

H2 Gas APPLICATION

Golden Rules Co.,Ltd
www.goldenrules.co.kr

Hydrogen filling station hydrogen flow meter

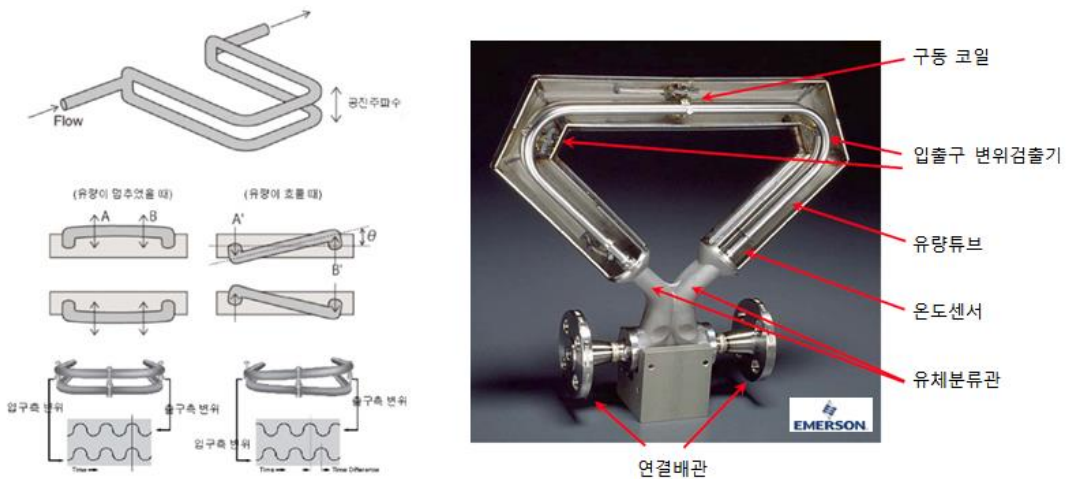


The nation's development item, 100% domestic goods, Patent **NO.** 10-1606497

1. H2 FLOWMETER

The mass formula hydrogen flowmeter cannot follow the differential pressure mass formula

Hydrogen is colorless, odorless, and non-toxic, and its unit energy is more than five times greater than that of fossil fuels. However, hydrogen is the lightest, so it rarely exists alone on Earth's surface and is mostly present in the atmosphere. Hydrogen is a clean energy, but it has the downside of being difficult to manage. In other words, in order to use hydrogen, either very high pressure gas or cryogenic liquid hydrogen must be used, and currently the most economical method is to use ultra-high pressure gaseous hydrogen as energy.



Flow measurement principle and structure of Coriolis flowmeter

The mileage of a hydrogen car is proportional to the amount of fuel charged, and this can be done by charging high-pressure hydrogen into the vehicle storage tank. Conventional hydrogen charging pressure was less than 350 bar (35 MPa), but it is a global trend to charge the tank with more than 700 bar (70 MPa) for high mileage. In order to charge hydrogen at 700 bar, the charging pressure of the hydrogen dispenser is higher than 840 bar, which is supplied to the hydrogen vehicle.

Currently, foreign-made Coriolis flowmeters are installed at hydrogen filling stations. This means that when there is no flow in the U-shaped piping, the vibration waveform in the drive coil is detected as the same waveform by the displacement detector at the inlet and outlet. When the flow rate flows through the flow tube, the flow direction at the inlet and outlet changes 180 degrees, and the waveform of the displacement detector generates a phase difference due to the Coriolis effect. This technology converts this phase difference into flow rate.

The Coriolis flowmeter is the newest technology and has the advantage of being able to derive mass flow rate directly. Disadvantages are that periodic zero-point adjustment is required as it is greatly affected by vibration and stress of the pipe, long stabilization time causes a large charging error until safety boots, and the manufacturing method is very complicated, so the price is very expensive. In particular, since the rigidity of the pipe in the ultra-high pressure state is very high, the coefficient value corrected in the low pressure state is proportionately correct in the ultra-high pressure state, so there is a high possibility of flow rate error.

