

Overview

LVA series metal tube float flowmeter, also known as the "metal tube rotameter", is a measuring instrument commonly used in the industrial automation process management to measure the variable area flow. Being featured with characteristics of small size, wide application range, convenient usage, etc., it is designed for measuring the flows of liquids, gases and steam, especially applicable for measurement of low flow speed and small flow rate.

Over the years, with its excellent property and reliability as well as preferable cost performance, the metal tube float flowmeter has been applied widely in a variety of industries, such as the petrochemical engineering, iron and steel, electric power, metallurgy, light industry, food, pharmacy, water treatment, etc.

Measuring Principle

LVA series metal tube float flowmeters are principally composed of two major parts: sensor and indicator. The sensor mainly consists of the joint flange, cone, float as well as upper and lower guiders; while, the indicator mainly consists of the casing, magnetic transmission system, dial scale and electric transmission system.

In the cone-shaped measuring tube, there is a measuring component which is flexible for upward and downward movements - float (Figure 1). As the fluid goes through the tube from bottom to top, the float moves upwards along the cone-shaped tube due to the acting force imposed by the fluid. The more the flow rate increases, the greater distance the float will travel; on the contrary, the distance the float travels decreases with the flow rate of the fluid. In other words, the flow rate of the fluid determines the location where the float stops in the measuring tube, which consequently determines the size of the annular area formed between the float and the cone-shaped tube. When the flow rate is maintained at a constant value "Q", the float is in a dynamic equilibrium state, remaining at a fixed location "h" in the cone-shaped tube. At such moment, the annular area formed between the float and the cone-shaped tube is kept unchanged. There are three forces acting on the float: the gravity force "G" of the float, the buoyancy force "F" and the acting forces "P" the fluid imposes on the float, which are maintained in equilibrium. On the basis of Bernoulli Equation, force-balance principle and law of fluid continuity in the hydrokinetics, the instantaneous rate of flow currently passing through the annular area can be hereby figured out. Therefore, it is the principle of variable area that the metal tube float flowmeter adopts to measure the flow rate.

A permanent magnet with high performance is embedded into the interior of the float. When the float maintains an equilibrium position, a homogeneous and stable magnetic field occurs around the float. In addition, a magnetic sensor will be installed outside the cone-shaped tube, which consequently makes it possible to transmit the straight-line displacement of the float inside the measuring tube to the indicator in a non-contact manner and finally display the results on the dial scale of the indicator or output corresponding standard current signals of $4 \sim 20$ mA after examination and treatment.



Features

- Designed for measurement of small caliber and low-speed medium
- With reliable performance, few maintenance and long service life
- Low requirement for the straight tube section
- Widely measure ratio: 10:1
- Dual-line display, instantaneous/ cumulative flow rates displayed at the field
- With a keyboard on the indictor for convenient operation and setting
- All in metal construction, designed for measuring corrosive medium of high temperature, high pressure and strong
- Non-contact magnetic coupling transmission
- Applicable for inflammable and explosive occasion
- Optional charging modes: DC power supply or battery power
- With the functions of data recovery, data backup and power failure protection
- Multiple parameters calibrating function



Technical parameter

Connection of flow	DN15, DN25, DN50, DN80, DN100, DN150 (For other caliber dimensions,		
meter	please negotiate with the manufacturer.)		
Range of flow	Liquid: $1.0 \sim 150000$ // Gas: $0.05 \sim 3000$ m3/h (For the detailed flow range,		
Italige of now	refer to the Table of Flow on Page 11.)		
Measure Ratio	10:1, 20:1 (special)		
Precision	Grade 0.5, Grade 1.0 (special)		
Proceuro rating	DN15、DN25、DN50: 4.0MPa (Max: 20MPa) DN80、DN100、DN150: 1.6MPa		
Fressure raung	(DN80: Max 10MPa, DN100: Max 6.4MPa, DN150: Max 4.0MPa)		
Medium temperature	Standard: -30 \degree C \sim +120 \degree C , high temperature: 120 \degree C \sim 350 \degree C		
Power supply	24VDC (12~36VDC)		
Output signal	4 \sim 20mADC (two-wire configuration); attached HART Protocol allowed		
Output load	500Ω (24V power supply)		
Environmental temperature	Local type: -40 \degree \sim 120 \degree Remote-control type: -30 \degree \sim 60 \degree		
Storage requirement	Temperature: -40 °C ∼85 °C humidity: ≤85%		
Connection mode	Flange connecting. Flange standard : GB/T9119-2000; User's appointment allowed		
Connection mode	$(\mbox{For other connection modes, please negotiate with manufacturer})$		
Cable interface	M20×1.5		
Housing protection grade	IP65		
Mark of explosion-proof	Intrinsic safety type: ExialICT6, explosion-proof type: ExdIICT6		
Pressure loss	See table of flow for detailed information		
Viscosity of medium	DN15: η < 5mPa.s DN25: η < 250mPa.s DN50~DN150: η < 300mPa.s		



Table of Flow

Table for flow rate of vertical installation type (See the following table)

