Operating Instructions

Flap-11

Magnetic Level Indicator

www.jiweiauto.com
+86 0755-28407683

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Catalog

深圳计为自动化技术有限公司 深圳市龙岗区横岗街道龙岗大道 3162 号宝丽商务 5 楼
电话: +86 755 28407683, 传真: +86 755 89352063, www.jiweimeter.cn

1 Introduction

1.1 Brief description

Jiwei Flap-11 Magnetic Level Indicator series possess features and strength of similar products on the market. Furthermore, Jiwei has carried out extensive studies on common problems and developed innovative techniques in design and production processes to make Flap-11 with great reliability and accuracy. Jiwei has been focusing on details of manufacturing technologies, strict production workflow and quality control. So far, 7 patents (both invention patents and utility patents) are qualified on Flap-11 Magnetic Level Indicator.

4 models for measuring various liquids with different chemical properties:

Flap-11S Economical: Made of 304 stainless steel, more practical and economical. It meets requirements for virtually all industrial applications and processes and can be applied in mild corrosive liquids level measurement.

Flap-11A Standard: Made of 316L stainless steel, with strong corrosion resistance, suitable for majority corrosive liquids.

Flap-11Px Lined model: Chambers are made of 304/316L stainless steel with F4/F46 lining, suitable for strong corrosive liquids.

Flap-11C Plastic: Chamber is made of plastic PP, suitable for low pressure and strong corrosive liquids.

Jiwei also developed Magnetic Switch, Compact Magnetic Switch and Remote Transmitter to combine with Flap-11 Magnetic Level Indicator to fulfill automatic remote level control.

SW-11 Magnetic Switch: Imported high quality and high-power reed switch as core component, with aluminum-alloy housing.

SW-21 Compact Magnetic Switch: Designed with lightweight compact structure and skillful layout, only 35mm in width and 120mm in length. Imported high quality and high-power reed switch as key component.

Reed-11 Remote Transmitter: With imported high-performance microprocessor. 304 stainless-steel external tube improves the corrosion resistance and reliability.

Panel-11 Indicator： Made of aluminum alloy. Ingress Protection ratings as IP65 and IP66/67 for various applications. Designed with broader panel and greatly increases the visual distance and viewing angle. With larger sharp scale and digits, visual

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indicator appears aesthetic and reasonable. The visible distance reaches 60 meters. Furthermore, the innovative design of magnetic coupling structure between magnetic flaps and magnetic float greatly improves the reliability.

1.2 Operating principle

Flap-11 Magnetic Level Indicator series products are designed based on the law of equilibrium in U connected vessels and coupling magnetic effect to achieve real-time level measurements and display.

The level indicator is attached to the vessel and connects directly with the fluid to be measured. Within the chamber is a magnet float assembly inside. This float rests on the fluid surface and moves up and down with the change of level. Because of coupling magnetic effect, float with a permanent magnet actuates magnetic interacted flaps in the visual indicator which is mounted beside the chamber. Associated bi-color magnetic flaps will flip 180 degrees to indicate the actual liquid level.

Generally, when liquid level rises, the float moves up and makes associated flaps flip from white to red, and when liquid level drops, the flaps flip from red to white.

The interface between red and white flaps is the actual indicated liquid level inside the vessel.

1.3 Application

Flap-11 Magnetic Level Indicator series are suitable for measuring liquid, such as water, hydrochloric acid, nitric acid, acid and alkali liquid, industrial wastewater and medical liquids.

