

UQK(S)-100

FLOAT LEVEL SWITCH

Operation Manual

UQK(S)-100-DT-JS-1017-2018(A)



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.

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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

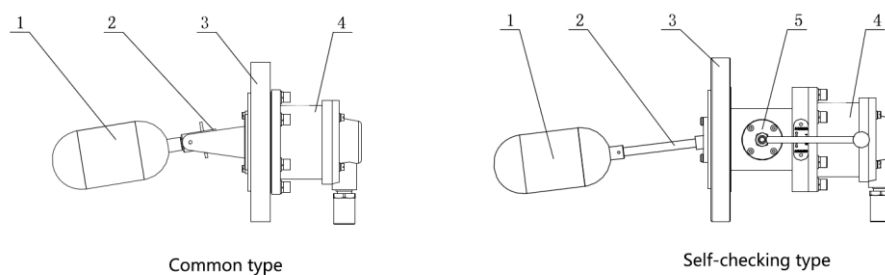


Figure 1

1. Float, level detecting element.
2. Float connecting rod with magnetic steel.
3. Flanges and flanges, flanges can be rotated 360°.

4. Transmitter, signal output section.

5. Self-test components, including handles, forks and dials.

2.2 Operating Principle-Figure 2

The ordinary float level switch, when the level of the measured medium rises or falls, is affected by the buoyancy force, and the float ball is lifted and lowered, and the connecting rod magnet at the end of the connecting rod is driven to swing up and down in the opposite direction. Through the magnetic coupling action, the magnetic steel of the same magnetic pole mounted in the meter head is pushed up and down in the opposite direction to the magnetic steel, and the movable contact at the end thereof is connected between the static contact 1-1 or 2-2 group or disconnect, so that the external control device is turned on or off, so that the control signal alarm device alarms or starts and stops the electric pump.

During the lifting and lowering of the float, only when the float is in the upper and lower limit positions, the movable contact will be turned on or off at the static contact, so that the external control device is turned on or off. In turn, the signal alarm device is controlled to alarm or start and stop the electric pump. In the process of raising and lowering the float with the level, there is no continuous signal output, and only the original on or off is maintained.

The self-checking float level switch adds a self-test part in the measuring part and the output part. When the self-checking handle is pulled, the shifting fork is pulled to trigger the dial to make the floating ball reach a high level or a low level. Check if the controller and system are normal.

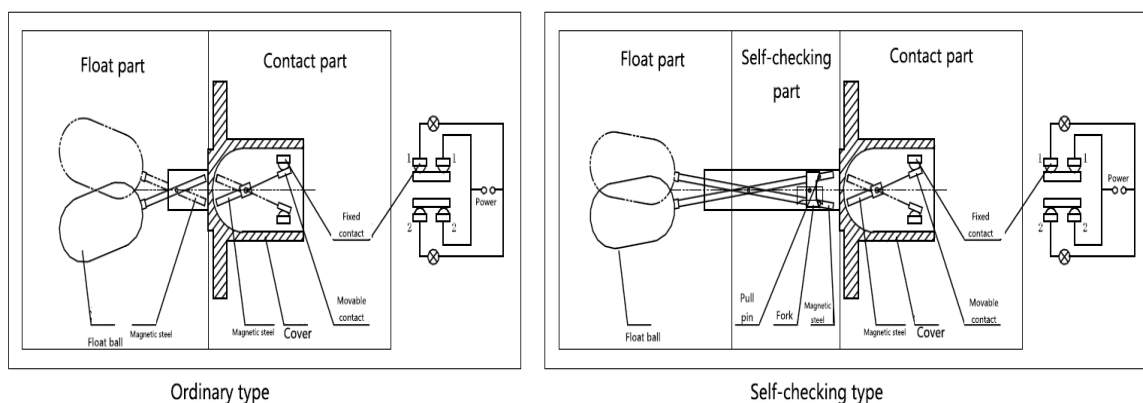


Figure 2

2.3 Packing

Please send the packaging waste to a special recycling agency.

