

HK-H990M

HART Transmitter Board

Manual



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1. General Introduction

Huakong General Pressure Transmitter OEM Board HK-H990M is designed in conformity with HART protocol. With HART communication, customers could manage and adjust the HART instrument and meantime monitor the process variables.

This manual mentions the technical specification of HK-H990M, the interface definition, the field adjustment, as well as the operation of HKS-C100A to calibrate HK-H990M.

Please read the manual before using HK-H990M, in order for you to operate it easily. If you have any further problems, please do not hesitate to contact with us, and it will be a great pleasure for us to help you. Thanks for your choice.

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2. Main Features

Technical Specification

- Remote management via HART Hand Held Communicator or PC
- Output Signal: 4~20mA with HART protocol (two-wire)
- Power Supply: 12~36 VDC
- Damping: 0~32s adjustable
- Basic Accuracy: $\pm 0.075\%$ F.S.
- Operation Temperature: $-40^{\circ}\text{C}\sim+85^{\circ}\text{C}$ (With LCD: $-20^{\circ}\text{C}\sim+70^{\circ}\text{C}$)
- Two modes software configurable: 0~2.5V for constant voltage; while 0~1mA for constant current
- Optional 4 1/2 digit LCD display

Signal Description & Interface Definition

HART Communication Output Wave

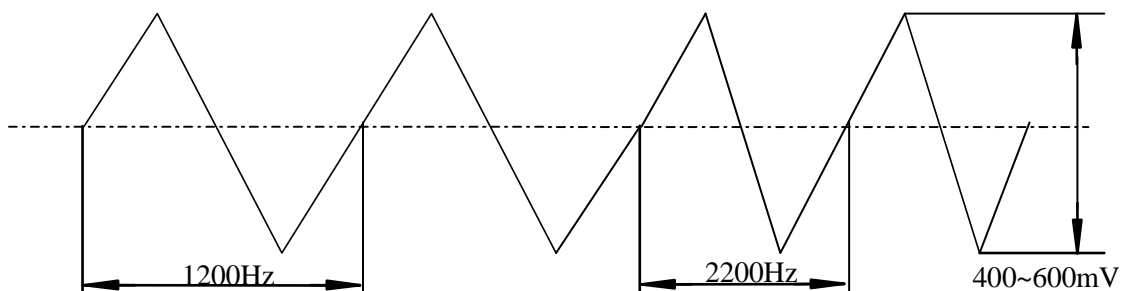


Figure 2-1 HART Communication Output Wave

Interface Definition

XF1 (2 pin) on HK-H990 should be connected to the power supply of the instrument, pin 1 for positive, and pin 2 for negative; XF4 (6 pin) is to the sensor. There are two modes: constant current and constant voltage. When former mode, pin 4 is for sensor positive and pin 1 is for sensor negative; or when later mode, pin 5 is for sensor positive and pin 1 is for

sensor negative. Pin 2 is for sensor input positive and pin3 is for sensor input negative. Pin 6 is for temperature sensor positive. HK-H990M is compatible with PT1000 and PN. Software could recognize the temperature sensor automatically without any manual configuration. If apply PT1000, connect it to pin 6 and pin 1; if apply PN, connect B and C to pin 6, and E to pin 1.

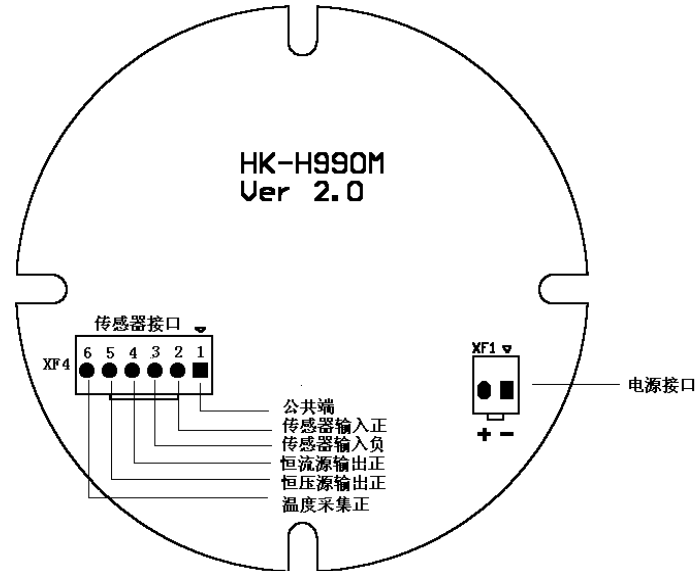


Figure 2-2 Interface Definition

Key-press & Alarm

XF2 (8 pin) should be connected to the LCD; Key-press Span is for span setting and key-press ZERO is for zero setting; the two groups of wire jumpers are for settings of failure alarm and EEPROM write-protect.

