

UQD | UQD.A

BALL FLOAT LEVEL TRANSMITTER

UQD.A

Operation Manual

UQD.A - DT - JS - 1002 - 2018(



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

Dandong Top Electronics Instrument (Group) Co.,Ltd.®, Dandong Top Pump Co., Ltd.®, DDTOP® are registered trademarks of the company.

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.

Quality

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 Product Basic Structure-Figure 1 small rotation angle ball float level transmitter;

- Figure 2 large rotation angle ball float level transmitter

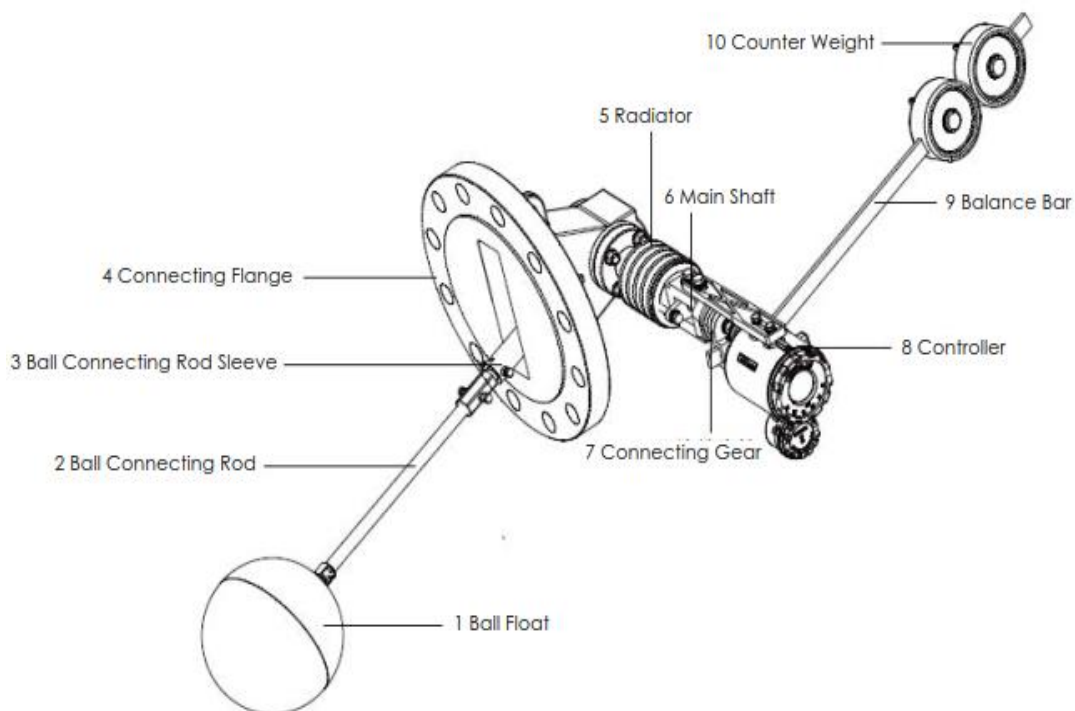


Figure 1 Small Rotation Angle Ball Float Level Transmitter

1. Ball float: level measuring element
2. Ball connecting rod: Connect the float ball to convert the floating displacement of the float ball

- due to the level change into the swing angle of the ball connecting rod, and the length of the ball connecting rod determines the range of the level transmitter
3. Ball connecting rod sleeve: Connecting the ball connecting rod with the main shaft
 4. Connecting flange: Fix the level transmitter on the user's site device
 5. Radiator: Reduce The temperature and protect the controller
 6. Main shaft: Transmitter the rotation angle of the pendulum Rod to the connecting gear
 7. Connecting gear: Transmitting the rotation angle angle of the main shaft to the controller
 8. Controller: Converts the position change of the float ball into a current signal of 4 ~ 20mA, transmits it to the control room, and displays it through the pointer
 9. Balance bar: Counter weight adjusts the moment by changing its position on the Rod, and counter weight is fixed on the balance bar
 10. Counter weight: Balance the gravity of floating ball, ball connecting rod, swing arm, swing rod and other parts to make the floating ball float, especially when the range is large, the effect is obvious when the ball connecting rod is long (the ball connecting rod is heavy)

