

UQD | UQD.Z

BALL FLOAT LEVEL TRANSMITTER

UQD.Z

Operation Manual

UQD.Z - DT - JS - 1015 - 2020



Preface

Thank you for choosing the products of Dandong Top Electronics Instrument (Group)Co.,Ltd.

This operation manual provides you with important information on installation, connection and commissioning as well as on maintenance, troubleshooting and storage. Please read it carefully before installation and commissioning and keep it as part of the product near the meter for easy reading.

This manual can be downloaded by entering the version number at www.ddtop.com .

If the instructions are not followed, the protection provided by the meter may be destroyed.

Trademark, Copyright and Restriction Instructions

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The performance specifications of the meter are effective as of the date of publication and are subject to change without notice. Dandong Top Electronics Instrument (Group)Co.,Ltd. reserves the right to modify the products described in this manual at any time without prior notice.

Quality Assurance

Dandong Top Electronics Instrument (Group) Co.,Ltd. guarantees that all glass plate level gauge have no defects in materials and manufacturing processes within one year from the date of delivery.

During the warranty period, if the product returns with quality problems and the claim is determined by the manufacturer to be within the scope of warranty, Dandong Top Electronics Instrument (Group) Co.,Ltd. is responsible for repair or replacement of the buyer (or owner) free of charge.

Dandong Top Electronics Instrument (Group) Co.,Ltd. is not responsible for the costs caused by improper use of equipment, labor claims, direct or subsequent damage and installation and use of equipment. In addition to the special written warranty certificate for certain products of Dandong Top Electronics Instrument (Group) Co.,Ltd., Dandong Top Electronics Instrument (Group) Co.,Ltd. does not provide any express or implied warranty.

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Dandong Top Electronics Instrument (Group) Co.,Ltd. has passed the ISO9001 quality system certification. The whole process of product production is strictly in accordance with the scope of the quality system, providing the strongest guarantee for product and service quality.

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1 Safety Tips

It is expressly prohibited to modify or change products for safety reasons, repair or replacement only allows the use of accessories specified by the manufacturer.

1.1 Explosion may result in death or serious injury.

When installing equipment in an explosive atmosphere, be sure to follow applicable local, national, international standards, codes, and procedures. Be sure to install the equipment in Intrinsically safe or non-flammable site operating procedures.

1.2 Process leaks can cause serious injury or death.

Care should be taken to lift the transmitter. If the process seal is damaged, the medium may leak at the joint.

1.3 Failure to follow safe installation guidelines may result in death or serious injury.

The operations described in this manual are performed by professionally trained and qualified professionals or end-user specialized professionals to complete.

2 Product Manual

2.1 Main Structure of Product-Figure 1 Small Rotation Angle Ball Float Level Transmitter;
-Figure 2 Large Rotation Angle Ball Float Level Transmitter

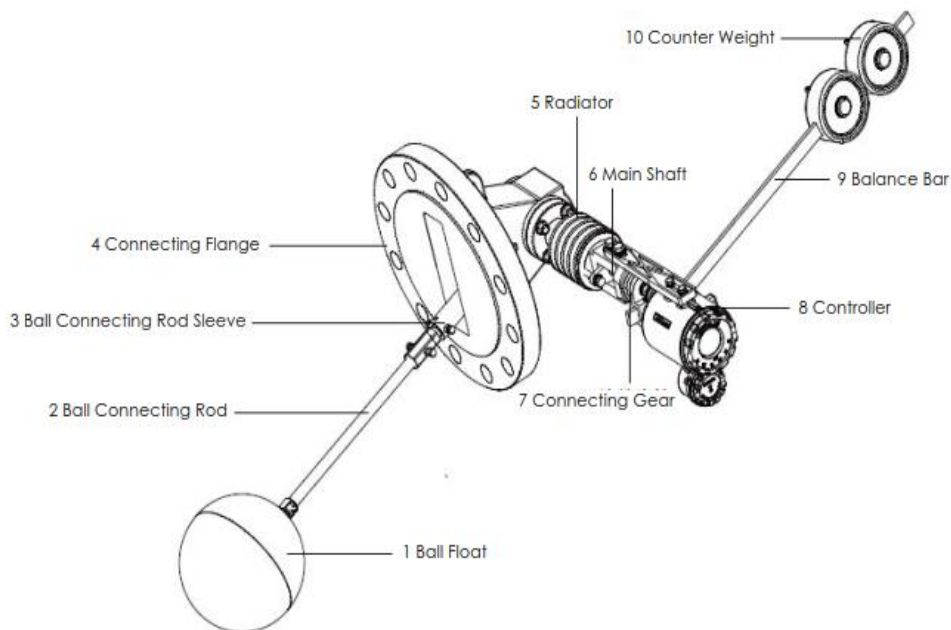


Figure 1 Small Rotation Angle Ball Float Level Transmitter

1. Float-Level measuring element
2. Ball Connection Rod-Connect the float ball to convert the up and down floating displacement of the float ball due to the change of the level into the swing angle of the ball connection rod. The length of the ball connection rod determines the range of the level transmitter.
3. Sleeve-Connecting the ball connection rod and the principal axis.
4. Connection Flange-Fix the level transmitter on the user's field device.
5. Cooling Fin-Reduce temperature and protect the controller.
6. Principal Axis-Pass the angle of rotation of the pendulum to the connecting gear.
7. Connecting Gear-Pass the principal axis rotation angle to the controller.
8. Controller-Convert the float position change to a 4~20mA signal, pass it to the control room, and display it through the pointer or LCD screen.
9. Balance Bar-The counterweight adjusts the torque by changing the position on the rod, and the counterweight is fixed on the balance bar.
10. Counterweight-Balance the gravity of the float, ball connection rod, swing arm, pendulum and other parts, so that the float is in a floating state, especially when the range is large and the ball connection rod is long (the ball connection rod is heavy).