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2 Configuration and characteristic

2.1 Configuration

As shown in Fig.1, Flap-11 consists of the components:

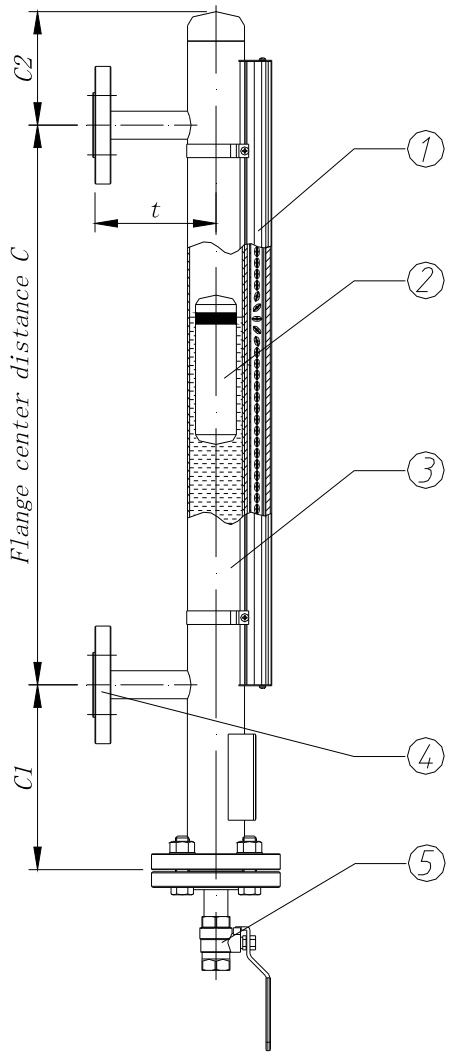

Fig. 1: Flap-11 Configuration

① Indicator ② Magnetic float ③ Buoy
④ Connecting flange ⑤ Blow-down valve

2.2 Characteristic

(1) Distinctive design with broader visual indicator and magnetic flaps greatly increases both visual distance and viewing angle. The larger sharp scale and digits make the indicator easily readable, even from visible distance of 60 meters.

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(2) Exceeds national standard of IP54, Ingress Protection IP65 and IP66/67 are selectable.
(3) SW-11 Magnetic Switch, SW-21 Compact Magnetic Switch and Reed-11 Remote Transmitter all qualified with SIL2 / SIL3 Functional Safety Assessment, as well as certified for both Intrinsic Safety and Flameproof Enclosure explosion protection.
(4) Optional F4 (PTFE)/F46 (FEP) lined chamber manufactured with multiple patented technologies for a wider range of corrosive liquid level control.
(5) With accessories such as steam / vacuum jacket, electric heater, thermal insulator for complex applications.

3 Technical data

Applicable liquid	Density	0.8～2g/cm³
	Viscosity	≤200cp
Measurement parameters	Range	Single section: 200～5600mm，multi-section up to 20m or longer
	Accuracy	±5mm or ±10mm
Materials and specifications	Chamber	304/316L/ with F4(PTFE)/F46(FEP) lining，φ57
	Float	304, 316L, titanium alloy, titanium/ with F46(FEP) out-lined
	Visual indicator	Aluminum or PA66 nylon. Front cover available in glass panel (standard) or acrylic sheet
Installation conditions	Process pressure	0～16 bar
	Process temperature	≤120℃
	Ambient temperature	-40～80℃
Output	Switch signal	Magnetic switch：220V AC 3A，SPDT
	Continuous signal	Remote transmitter：4～20mA
Process connection	Connection	Flange with customized dimension
	Connection material	304/316L stainless steel / with F46 lining
End fitting	Upper vent	Flange
	Lower drain	Standard flange, lined valve available upon request
Accessory	Thermal insulator	Rubber foam, asbestos, polyester
Certificates and approvals	SIL Qualification	SIL2(HFT≥0)/SIL3(HFT≥1)
	Ingress Protection	IP65, IP66/IP67
	Explosion-Proof	Flameproof Enclosure：Ex d IIC T6 Gb（Magnetic switch and Remote transmitter） Intrinsic Safety：Ex ia IIC T6 Ga（Magnetic switch and Remote transmitter）

Approvals

Instruments with approvals can have different technical data depending on the version. For that reason the associated approval documents of these instruments have to be carefully noted. You can find the approvals in the certification area on “www.jiweimeter.cn”.

