Hydrogénies, les trophées de l'hydrogène 2024

Candidat **20_liquid_level_sensor** **27/05/2024**

3-Prix de la Mobilité ferrée ou aéronautique ou maritime/fluviale **7-Prix de la décarbonation de l'industrie**

Date d'enregistrement de l'utilisateur ou utilisatrice : 28 mai 2024
Title of the project : Development of a liquid level sensor for LH2
DESCRIPTION OF THE PROJECT : The development of high-precision level sensors will enable accurate liquid volume control in tanks and other containers.
CATEGORIES : Rail, Aeronautic, Maritime or Fluvial Transport Prize,Industry Decarbonisation Prize
Scope of budget (EN) : 14 080 000 JPY (= 88 000€ env.)
Name of funding organisation : Kobe city
Date of financing (EN) : 12 October 2022.
Date/ period of implementation (EN) : Sales start in March 2024.
Name of company : Yamamoto Electric Works Co., Ltd.
Commercial register number and city : 1400-01-018031, Kobe.
Adress Street : 1-2-3, Nishishiriike-cho, Nagata-ku,
Postal code : 653-0031
City & Country : Kobe, JAPAN
Name and position of general director : Hirokazu Yamamoto, President.
Telephone number : 0081-78-631-6000
Name and position of person to contact concerning the candidacy : Yuta Sekiguchi, Sales Department Chief.
E-mail address : y.sekiguchi@manostar.co.jp
Mobile number : 0081-78-631-6000
Raison sociale des différentes entités partenaires du projet : Kawasaki Heavy Industries, Ltd. IHI AEROSPACE Co., Ltd. Kobe University. Tokyo University of Agriculture and Technology. National Institute for Materials Science.
Description : Liquefied hydrogen can store energy at a higher density than compressed hydrogen gas and is expected to expand the range of movement of vehicles, aircraft, railways and ships. Therefore, it is necessary to accurately control the amount of liquid hydrogen, and we have developed this level sensor. This level sensor, which specializes in liquefied hydrogen, is the result of a completed innovation, which was greatly advanced by a grant from the City of Kobe, learning superconductivity technology from NIMS and ultra-low temperature technology from Kobe University, and integrating sensor circuit technology developed through the development of existing products.
Innovative character : Good accuracy (±1%F.S.). Good response time (≤100ms). The minimum measuring wire and cable size is 0.3 mm (ø 0.3 mm), which allows for miniaturization. The system can be freely shaped, e.g. to be installed alongside tank walls. The simple measurement method eliminates the need for complex signal processing. The possibility of disconnection is infinitely low unless an excessive external force is applied.
Technological solutions or new uses proposed : Currently, few level sensors are suitable for measuring liquid levels where the liquid level moves violently. Our level sensor, on the other hand, can detect rapid liquid level changes in real time. They can also accurately control the liquid level, thereby increasing the efficiency and safety of the fuel supply. In addition, it has an incredibly long lifespan for the following reasons : The level sensor is constructed from metals that have a small difference in expansion due to temperature. The temperature of the wire material does not rise too high during use. Metals that do not react chemically with hydrogen are used. etc. So, it is impossible to break a wire in use.
What are the elements you feel make your project deserve a prize? : The 4 SUPER (superconductive, Super-high precision, Super-long lifespan and Super-lightweight) will greatly advance the mobility revolution! Liquefied hydrogen has a small distribution volume and few experimental facilities. We have been working on this development together with Professor Minoru Takeda of Kobe University. This is the only level sensor in the world that can measure the liquid level of liquefied hydrogen linearly and accurately. If it becomes available for use in automobiles, it will be widely used and lower costs can be achieved. It is also suitable for mobility tanks due to its lightweight. We are therefore confident that the use of liquefied hydrogen will increase!
Document attaché : 20_liquid_level_sensor