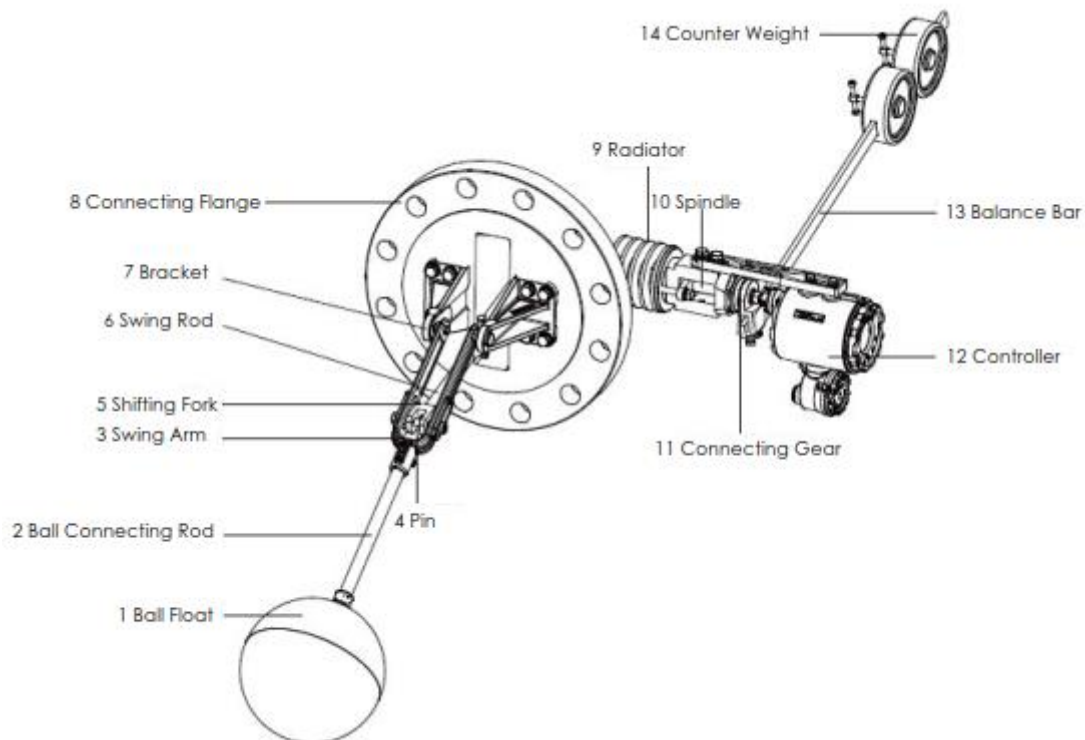


Figure 2 Large Rotation Angle Ball Float Level Transmitter

1. Float-Level measuring element
2. Ball Connection Rod-Connect the float ball to convert the up and down floating displacement of the float ball due to the change of the level into the swing angle of the ball connection rod. The length of the ball connection rod determines the range of the level transmitter.
3. Swing Arm-The ball connection rod is fixed on the swing arm, the swing arm swings with the ball connection rod, there is a slide, and the pin slides in the slide.
4. Pin-Connect the swing lever and swing arm to slide in the swing arm slide.
5. Fork-Soldered on the top of the swing lever and connected to the pin.

6. Swing Lever-After connecting with the swing arm, the ball connection rod swing angle is transmitted to the Principal Axis.
7. Bracket-Support the swing arm and ensure that the swing arm rotates well within the range.
8. Connection Flange-Fix the level transmitter on the user's field device.
9. Cooling Fin-Reduce temperature and protect the controller.
10. Principal Axis-Passing the angle of rotation of the pendulum to the connecting gear.
- 11.Connecting Gear-Pass the principal axis rotation angle to the controller.
12. Controller-Convert the float position change to a 4~20mA signal, pass it to the control room, and display it through the pointer or LCD screen.
13. Balance Bar-The counterweight adjusts the torque by changing the position on the rod, and the counterweight is fixed on the balance bar.
14. Counter weight-balance the gravity of the float, ball connection rod, swing arm, pendulum and other parts, so that the float is in a floating state, especially when the range is large and the ball connection rod is long (the ball connection rod is heavy).

2.2 Operating Principle

UQD.Z ball float level transmitter is a combination of analog, digital and microprocessor. When the liquid level changes, the position of the float changes correspondingly, which drives the spindle to rotate, the spindle and the head angular displacement sensor. The output shaft is connected, and the angular displacement sensor converts the floating ball with the change of the liquid level into a corresponding electrical signal. The transmitter converts the analog voltage signal into a 4~20 mA two-wire current output signal and loads the HART protocol communication.

