

CONFIDENTIAL

SPECIFICATIONS

Product Name : Hydrogen Sensor Module

Model No. : FH2-HY11-HC

Nissha FIS, Inc.

3-36-3, Kitazono, Itami, Hyogo, Japan

Approve	Check	Create
		7. Aug. 2018

Product Specification	Nissha FIS, Inc.
Product name: Hydrogen Sensor Module Model number: FH2-HY11-HC	Specification No. U-1808-01-HC

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Product name: Hydrogen Sensor Module Model number: FH2-HY11-HC	Specification No. U-1808-01-HC

2. SCOPE

This specification applies to hydrogen sensor module “FH2-HY11-HC”.

3. PRODUCT NAME AND MODEL NUMBER

Product name : Hydrogen Sensor Module

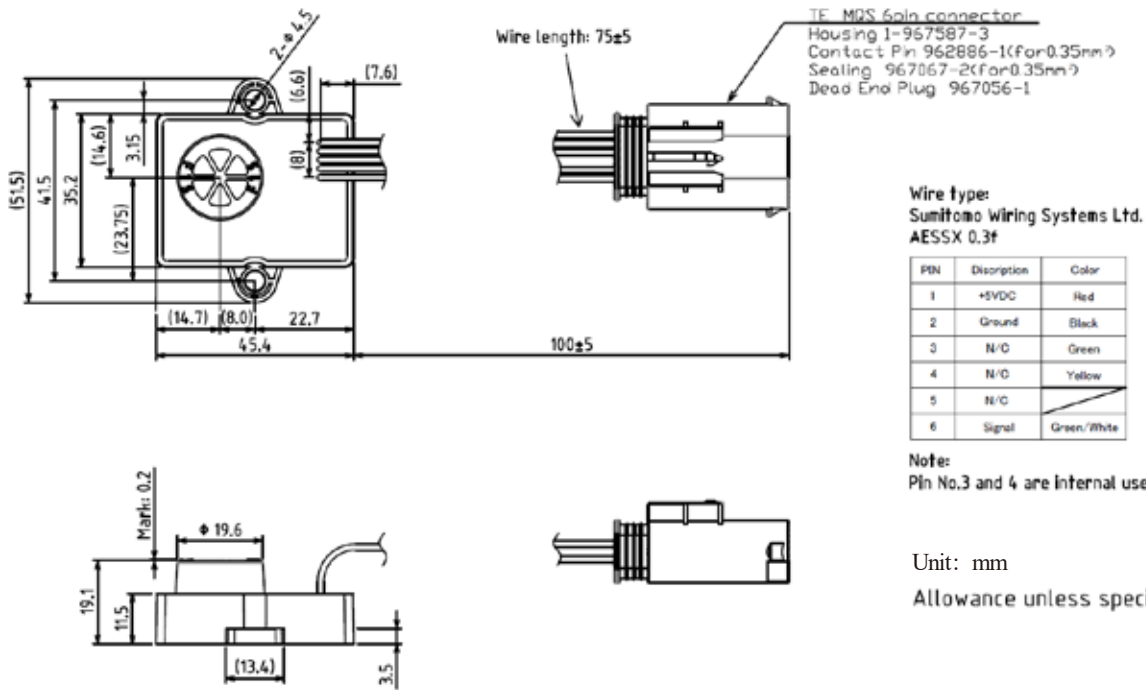
Model No. : FH2-HY11-PP

4. PRODUCT SPECIFICATION

4-1. Product overview and use

This product is a hydrogen sensor module, with the purpose of detecting leakages of hydrogen in the atmosphere and is able to detect concentrations below the Lower Explosion Limit (LEL) of hydrogen (4 vol.%).

4-2. Product appearance and dimensions



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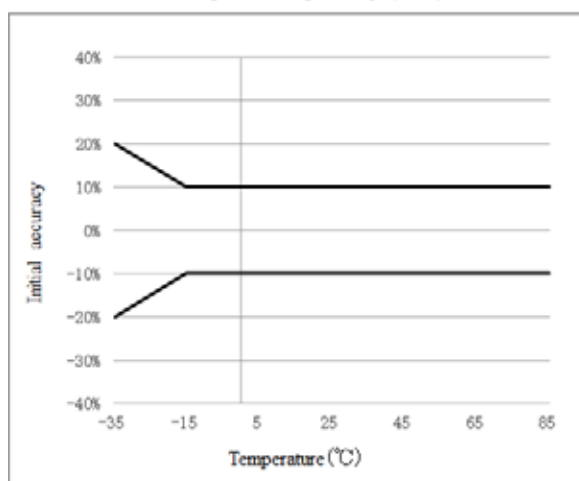
4.3. Product specification