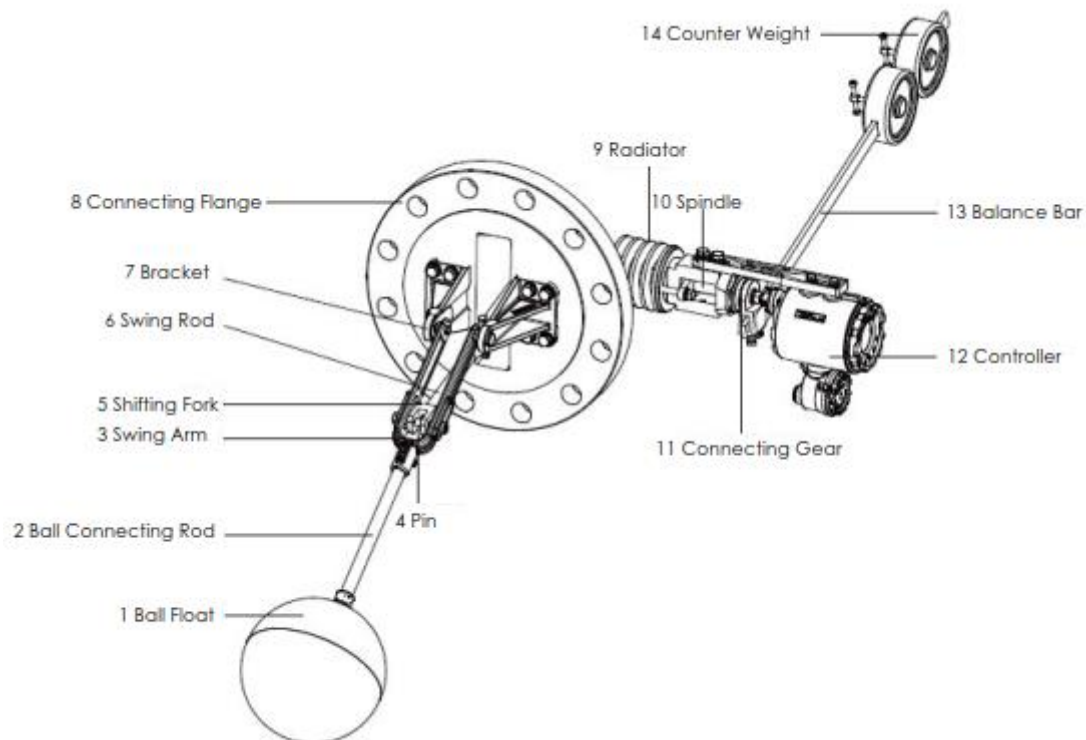


Figure 2 Large Rotation Angle Ball Float Level Transmitter

1. Ball float: Level measuring element
2. Ball connecting rod: Connect the float ball to convert the floating displacement of the float ball due to the level change into the swing angle of the ball connecting rod, and the length of the ball connecting rod determines the range of the level transmitter
3. Swing arm: The ball connecting rod is fixed on the swing arm, which swings with the swing of the ball connecting rod and has a slideway in which the pin shaft slides
4. Pin: Connect the swing rod with the swing arm and slide in the swing arm slideway
5. Shifting fork: Welded to the top of swinging rod and connected with pin shaft
6. Swing rod: After connecting with the swing arm, transmit the swing angle of the ball

- connecting rod to the main shaft
7. Bracket: Support the swing arm and ensure the swing arm can rotate well within the range
 8. 8. Connecting flange: Fix the level transmitter on the user's field device
 9. 9. Radiator: Reduce the temperature to protect the controller
 10. 10. Spindle: Transmitter the rotation angle of the pendulum rod (unit) to the connecting gear
 11. Connecting gear: Transfer the rotation angle of the main shaft to the controller
 12. 12. Controller: Converts the position change of the float ball into a current signal of 4 ~ 20mA, transmits it to the control room, and displays it through the pointer
 13. 13. Balance bar: Counter weight adjusts the moment by changing its position on the Rod, and counter weight is fixed on the balance bar.
 14. 14. Counter weight: Balance the gravity of floating ball, ball connecting rod, swing arm, swing rod (unit) and other parts to make the floating ball float, especially when the range is large and the ball connecting rod length (ball connecting rod weight) is obvious

