

LGXS

WEDGE FLOW METER

Operation Manual

LGXS - DT - JS - 1021 - 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 about installation, connection and commissioning as well as maintenance, troubleshooting and storage. Please read it carefully before installation and commissioning and save it as an integral part of the product near the instrument for reading at any time.

This manual can be downloaded from www.ddtop.com.

If you do not follow this manual, the protection provided by this instrument may be damaged.

Trademarks, Copyrights and Restrictions Instructions

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The performance specifications of this instrument are effective from the date of release, 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.

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Dandong Top Electronics Instrument (Group) Co., Ltd guarantees that all products will be free from defects in materials and manufacturing processes within one year from the date of leaving the factory.

During the warranty period, if the product is returned due to quality problems, and the claim is determined to fall within the scope of the warranty after inspection by the manufacturer, Dandong Top Electronics Instrument (Group) Co., Ltd is responsible for repairing or replacing it for 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. Except for the special written warranty certificate for certain products, Dandong Top Electronics Instrument (Group) Co., Ltd does not provide any express or implied quality guarantee.

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

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1 Safety Tips

For safety reasons, it is expressly prohibited to modify or change the product without authorization. Repair or replacement is only allowed to use the accessories specified by the manufacturer.

1.1 An explosion may cause death or serious injury.

When installing the device in an explosive environment, be sure to comply with applicable local, national, and international standards, codes, and regulations. Ensure that the equipment is installed in accordance with intrinsically safe or non-flammable site operating procedures.

1.2 Process leaks can cause serious injury or death.

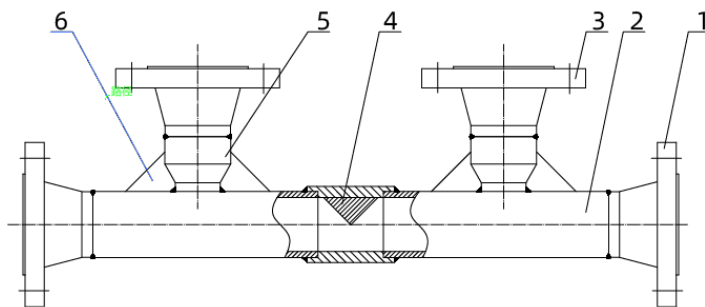
If the process seal is damaged, the medium may leak at the connection.

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

The operations described in this manual need to be completed by professionals who have received professional training and obtained corresponding qualifications or special end-users.

2 Product Description

2.1 Product Structure-Figure 1

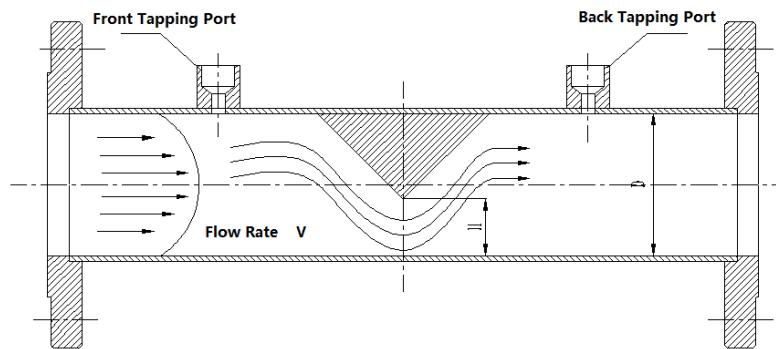


- | | | |
|----------------------|-----------------------|-------------------|
| 1. Connecting Flange | 2. Measuring Tube | 3. Tapping Flange |
| 4. Wedge Assembly | 5. Tapping Short Tube | 6. Stiffener |

Figure 1

2.2 Operating Principle-Figure 2

The basic principle of LGXS wedge flow meter comes from energy conservation and continuity equations. The wedge with a triangular longitudinal section is placed in the process pipeline. When the fluid flows through the wedge flow meter, due to the throttling effect of the wedge, the upstream and downstream sides produce a differential pressure with a square relationship with the volume flow value. The differential pressure transmitter can output a standard signal with a square relationship with the measured fluid flow value to obtain the flow value.



Working Principle Diagram of Wedge Flow Meter

Figure 2

Basic Calculation Formula:

$$\text{Volume Flow } Q = \frac{C\varepsilon}{\sqrt{1-m^2}} m \frac{\pi D^2}{4} \sqrt{\frac{2\Delta P}{\rho}}$$

$$\text{Mass Flow } M = \frac{C\varepsilon}{\sqrt{1-m^2}} m \frac{\pi D^2}{4} \sqrt{2\Delta P \rho}$$

C— Outflow Coefficient

E— Expansion Coefficient

Π M— Throttle Area Ratio

D—Pipe Inner Diameter

ΔP — Differential Pressure Pa

P—Density Of Measured Medium Kg/m^3

2.3 Package

Please send packaging waste to a special recycling agency.