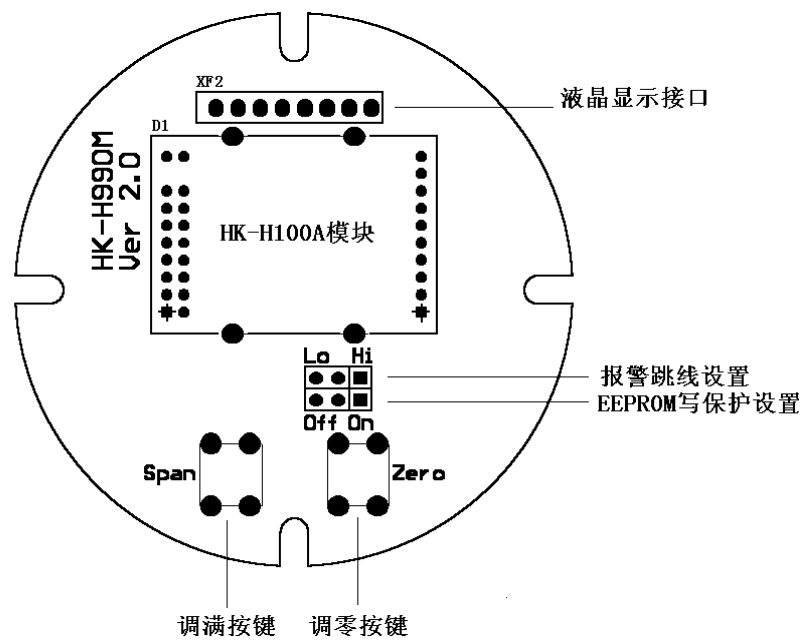


Figure 2-3 Front Panel Definition

If the failure alarm wire jumper has been selected as LO, it will be minimum output (3.8mA); while if it has been selected as Hi, it will be maximum output (22mA). If nothing selected, it will be default minimum output.

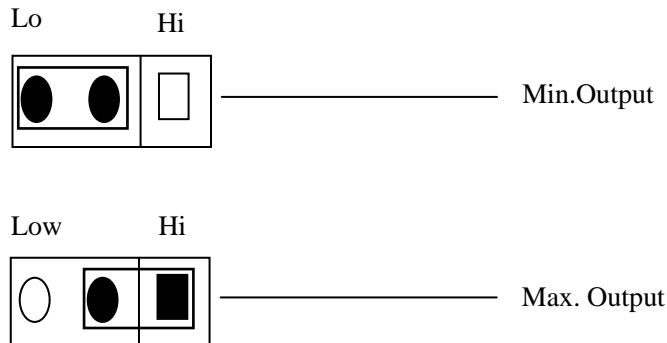


Figure 2-4 Failure Alarm Wire Jumper

If the EEPROM write-protect has been selected as Off, it will be in non-protecting state, and configuration is available; while if it has been selected as On, it will be in protecting state, and configuration is not available. If nothing selected, it will be in default protecting state.