2.3 Packaging

Please send the packaging waste to a special recycling agency.

2.4 Hoisting and Transporting

Please use quality hoisting equipment and lifting straps, and pay attention to safety.

2.5 Warehousing

Storage temperature -20 ° C ~ 40 ° C

Storage humidity ≤ 40%

3 Technical Characteristics

3.1 Main Performance

3.1.1 Has passed the explosion-proof certification

Through NEPSI certification

Intrinsically Safe Type Exia II CT1-T6 Ga

Explosion Isolation Type Exd II CT1-T6 Gb.

3.1.2 Product Performance Standards

Q/AMM 001 Ball Float Level Transmitter.

3.2 Main Parameters

3.2.1 Supply Voltage: 24V DC;

3.2.2 Output Signal: 4 ~ 20mA DC with HART protocol

4 dimensional Schematic

Figure 3 Small Rotation Angle Ball Float Level Transmitter

Figure 4 Large Rotation Angle Ball Float Level Transmitter

If the order is required to be a special size, the actual size will prevail.

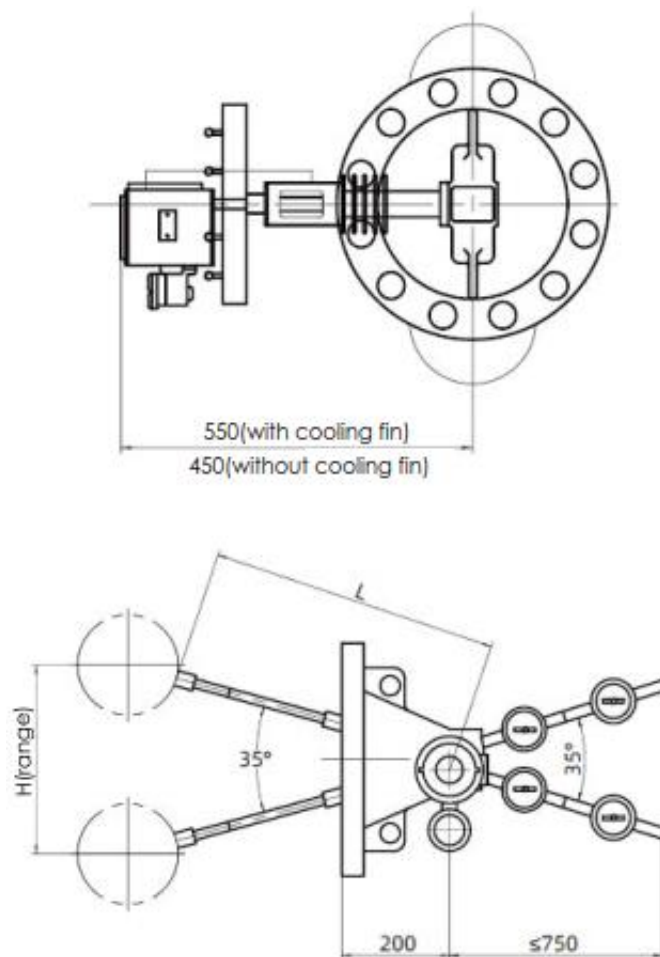


Figure 3 Small Rotation Angle Ball Float Level Transmitter

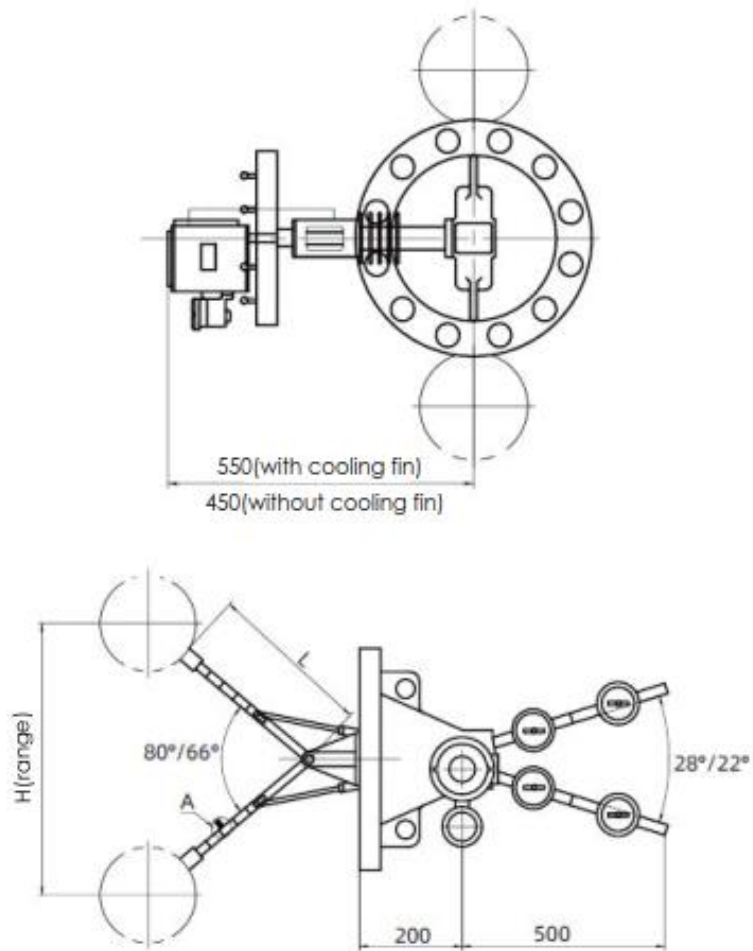


Figure 4 Large Rotation Angle Ball Float Level Transmitter

5 Unpacking and Inspection

5.1 Unpacking Inspection Notice

5.1.1 Check whether the product nameplate (Figure 5) is consistent with the supply list information.


DDTOP ELECTRONICS INSTRUMENT	
Ball Float Level Transmitter UQD.A-	
Explosion Mark	<input checked="" type="checkbox"/> Ex ia II CT1~T6 Ga
	<input checked="" type="checkbox"/> Ex d II CT1~T6 Gb
Power Supply	24V DC
Output Signal	(4~20)mA+Hart
Load Resistance	≤600Ω
Ambient Temperature	(-30~70)°C
IP Rating	IP66
Accuracy	
Tag Number	
Date of Manufacture	
Number of Manufacture	
<small>Dandong Top Electronics Instrument (Group) Co., Ltd.</small>	