2.2 Operating Principle

UQD. A electric ball float level transmitter is mainly composed of two parts: measuring and sensing mechanism and electric transmitter. The measuring and sensing element is a ball-shaped floating ball. The transmitter adopts a moment balancing mechanism composed of a balancing rod and a balancing hammer and a floating ball, so the floating ball can freely rise and fall with the change of the level. When the level changes, the position of the float ball changes correspondingly, driving the spindle to rotate, the spindle is connected with the output shaft of the angular displacement sensor of the meter (transmitter), the angular displacement sensor converts the float ball with the change of the level into a corresponding electrical signal, and then the circuit inside the float ball controller converts this signal into a 4 - 20mA two-wire current output signal proportional to the change of the level, which is transmitted to the instrument control room for remote monitoring.

2.3 Packing

Please send the packaging waste to a special recycling agency.

2.4 Hoisting and Transporting

Please select qualified 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 Product Features

3.1.1 Explosion-proof certification as adopted:

Through NEPSI certification

Intrinsically safe EXIA II CT5

Explosion isolation EXD II CT1 - T6 GB

3.1.2 Product implementation standards

Q/AMM 001 Ball Float Level Transmitter

3.2 Main Parameter

3.2.1 Supply voltage: 24V DC;

4 Dimension Schematic

Figure 3 Small Rotation Angle Ball Float Level Transmitter

Figure 4 Large Rotation Angle Ball Float Level Transmitter

If special dimensions are required when ordering, the actual dimensions shall prevail.

