or property damages.
- To prevent electric shock or equipment failure, please do not turn on the power until completing wiring.
- Never disassemble, modify, or repair the product. There is a possibility of a malfunction, an electric shock, or a risk of fire.
- Please turn off the power when mounting/dismounting of the product. This is a cause of an electric shock, a malfunction, or failure.
- To prevent damage or failure of this product, please supply the rated power voltage.
- Since this is not explosion-proof structure, please do not use in a place where combustible or explosive gas is around.
- Since there is a possibility of an electric shock, please use the product as mounted on a panel while the power is being supplied.

CAUTION

- The contents of the instruction manual are subjective to change without prior notice.
- Please make sure that the specification is the same as what you have ordered.
- Please make sure that the product is not damaged during shipping.
- Please use this product in a place where corrosive gas (such as harmful gas, ammonia, etc.) and flammable gas do not occur.
- Please use this product in a place where there is no direct vibration and a large physical impact to the product.
- Please use this product in a place where there is no water, oil, chemicals, steam, dust, salt, iron or others (Contamination class 1 or 2).
- Please do not wipe this product with organic solvents such as alcohol, benzene and others. (Please use mild detergent)
- Please avoid places where excessive amounts of inductive interference and electrostatic and magnetic noise occur.
- Please avoid places where heat accumulation occurs due to direct sunlight or radiant heat.
- Please use this product in a place where the elevation is below 2,000 m.
- Please make sure to inspect the product if exposed to water since there is a possibility of an electric leakage or a risk of fire.
- It is effective against noise if making the power lines of the product the twisted pair wiring.
- Please do not connect anything to the unused terminals.
- Please connect wires properly after making sure the polarity of terminal.
- Please install a switch or break near the operator to facilitate its operation.
- Write down on a label that the operation of circuit breaker or switch disconnects the power since the device is installed.
- In order to use this product properly and safely, we recommend periodic maintenance.
- Some parts of this product have limited expected life span and aged deterioration.
- The warranty of this product (including accessories) is 1 year only when it is used for the purpose it was intended under normal condition.

Suffix code

Model	Code	Description
BA1-	<input type="checkbox"/> <input type="checkbox"/> - <input type="checkbox"/> - <input type="checkbox"/>	mini DC indicator 48(W) × 24(H) mm
Output	N	instruction only
Input	D 10	DC voltage (voltmeter)
	D 20	DC current (ammeter)
	D 11	DC voltmeter (1 – 5 V DC)
	D 21	DC ammeter (4 – 20 mA DC)
Range code	1~8	Refer to the measurement range code
Power supply voltage	-	No indication: 5 V d.c.
	A	12 – 24 V d.c.

Measurement range

■ DC voltage

Model	Measurement range	Resolving power	Input impedance	Max allowable input voltage
BA1-ND10-1	199.9 mV	100 μ V	100 k Ω	70 V
BA1-ND10-2	1,999 V	1 mV	1 M Ω	100 V
BA1-ND10-3	19,99 V	10 mV	1 M Ω	250 V
BA1-ND10-4	199.9 V	100 mV	10 M Ω	300 V

※ Accuracy : $\pm 0.2\%$ of indication value ± 1 digit (23 $^{\circ}$ C ± 5 $^{\circ}$ C)

■ DC current

Model	Measurement range	Resolving power	Input impedance	Max allowable input current
BA1-ND20-1	199.9 μ A	0.1 μ A	1 k Ω	1 mA
BA1-ND20-2	1,999 mA	1 μ A	100 Ω	50 mA
BA1-ND20-3	19,99 mA	10 μ A	10 Ω	150 mA
BA1-ND20-4	199.9 mA	100 μ A	1 Ω	300 mA
BA1-ND20-5	1,999 A	1 mA	Use shunt (secondary voltage 50 mV)	
BA1-ND20-6	19,99 A	10 mA		
BA1-ND20-7	199.9 A	100 mA		
BA1-ND20-8	1999 A	1 A		

※ Accuracy : $\pm 0.2\%$ of indication value ± 1 digit (23 $^{\circ}$ C ± 5 $^{\circ}$ C)

■ DC voltage

Model	Input	Display range	Input impedance	Max allowable input voltage
BA1-ND11-1	1 – 5 V DC	50.0	100 k Ω	100 V
BA1-ND11-2		100.0	100 k Ω	100 V
BA1-ND11-3		199.9	100 k Ω	100 V

※ Accuracy : $\pm 0.2\%$ of indication value ± 1 digit (23 $^{\circ}$ C ± 5 $^{\circ}$ C)

■ DC current

Model	Input	Display range	Input impedance	Max allowable input current
BA1-ND21-1	4 – 20 mA DC	50.0	25 Ω	150 mA
BA1-ND21-2		100.0	50 Ω	150 mA
BA1-ND21-3		199.9	100 Ω	150 mA

※ Accuracy : $\pm 0.2\%$ of indication value ± 1 digit (23 $^{\circ}$ C ± 5 $^{\circ}$ C)

Specification

Power supply voltage	5 V d.c.	12 – 24 V d.c.
Power consumption	Approx. 3 W	Approx. 5 W
Insulation resistance	10 M Ω min (500 V d.c.)	
Dielectric strength	1,500 V AC for 1 min (power terminal – input terminal)	
Noise resistance	Power supply terminal normal mode ± 200 V Power supply terminal common mode ± 500 V	
Vibration durability	10 – 55 Hz Peak amplitude for 2 hours each in X, Y, Z directions	
Shock durability	300 % (Approx 30 G)	
Ambient temperature	0 ~ 50 $^{\circ}$ C	
Ambient humidity	35 ~ 85 % RH	
Storage temperature	-10 ~ 70 $^{\circ}$ C	