 10F212-21	

Figure 5 Product Nameplate

5.1.2 Check the quantity of each part against the packing list and the material is correct.

5.2 Check Content

Check if the probe is bent, and check the probe at the connection with the meter head.

6 Installation

6.1 Installation Tool

Wrenches, flange gaskets and flange bolts for process connections

6.2 Installation Technical Requirements

Before installation, first determine the installation direction of the transmitter according to the structural characteristics of the transmitter and taking into account the convenience of future operation, observation, and inspection. As shown in Figure 6.

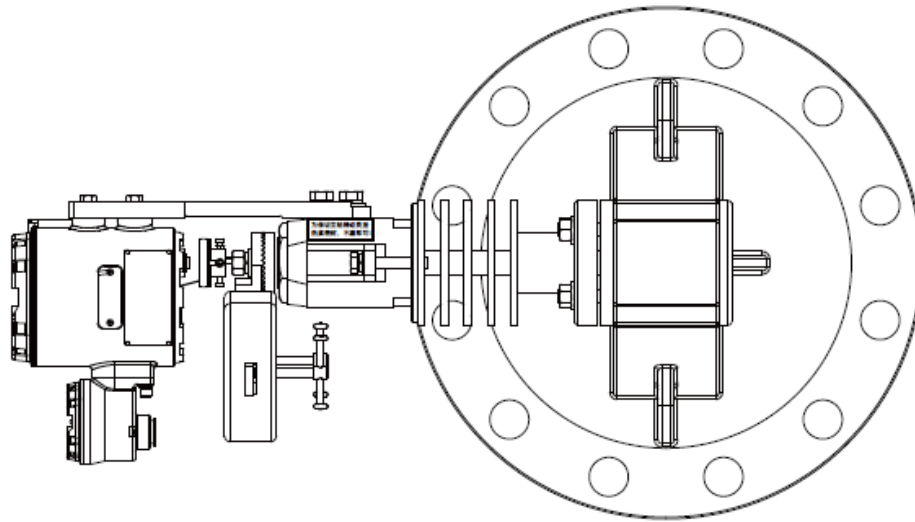


Figure 6 Installation Requirements

6.3 Installation Process

6.3.1 First, tighten the float and the ball connection rod and tighten it. For the ball connection rod installation operation of the small rotation angle float ball, screw the ball connection rod into the screw hole in the connecting rod end of the ball connection rod sleeve, and pay attention to tighten the top wire on both sides of the connecting rod into the annular groove on the ball connection rod. Tighten the lock nut on the top wire.

6.3.2 For the installation of the 91-type large rotation angle float ball, screw the ball connection rod into the threaded hole at the front end of the swing arm, and tighten the ring groove at the end of the top wire of the top wire, as shown in Figure 7.

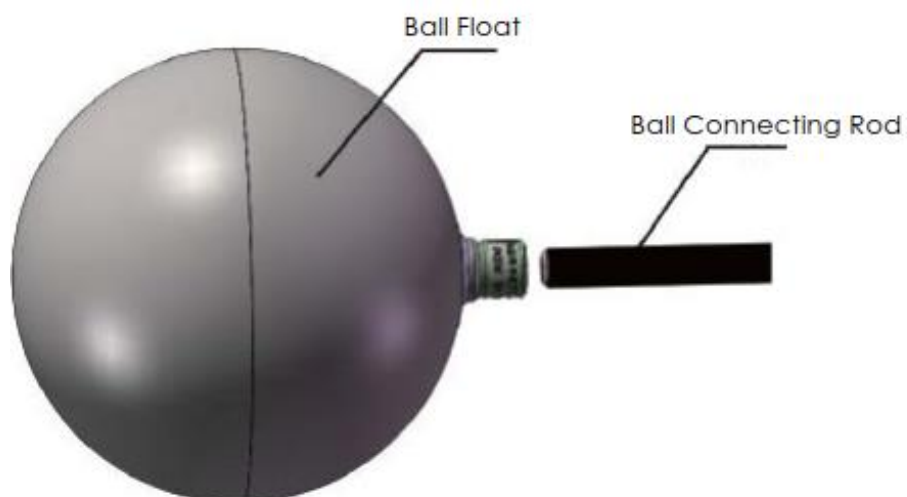


Figure 7 Ball Float Installation

※If the conditions in the field are bad, it is recommended that the user solder the top wire and the lock nut to the coupling or directly weld the ball to the coupling.

