Digital frequency meter

# MP3-4□H, MP6-4□H

## 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

There is a danger of occurring electric shock in the input/output terminals so please never let your body or conductive substance is touched.

### ⚠ Warning

- This product does not contain an electric switch or fuse, so the user needs to install a separate electric switch or fuse externally. (Fuse rating : 250 V 0.5 A)
- To prevent defection or malfunction of this product, apply a proper power voltage in accordance with the rating.
- To prevent electric shock or malfunction of product, do not supply the power until the wiring is completed.
- Since this product is not designed with explosion-protective structure, do not use it any place with flammable or explosive gas.
- Do not decompose, modify, revise or repair this product. This may be a cause of malfunction, electric shock or fire.
- Reassemble this product while the power is OFF. Otherwise, it may be a cause of malfunction or electric shock.
- If you use the product with methods other than specified by the manufacturer, there may be bodily injuries or property damages.
- There is a possibility of occurring electric shock so please use this product after installing it onto a panel while it is operating.

### ⚠ Caution

- The contents of this manual may be changed without prior notification.
- Do not use this product at any place with occurring 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.(Use at Pollution level 1 or 2)
- Do not polish this product with substances such as alcohol or benzene. (Use neutral detergent.)
- Do not use this product at any place with a large inductive difficulty or occurring 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 2,000 m in altitude.
- When the product gets wet, the inspection is essential because there is danger of an electric leakage or fire.
- If there is excessive noise from the power supply, using insulating transformer and noise filter is recommended. The noise filter must be attached to a panel which is already connected to a ground and the wire between the filter output side and power supply terminal must be short as possible.
- If twisting the power cables closely together then it is effective against noise.
- Do not connect anything to the unused terminals.
- After checking the polarity of terminal, connect wires at the correct position.
- When this product is connected onto a panel, use a circuit breaker or switch approved with IEC60947-1 or IEC60947-3.
- Install a 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.

## Suffix code

| Model | Code | | | | | | | | Information |
|---|---|---|---|---|---|---|---|---|---|
| MP | □ | □ | □ | □ | | | | | Digital frequency meter |
| Dimension | 3 | | | | | | | | Dimension 96 × 48 ㎜ |
| | 6 | | | | | | | | Dimension 72 × 36 ㎜ |
| Displayable digit | | 4 | | | | | | | 4 digits (9999) |
| Output (Optional) | | | N | | | | | | Only for display |
| | | | 0 | | | | | | Relay output (HI, GO, LO) + Current output (4 – 20 ㎃) |
| | | | 1 | | | | | | Relay output (HI, GO, LO) |
| | | | 2 | | | | | | NPN TR output (HI, GO, LO) + Current output (4 – 20 ㎃) |
| | | | 3 | | | | | | PNP TR output (HI, GO, LO) + Current output (4 – 20 ㎃) |
| Measurement input signal | | | | H | | | | | AC input frequency measurement |

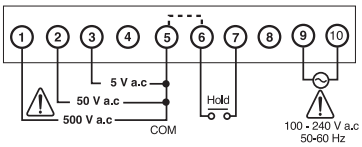
※ Measurement input signal is confined to MP6-4□H and MP3-4□H is under developed

## Specification

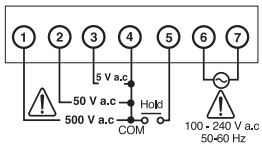
| | |
|---|---|
| Power supply voltage | 100 – 240 V a.c 50 – 60 Hz allowable voltage fluctuation : 85 ~ 110 % |
| Power consumption | 5 VA |
| Display method | 7 Segment LED Display |
| Insulation resistance | 100 min MΩ (500 V d.c mega standard) between the external terminal and case |
| Dielectric strength | 2000 V a.c for 1 min (between the external terminal and case) |
| Noise immunity | Square wave noise by the noise simulator pulse width 1 ㎲, ±1000 V |
| Vibration resistance | Malfunction 10 –55 Hz peack amplitude 0.5mm X/Y/Z each direction for 1 hour |
| | Resistance 10 –55 Hz peack amplitude 0.5mm X/Y/Z each direction for 2 hours |
| Shock resistance | Malfunction 100 ㎨ X · Y · Z each direction for 3 times |
| | Resistance 300 ㎨ X · Y · Z each direction for 3 times |
| Ambient temperature | –10 ~ 55 ℃ (icing or dew condensation not allowed) |
| Ambient humidity | 35 ~ 85 % RH (without dew condensation) |
| Storage temperature | –20 ~ 65 ℃ (icing or dew condensation not allowed) |
| Relay Life span | Phisical : 20,000,000 ps Min , Electrical : 100,000 ps Min |
| Measurement method | Coefficient Measuring method |
| Display cycle | When the input period is less than 0.1 second, it displays every 0.1 second. When the input period exceeds 0.1 second, it displays every 0.1 second. |
| Displayable digit | –1999 ~ 9999 (4 digits) |
| Measurable range | 0.1 Hz – 9999 Hz |
| Measuring items | Frequency (Hz) |
| Decimal function | Selection by internal parameter |
| Scaling function | Displaying function of converting measured maximum value and minimum value into random figure |
| Hold function | External hold automatic hold of peak detection for maximum value and minimum value |
| Control | Hold of Displaying value |
| Other functions | • Comparative output • Max value / min value indication by the front key • Protect the set value from changing • Average the value and delay the display cycle |
| Output (Optional) | · Relay output of contact point (3 output) · Current output (4 – 20 ㎃) · Transistor output (NPN, PNP) |
| Weight | Approx. 180 g |