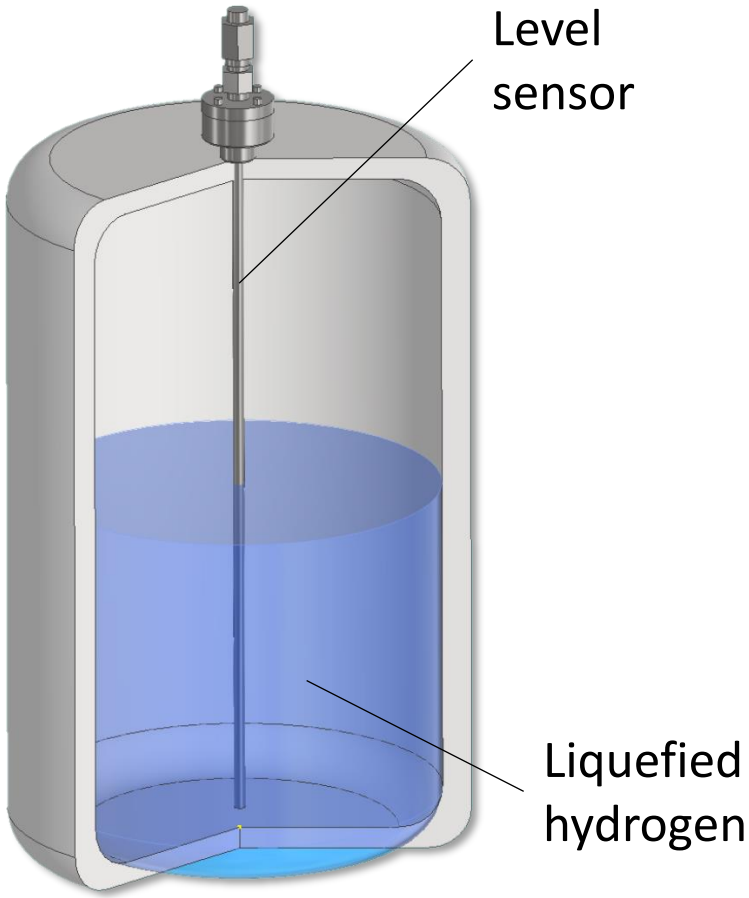
The only level sensor for mobility

Superconducting level sensor for liquefied hydrogen

株式会社山本電機製作所
YAMAMOTO ELECTRIC WORKS CO.,LTD. JAPAN

4 SUPER

will start a mobility revolution!



Installation image

▸Super-conductive

Use of wire (MgB_2)
that become superconducting at -253℃.

▸Super-high precision

Accuracy of ±1% F.S.
Good responsiveness (≤ 100 ms)

▸Super-long lifespan

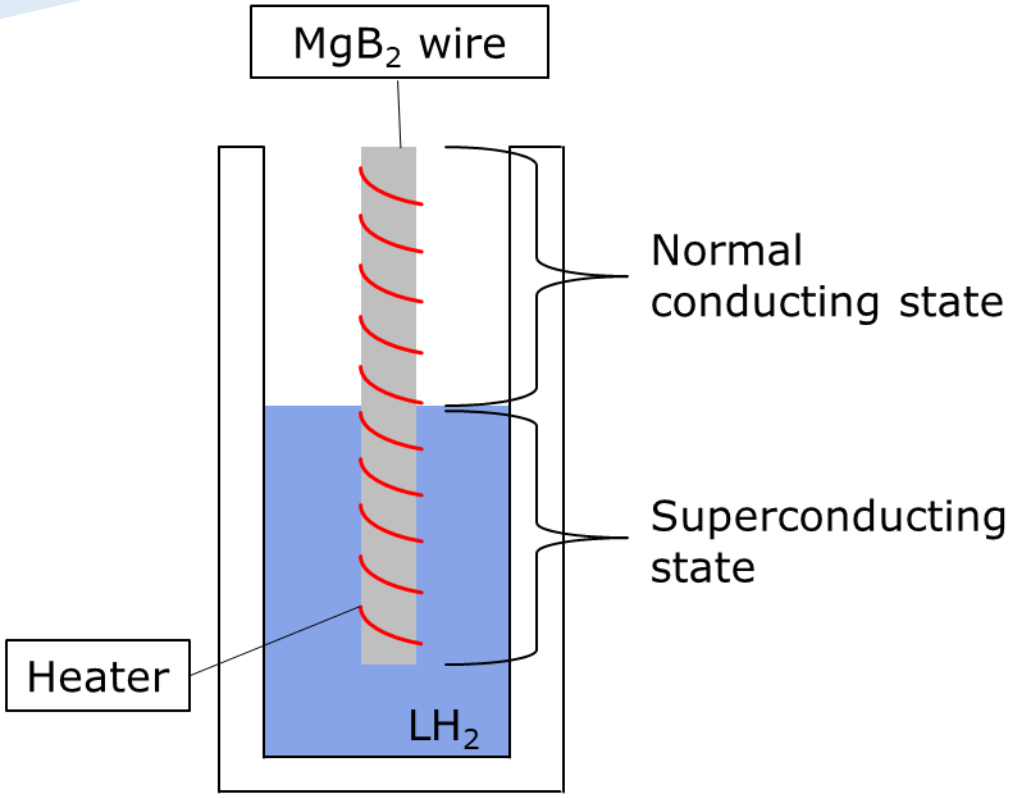
There are few disconnections in use.
Maintenance free.