6.3.3 The transmitter head is connected to the heat sink through the connecting plate. When installing, insert the principal axis head into the coupling hole of the transmitter head, and the coupling should not be significantly distorted. The transmitter's meter head can be installed on the left or right side. The installer is installing the interface on the float. If the transmitter is on the left hand side of the installer, the head end pointer should be turned to the "left 0" position. If the transmitter is on the right hand side of the installer, turn the rear end pointer of the meter to the "right 0", and then tighten the coupling to the set screw of the principal axis when moving the float to the lowest measurement position. As shown in Figure 8.

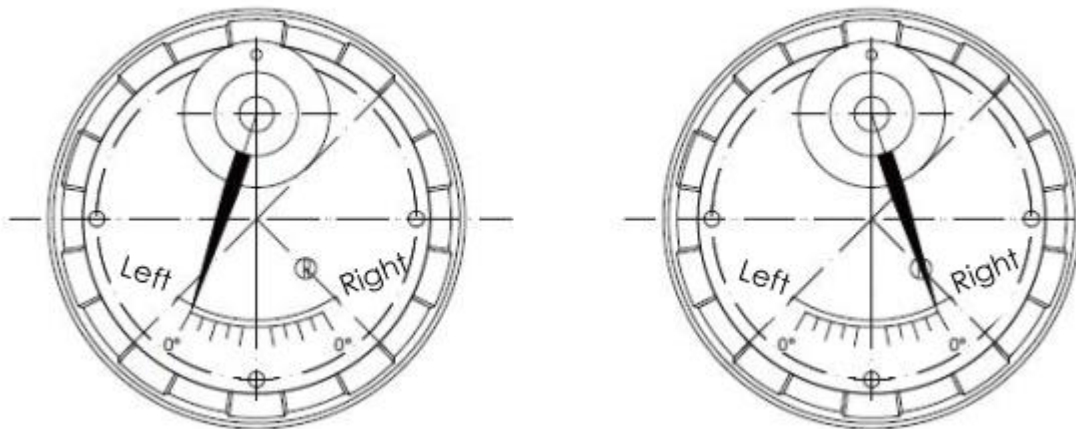


Figure 8 Transmitter Head Installation

6.3.4 Insert the balance bar (mechanism) into the square hole of the jaw joint, tighten the top wire to fix the balance bar, loosen the shaft nut, adjust the jaw bond to make the balance bar and the ball connection rod in the same plane, and then the shaft head The nut is tightened, the position of the counterweight is moved, the balance is adjusted to the best condition, and the counterweight is fixed. For liquids of different densities, the buoyancy of the float is different, and the position of the counterweight on the balance bar can be adjusted to achieve the measurement purpose, as shown in Figure 9.

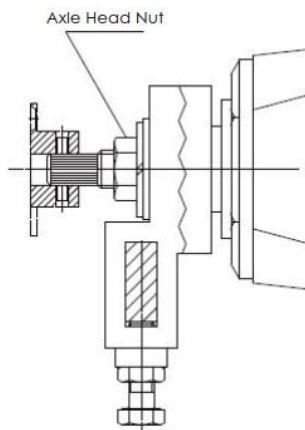


Figure 9 Balance Bar Installation

6.3.5 The sealing packing ring of the float ball is pre-tightened by pressing at the factory. When the pressure is applied, when the pressure and temperature of the medium rise, tighten the gland bolt on the packing ring, and tighten the hammer while tightening. The rod rotates the principal axis to see if it is still flexible until it does not leak, as shown in Figure 10.

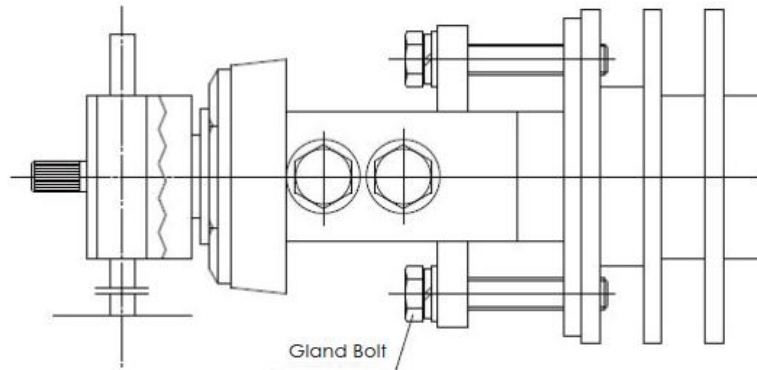


Figure 10 Float Ball Sealing

7 Debugging

7.1 Electrical Wiring

Unscrew the front cover of the instrument and introduce the transmission lead into the transmitter head through the introduction device (do not break the connection inside the watch when paying attention to the lead wire), and fix the positive and negative poles of the wire to the marked "+" and "-", the position of the symbol (see Figure 11). But be careful not to take the wrong polarity, and then power on after checking.