2.4 Transporting

When 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 ≤20% .

3 Technical Characteristics

3.1 Main Performance

3.1.1 Has Passed the National Explosion-Proof Certification, Certification Mark:

Intrinsically safe type Ex ia II CT5/T6 Ga

Explosion isolation type Ex d II CT1 ~ T5/T6 Gb

3.1.2 Product Execution Standard: Q/AMM003 float level switch.

3.1.3 Has passed functional safety certification, functional safety level: SILII

3.2 Main Parameters:

3.2.1 Voltage: AC220V DC24V

3.2.2 Output Signal: Relay Contact SPDT or DPDT

4. Dimensional Schematic -Figure 3

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

Figure 3-1 General type -UQK-101

Figure 3-2 General type -UQK-102

Figure 3-3 General type -UQK-103

Figure 3-4 General type -UQK-104

Figure 3-5 General type -UQK-105

Figure 3-6 General type -UQK-1011

Figure 3-7 General type -UQK-1012

Figure 3-8 Self-checking type-UQKS-101

Figure 3-9 Self-checking type -UQKS-102

Figure 3-10 Self-checking type -UQKS-103

Figure 3-11Self-checking type -UQKS-104

Figure 3-12Self-checking type -UQKS-105

Figure 3-13Self-checking type -UQKS-1011

Figure 3-14Self-checking type -UQKS-1012

General type

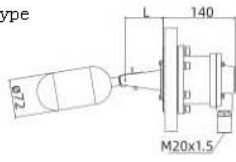


Figure 3-1 UQK-101

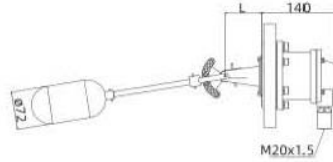


Figure 3-2 UQK-102

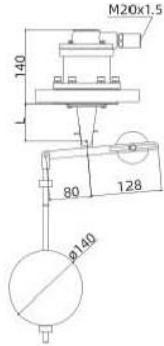


Figure 3-3 UQK-103

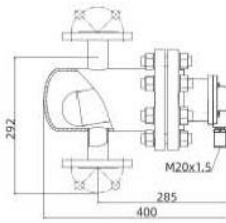


Figure 3-4 UQK-104

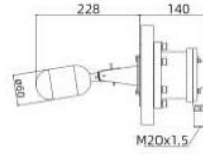


Figure 3-5 UQK-105

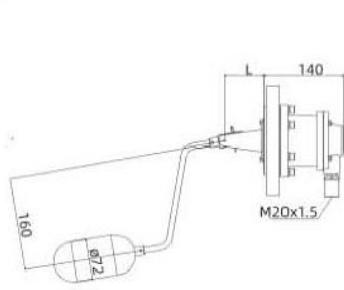


Figure 3-6 UQK-1011

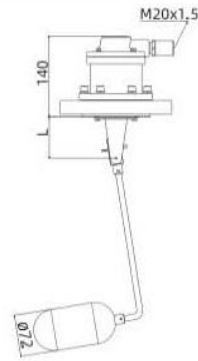


Figure 3-7 UQK-1012

Self-checking type

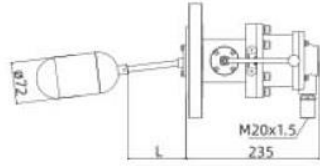


Figure 3-8 UQKS-101

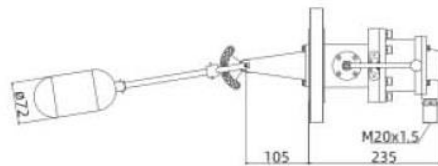


Figure 3-9 UQKS-102

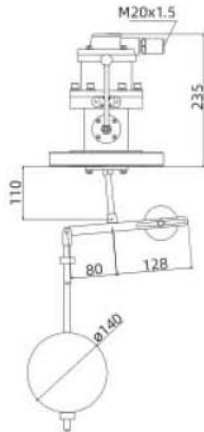


Figure 3-10 UQKS-103

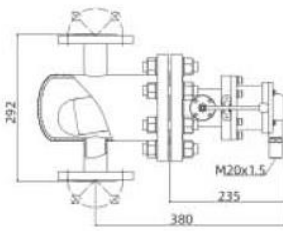


Figure 3-11 UQKS-104

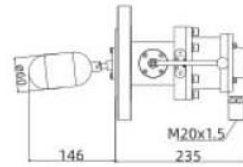


Figure 3-12 UQKS-105

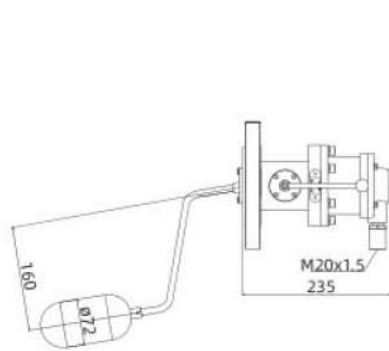


Figure 3-13 UQKS-1011

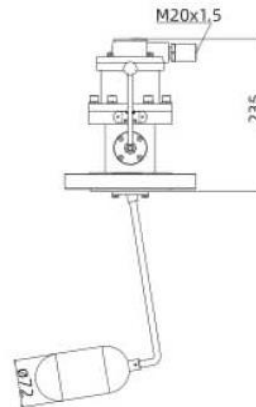


Figure 3-14 UQKS-1012

5. Unpacking and Inspection

5.1 Unpacking Inspection Notice

5.1.1 Check whether the product nameplate (**Figure 4**) is consistent with the supply list information.