## Connection diagram

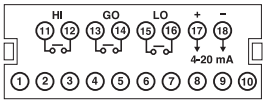
● MP3-4-NH



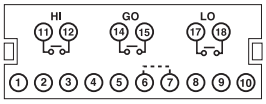

● MP6-4-NH



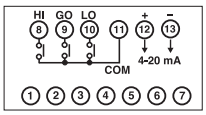

■ MP3-4-OH
(Relay output, 4 – 20 mA Current output)



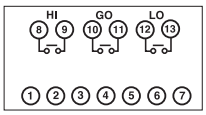

■ MP3-4-1H (Relay output)



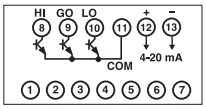

■ MP6-4-OH
(Relay output, 4 – 20 mA Current output)



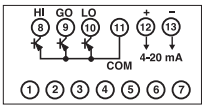

■ MP6-4-1H (Relay output)




■ MP6-4-2H
(NPN TR, 4 – 20 mA Current output)




■ MP6-4-3H
(PNP TR, 4 – 20 mA Current output)




## Parameter 1

| Display | Mode name | Default value | Set range | | Remark |
|---|---|---|---|---|---|
| in.S | Input range | 999.9 | 0 | 9.999 | Select the measuring range of input frequency. |
| | | | 1 | 99.99 | |
| | | | 2 | 999.9 | |
| | | | 3 | 9999 | |
| 2.HdP | Factor | 1.000 | Max : | 1.800 | Use this to get the ×(involution) of input reading. |
| | | | Min : | 0.500 | |
| 3.LdP | Input compensation | 0 | Max : | 99 | Correct the error by adding(+) or reducing(–) to the input reading. |
| | | | Min : | -99 | |
| 4.Adt | Updating cycle | 0.2 | Max : | 5.0 | Set up the time for measure the mean value of input. |
| | | | Min : | 0.1 | |
| 5.SCH | High scale | 0 | Max : | 9999 | Set up the maximum value of display when you need to convert into random value. |
| | | | Min : | -1999 | |
| 6.SCL | Low scale | 0 | Max : | 9999 | Set up the minimum value of display when you need to convert into random value. |
| | | | Min : | -1999 | |
| 7.dPP | Position of decimal point | 000.0 | | | Set up the location of a decimal point |
| 8.PdH | Hold function | oFF | oFF | | Set up the autonomic holding when detecting PEAK value. Use external hold (E-Ha) |
| | | | H-Hd | | |
| | | | L-Hd | | |
| | | | E-Hd | | |
| 9.LoC | Lock function | oFF | on | | Set up the locking on function of panel meters |
| | | | oFF | | |

## Parameter 2

| Display | Mode name | Default value | Set range | Remark |
|---|---|---|---|---|
| HHPt | High Peak Display | – | – | Display the max value among the measured values. |
| LLPt | Low Peak Display | – | – | Display the min value among the measured values. |
| HSEt | Output High Set | 5000 | Max : +9999<br>Min : –1999 | Set up the high set value. |
| LSEt | Output Low Set | 2000 | Max : +9999<br>Min : –1999 | Set up the low set value. |
| PSot | Output Type Select | oFF | LL(LL_ot) | Set the comparative output mode. |
| | | | HH(HH_ot) | |
| | | | LH(LH_ot) | |
| | | | HL(HL_ot) | |
| | | | IL(IL_ot) | |
| HYSt | HYS terisis | 01 | Max : 99<br>Min : 00 | Set up the hysteresis. |