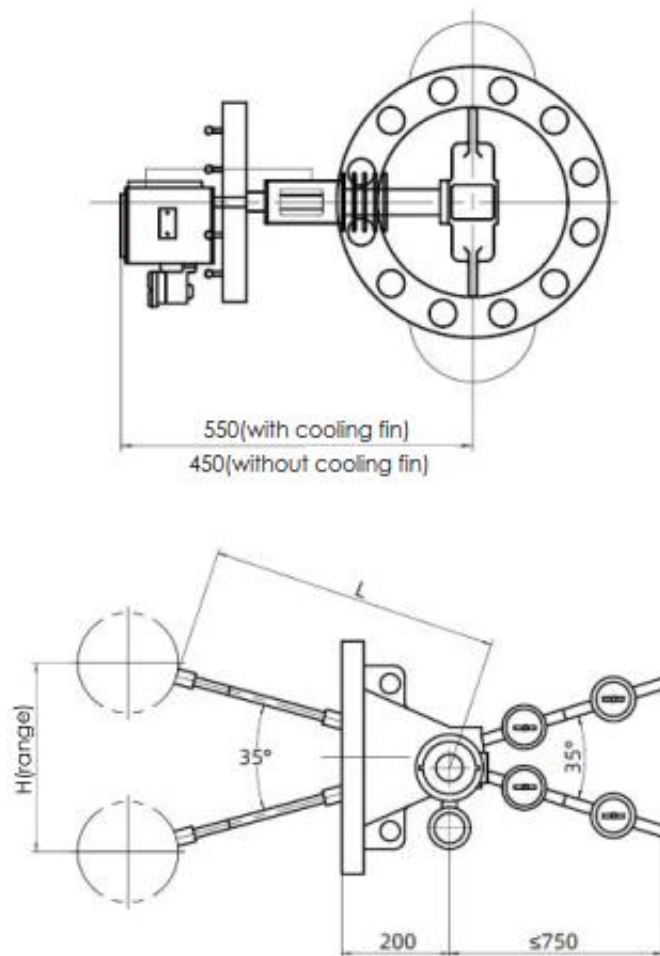


Figure 3 Small Rotation Angle Ball Float Level Transmitter

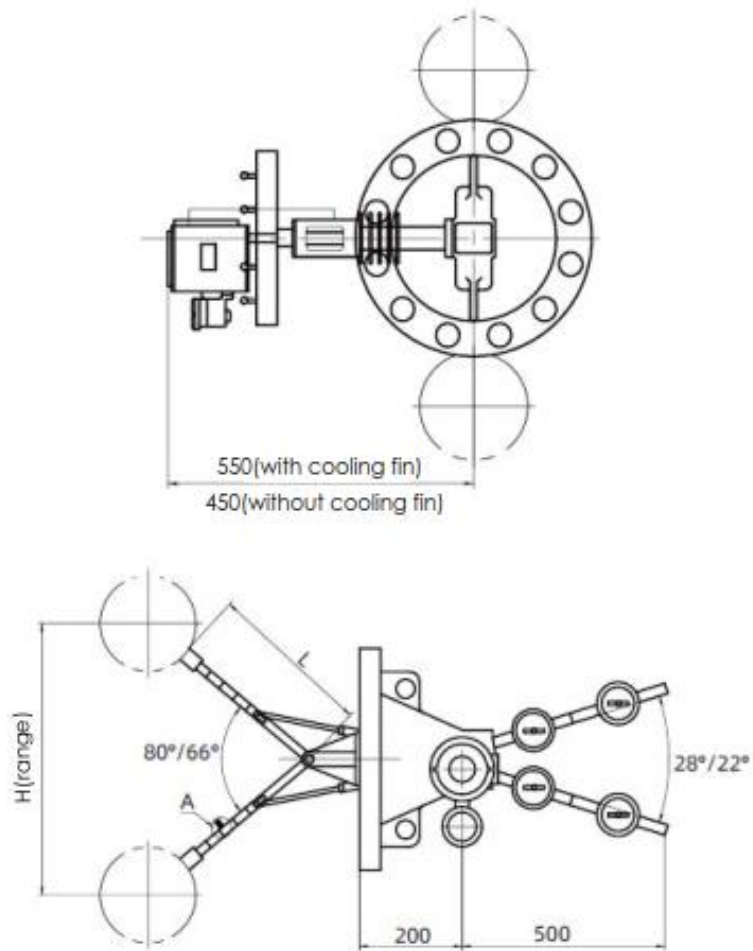


Figure 4 Large Rotation Angle Ball Float Level Transmitter

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.



Ball Float Level Transmitter
UQD.A-

Explosion Mark	<input checked="" type="checkbox"/>	Ex ia II CT5
	<input checked="" type="checkbox"/>	Ex d II CT1~T6
Power Supply	24V DC	
Output Signal	(4~20)mA	
Load Resistance	≤750Ω	
Ambient Temperature	(-40~80)°C	
IP Rating	IP66	
Accuracy		
Tag Number		
Date of Manufacture		
Number of Manufacture		

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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 whether the appearance of the instrument is defective or damaged.

6 Installation

6.1 Installation Tool

Wrenches, flange gaskets and flange bolts for process connections

6.2 Installation Technical Requirements

Before installation, the installation direction of the transmitter should be determined according to the structural characteristics of the transmitter and the convenience of future operation, observation and maintenance, as shown in figure. 6.

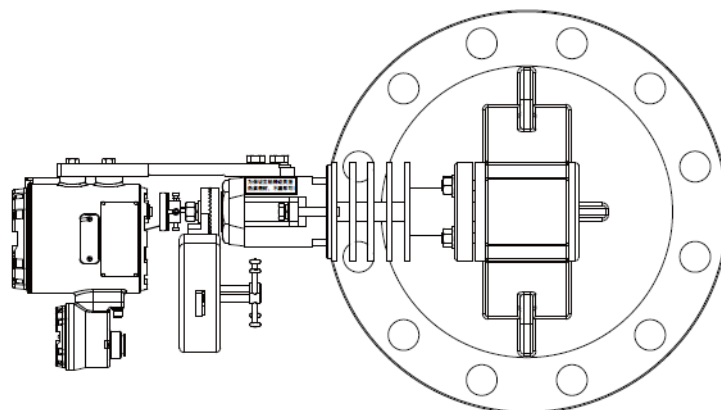


Figure 6 Installation Requirement

6.3 Installation Process

6.3.1 First, tighten the ball float and the ball connecting rod and weld them firmly. For the installation operation of the small-angle ball float, the ball connecting rod is screwed into the screw hole in the connecting Rod at the end of the ball connecting rod sleeve. Pay attention to tightening the top thread on both sides of the connecting Rod into the annular groove on the ball connecting rod, and then tighten the lock nut on the top thread.