1. H2 FLOWMETER

The mass formula hydrogen flowmeter cannot follow the differential pressure mass formula

Korea is leading the hydrogen vehicle market as a part of the hydrogen economy, but if the amount of hydrogen charging is not accurately known, the reliability of the hydrogen vehicle as a whole will decrease. So, you need a mass flow meter that can know the exact amount of hydrogen charge.

The hydrogen flow meter of Golden Rule Co., Ltd. is a differential pressure type mass flow meter and does not require a separate flow computer. Instead of the existing temperature and pressure correction method, the flow function built-in method considering the compression coefficient, expansion coefficient, and viscosity coefficient provides users with density and enthalpy in addition to the flow rate value. These technologies were recognized as New Technology Certification (NET) by the Korean government in 2014.

The design of the hydrogen flow meter for the hydrogen filling station is designed through Golden Rule's DPP G1 program. The tightening mechanism is a venturi nozzle, the charging pressure is 84 MPa, the charging temperature is 15°C, the flow rate is 260 kg/h, and the charging density is 45.287 kg/m³. It's possible.

Pressure piping uses 20,000 psi, tube size 9/16", stainless 316 cold material cone and thread type nipple, so there is no leakage and durability is very strong.

Golden Rule's hydrogen flowmeter includes two pressure sensors and a temperature sensor. As the pressure sensor increases, the full scale error decreases, so it is possible to measure the flow rate more accurately than any other existing sensor in the ultra-high pressure condition of 70 MPa or more. do. The two pressure sensors have an automatic zero-point adjustment function, so high accuracy can be maintained in any installation environment. Our hydrogen flowmeter has passed the explosion-proof (Ex d IIC T6) test and the protection grade (IP 67) test, and it is a product that has completed the 100 MPa pressure test and flow rate test through an authorized institution.

Hydrogen flow meter, now you have to trust and use it. Currently, the maximum permissible error (MPE) of the hydrogen flowmeter is suggested as 5%. This is because the error increases due to high-pressure charging and the technical requirements for metering accuracy of the existing OIML R 139 cannot be applied. In Europe, 2, 3, 5% is being selectively determined. Ultimately, in Europe, since these errors cannot be improved, a new calibration method is proposed, "Let's define it as an applicable error."

Currently, the hydrogen market is a blue ocean. The high value-added flowmeter, which has been monopolized in developed countries such as Europe and the United States, should now be converted to the hydrogen flowmeter of Golden Rule Co., Ltd. in Korea. It is necessary to rapidly expand infrastructure, lead the global market with domestic technology, expand the market through product standardization, and create high value-added flowmeters.

Hydrogen Mass Flowmeter



APPLICATIONS

Compressed Hydrogen

FEATURES

Accuracy : ± 1.0 % Rate

Measurement : Mass/Volume/Energy flowrate, Total flow

Control : Mass/Volume/Energy flowrate, Pressure

Display : Digital 2-line LCD backlight

Anti-explosion : CE ATEX, KCs

Operation : Remote controller



SPECIFICATIONS

Fluid	Hydrogen
Filling pressure	840 bar
Network	RS-485 communication
Connection	Cone & Thread Tubing
Signal output	4 to 20 mA, 2-wire, Pulse
Power supply	12 to 30 V DC
Display	kg, kg/h
Certificate	Ex d IIC T6, IP67
Sensor type	Digital DP sensor, RTD, Absolute pressure sensor
Response time	Typically <0.1s
Design pressure	Up to 1000 bar
Design flowrate	260 kg/h
Housing material	Aluminum, ALDC 12.1
Piping material	STS316
Display installation	Gas(upward)



Golden Rules

• GOLDEN RULES

www.goldenrules.co.kr

Gas, Steam, Liquid, Oil

Mass Flowmeter

Specialized manufacturer

Distributor

Certified in accordance with

 (주)골든룰