

Pulse meter

LP1

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

To prevent electric shock while it is running, put to earth with the fixed screw of the unit and do not touch the radiator panel since it is very hot. Do not touch or contact the input/output terminals because they cause electric shock.

WARNING

- Do not decompose, modify, revise or repair this product. This may cause malfunction, electric shock or fire.
- If you use the product with methods other than specified by the manufacturer, there may be bodily injuries or property damages.
- Because this product uses the Lithium battery as the internal power, please do not disassemble or burn the product.

CAUTION

- The contents of this manual may be changed without prior notification.
- Before using the product you have purchased, check to make sure that it is exactly what you ordered.
- Check to make sure that there is no damage or abnormality of the product during delivery.
- Do not use this product at any place with corrosive (especially noxious gas or ammonia) or flammable gas.
- Do not use this product at any place with direct vibration or impact.
- Do not use this product at any place with liquid, oil, medical substances, dust, salt or iron contents. (Pollution level 1 or 2)
- Do not polish this product with substances such as alcohol or benzene.
- Do not use this product at any place with excessive induction trouble, static electricity or magnetic noise.
- Do not use this product at any place with possible thermal accumulation due to direct sunlight or heat radiation.
- Install this product at place under 2,000m in altitude.
- When the product gets wet, the inspection is essential because there is danger of an electric leakage or fire.
- Install the circuit breaker or switch at near place for convenient use.
- For the continuous and safe use of this product, the periodical maintenance is recommended.
- Some parts of this product have limited life span, and others are changed by their usage.
- The warranty period for this product including parts is one year if this product is properly used.

THINGS TO CONSIDER WHEN HANDLING THE BATTERY

- Because Lithium battery is built in, please avoid the places such as the explosive place or flammable place when scraping the product.
- Please do not charge, short, disassemble, modify and heat the product. Also, please do not throw into the fire and etc.
- Pay attention to the + polarity and - polarity of lithium battery.
- Please do not solder battery.
- When disuse battery, please insulate it with the tape or etc
- Please avoid direct sun light, high temperature and high humidity places when keep it.
- When you change lithium battery, please do not mingle new one with used or other type.

Specialty

- Mini LCD pulse meter
- Various functions available (rps, rpm, 0.1 rpm, Hz, 0.1 Hz)
- 5 digits display value function in front display
- No need to charge the internal battery externally
- Reusage function according to the battery replacement
- Non voltage and free voltage input
- IP66 protective structure (front side)

Function explanation

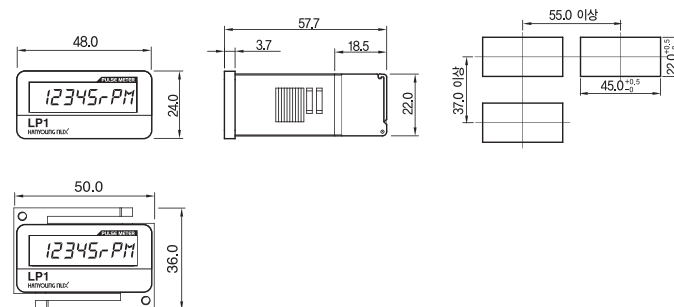
- RESET Function**
It is used to change the operation mode and initialize the measuring value and the display value.
- HOLD function**
Display the display value on the LCD after fixing the present measured value, regardless of the signal input
- rpm function**
Display the rotation per minute by measuring the rotation speed of the rotation axis
- rps function**
Display the rotation per second by measuring the rotation speed of the rotation axis.
- Hz function**
Measure the AC Line's frequency and display.
- 0.1 rpm function**
After measuring the rotation speed of the rotation axis, display the rotation per minute from 0.1 to 1000.0 rpm
- 0.1 Hz function**
Measure the AC Line's frequency and display it from 0.1 to 100.0 Hz