6.3.2 For the installation of the 91 - type large-angle floating ball, the ball connecting rod is first screwed into the threaded hole at the front end of the swing arm, then the top thread is pushed into the annular groove at the end of the Rod , and finally tightened, as shown in Figure 7.

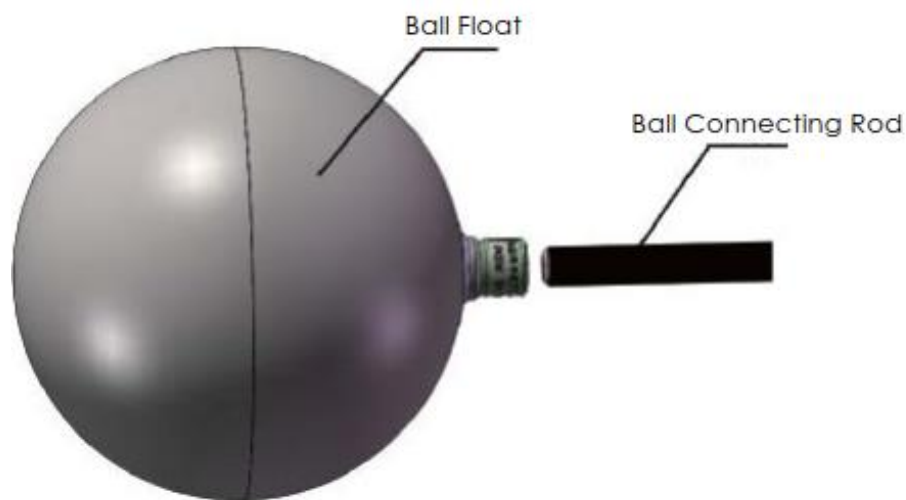


Figure 7 Ball Float Installation

※ If the site conditions are bad, it is recommended that the user weld both the top thread and the lock nut to the connector, or directly weld the ball connecting rod to the connector.

6.3.3 The meter head of the transmitter is connected to the radiator through a connecting plate. When installing, insert the spindle head into the shaft connector hole of the transmitter gauge head, and should not make the shaft connector produce more obvious distortion phenomenon. The head of the transmitter can be installed on the left or right side, the installer is opposite the float ball installation interface, if the transmitter is on the left side of the installer, the pointer at the back of the head should be rotated to "left 0"; If the transmitter is on the right hand side of the installer, the pointer at the back end of the meter head will be rotated to "right 0", when the float ball moves to the lowest measurement position, tighten the coupling device and the spindle set screw, as shown in Figure 8.

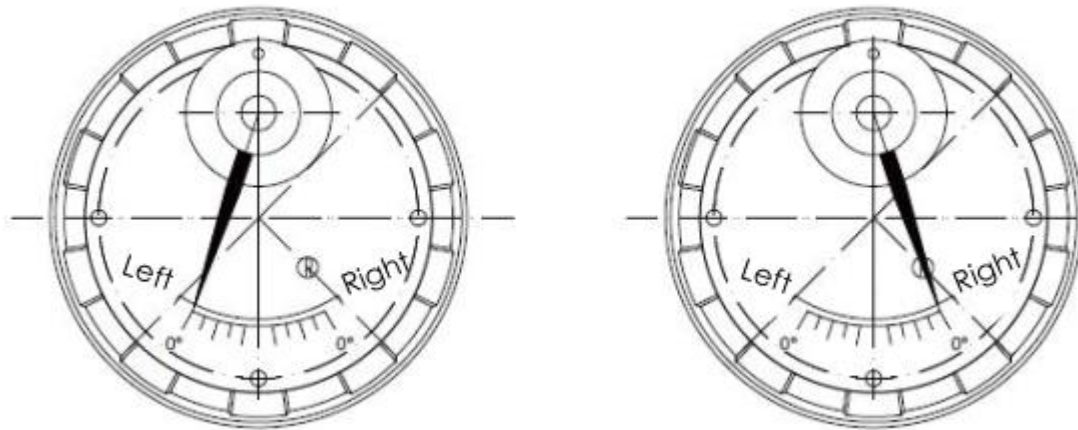


Figure 8 Transmitter Installation

6.3.4 Load the balance bar (mechanism) into the square hole of the tooth insert binding son, tighten the top wire, fix the balance bar, loosen the axle head nut, adjust the tooth insert binding son to make the balance bar and the ball connecting rod in the same plane, then tighten the axle head nut, move the position of the balance hammer, adjust to the optimal balance state, and fix the balance hammer. For level of different densities, due to the different buoyancy of the floating ball, the position of the balance hammer on the balance bar can be adjusted to achieve the purpose of measurement, as shown in Figure 9.