## Measurement input and range

| Input signal | Mode | Input range | Display range | Input impedance | Accuracy |
|---|---|---|---|---|---|
| AC voltage | 5 V ( 5V ) | 0.1 ~ 9999 Hz | 0.1 ~ 9999 | 100 kΩ | ±5 Digit max. |
| | 50 V ( 50V ) | | | 1 MΩ | |
| | 500 V ( 500V ) | | | 5 MΩ | |

※ Maximum range of display scale
−1,999 ~ 1,999 / −19,99 ~ 19,99 / −199,9 ~ 199,9 / −1999 ~ 9999
the displaying range of expression changes depending of the set−up location of a decimal point

## Comparative output action (PSot)

| Operation mode | Output operation | Explanation |
|---|---|---|
| | HSEt / LSEt | H : Hysteresis |
| OFF | | No output operation |
| LLot | GO / LO | Current indication value ≦ LSEt value, LO output becomes ON. Current indication value ≧ LSEt value, GO output becomes ON. |
| HHot | HI / GO | Current indication value ≧ HSEt value, HI output becomes ON. Current indication value ≦ HSEt value, GO output becomes ON. |
| LHot | HI / GO / LO | Current indication value ≦ LSEt value, LO output becomes ON. Current indication value ≧ HSEt value, HI output becomes ON. Current indication value < LSEt. HSEt GO output becomes ON. |
| HLot | HI / GO / LO | Current indication value ≧ LSEt value, LO output becomes ON. Current indication value ≧ HSEt value, HI output becomes ON. Current indication value < LSEtand HSEt, GO output becomes ON. |
| ILot | GO / LO | Same as the LLot operation but LO output will not operate under the initial setup value of LSEt. It starts to operate from the next value of LSEt. |

It does not operate under the initial LSEt

## Initializing set value

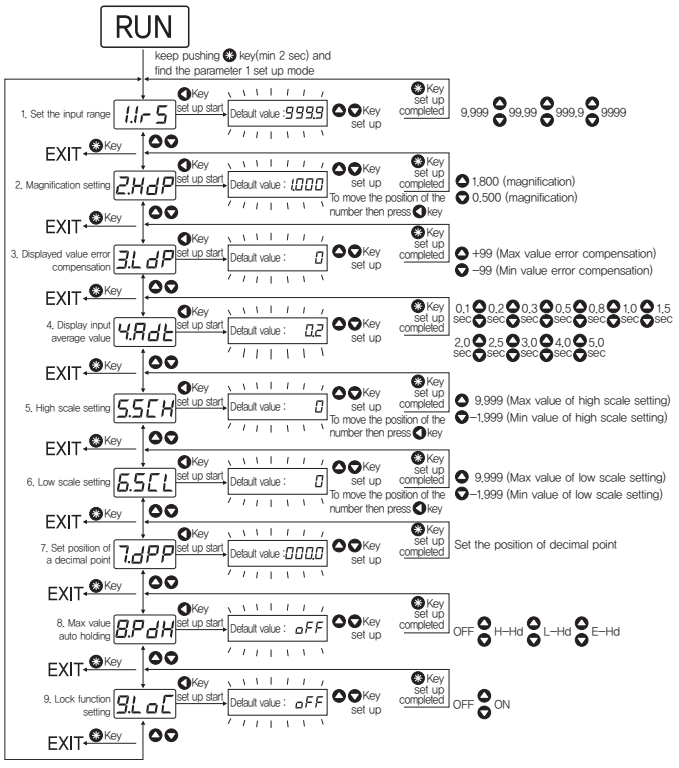
Push the button ✱ → ◀ → ▼ → sequancely with pushing the ▲.
And then LSEt is displayed. When displaying LSEt, push again the ▲ button and the all default value is initialized.
(* Initializing set value is not available when LoCK on.)

## Error display code

"OVEr" : This will be displayed when a measured input value exceeded max display range (9999 4digits) or when negative valve is indicated with in normal mode. Normal mode : SCH 0 or SCL 0
"HLEr" : Error message will be displayed when a setting value of High Comparative Output is less than that of Low Comparative Output
"----" : When input is less than min measurement range 0.1 Hz