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4 Reed-11 Remote Transmitter

4.1 Brief description

Reed-11 Remote Transmitter is designed to be assembled with Flap-11 Magnetic Level Indicator series for remote control. It converts liquid level status to a 4～20mA signal and transmits it to remote console or control center to monitor and control the liquid level in real-time.

The magnetic float in the chamber rises or drops with the fluid level in the vessel. As the float moves, the reed switches in the chamber proximal to the magnetic float are magnetized and close to the blades, and all other reeds that are not magnetized by the float are in open state. The position of the float is as the sliding point in a potentiometer. The magnetic float moving with the liquid level up or down will lead to resistance change in the circuit and the voltage will change accordingly. Then it is converted into a 4-20mA current signal through a current-voltage convertor. Jiwei offers two types of reed transmitter with accuracy of ± 5mm or ± 10mm respectively. The higher the accuracy, more reed switches will be needed.

Specific installation diagram is shown as Fig. 2:

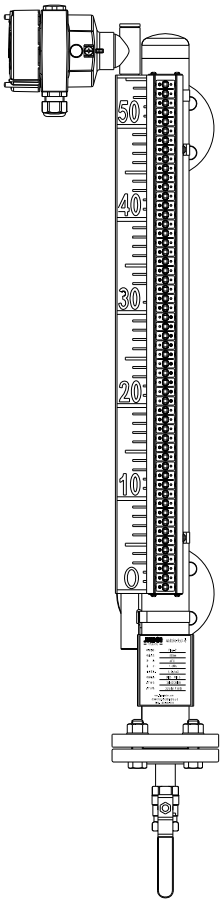

Fig. 2: Reed-11 installation diagram

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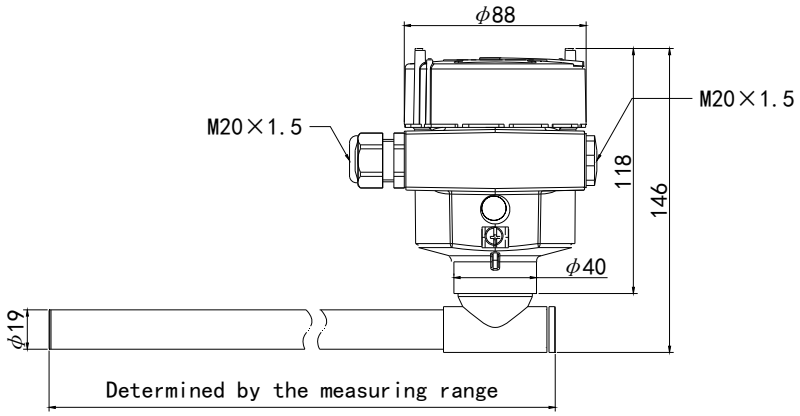
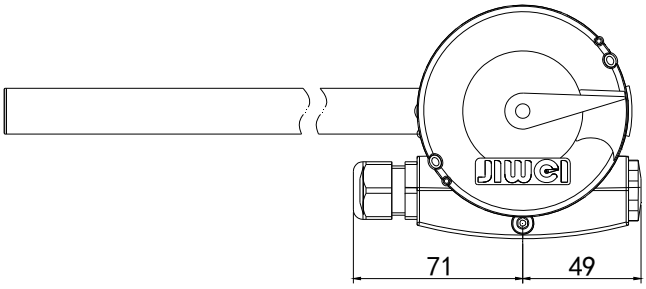
4.2 Technical data

Resolution	±5mm/±10mm
Power supply	10～36V DC
Process temperature	-50～150℃
Ambient temperature	-20～50℃
SIL Qualification	SIL2(HFT≥0)/SIL3(HFT≥1)
Explosion-Proof	Flameproof Enclosure: Ex d IIC T6 Gb
	Intrinsic Safety: Ex ia IIC T6 Ga
Ingress Protection	IP66/IP67
Cable entry	1/2"NPT or M20×1.5