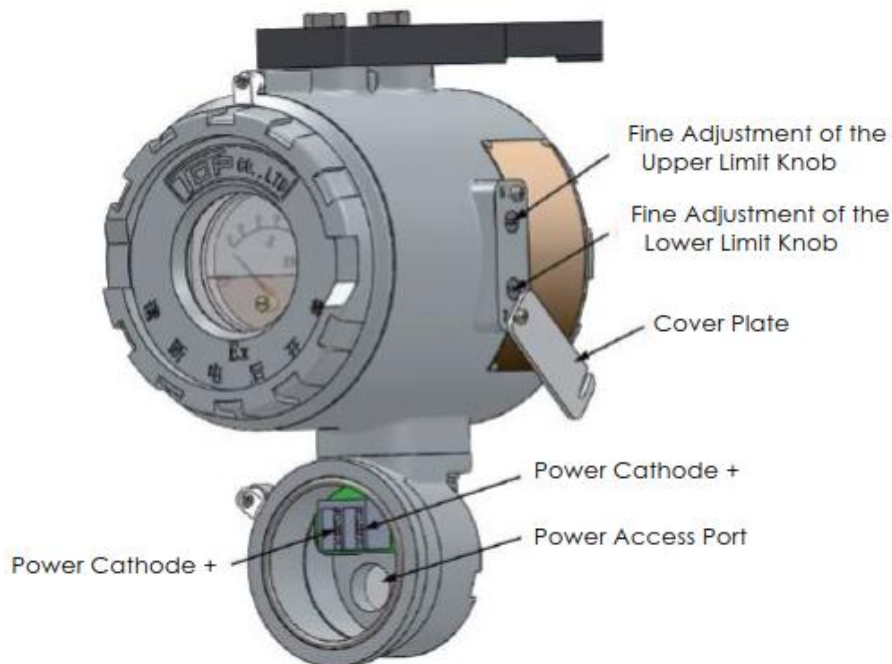


Figure 11 Electrical Wiring

7.2 Calibration Operation Process

This section mainly introduces how to use the three local buttons that come with the transmitter (Enter \leftarrow), (upward “ \uparrow ”), (down “ \downarrow ”), combined with the LCD display to configure the parameters in the table.

7.2.1 LCD Display Function Overview

The full screen information is shown in Figure 7-1. The LCD screen can display variables including current (Figure 7-2), percentage (Figure 7-3) and host variable (Figure 7-4), which can be set to display a single variable, or set the percentage and main variable cycle display, and the valid part of the decimal part can be set by DCS or handheld device (0, 1, 2, 3, 4 decimal places). The display mode is set by the 475 configuration software or button. If the percentage and main variable are displayed cyclically, the LCD alternately displays the two variables in a period of 3 seconds.

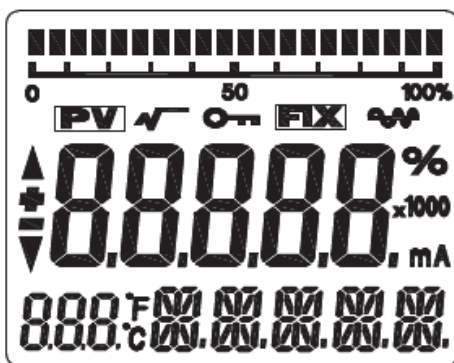


Figure 7-1 LCD Full Screen Display

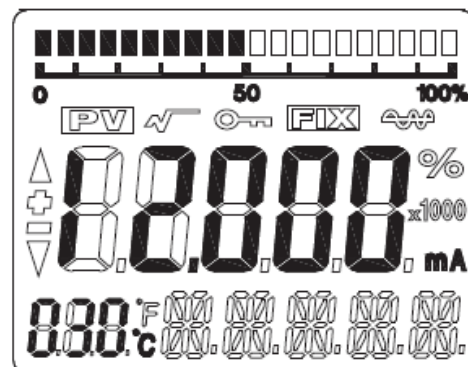


Figure 7-2 Current Display

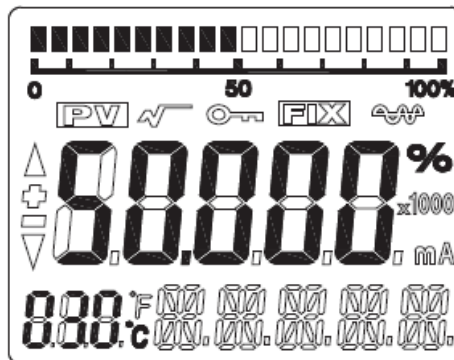


Figure 7-3 Percentage Display

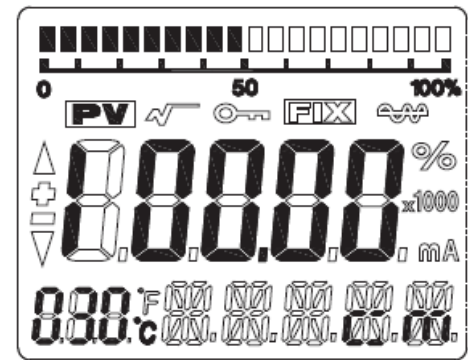





Figure 7-4 Host Variable Display

7.2.2 LCD Display Symbol Description

- ① If it is in the HART communication state, the symbol  in the right corner of the LCD screen will flash.
- ② If it is in the square output, LCD display .
- ③ If you set a fixed output current, LCD display **FIX**.
- ④ If start write protection, LCD display .
- ⑤ The three "888" display bits in the lower left corner of the LCD show the temperature of the

electronic module and the menu number at the time of configuration.