		UQKS- Self-testing float level switch		IP66
Contact Capacity AC220VA DC50W	Nominal Diameter	Nominal pressure		
Explosion-proof mark Exia II CT1~T5/T6 Ga Exid II CT1~T5/T6 Gb	Ambient Temperature -40°C~+80°C	Media Density g/cm ³		
		Tag No.	Manufacturer's date/No.	
Dandong Top Electronics Instrument (Group) Co.,Ltd.				

		UQK- Float level switch		IP66
Contact Capacity AC220VA DC50W	Nominal Diameter	Nominal Pressure		
Explosion-proof mark Exia II CT1~T5/T6 Ga Exid II CT1~T5/T6 Gb	Ambient Temperature -40°C~+80°C	Media Density g/cm ³		
		Tag No.	Manufacturer's date/No.	
Dandong Top Electronics Instrument (Group) Co.,Ltd.				

Figure4 Sample Nameplate

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

5.2 Check Content

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

6. Installation

6.1 Installation Tool

6.1.1 Wrenches, flange gaskets and flange bolts for process connections.

6.1.2 Level

6.2 Installation Technical Requirements

6.2.1 Ensure that the lead length L and inner diameter of the equipment are suitable for the selected float level controller to ensure that the float is in the tank.

6.2.2 Pay attention to the distance between the tank flange and the inner wall of the tank and the diameter of the tank when installing, to ensure that the limit bracket is flexible in the tank.

6.2.3 Ensure that the horizontal level of the equipment is within 3 °.

6.2.4 Ensure that no ferromagnetic particles in the medium may be attracted to the controller's magnetic steel rod to affect the switching performance.

6.2.5 The level surface fluctuation frequency of the measured medium shall not be too large, and the fluctuation range shall not exceed the allowable action limit.

6.3 Installation Process

6.3.1 Installation (see

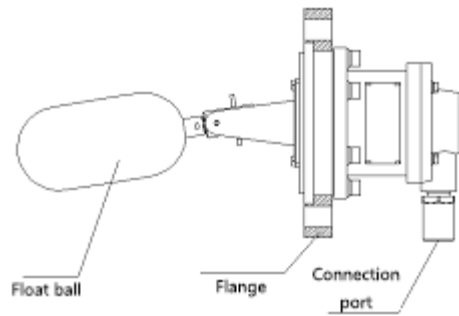


Figure5 Installation

1. Place the gasket on the flange sealing surface of the container.
2. Carefully pick up the controller and load the float into the container.
3. Align the controller flange with the container flange to ensure that the controller wiring is facing downwards (except for the top mounting method). Rotate the controller flange to align the bolt holes. Make sure the flange gaskets are installed correctly.
4. Install flange bolts and nuts. Alternately tighten flange bolts.