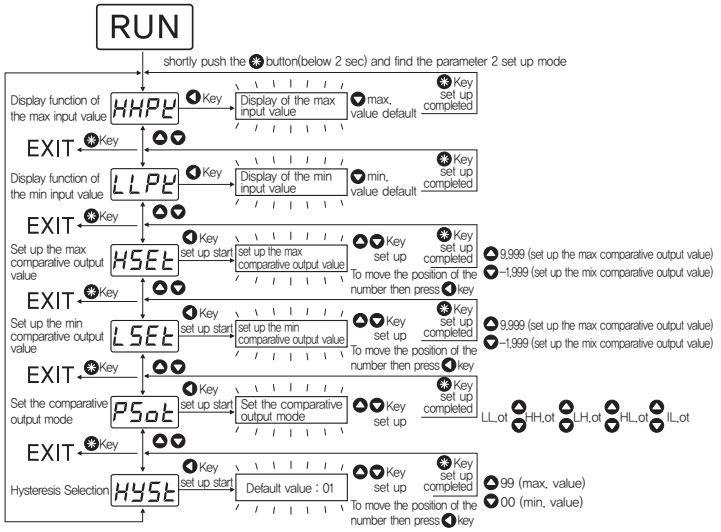
## Parameter composition and setting method

### ■ Parameter 1 ( ✱ Key − keep pushing the button(min 2 sec))

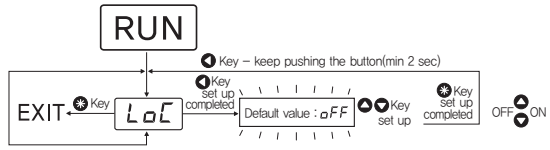



※ AdE : This is the set−up value when input pulse frequency is within 0.1 second and this value can change if the input impulse frequency exceeds 0.1 second.

### ■ Parameter2 ( ✱ Key −shortly push the button (below 2 sec)




### ■ Lock key ( ◀ Key − keep pushing the button(min 2 sec))




※ every parameter set up is not available when the LoCK on.

### ■ How to change the parameter set value

1. Pressing ✱ key more than 2 sec within the RUN MODE will enter into the Parameter 1 and pressing ✱ key less than 2 sec will enter into the parameter 2.
2. Able to select the parameter by pressing ▲, ▼ key and within the selected parameter, parameter and set value repeatedly flickers in the display unit.
3. Able to change the set value by pressing the ◀ key and at this moment, set value flickers in the display unit(when set value is 0, only the 0 th digit of constant value flickers and displayed) When changing the setting of constant value, able to perform the position shifting by using ◀ key.

Example)

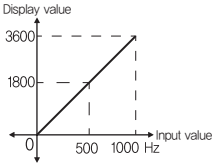

When set value is constant, only 0 th digit of the constant value will flicker in the display unit.
In order to change the value on 100 th digit, press the ◀ key 3 times. Each time when users press the ◀ key, position of the digit will shirt to the left and selected digit will flicker in the display unit.
When setting is completed, return to the parameter mode by pressing the ✱ key. At this moment, flickers the parameter and set value repeatedly. Able to return to the RUN mode by pressing the ✱ Key again.

### ■ Slope setting method

When users want to display 3600 (min −1999 ~ 9999) within the 1000 Hz input, setting the parameter is as follows.
1. Enter into the parameter 1 by pressing the ✱ key for 2 sec
2. Set SCH in the 3600 (slop high value) parameter by using shift, up and down key
3. Set 0 in the SCL(slope low value) parameter by using shift, up and down key.

Finish the setting just like above and return to the RUN mode by pressing the menu key.

| | Parameter 1 | |
|---|---|---|
| Parameter | SCH | SCL |
| Set value | 3600 | 0 |




### ■ Input of peak value and hold by external input

8PdH Detect the input peak value through the set−up of parameter or detect the displayed value by external pressure, or hold the displayed value by external pressure.

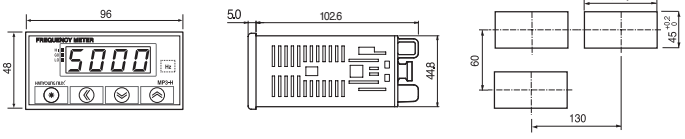
| oFF : Disuse | H-Hd : Hold the maximum value | L-Hd : Hold the minimum value | E-Hd : Hold by external pressure |
|---|---|---|---|

### ■ Transmission function (Auxiliary output)

- All electrical current : Show the output 4 − 20 ㎃ d.c of current displayed value. (Resolution 12000)
- PNP output (Output of open collector being below 12 − 24 V d.c 50 ㎃)
- NPN output (Output of open collector being below 12 − 24 V d.c 50 ㎃)
- RELAY output (250 V a.c 5 A below) 1a × 3

## Dimension and Panel cutout

### ■ MP3−H




### ■ MP6−H