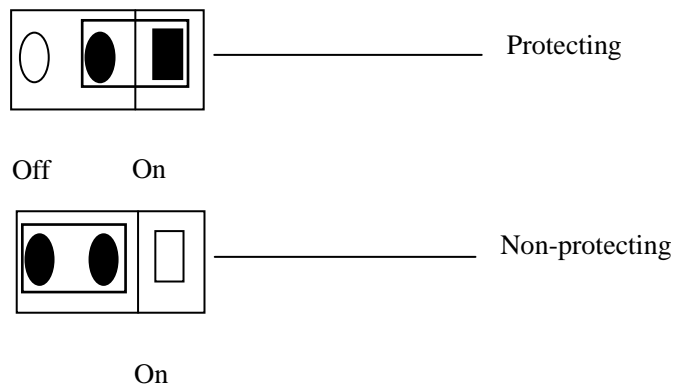


Figure 2-5 Write-protect Wire Jumper

Block Diagram

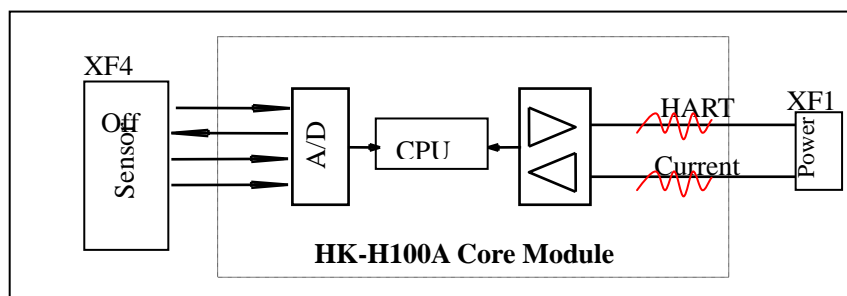


Figure 2-6 HK-H990M Block Diagram

Typical Connection

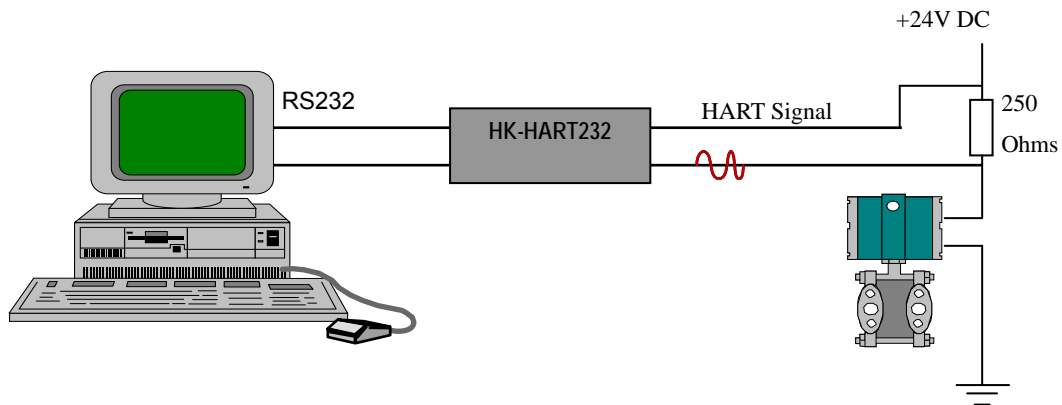


Figure 2-7 Typical Connections of HK-H990M

3. Operation Procedure of HKS-C100A

Please refer to HKS-C100A Manual for detailed information.

4. Display

The LCD could display below process variables: current, PV, PV%, as well as sensor temperature.

PV Display



Figure 4-1 PV Display Format

PV% Display

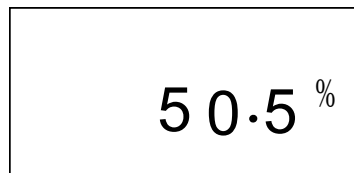


Figure 4-2 PV % Display

Current Display



Figure 4-3 Current Display

Sensor Temperature Display

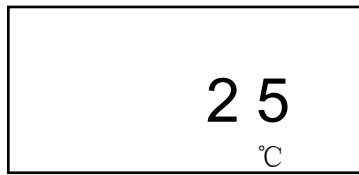


Figure 4-4 Sensor Temperature Display

5. Field Adjustment

The available adjustments include zero setting, span setting, display variable setting, PV unit setting, lower limit setting, upper limit setting, damping setting, as well as PV zero setting.

Zero & Span

1. Press ZERO and SPAN simultaneously for 5 seconds, and it will enter into configuration state.
2. Input 4mA pressure to the high side of the transmitter.
3. Till the pressure stable, press ZERO for at least 5 seconds, and set the zero.
4. Confirm the output to be 4mA.
5. Input 20mA pressure to the high side of the transmitter.
6. Till the pressure stable, press SPAN for at least 5 seconds, and set the span.
7. Confirm the output to be 20mA.

Note: The upper and lower limit should be within the limit of the sensor. And the minimum and maximum range should be within the transmitter range limit. When adjusting, if the waiting time for the pressure output exceeds 60 seconds and there is no additional operation, the transmitter will exit adjustment state automatically. Then you should enter into the adjusting state again to restart the adjustment.

Display Variable

If press Span, the LCD will display PV unit, Temperature, Current, and PV% in turn. Then when the display variable you need appeared in the LCD, cut SPAN and the setting will be saved successfully.