7.2.3 Button Function Description

The LCD panel has a total of three buttons, which are the Enter "←", the down "↓", and the up "↑".

- The "↑" and "↓" are used to indicate the increase and decrease of data bits and the decimal point shift;
- The "←" is used to enter the prompt data setting interface and data saving.

7.2.4 Parameter Configuration Method Description

Long press "←" when the "888" character in the lower left corner shows 1 ~ 17, indicating that the transmitter is in the field configuration mode of menu rotation. At this time, you can input initialization code, modify parameters, meter calibration or migrate by pressing the button.

Data setting process utilization:

The "←" is used to select the digits to be edited and the decimal point and the last confirmation save.

(Flicker represents the selected state)

The "↑" is used to flash the digits in increments from 0-9 loops and to the right to move the decimal point.

The "↓" is used to flash the digits to decrement from the 9-0 loop and to the left to move the decimal point.

The setup process is as follows:

1. Press and hold the "←" to enter the data configuration interface. At this time, "01" is displayed in the lower left corner and '00005' is displayed in the data line. When the "←" is pressed again, the sign bit starts to flash, indicating that the sign bit can be modified.
2. If you press "↑" or "↓" again, you can switch the sign of the data.
3. Press the "←" again, the symbol is selected and the first digit starts to flash, indicating that it can be modified. Press the "↑" or "↓" multiple times or for a long time to set the number to cycle between 0 and 9.
4. Press the "←" again, the first digit setting is completed and the second digit to the fifth digit can be set in sequence. The setting method is exactly the same as the first digit.
5. After setting the fifth digit, press "←" to start setting the decimal point. The decimal point starts to flash at the same time, indicating that the decimal point can be set. At this time, press "↑" or "↓", and the decimal point position is shifted to the right or left to cycle.
6. After the decimal point is set, press the "←" and the up and down arrows on the left will light up to indicate the save settings.
7. Press the "←" again to restart the setup data.

7.2.5 Button Function Code Quick Lookup Table

When the button configuration is used in the field, the two “888” display characters in the lower left corner of the LCD indicate the current setting menu number, which is the setting function performed by the current button. The corresponding relationship is:

The Lower Left Corner "888" Display	Setting Variables
0 or empty	Normal Display
1	Enter the Opcode (00911 Initialize the Instrument)
2	Setting Unit
3	Set the Lower Range LRV
4	Set The Range Upper Limit URV
5	Set Damping Time
8	Density (Standby)
9	Any Point Migration Input Compensation Value, Compensation Value = P Measured - P Pre-Output
11	Normal Display
12	Enter the Opcode (00911 Initialize the Instrument)
17	Setting Unit

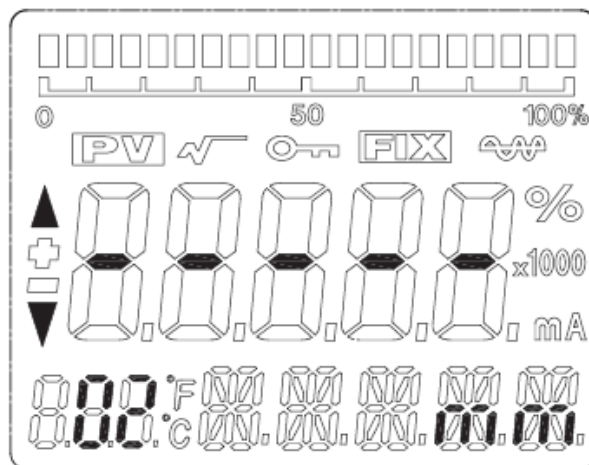
Meter calibration, range upper and lower limits and damping settings can be completed as described in 7.2.4 Data Setup Method

7.2.6 Unit Setting

The units that can be set are: m, cm, mm, feet, inch.

① Press and hold the “←” to enter the configuration mode (the menu No. 1 is displayed first, and the up and down arrows on the left are lit)

② Press the “↑” to switch the menu to No. 2, while the current unit symbol is displayed in the lower right corner.



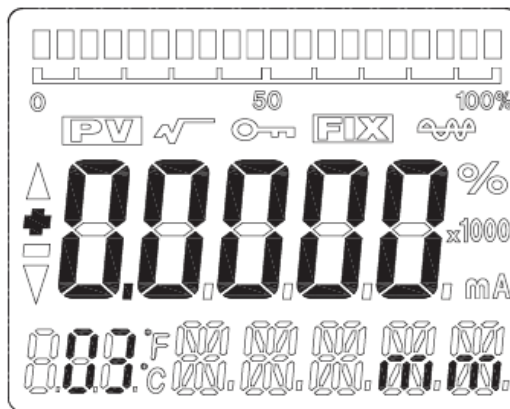
Unit Setting

- ③ Press the “←” again, the unit starts to flash, then press the “↑” or “↓” to switch to the unit you want to set.
- ④ Press the “←” again, the unit setting is completed and the left and right arrows are lit.