4.3 Dimensions





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5 Note

(1) In order to prevent magnetic floats from moving and impaction during transportation, magnetic floats are fixed on the side of the buoy by the nylon belt. Before installation, user needs to open the lower flange and put magnetic floats into the buoy (with the arrow and the heavy end magnetism upwards);
(2) A valve should be installed between the magnetic level indicator and storage tank, so that materials can be cut off during cleaning and maintenance;
(3) Magnets are not allowed to get close to the magnetic level indicator, and iron clasps/clamps are forbidden. Otherwise, the reliability of magnetic level indicator will be affected;
(4) When the magnetic level indicator is mounted from above, the level gauge protection tube and main tube must be vertical and perpendicular to the same vertical line. The magnetic floats' connecting rod cannot be bent and must be loaded straightly;
(5) For the lined and anti-corrosion type magnetic level indicator, due to the unique sealing structure at the joint between the buoy and the flange, it needs to be assembled with the help of professional tools. In order to ensure the reliability, please do NOT disassemble.
(6) Magnetic level indicators with reed remote transmitter, magnetic switch and electric heat tracing device are equipped with a grounding terminal, which must be grounded after installation.
(7) After installation, please use magnetic steel to adjust, and makes the flap display silver-white color above the zero scale;
(8) Before operation, open the valve of the upper liquid guide pipe first, then slowly open the valve of the lower liquid guide pipe. After that, let the liquid flow smoothly and stably, avoid liquid medium rising the float rapidly, resulting in flaps turning failure or jumbled (If so, please use magnet steel to re-adjust).
(9) No solid impurity is allowed to get into the buoy, or the floats will be blocked. The buoy can be cleaned regularly and the internal impurities can be removed according to the real condition.
(10) For the over-length liquid level meter (measuring range more than 4m), the freight and transportation are costly, so the liquid level meter is usually made by sections. Two segmentation methods are as the following, which can be determined according to the actual contact forms. In Fig. 3, a liquid level meter is divided into two sections. During installation, the connecting flange is assembled first, then, the display panel can be loosened appropriately. The number of supporting points is determined according to the length; Fig. 4 is divided into two independent liquid level meters. This type of structure requires that the center line of the two flanges in the middle must be on the same horizontal plane, so as to realize the continuity of liquid level display.

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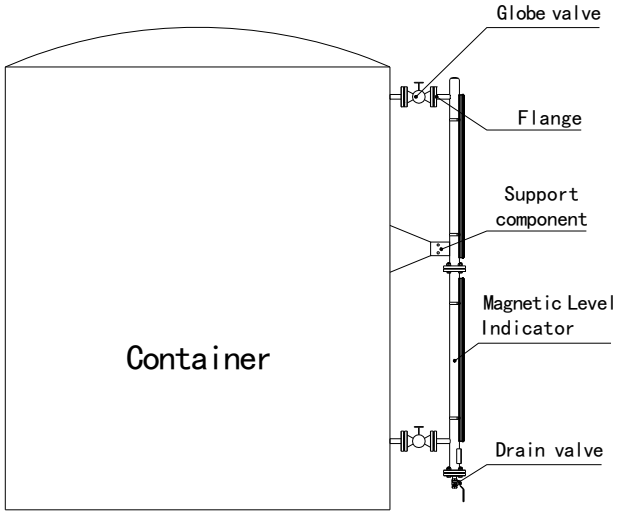