Configuration

If press ZERO, it will enter into password setting state. The default password is 1234. Set the password correctly, and it will enter into configuration state. Under password setting state and configuration state, the main function of ZERO is switching state and setting the digit rightward; while the main function of SPAN is setting the configuration data and confirming saving.

The whole procedure of configuration is shown as Figure 5-1 below:

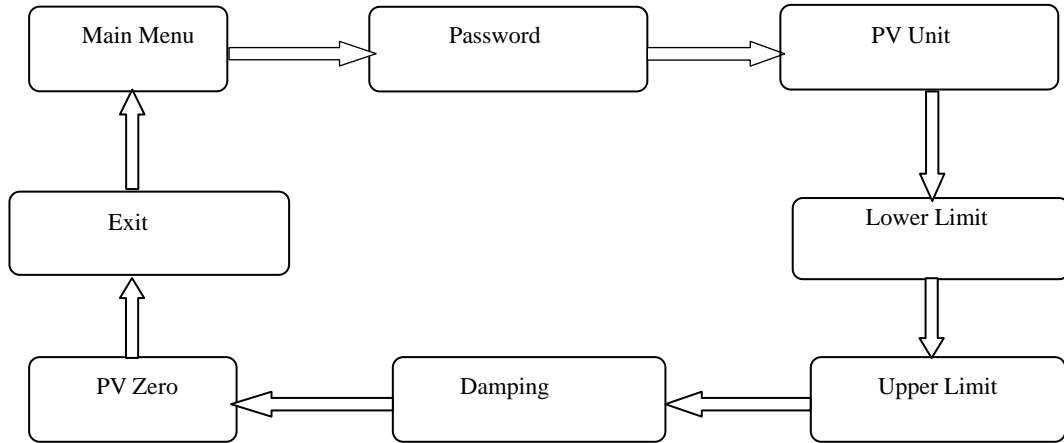


Figure 5-1 Configuration Procedure

Password

If press ZERO, it will enter into password setting state, shown as Figure 5-2 below:

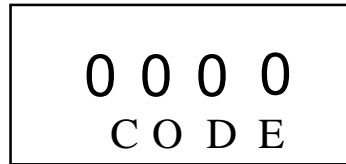


Figure 5-2 Password Setting

When the highest digit begins to flash, the password setting is available. If press SPAN, the flashing digit will move rightward. When the flashing digit switches to the down arrow in the left corner at the bottom of the LCD, if press ZERO, the password setting will be done. If the password setting is correct, it will enter into PV unit setting state, shown as Figure 5-3 below; or it will go back to the main menu.

PV Unit

Under PV unit setting state, if press ZERO, it will enter into setting state, and present PV unit will display at the bottom of the LCD, shown as Figure 5-3 below. Then if press SPAN, PV units will display in turn according to below order, flashing to indicate the setting state: KPA → TORR → ATM → MPA → INH20 → INHG → FTH20 → MMH20 → MMHG → PSI → BAR → MBAR → G_SC → KG_SC → PA → KPA (if present PV unit is KPA)

Then if press ZERO again, it will exit PV unit setting state, and save the present PV unit. If the operation is successful, it will display SAVE for successful setting, shown as Figure 5-4 below. A second later, it will enter into lower limit setting state, shown as Figure 5-5 below.



Figure 5-3 PV Unit Setting



Figure 5-4 Successful Setting

Lower Limit

Under lower limit setting state, the system will display present lower limit in the LCD, shown as Figure 5-5 below.

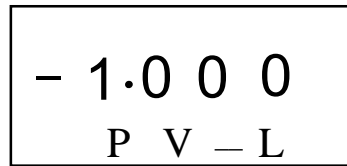


Figure 5-5 Lowe Limit Setting

If press ZERO, it will pass lower limit setting, and enter into upper limit setting, shown as Figure 5-6 below; while if press SPAN, it will enter into lower limit setting, and the negative sign begins to flash (or if positive number, the up arrow in the left corner at the bottom of the LCD will begin to flash), and you could change the lower limit value then. Under setting state, press SPAN to set positive sign or negative sign (up arrow in the left corner at the bottom of the LCD for positive number, and the negative sign in the left for negative number), as well as the decimal position; while press ZERO to move the flashing digit rightward. When the flashing digit switches to the down arrow in the left corner at the bottom of the LCD, if press ZERO, it will continue the lower limit setting; while if press SPAN, it will enter into upper limit setting state, shown as Figure 5-6 below.