6.3.2 Step Adjustable.

The action range of the UQK-102 float level switch is a step-by-step adjustment, by adjusting the position of the positioning pin on the fan-shaped lever, changing the swing angle of the float, the desired action limit can be obtained, and the maximum action limit is 550mm. If there is no special requirement, the factory setting limit pin position is shown in Figure 6, the action limit is 45mm.

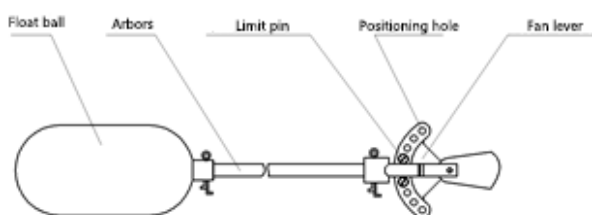


Figure 6 Step Adjustable

6.3.3 Steplessly Adjustable

The UQK-103 float level switch has a stepless adjustment range, see Figure 7. The movement limit is adjusted by changing the relative positions of the upper and lower limit screws of the float guide bar, and the adjustment range is 0 to 1000 mm. There is a slidable counterweight on the balance bar. When the upper limit is used, moving the counterweight makes the right side slightly lighter than the float side (excluding the float). When the lower limit is used, the counterweight side should be slightly heavier than the float side (Does not contain floats) weight. UQK-103 float level switch controller float diameter $\Phi 140$, larger than flange nominal diameter DN80, so its top cover must be removable.

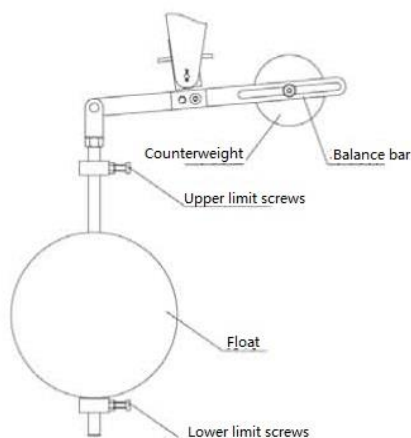


Figure 7 Stepless adjustable

7. Debugging

7.1 Preparation for commissioning

7.1.1 Debugging Tool: Multimeter

7.2 Electrical Wiring

7.2.1 Cable preparation: Wiring should be $\Phi 10\text{mm}$ OD five-core rubber sleeve cord or rubber cable, one core is the inner grounding wire, and the other four cores are for a pair of normally open and normally closed contact wires (using two cores), or for two pairs of normally open, normally closed contacts.

7.2.2 Electrical wiring

1. Remove the cover.

2. According to the wiring diagram wiring, please note that the over-reporting and under-reporting switches are opposite. Be sure to connect to the correct terminal according to the wiring diagram (see Figure 8). For the SPDT

form, the high-level report is normally open, and the low-level report is normally closed. For the DTDP form, the high-level report is normally open-common-side, low-reported normally-closed-common.

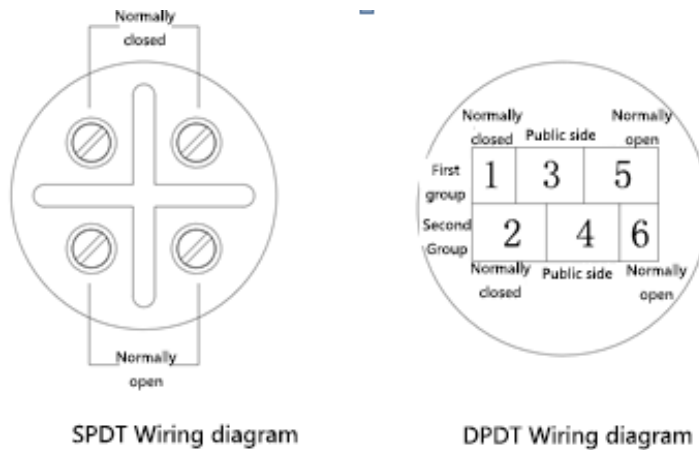


Figure8 Electrical wiring

3. All terminals should be in good contact, the output nut should be properly pressed to prevent the lead from loosening.
4. Make sure the wiring port is pointing vertically downwards. Make sure that the extra wires do not interfere with the movement of the switch cover or switch mechanism.