Specification

Model	LP1		
Power supply	No power supply (built-in battery, exchangeable battery)		
Indication method	LCD Indication method, Zero blanking (letter height: 8,7mm)		
Battery life	Approximately more than 3 years (about 25 °C)		
Input type	Non voltage input (INA)	Voltage input (INB)	Voltage input (INC)
Input conditions	Remaining voltage when disconnected : Max. 0.5 V Max impedance when disconnected : Max. 10 kΩ Min impedance when connected : Min. 500 kΩ	* AC voltage input 3~30 V AC * DC voltage input High: 4.5~30 V DC Low 0~2 V DC	* AC voltage input 30~240 V AC
HOLD Input type	Non voltage input		
Measuring degree	± 0.1% rdg ± 1 dig		
Measuring range	rpm	1 ~ 10000 rpm	
	0.1 rpm	0,1 ~ 1000,0 rpm	
	rps	1 ~ 1000 rps	
	Hz	1 ~ 1000 Hz	
	0.1 Hz	0,1 ~ 100,0 Hz	
External setting switch	SW1-1 : rps / rpm, SW1-2 : ×1 / ×0,1 SW2-1 : RESET, SW2-2 : (rps, rpm) / Hz		
External connection	terminal block (5 pin)		
Insulation resistance	Min. 100 MΩ (500 V d.c mega standard, between the electric conduction terminal and exposed non-charging metal part)		
Dielectric strength	2000 V a.c (50 / 60 Hz for 1 min, between the electric conduction terminal and exposed non-charging metal part)		
Vibration	Durability	10~55 Hz (1 minute cycle) double amplitude, each direction of X, Y, Z for 1 hour	
	Malfunction	10 - 55 Hz double amplitude, each direction of x, y, z for 10 min	
Shock	Durability	300 % each direction of x, y, z 3 times	
	Malfunction	100 % each direction of x, y, z 3 times	
Ambient temperature	-10 ~ 55 °C (no dew condensation, no icing)		
Storage temperature	-20 ~ 65 °C (no dew condensation, no icing)		
Ambient humidity	35 ~ 85 % R.H.		
Weight	approx 46 g (excluded the weight of box)		

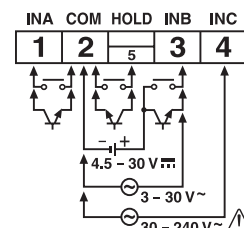
* In order to increase the battery life, please refer to the conditions above when replacing the battery

Dimension and panel cutout



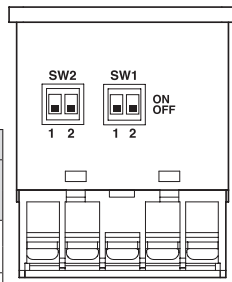
Connection diagram

- * INA : Non voltage input
 - * INB : Voltage input
 - DC Voltage input (4.5~30 V d.c)
 - AC Voltage input (AC Line frequency, 3~30 V a.c)
 - * INC : Voltage input
 - AC Voltage Input (AC line frequency, 30~240 V a.c.)
- Please use only 1 input terminal among 3 input terminals like INA, INB, INC.



Operation mode

SW2		SW1	
RST ON	Hz	rpm	X 0.1
RST OFF	rps, rpm	rps	X 1
1	2	1	2



Operation mode setting					
Operation mode	SW2		SW1		Measuring range
	1	2	1	2	
※ rps	ON	OFF	ON	OFF	1 ~ 1000 rps
rpm	ON	OFF	ON	OFF	1 ~ 10000 rpm
0.1 rpm	ON	OFF	ON	OFF	0.1 ~ 1000.0 rpm
Hz	ON	OFF	ON	OFF	1 ~ 1000 Hz
0.1 Hz	ON	OFF	ON	OFF	0.1 ~ 100.0 Hz
RST	ON	OFF	ON	OFF	-

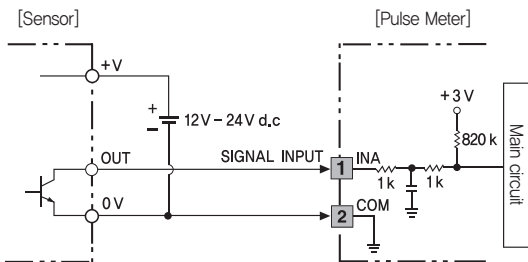
- Please select operation mode with using the SW1 and SW2
- When changing to operation mode, change SW2-1 (RESET) from ON to OFF then, operation mode is set.
- 'X 0.1' operation mode is not supported when setting rps operation mode.
- ※ rps operation mode is not set at default setting.

When setting the SW2-1 (RESET)'s position ON, indicative value is not displayed on the front of LCD.

Input connection diagram

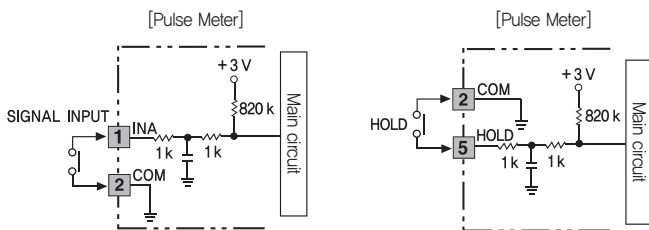
■ Non-voltage input

1. Non-connect input



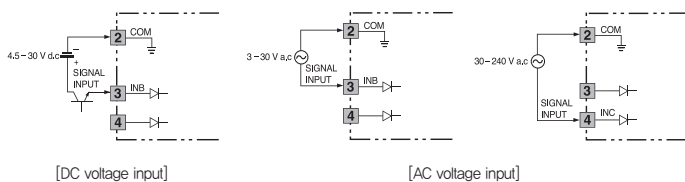
- Please use NPN open collector output type for the sensor and supply power from the outside.
- Do not supply voltage to the terminal 1 (INA) and 2 (COM). It can cause malfunction or it may be destroyed.

