ABLE INSTRUMENTS & CONTROLS

RHEONIK

ENERGY SOURCES OF THE FUTURE

RHEONIK HYDROGEN & CARBON MEASUREMENT SOLUTIONS

RHEONIK.

THERE ARE SEVERAL WAYS TO MEASURE HYDROGEN. THEN THERE'S RHEONIK

- Most experience among all manufacturers in H_2 flow metering
- Largest installed base globally
- Widest product range with flows from 1 g/min
- Custody transfer accuracy
- Liquid and gas measurement
- Intrinsically safe sensor suitable for Zone 0
- Certified to MID MI-002, OIML R 137-1&2:2012 & CS OIML R139
- Cryo-Hydrogen as liquid and Hydrogen as gas
- Pressures up to 1722 bar / 24976 PSI, Temperature from -200°C to +400°C
- Stationary and mobile installations
- Latest Electronics Design with Assurance Factor®

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WHY RHEONIK CORIOLIS MASS FLOW METERS?

At a temperature of -56.6 °C (-68,88 °F), carbon dioxide gas changes to a liquid state. Hydrogen, on the other hand, changes at a temperature of -252.9 °C (-423,22 °F). Rheonik Coriolis mass flow meters can reliably and accurately measure both liquid and gas states, making them a valuable addition to H_2 and CO_2 processes.

Hydrogen fuelled vehicles have become a common sight in areas where investment has been made in the "hydrogen highway" to establish filling stations and fuel supply to support such vehicles on the road. America, Canada, Japan, China and many European countries have already invested large sums of money to establish a basic network of hydrogen stations supporting fuel cell cars. With many fuel cell vehicles from several manufacturers already on the road and with many more to come, the hydrogen highway will continue to expand, providing the capacity needed to keep them running.

__Rheonik__ is a pioneer in the __hydrogen fuel cell revolution__. From the very outset, __Rheonik__ has worked with all of the major hydrogen suppliers to produce flow meters that are both __accurate__ and can __handle the extremely high pressures__ associated with hydrogen distribution and dispensing.

The implementation of clean fuel technologies such as that found in hydrogen fuel cell vehicles is an increasing priority for many countries as concerns about global warming and its effect on the planet continue. Rheonik are proud of their contribution to the industry and will continue a programme of improvement to provide even better solutions and performance to support these important global warming reduction initiatives.

Hydrogen is transferred to storage and into fuel cell vehicles at very high pressures, high velocities and at varying temperatures. The provision of a flow meter to measure under these conditions is not trivial as it must be both accurate, reliable and usable for end user point-of-sale billing. Rheonik Coriolis mass flow meters have proven to be, and continue to be, the most reliable meters for H_2 measurement available.

ABLE Instruments & Controls Ltd are **Rheonik's exclusive representative** for sales and service in the UK and Ireland

Industries with high carbon emissions, such as cement, steel or energy generation from waste storage

Fossil or biomass-fuelled production and power stations

CO_2 CO_2 CH_4

CO_2

Carbon storage

Steam reforming plant for hydrogen production from natural gas

CO_2

CO_2 CO_2 CO_2

Reuse of captured carbon as an input or feedback for the production of products in industrial biotechnology, building materials, food and beverage production or chemical and mineralization industries

Carbon transportation

CO_2 CO_2 CO_2 CO_2 CO_2

CCS / EOR
Permanently storing CO_2 in underground geological formations, onshore or offshore

● **Rheonik Coriolis Flow Meter Installation**

*Use of **Rheonik** products in **hydrogen** and **carbon processes***

Wind and **solar** energy for green hydrogen

Nuclear plant for pink hydrogen

Electrolysis plant for hydrogen production

H_2

CH_4 $CH_4 + H_2$

Natural gas with up to 10% **injected hydrogen**

H_2

H_2

H_2

H_2

Distribution of hydrogen

Hydrogen for **energy-intensive production**, e.g. steel mills, cement plants, etc

Hydrogen **storage**

H_2

H_2

H_2

H_2

Hydrogen **dispenser**

Overseas **transportation** of hydrogen

H_2

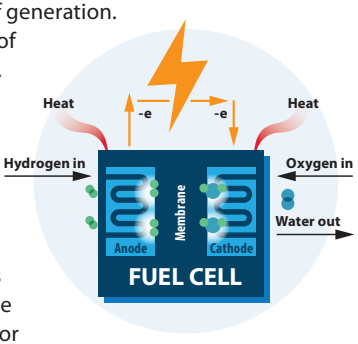
H_2

Refuelling of light and heavy duty hydrogen-powered **vehicles** for a sustainable transport revolution

HIGHLY ACCURATE MASS FLOW METERS FOR THE MOST EFFICIENT USE OF HYDROGEN

H_2 DISTRIBUTION

While a few filling stations have a pipeline supplying them with Hydrogen 24/7, most do not and it falls to trucks equipped with high pressure tube trailers to deliver Hydrogen to local storage at filling stations from the point of generation. The same applies for the delivery of Hydrogen to industrial customers. In order to control and account for the amount of gas being delivered, each truck is equipped with a flow meter that totalizes the amount of each gas transfer.



Rheonik Coriolis mass flow meters are fitted to tube trailers to provide records of all gas either loaded to or unloaded from the trailer. Rheonik meters are rugged and can stand up to the rigours of road transport and their compact size makes them the very best option when installing in side enclosures and housings, a real challenge for other meters that are bulky and large. Transmitters are operated directly from the truck 12Vdc battery supply, removing the need for additional power supply converters or external sources. Transmitters can also be tamper-proof, sealed against unauthorized change of configuration and settings to protect the integrity of the measurement at all times.

For more information regarding the Rheonik Coriolis meters, please email **info@able.co.uk**

HYDROGEN FILLING STATIONS

Hydrogen fuel dispensers have been installed at many gas stations around the world alongside the familiar gasoline and diesel fuel dispensers to support the growing fleet of H_2 fuel cell automobiles and trucks. Refuelling of trains and ships is also increasing. The heart of a hydrogen dispenser is the flow meter and for consumer purchases of H_2, the meter must be able to be approved by local weights and measures authorities. Since hydrogen is sold in units of mass, Rheonik Coriolis meters are ideal for this application because they primarily measure in mass and have exceedingly high measurement accuracy. Procedures developed using certified scales to qualify Coriolis meters for use in the sale of H_2 brings safeguards to consumers that they are getting the amount of H_2 they are paying for. Local authorities witness such tests and apply point-of-sale seals just as they would to a liquid fuel dispenser. Coriolis meters are ideal for the service as they read primarily in mass and have a large measurement turndown capability. In this challenging measurement application, cars are refuelled with pressures of up to 700 bar and trucks and buses with up to 350 bar at a temperature of -40 °C

*Any **Rheonik mass flow** transmitter model can be combined with any **Rheonik mass flow sensor** to provide a complete mass flow measurement system to meet any requirement. The **wide range of sensors and transmitters** provides copious options for system designers and end users alike.*

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The vast majority of hydrogen dispensers worldwide are equipped with Rheonik Coriolis flow meters. Manufacturers of hydrogen dispensers for automobiles and other forms of transportation are confident that a Rheonik meter will provide the performance and reliability that they, their customers, and the public that purchase hydrogen, both need and demand.

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Registered Address
ABLE Instruments & Controls Ltd
Cutbush Park, Danehill, Lower Earley,
Reading, Berkshire, RG6 4UT. UK.

Reading
Tel: +44 (0)118 9311188 | Email: info@able.co.uk

Web
able.co.uk

E-commerce
247able.com