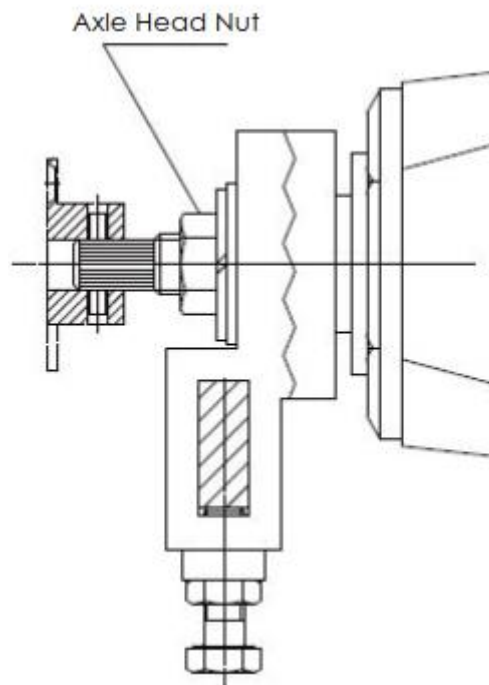


Figure 9 Balance Bar Installation

6.3.5 The sealing packing ring of the float ball is pre-tightened by pressing at the factory. When the pressure and temperature of the medium rise, then tighten the gland bolt on the packing ring. At the same time of tightening, press the heavy hammer rod to make the spindle turn once to see

whether it still rotates flexibly until it does not leak, as shown in Figure 10.

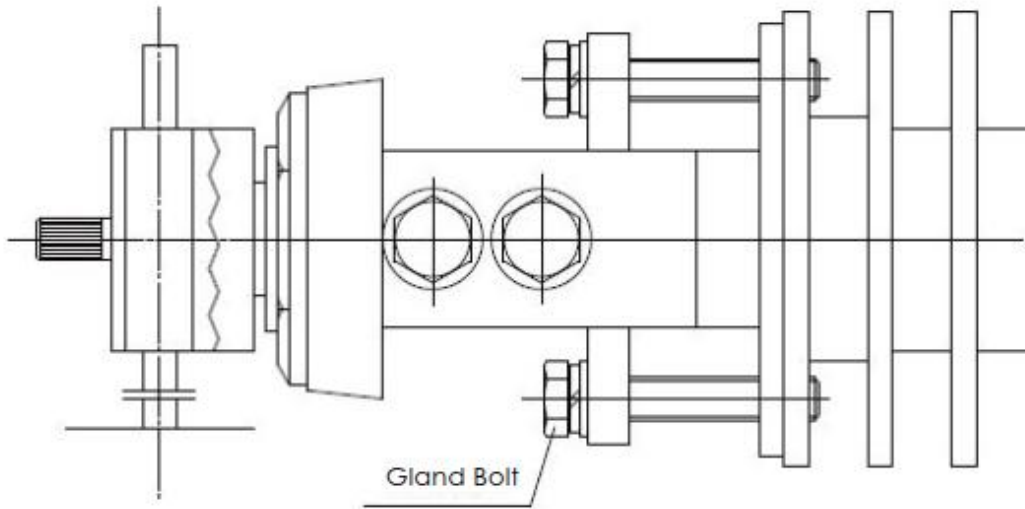


Figure 10 Float Sealing

7 Debugging

7.1 Electrical Wiring

Unscrew the front cover of the instrument, introduce the transmission wire through the lead device into the transmitter meter head (note that the lead wire should not break the line in the table), and fix the positive and negative poles of the wire in the position marked with "+" and "-" (see figure 11). But pay attention not to connect the wrong polarity, after the check without error can be energized.