2. Contact input



- Contact input (relay) must withstand 3 V d.c., 5uA
- Terminal 2 (COM) is GND terminal and it is connected inside
- HOLD function can be used as above method.

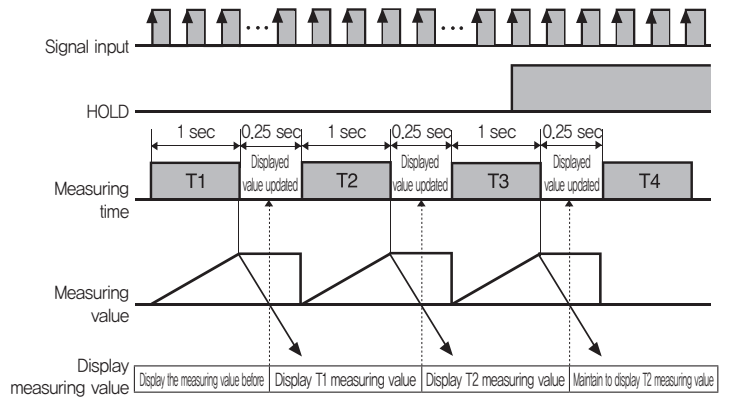
■ Voltage input



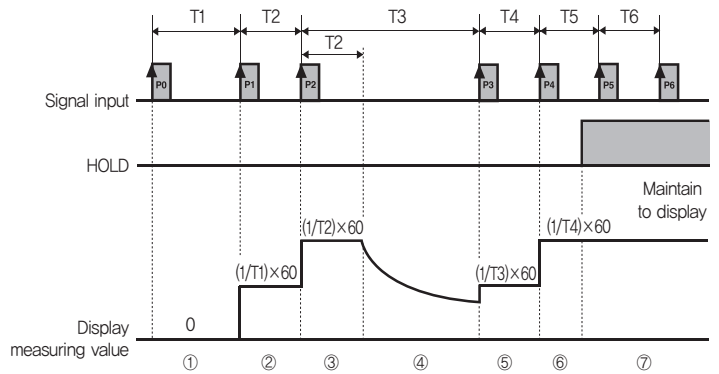
- INB (Terminal 3): DC voltage input (4.5-30 V d.c.), AC voltage input (AC Line frequency, 3-30 V a.c.)
- INC (Terminal 4): AC voltage input (AC Line frequency, 30-240 V a.c.)
- Contact input (relay) must withstand 3 V d.c., 5uA
- Please use only one from input terminals. It can cause malfunction or it may be destroyed. (input terminal : INA, INB, INC)

Operation chart

■ Setting rps, Hz operation mode



■ Setting rps, 0.1 rpm, 0.1 Hz operation mode



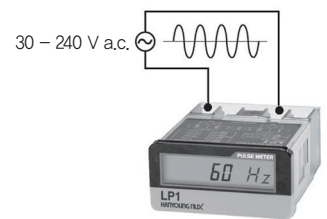
- ① Display the measuring value for the signal that is input before ('0' is displayed since there is no signal input)
- ② Display the measuring value regarding the signal input, 'P0'
- ③ Display the measuring value regarding the signal input, 'P1'
- ④ Display value is gradually decreasing until signal is received as signal input is none within T2 time
- ⑤ Display the measuring value regarding the signal input, 'P2'
- ⑥ Display the measuring value regarding the signal input, 'P3'
- ⑦ Maintain the display of measuring value for signal input 'PS3' since input status is HOLD.

Example of use

■ Measuring of the number of revolutions



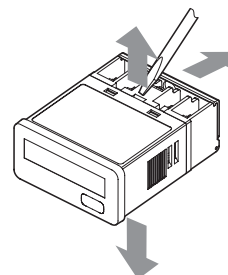
■ Measuring of alternating current power source frequency



- Motor's number of revolutions is detected by proximity sensors and the value that is measured from it is displayed.
- ※ Non-voltage input (INA)
- ※ Voltage input (INB) : 4.5 - 30 V d.c

- AC Line's frequency in the industry site is detected and the value that is measured from it is displayed.
- ※ Voltage input (INB) : 3 - 30 V a.c
- ※ Voltage input (INC) : 30 - 240 V a.c

Things to consider when replacing batteries



- Please disconnect wires when replacing the batteries. There is possibility that you get electric shock if you touch the part where high voltage had been supplied.
- When replacing the batteries please perform with static electricity not charged on to the body.
- Please use designated battery (CR2477 3V) only.
- Order for replacing batteries
 - ① Please separate the upper and lower part of case Lock by using tools.
 - ② Please pull the body part of case.
 - ③ After case being separated, replace the batteries. (cautious for the polarity)