Fig. 3

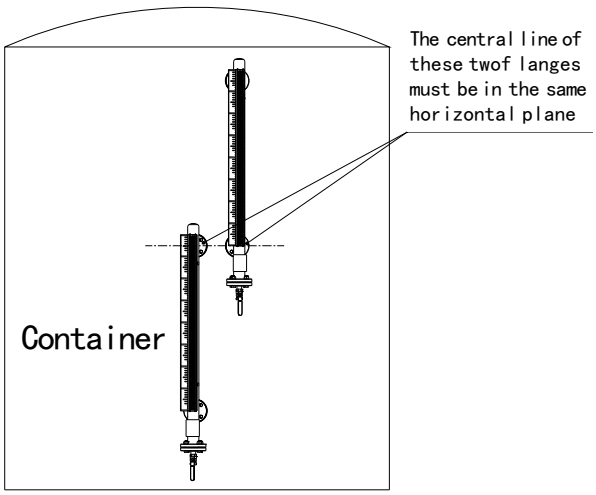

Fig. 4

(11) For the sections that mentioned in (10), when equipped with reed remote transmitter or electric heat tracing device, the corresponding cable connector at the sections shall be connected firmly. Fig. 5 is the connecting diagram of non-explosion-proof reed remote transmitter, which is connected with aviation connector and waterproof sealing; Fig. 6 is the connecting diagram of explosion-proof reed remote transmitter. Connect the upper and lower wires in the explosion-proof connection box through explosion-proof flexible wiring tube. The aviation connector shall be connected in the connection box, and close the housing cover after the wiring (Fig. 7 and 8).

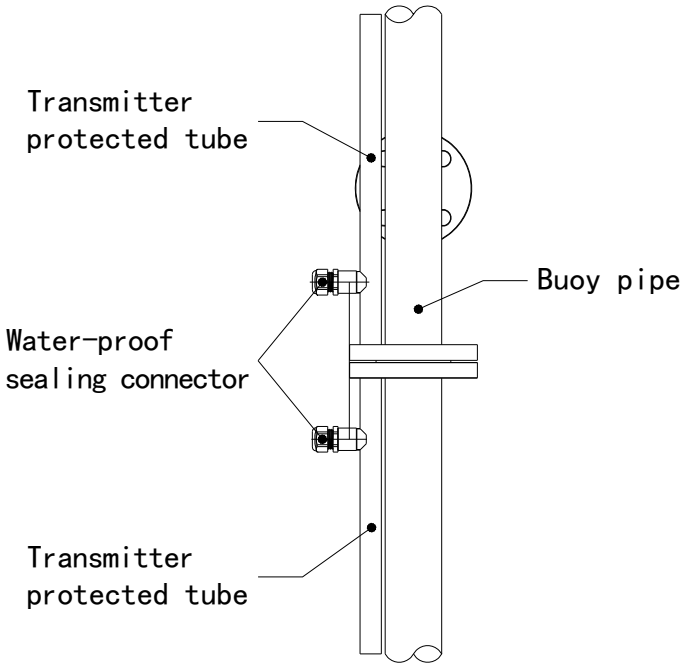

Fig. 5

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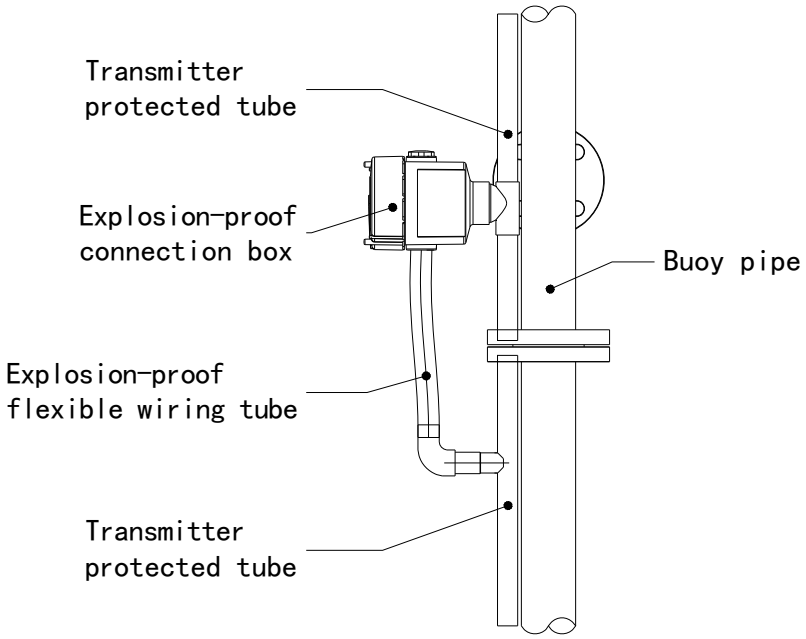

