

TECHNOLOGY

**HOLYKELL®**

# FLOWMETER

• DATASHEET •

1. Pressure Measurement 2. Level Measurement 3. Temperature Measurement  
4. **Flow Measurement** 5. Display & Control Instruments

# HTR Metal Tube Rotor Flow Meter

## Product Introduction



Metal tube rotor flow meter, also known as 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.

## Applications

Over the years, with its excellent property and reliability as well as preferable cost performance, the metal tube float flow meter 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.

## 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 indicator for convenient operation and setting

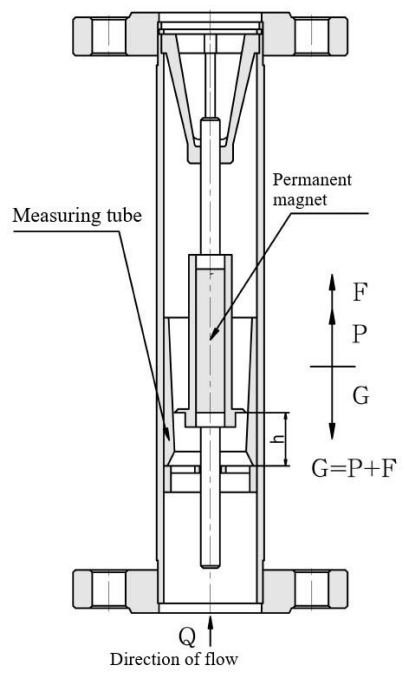
- ◆ All in metal construction, designed for measuring corrosive medium of high temperature, high pressure and strong
- ◆ Non-contact magnetic coupling transmission
- ◆ Applicable for inflammable and explosive occasion
- ◆ Optional charging modes: DC power supply or battery power
- ◆ With the functions of data recovery, data backup and power failure protection
- ◆ Multiple parameters calibrating function

### **Working Principle**

Metal Tube Float Flow meters 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 as below). 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 flow meter 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. And 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 results on the dial scale of the indicator or output corresponding standard current signals of 4 ~ 20mA after examination and treatment.



### Specification

Parameter	Specification
Caliber of flow meter	DN15, DN25, DN50, DN80, DN100, DN150 (Others on request)
Range of flow	Liquid:1.0~150000l/h Gas:0.05~3000m <sup>3</sup> /h
Measure Ratio	10:1, 20:1 (special)
Medium temperature	Standard:-30°C~+120°C,high temperature:120°C~350°C
Environmental temperature	Local type:-40°C~120°C Remote-control type:-30°C~60°C
Storage requirement	Temperature: -40°C~85°C humidity:≤85%
Output load	500Ω (24V power supply)
Output signal	4~20mADC (two-wire configuration); attached HART Protocol allowed
Pressure rating	DN15, DN25, DN50:4.0MPa (Max: 20MPa) DN80, DN100, DN150:1.6MPa (DN80:Max 10MPa; DN100:Max 6.4MPa; DN150:Max 4.0MPa)
Power supply	24VDC (12~36VDC)
Precision	Grade 0.5, Grade 1.0 (special)
Connection mode	Flange (Others on requests)
Cable interface	M20×1.5
Housing protection grade	IP65
Explosion-proof	Intrinsic safety type:ExiaIICT6, Explosion-proof type:ExdIICT6
Viscosity of medium	DN15:η<5mPa.s DN25:η<250mPa.s DN50~DN150:η<300mPa.s