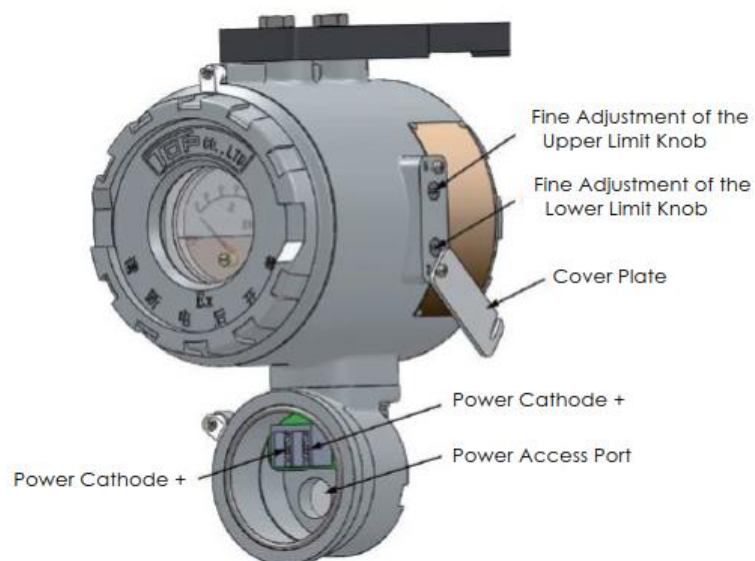


Figure 11 Electrical Wiring

7.2 Debugging Process

7.2.1 Ball connecting rod debugging action

Pull the ball connecting rod to make the float ball at the lower limit, that is, the level is at the low level. The amplifier detects and transforms the output of 4mA. Pull the ball connecting rod so that the float ball is at the upper limit, that is, the level is at a high level. The amplifier detects and transforms the output 20mA. The balance hammer can balance the weight and buoyancy of the float ball and the ball connecting rod, as shown in Figure12.