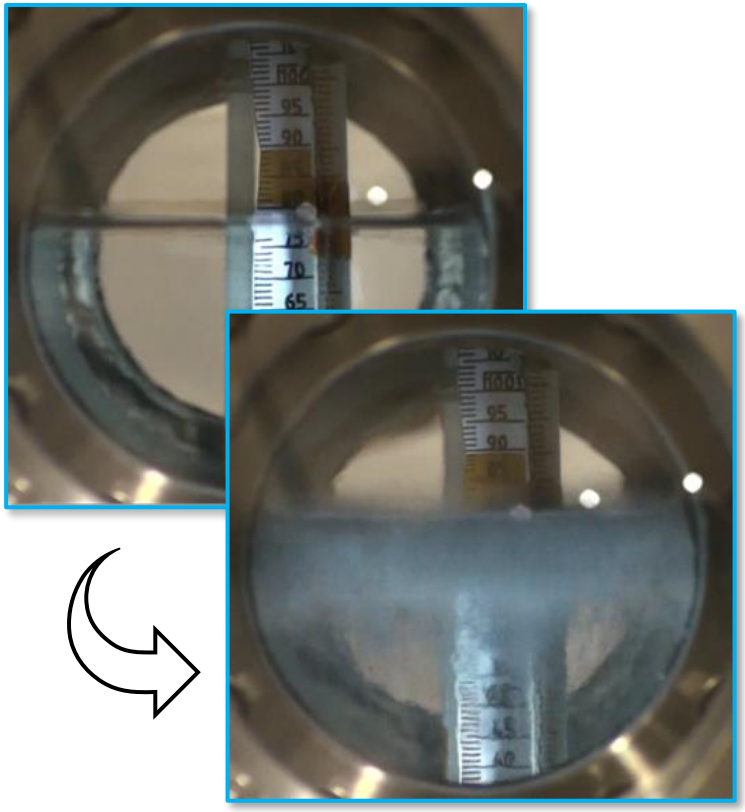
▸Super-lightweight

Measurement is possible with
a minimum of 0.3 mm dia. wire.

The measurement principle is very simple.

➡The overall resistance varies with the height of the liquid level.
This enables level measurement.
No need for complex signal processing.

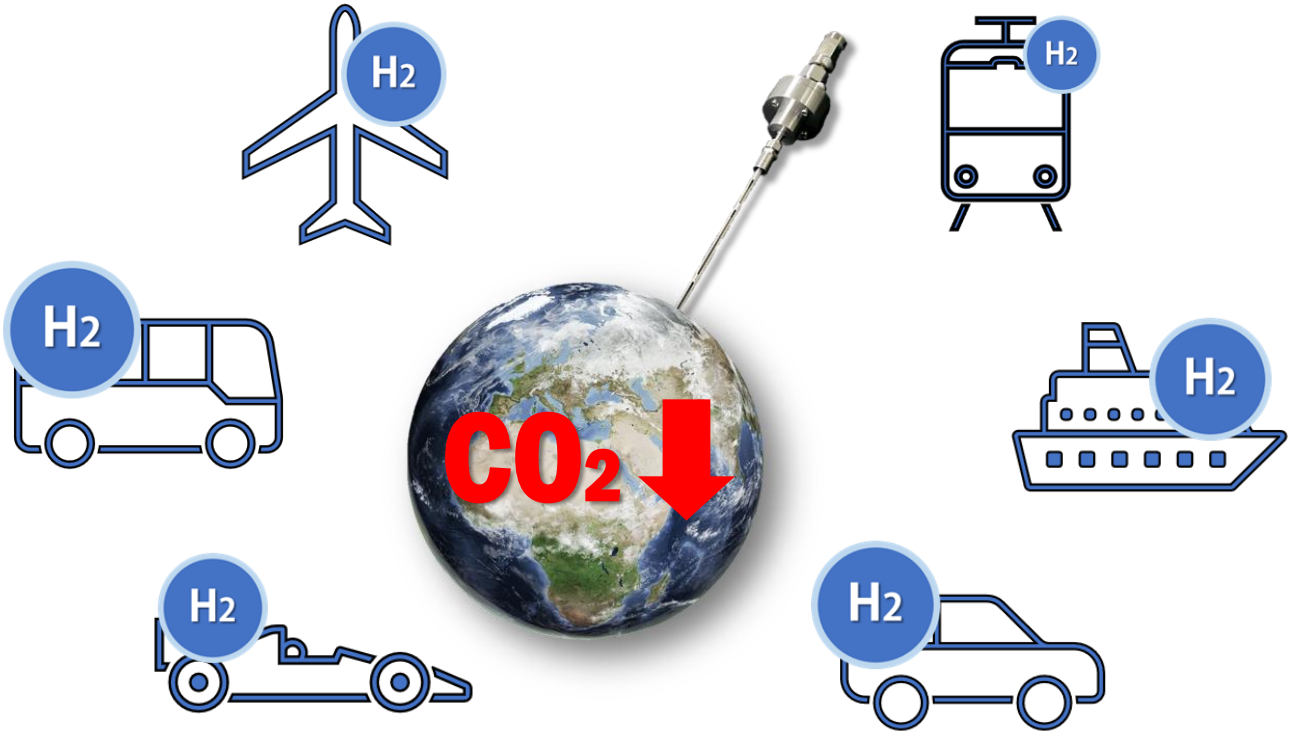




Real-time detection of any change in liquid level.
Accurate liquid level control also ensures efficient and safe fuel supply.

Its use in various mobility tanks will accelerate the use of liquid hydrogen.

The only level sensor in the world that can accurately measure the liquid hydrogen level height linearly is made **by Yamamoto Electric Works.**



Can make a significant contribution to reducing CO2 emissions.