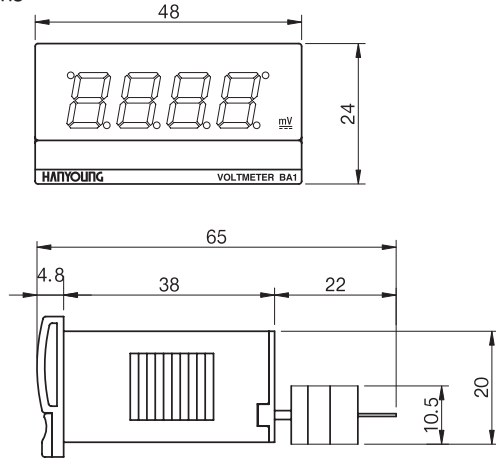
Function

Input signal	Voltage, current, current loop (4 – 20 mA d.c. or 1 – 5 V d.c.)
A/D conversion type	Duplex integral type
Sampling cycle	300 ms
Response speed	Approx. 2 sec (max range)
Max displayable digit	± 1999
Displaying part	7 segments LED
Decimal point indication	10 ¹ , 10 ² and 10 ³ indication by the backside terminal connection
Polarity indication	Display “-” automatically when input signal is opposite.
Indication when range is exceeded	Indicate with / □□□
Indication when range is short	Indicate with -/ □□□

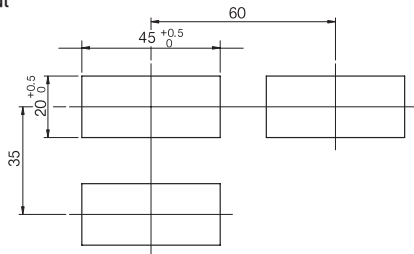
Dimensions and panel cutout

[Unit : mm]

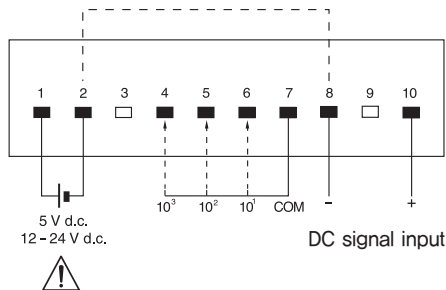
• Dimensions



• Panel cutout



Connection diagram



※ When using more than one BA1, please use separate power supply.
Please be cautious that ② and ③ terminals are internally short.

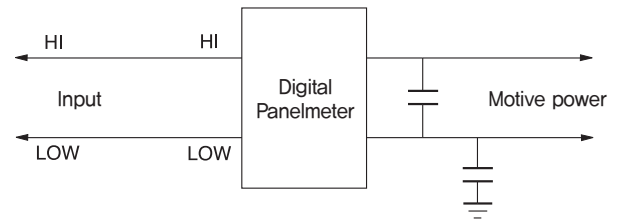
■ Power supply connection

- Connect power to the power terminal.
- Connect “+” to number 1 terminal and “-” to number 2 terminal for power 5 V d.c. Use the power within $\pm 5\%$ of 5 V d.c.
- Even using the prevention device against noise depending on the types, it is very difficult to equip the absolute prevention device to such a small equipment like a digital panelmeter.

(Figure 1) In case you use SMPS.

This noise problem does not happen with all SMPS, but if the requirements are not met, you can see the effect by adding the condenser to the driving power source, as below.

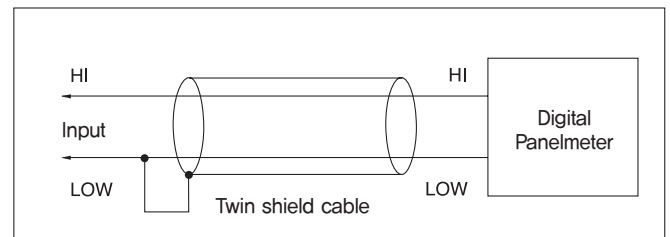
(Figure 1)



■ Input's connection

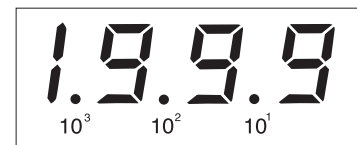
- For input signal (direct voltage or 4 – 20 mA d.c. or 1 – 5 V d.c.), please connect to terminal number 8 and terminal number 10.
- For the connection wire use two pieces of shield wire and connect shield to terminal number 8. (Refer to figure 2)

(Figure 2)



Select decimal position

- Please use the backside terminal for decimal position selection.



- When turning on 1,999 decimal point, please connect to terminal number 7 (COM) and number 4 terminal which are common terminals of decimal point.

Repair and inspection

- Please keep the device under the 60% humidity within the temperature -10 to +70. Please get rid of the dust when using it in the dusty places. (The machine's life is shortened due to high temperature of components in the device).
- Please be cautious not to touch thinner and volatile oil since this instrument's case is molded plastic.

After Service

This product is released out after production, testing, and examination through a strict quality control. If it has broken down, please contact the dealer or our headquarters directly. (Please send the defective product with the detailed information about it.)