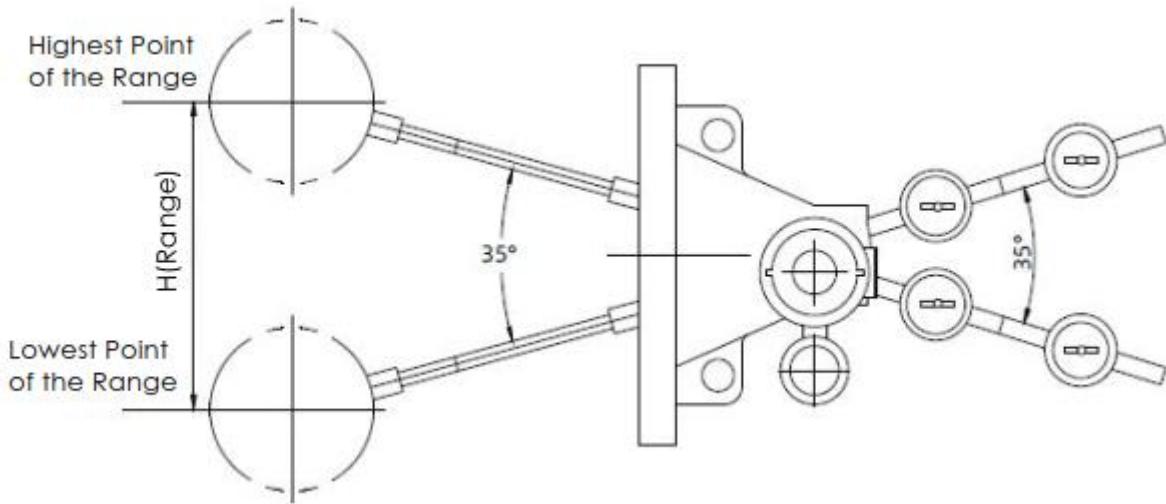


Figure 12 Bench Debugging - Small Corner

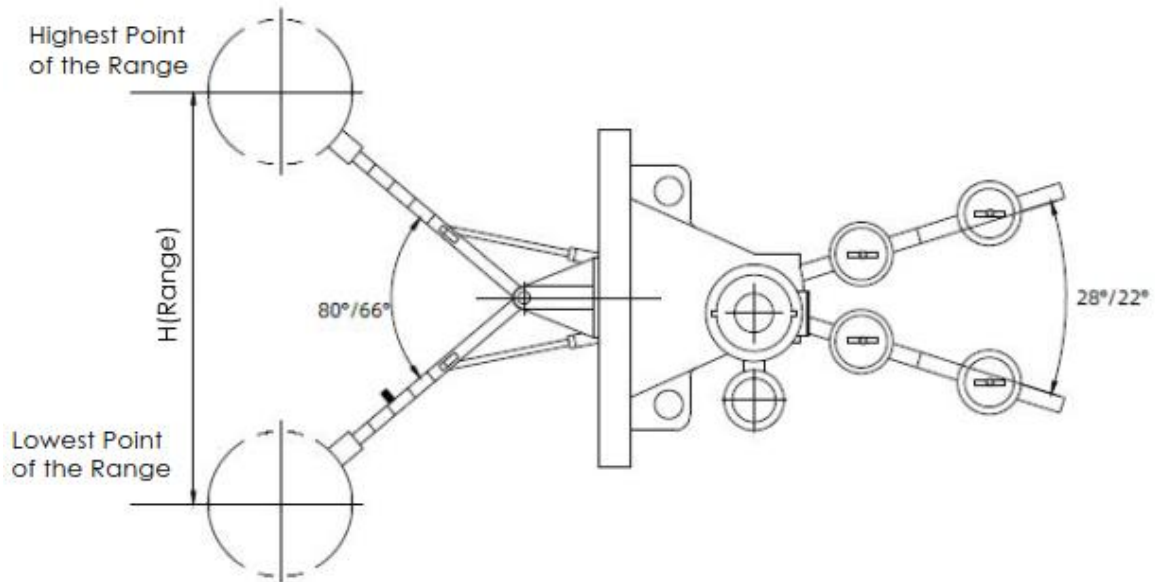


Figure 12 Bench Debugging - Large Corner

7.2.2 On-site debugging method (see Figure 11, Figure 12)

1) Lower limit (ie zero) debugging:

When the float ball is in the lowest position (ie zero), turn the lower limit button with a one-word screwdriver to make the output 4mA, and the head pointer indicates the position at 0%.

2) Upper limit (ie full degree) debugging

Press the balance bar, move the float to the highest position (ie full degree), turn the upper limit button with a one-word screwdriver, so that the output 20mA, the head pointer refers to the position of 100%.

3) Repeatedly adjust several times according to the above steps to make the float ball at the lowest and highest level when the transmitter output is 4mA and 20mA, and the head pointer indicates 0% and 100% respectively.

8 Precautions

8.1 The user must not open the shell of the display table during normal use.

8.2 When repairing, the power should be cut off first, then the float level transmitter head should be removed from the float radiator.

8.3 Loosen the fixing screw in the subobox cover assembly at the upper end of the watch head, and make the cover unscrew from the end box.

8.4 In the process of dismantling and assembling the meter head, attention should be paid to avoid the damage of explosion-proof thread surface of the explosion-proof product.

8.5 The environment temperature not over 80 °C, lest damage electronic parts.

8.6 Tighten the power cover of the display after debugging to prevent water and moisture in the meter.

9 Fault Analysis and Elimination

Fault Phenomenon	Reason	Exclusion Method
The indicator does not move with the change of the level, and the balance bar feels heavy.	<ol style="list-style-type: none"> The sealing material expands and holds the main shaft due to the increase of the medium temperature after the start of construction. The balance is not adjusted. 	<ol style="list-style-type: none"> Adjust the bolts in the two directions behind the radiator, and rotate the balance bar until it is fit for tightness. Note: Do not loosen too much to avoid leakage. Adjust the position of the balance hammer to achieve balance
Leakage	After a period of use, the sealing packing rubs against the main shaft to create a gap.	Adjust the two bolts behind the radiator while turning the balance bar until the elastic is suitable Note: Do not hold the spindle too tight in case the spindle is locked
Can't adjust	The output of the meter is not in the same direction as the float, and it is reversed.	Reduce the float ball to the minimum level, reset according to the instructions, and debug
Ammeter does not indicate	The switch wire is broken, the electronic switch is pulled, check whether the current value output of the left and right gears is normal, and there is an open circuit.	If there is a problem on one side, remove the circuit board and solder the switch wiring. If the electronic switch is broken, it needs to be replaced.

10 Disassembly

10.1 Warning

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