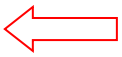

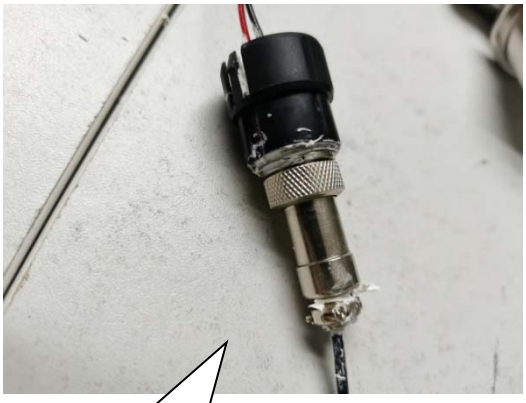

Connect the 2p aviation connector and tighten the cap.

Fig. 6

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Fig. 7

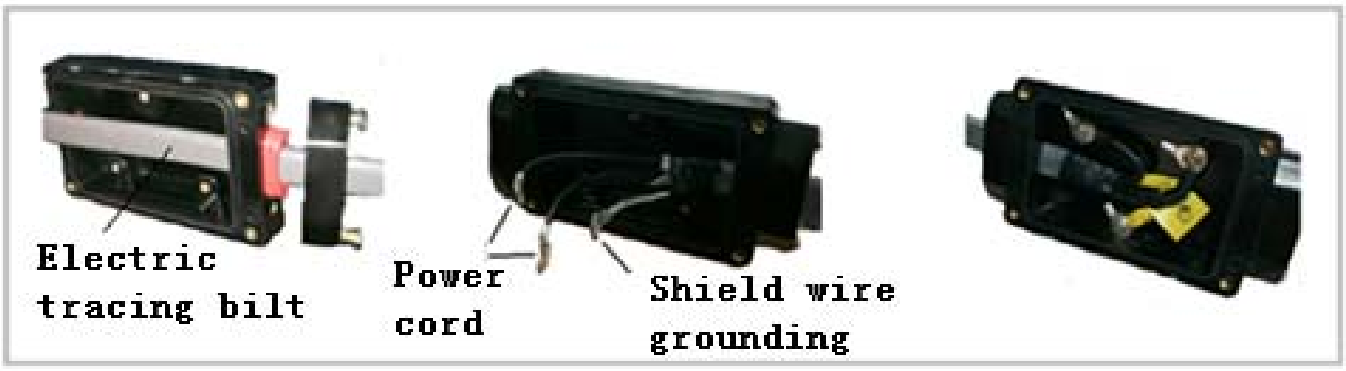

Fig. 8

6 Instrument repair

We offer our customers service including technical consulting, user training, on-site installation and commissioning, product replacement and maintenance as well as on-site technical support, etc. Jiwei product quality warranty period is one year, the warranty period for your free maintenance, long-term technical support, if you need advice in use, please call the service hotline：+86-0755-28407683, you can find the relevant services on our website www.jiweimeter.cn

7 Storage and transport

7.1 Packaging

Your instrument was protected by packaging during transport.

The packaging of standard instruments consists of environment friendly, recyclable carton cover material.The probe is additionally protected with a cardboard cover. For

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special versions, PE foam or PE foil is also used. Please dispose of the packaging material through specialized recycling companies.

7.2 Transport

Transport must be carried out in due consideration of the notes on the transport packaging. Nonobservance of these instructions can cause damage to the instrument.

The delivery must be checked for completeness and possible transit damage immediately at receipt. Ascertained transit damage or concealed defects must be appropriately dealt with.

7.3 Storage

The packages must be stored under the following conditions:

(1) Not in the open
(2) Dry and dust free
(3) Not exposed to corrosive media
(4) Protected against solar radiation
(5) Avoiding mechanical shock and vibration
(6) Storage environment
Relative humidity: 0～95%
Storage temperature: -40～80℃

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