Caliber	Float number	Water L/h (0.1013MPa, abs, 20℃)		Air m³/h (0.1013MPa, abs, 20℃)	Pressure loss kPa (Low pressure loss needs to be confirmed with manufacturer)	
	Float material	SS	PTFE, Ti	SS	SS	PTFE, Ti
	F15.0	10	1000		1.5	-
	F15.1	16		0.5	1.5	<u> </u>
	F15.2	25	1.000	0.7	1.5	-
	F15.3	40	25	1.2	1.5	1.5
DN15	F15.4	60	40	1.8	1.5	1.5
	F15.5	100	60	2.8	1.5	1.5
	F15.6	160	100	4.5	1.5	1.5
DN15 DN50 DN80 DN100	F15.7	250	160	7.5	3.0	1.5
	F15.8	400	250	12	3.0	3.0
	F15.9	600	400	18	3.5	3.0
	F50.0	6000	4000	180	3.0	3.0
	F50.1	8000	5000	240	3.0	3.0
DMGO	F50.2	10000	6000	300	4.0	3.0
DN 30	F50.3	12000	8000	360	4.0	3.0
	F50.4	16000	10000	480	8.0	4.0
	F50.5	20000	12000	600	8.0	4.0
	F80.0	25000	16000	750	14.0	8.0
DN15 DN50 DN80 DN100 DN125 DN150	F80.1	30000	20000	900	14.0	9.0
DIN 80	F80.2	40000	25000	1200	20.0	12.0
DN 50 DN 80 DN 100	F80.3	50000	30000	1500	20.0	15.0
	F100.0	60000	40000	1800	28.0	25.0
DN100	F100.1	80000	50000	2400	28.0	27.0
DN100	F100.2	100000	60000	3000	40.0	38.0
DNIAC	F125.1	100000	80000	3000	45.0	35.0
DN 125	F125.2	125000	100000	3 -	48.0	40.0
DNI160	F150.1	125000	100000	0.77	48.0	40.0
DIN150	F150.2	150000	125000		50.0	42.5



Caliber	Float number	Water L/h (0.1013MPa,20℃)		Air m³/h (0.1013MPa,20℃)	Pressure loss kPa (Low pressure loss needs to be confirmed with manufacturer)	
	Float material	SS	Ti	SS	SS	Ti
	F15.5	160	100	4.5	1.5	1.5
	F15.6	200	120	6.0	1.5	1.5
DN15	F15.7	250	160	7.5	2.0	2.0
	F15.8	400	250	12	2.0	2.0
	F15.9	600	400	18	3.5	3.5
DN25 DN50	F25.0	1000	600	30	1.5	1.5
	F25.1	1600	1000	45	1.5	3.0
	F25.2	2000	1200	60	3.0	3.0
	F25.3	2500	1600	75	3.0	3.5
	F25.4	3000	2000	90	3.5	Cost N a ss needs to be nanufacturer) Ti 1.5 2.0 2.0 3.5 1.5 3.0 3.0 3.5 3.5 3.0 30.0 30.0 30.0 30.0 45.0 45.0 46.0
	F25.5	4000	2500	120	8.0	8.0
	F50.0	6000	4000	180	3.0	3.0
	F50.1	8000	5000	240	3.0	3.0
DN 50	F50.2	10000	6000	300	4.0	4.0
	F50.3	12000	8000	360	4.0	4.0
	F50.4	16000	10000	480	8.0	8.0
	F80.1	25000	16000	750	14.0	14.0
DN80	F80.2	30000	20000	900	14.0	14.0
	F80.3	40000	25000	1200	20.0	22.0
	F100.0	60000	40000	1800	30.0	30.0
DN100	F100.1	80000	50000	2400	30.0	30.0
	F100.2	100000	60000	3000	45.0	45.0
DN 125	F125.1	100000	80000	3000	45.0	45.5
DN 123	F125.2	125000	100000	-	46.0	48.0
DMISS	F150.1	125000	100000	-	48.0	46.0
DN150	F150.2	150000	125000	_	50.0	50.0

Table for flow rate of horizontal installation type (see the following table)

Description: Data in table for flow rate of Series are the standard parameters of apparatus. Usercan consult with the supplier if special flow rate ranges are required.



		LVA Series ordering code
	0.1	
	Code	Technical parameters
1.	LVA	Series
2		lype
2.	R	Remote type
	X	Others
		Pipe size
3.	15	DN15
	25	DN25
	50	DN50
	80	DN80
	10	DN100
	 	Pipe material
4.	4	304 Stainless steel
	6	316 Stainless steel
	L	316L Stainless steel
	F	Stainless steel lined with Fluoroplastic
	Т	Titanium alloy
	Н	Hastelloy C
		Indicator form
5.	D	Multi function indicator, flameproof
	Т	Pointer type non-linear indication instantaneous flow
	DE	Stainless steel case, multi-function indicator, flameproof
	TE	Stainless steel case pointer type non-linear indication of instantaneous flow
		Transmitter
6.	S1	Pointer, ESK Remote transmission, with LCD, backlight
	S2	Pointer, ESK Remote transmission
	S3	Pointer, ESK Remote transmission, HART
	S4	Pointer, ESK Remote transmission, with LCD, backlight, HART
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1.	A	Intrinsically safe EXI
	X	
8	K1	
0.	K2	
	K3	Upper and lower limit alarm
		Structural style
9.	н	Vertical installation
	V	Horizontal installation
	S	Side in side out
	В	Bottom in side out
		Additional structure
10.	Т	Jacket type
-	H	High temperature type
	L	Media status
11.	G	Gas
		Linuid