Upper Limit

Under upper limit setting state, the system will display present upper limit in the LCD, shown as Figure 5-6 below.

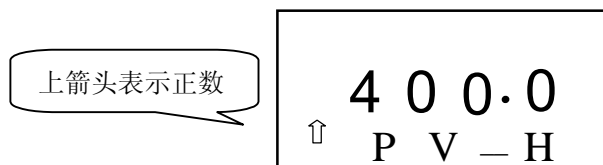


Figure 5-6 Upper Limit Setting

If press ZERO, it will pass upper limit setting, and enter into damping setting, shown as Figure 5-7 below; while if press SPAN, it will enter into upper limit setting. When the up arrow in the left corner at the bottom of the LCD begins to flash and you could change the upper limit value then. The operation here is the same as lower limit setting. Press ZERO to move the flashing digit; while press SPAN to change the number or set the decimal position. After amendment, if press SPAN, in case the upper limit and lower limit is in conformity with the requirements (upper limit, lower limit and minimum range), system will

save the upper limit and lower limit into transmitter; while in case the upper and lower limit is not in conformity with the requirements, it will display OVER, shown as Figure 5-7 below. Then press any key-press to go back to lower limit setting state. If the operation is successful, it will display SAVE for successful setting, shown as Figure 5-4. A second later, it will enter into damping setting state, shown as Figure 5-8 below.



Figure 5-7 Operation Over

Damping

Under damping setting state, the system will display present damping time in the LCD, shown as Figure 5-8 below (unit: second).



Figure 5-8 Damping Setting

If press ZERO, it will pass damping setting and enter into PV zero setting state, shown as Figure 5-10 below; while if press SPAN, it will enter into damping setting state, and the high digit begins to flash, and you could change the damping time then. Under setting state, press ZERO to move the flashing digit; while press SPAN to change the number or set the decimal position (damping time should not be negative). When the flashing digit switches to the down arrow in the left corner at the bottom of the LCD, if press ZERO, the setting will be completed. If damping time within 32 second, it will be saved; while if it beyond 32 second, it will display OVER, shown as Figure 5-7. Then press any key-press to go back to damping setting state. If the operation is successful, it will display SAVE for successful setting, shown as Figure 5-4. A second later, it will enter into PV zero setting state, shown as Figure 5-10 below.

NOTE: By continuously setting the damping as 4567 and 5678, backup data will be recovered into EEPROM. Before this operation, make sure that EEPROM data backup has been done when it leaves factory. During backup or recover, it will display as Figure 5-9 below.



Figure 5-9 Backup or Recover EEPROM Data

PV Zero

After damping setting, it will enter into PV zero setting state, shown as Figure 5-10 below:

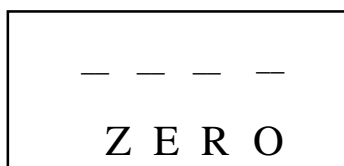


Figure 5-10 PV Zero Setting

Under PV zero setting state, if press ZERO, it will pass PV zero setting, and enter into exit field adjustment state, shown as Figure 5-13 below; while if press SPAN, it will enter into PV zero setting state, shown as Figure 5-11 below.

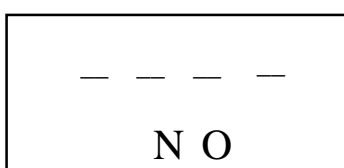


Figure 5-11 No PV Zero Setting

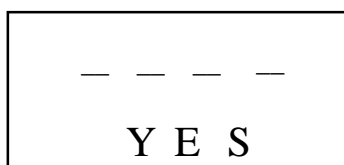


Figure 5-12 PV Zero Setting

If press SPAN, the LCD will display YES and NO in turn, shown as Figure 5-11 and Figure 5-12. When it shows as Figure 5-11, if press ZERO, it will enter into exit field adjustment state, shown as Figure 5-13 below; while when it shows as Figure 5-12, if press ZERO, it will enter into PV zero setting state. If PV beyond sensor range by 10%, it will display OVER, shown as Figure 5-7. Then press any key-press to go back to PV zero setting state. If the operation is successful, it will display SAVE for successful setting, shown as Figure 5-4. A second later, it will enter into exit field adjustment state, shown as Figure 5-13 below.

Exit

After PV zero setting, it will enter into exit field adjustment state, shown as Figure 5-13 below. Note that if you press no button within 60 seconds at any state above, the instrument will exit automatically.



Figure 5-13 Exit Field Adjustment

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