2.4 Lifting Transportation

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

2.5 Storage

Storage temperature $-20^{\circ}\text{C}\sim 40^{\circ}\text{C}$; storage humidity $\leq 20\%$.

3 Technical Characteristics

3.1 Product Features

3.1.1 Wide Measuring Range

In the range of Reynolds number from 500 to millions, flow and differential pressure always maintain a square root relationship.

3.1.2 High Accuracy

The basic error of the flow coefficient of the calibrated wedge flow meter is within $\pm 0.5\%$, and the repeatability is 0.2%.

3.1.3 Strong Cleaning Ability

It has self-cleaning ability without stagnation area.

3.1.4 Abrasion Resistance

The surface of the wedge can be sprayed with carbide or butt-welded with stellite cemented carbide, which has good abrasion resistance.

3.1.5 Permanent pressure loss is smaller than orifice plate

3.1.6 Good repeatability and high reliability

3.1.7 Long life, low cost, convenient installation and maintenance

3.1.8 Straight Pipe Requirements

Two-way flow measurement. It has the smallest straight pipe section requirements: 5 pipe diameters upstream and 2 pipe diameters downstream.

3.2 Main Parameters

Nominal Diameter: DN25~DN600

Wedge Ratio: 0.2,0.3,0.4,0.5

Nominal Pressure: 0~26.0MPa

Medium Temperature: $-196^{\circ}\text{C}\leq T\leq 500^{\circ}\text{C}$

Range Ratio: 10: 1

Accuracy: $\pm 1\%$ $\pm 0.5\%$ (Real Flow Calibration)

Reynolds Number Range: $300 \sim 1 \times 10^7$

Measured Medium Viscosity: 500mPa.s

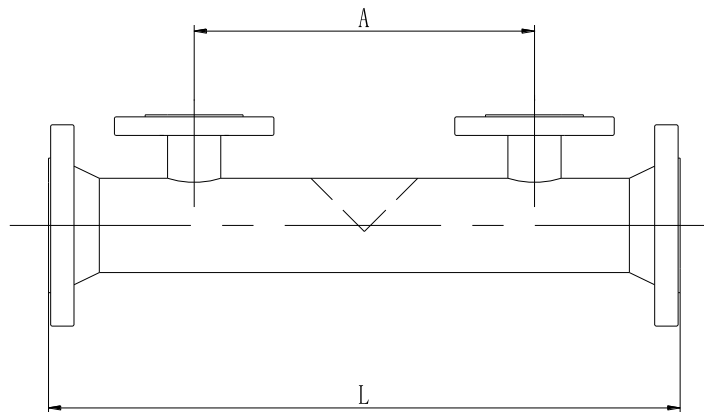
3.3 Application Scope

3.3.1 It is suitable for flow measurement of fluid with low Reynolds number.

3.3.2 It is suitable for flow measurement of high-viscosity fluids, liquids containing solid particles, slurry fluids, such as fuel oil, residual oil, oil slurry, wastewater, etc.

3.3.3 It is suitable for pipes with nominal diameters DN25 ~ DN600.

4 Schematic Diagram of Pipeline Size-Figure 3



LGXS Wedge Flow Meter Dimensions Table

Nominal Diameter D	L (mm)	A (mm)
DN25	600	280
DN40	600	280
DN50	600	280
DN80	600	310
DN100	800	370
DN150	800	450
DN200	900	520
DN250	960	600
DN300	1100	670
DN350	1150	710
DN400	1200	770
DN450	1300	850
DN500	1400	940
DN600	1500	1050

5 Unpacking and Inspection

5.1 Precautions for Unpacking Inspection

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

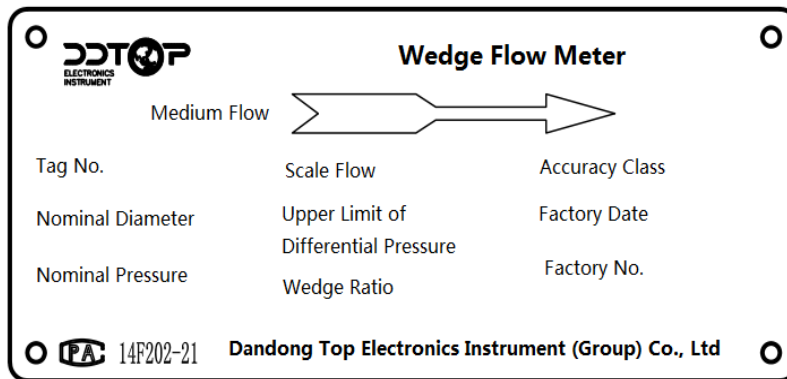


Figure 4

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

5.2 Check Content

5.2.1 Check whether the appearance of the instrument is defective or damaged.

5.2.2 If the LGXS flow meter and its accessories are packaged separately, please confirm that the quantity and specifications are correct before unpacking.