7.3 Debugging Process

7.3.1 Ordinary float level controller, lift or lower the float to simulate level lift before installation, and use a multimeter to verify whether the output status is correct (Figure 8 output status is empty can state).

7.3.2 Self-checking float level controller, use multimeter to verify whether the output status is correct. Under the empty tank state, simulate the high level and pull the self-test handle downward. Then use the multimeter to check whether the signal is switched once, then pull up. Dynamically simulate a low level and use a multimeter to check if the output is correct. Note that the position of the handle must be placed at the working position after commissioning (see Figure 9)

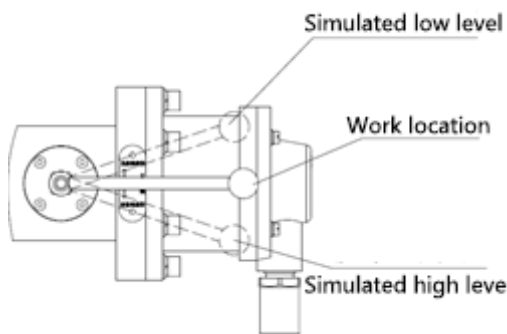


Figure 9 Commissioning operations

8. Precautions

8.1 The density of use should be the same as the design density. If the density changes, please contact the factory to confirm whether it can continue to be used.

8.2 Make sure the power supply is safe and reliable, and must be powered off before opening the cover.

8.3 When the vibration is large, it is not suitable to use the float level switch.

8.4 Medium with viscosity $\geq 500\text{mPa/s}$ is not suitable for use with float level switch.

8.5 Medium with ferromagnetic particles is not suitable for use with float level switch.

8.6 After wiring, tighten the power supply cover to prevent the instrument from getting wet.

9. Fault Analysis and Elimination

Fault Phenomenon	Cause of Issue	Troubleshooting Method
The level to the specified position switch does not work.	<ol style="list-style-type: none"> 1. The ball is too heavy, not floating. 2. The installation location is wrong. 3. The lead pipe is too long, the float ball is stuck in the lead pipe and does not reach into the tank. 4. Ferromagnetic particles or obstacles in the medium cause the float ball to block. 5. Transmitter failure. 6. Self-checking level controller handle position is wrong. 	<ol style="list-style-type: none"> 1. Confirm the density or replace the float. 2. Confirm the installation position according to the instructions, and make sure the wiring is punched down. 3. Confirm that the order neck is larger than the length of the guide tube. If the neck is small, contact the factory to replace the relevant parts. 4. Remove the instrument to clean the float and connecting rod. 5. Replace the transmitter. 6. The handle position is moved to the working position.

10. Disassembly

10.1 Warning

Must be powered off before opening the cover.

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 7.2 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 certifications

Product Certifications			
Certification		Certificate No.	Scope of certification/description
China Classification Society		DL17T0006_04	Ships and Mobile Offshore Units
SIL Certification	SIL 2	CFS17.00171	According to IEC 61508:2010, the UQK (S)-100 series float level switch is a Class A safety related component with HFT (Hardware Failure Factor) = 0 and a safety completion level of SIL2 in low requirement mode.
Explosion Proof Certificate		Ex ia CCRI16.2073X Ex d CCRI17.1158X	Ex ia IIC T1~T5/T6 Ga Ex d IIC T1~T5/T6 Gb
Explosion Proof Certificate		CE16.1151	Ex ia IIC T1~T5/T6 Ga Ex d IIB T4 Gb