7.2.7 Range Setting

Set the Lower Range LRV

- ① Press and hold the “←” to enter the configuration mode (the menu No. 1 is displayed first, and the up and down arrows on the left are lit)
- ② Press the “↑” to switch the menu to No. 3 and the LCD displays the current LRV value.



Range Setting

- ③ Press the “←” again and the symbol starts to flash. Press “↑” or “↓” to switch to the positive and negative signs you want to set.
- ④ Press the “←” to complete the setting and start setting the highest range. Press “↑” or “↓” to increment or decrement the current flashing digit and press “←” to confirm, and then the other digits and decimal points are set in turn, and the menu item setting is completed when the up and down arrows on the left side are lit.

Set the Range Upper Limit URV

Switch the menu to No. 4, and the LCD displays the current URV value, and repeat steps 3 and 4 in 7.2.7 to set.

7.2.8 Damping Setting

Switch the menu to No. 5, and the LCD displays the current damping value. Repeat step 3 and step 4 in 7.2.7 to complete the setting.

7.2.9 Two-Point Calibration

LRV Calibration

- ① First adjust the PV value to the zero position (float lever toggles to zero)
- ② Switch the menu to No. 11, while the LCD displays the current calibration position value, and

repeat the step 3 and step 4 input zero value in 7.2.7 for zero position calibration.

③ Press the “←” until the left and right arrows illuminate the zero position calibration is completed.

URV Calibration

① First adjust the PV value to the full scale position

② Switch the menu to No. 12, and the LCD displays the current calibration position value, and repeat the step 3 and step 4 input fullness value in 7.2.7 for full position calibration.

③ Press the “←” until the left and right arrows illuminate the full position calibration.

7.2.10 Any Point Migration

The “9” menu can implement any point migration function. The user can migrate the current PV value to any point within the range. The (input compensation value) setting process is as follows:

① Press and hold the “←” to enter the configuration mode (the first menu is displayed, the left and right arrows are lit)

② Press the “↑” to switch the menu to “9” and the LCD displays the current PV compensation value.

③ Press the “←” again and the symbol starts to flash. Press “↑” or “↓” to switch to the positive and negative signs you want to set.

④ Press the “←” to complete the setting and start setting the highest range. Press “↑” or “↓” to increment or decrement the current flashing digit and press “←” button to confirm, and then the other digits and decimal points are set in turn, and the menu item setting is completed when the up and down arrows on the left side are lit.

Compensation value calculation method:

Compensation value = PV measured - PV pre-output

Note: The button configuration process does not automatically exit, you need to manually exit the button configuration. The method is to continuously press the “↑” or “↓” in the menu state to increment or decrement. When the menu is larger than 17 or less than 1, the mode is exited and the normal output mode is entered.

8 Precautions

8.1 Users should not open the display case during normal use.

8.2 When repairing, the power should be cut off first, then remove the floating ball level transmitter from the float of the float.

8.3 Loosen the fixing screws in the terminal cover assembly on the meter head to unscrew the cover from the terminal box.

8.4 During the disassembly and assembly process of the meter, care should be taken to avoid damage to the explosion-proof thread surface of the explosion-proof product.

8.5 Do not exceed 80 °C ambient temperature to avoid damage to electronic components.

8.6 After the commissioning, tighten the display and power cover to prevent the instrument from getting wet.

9 Fault Analysis and Elimination

Fault Phenomenon	Cause of Issue	Cause of Issue
The indication does not change with the level Plate balance bar feels heavy	1、 The seal packing expands and holds the principal axis due to an increase in the temperature of the medium after the start of construction. 2、 The balance has not been adjusted.	1、 Adjust the two direction bolts behind the radiator and turn the balance bar to adjust to the tight fit. Note: Do not loosen too much to avoid leakage. 2、 Re-adjust the position of the counterweight to reach equilibrium.
Leakage phenomenon	After a period of use, the sealing packing rubs against the principal axis to create a gap.	Adjust the two bolts behind the radiator and turn the balance bar to adjust to the tight fit. Note: Don't be too tight, so that the principal axis is not locked.
Can't adjust	The output of the meter is not in the same direction as the float, and it is reversed.	Re-float the float to the minimum level, follow the instructions to reset and debug.
Display CURFL	Loop Current Fault	1. Whether the grounding is reliable 2. Recalibration 3. Instrument circuit function damage
Display CCSFL	Sensor excitation faults	Open sensor or faulty circuit board

10 Disassembly

10.1 Warning

Attention should be paid to hazardous process conditions, such as pressure inside the vessel, high temperatures, corrosive or toxic media, etc.

Refer to the instructions in section 6.3 Installation Operation and Section 7.1 Electrical Wiring to remove the parts in the reverse order of operation.

10.2 Waste Removal

Waste disposal should be carried out in accordance with the current guidelines in each region.

11 Product Certification

Product Certification		
Certification	Certification Number	Scope of Certification/Description

Formal approval certification
for measuring instruments



10F211-21