6 Installation

6.1 Installation Tools

6.1.1 Suitable for wrenches, flange gaskets and flange bolts of process connections.

6.2 Installation Technical Requirements

6.2.1 LGXS wedge flow meter can be installed regardless of the medium flow direction.

6.2.2 When the LGXS wedge flow meter is installed on a horizontal pipeline, the pressure tap should be within 45° of the horizontal centerline of the pipeline. When installed on a vertical pipeline, different elevations of the pressure tap will produce additional pressure heads. After the transmitter is installed, it is solved by resetting the zero.

6.2.3 When the nozzle pressure wedge flow meter measures fluids with high viscosity, easy to crystallize, coking or containing solid particles, the pressure point should be self-tracing or externally heated and an isolation container should be provided.

6.2.4 The upstream and downstream of LGXS wedge flow meter should have a certain length of straight pipe section without resistance parts.

6.2.5 Requirements for Front and Rear Straight Pipes.

Choke	Upstream	Downstream
1 Elbow	5D	4D
2 Elbows	7D	4D
Tee Joint Head	6D	4D
Full Open Gate Valve	6D	4D
Full Open Ball Valve	8D	4D
Reducer	9D	4D
Divergent Tube	9D	4D

7 Fault Analysis and Troubleshooting

Failure Phenomenon	Reason	Method
1. Differential pressure transmitter indicates no change	1. Stop valve is not opened	Open the stop valve
	2. Differential pressure pipeline is blocked	Unblock the differential pressure pipeline
	3. Differential pressure transmitter failure	Check differential pressure transmitter
2. The indication value of the differential pressure transmitter obviously deviates from the indication value of gauge	1. The installation direction of flow element is wrong	Reinstall the flow element
	2. Differential pressure transmitter failure	Check differential pressure transmitter
	3. The working condition parameters of the measured medium are inconsistent with those used when designing the flow element	Correct according to the relevant formula, it is necessary to recalculate the differential pressure value
	4. The length of the straight pipe before and after the flow element is not enough	Adjust the length of straight pipe
	5. The inner diameter of the straight pipe section is out of tolerance	Measure the inner diameter of straight pipe section and recalculate the maximum flow
	6. Throttle aperture tolerance	Measure the orifice aperture, recalculate the maximum flow
	7. Flow element is deformed	Replace flow element
	8. There are attachments on flow element	Clean and replace flow element

	9. Tap location is incorrect	Reinstall in the correct way
	10. Condensate liquid level in the condenser is inconsistent	Adjust the condensate level to make the height consistent
3. Differential pressure transmitter has no indication	1. Power is not turned on	Turn on the power
	2. The stop valve is not open	Open the stop valve
	3. Differential pressure transmitter failure	Check differential pressure transmitter
4. Medium leakage at the flow element	1. Insufficient clamping force of connector	Refasten the connection
	2. Sealing gasket failure	Replace sealing gasket
	3. Material is corroded	Replace corroded parts

8 Maintenance

After the flow element is put into use, in order to ensure its measurement accuracy and reliability, it must be maintained.

8.1 Regularly clean the tapping signal pipeline and the differential pressure transmitter to remove all debris, and check and adjust the zero point of the differential pressure transmitter at the same time.

8.2 If the indicated value of the differential pressure transmitter is found to be significantly different from the measured value, a comprehensive inspection and adjustment should be carried out, and the metrological verification should be carried out if necessary.

8.3 The differential pressure transmitter shall be subject to periodic measurement verification according to the measurement verification period.

9 Disassemble

9.1 Warning

Before disassembling, pay attention to dangerous process conditions, such as pressure, high temperature, corrosive or toxic media in the container, etc.

9.2 Waste Disposal

Please follow the current regulations in each region for waste disposal.

10 Product Certificate

Product Certificate

Certificate	Certification No.	Scope and Description
Approval of Measuring Instrument Form	14F202-21	