Item	Specification
Detection method	Catalytic combustion
Detection gas	Hydrogen
Detection range	0.1 to 4 vol.% (40,000 ppm)
Initial detection accuracy	±10 % (Over 10,000 ppm at room temperature) For temperature dependency, see below
Start-up time	< 1 second
Response speed	< 3 seconds (T90)
Recovery time	< 10 seconds
Gas selectivity	CO, Methane, Propane, Ethanol (Refer to APPENDIX A)
Mounting orientation	Install with the gas detection (membrane filter) side facing down.
Supply voltage	5V ± 0.25V DC
Power consumption	Approx. under 250 mW (steady state)
Condenser capacity	10µF
Output impedance	100Ω
Operating temperature	-35°C to 85°C (no condensation)
Storage temperature	-40°C to 85°C (no condensation)
Output signal	Analog output 0.5V to 4.5V DC proportional to hydrogen gas concentration (Refer to 4-4) Refer to Note) shown as below about details of error output
Dimensions	Refer to 4-2.
Weight	Approx. 36 g
Standards	EN 61326-1:2013 EN 61000-4-2:2009 Level 4 EN 61000-4-3:2006+A1:2008+A2:2010 20V/m(27MHz to 1GHz) EN 55011:2009/A1:2010 IEC 60079-29-1:2016

Note) Error output: The analog output is below 0.2 V in situations such as ① to ⑥.

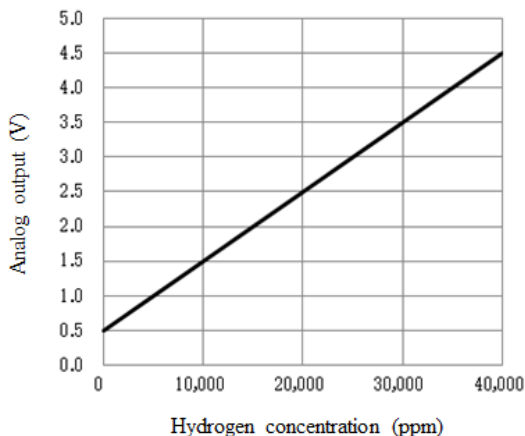
- ① Sensor (platinum wire) is broken
- ② Abnormal sensor output
- ③ Faulty thermistor
- ④ Faulty microcomputer
- ⑤ Defective microcomputer (calibration data has been reset or cannot be read)
- ⑥ Output affected by some other faulty part.

Temperature dependency (Initial)



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4.4. Output format



Concentration conversion :

$$\text{Hydrogen gas concentration (ppm)} = \text{Analog output (V)} - 0.5 \times 10,000$$

SHIPMENT INSPECTION AND CERTIFICATE OF INSPECTION

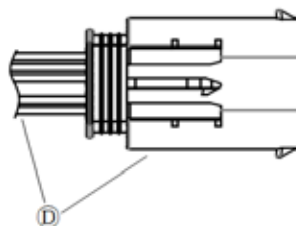
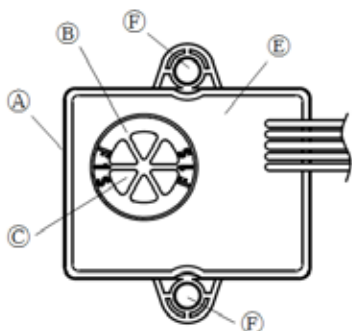
Shipment inspections are conducted as described in the table below. Ten of the results are recorded in a certificate of inspection (separate sheet) and submitted.

※If a single shipment involves less than 10 detectors, the results for all will be recorded.

※Responsiveness is tested on one module per shipping lot.

Inspection item	Method	Shipment criteria	Inspection criteria (after conversion to concentration)
Output in Air	Gas sensitivity test	0.40 to 0.60 V	< 1,000 ppm
Output in 10,000 ppm H ₂	Gas sensitivity test	1.40 to 1.60 V	10,000 ppm ± 10 %
Output in 20,000 ppm H ₂	Gas sensitivity test	2.30 to 2.70 V	20,000 ppm ± 10 %
Output in 38,000 ppm H ₂	Gas sensitivity test	3.92 to 4.50 V	38,000 ppm ± 10 %

5. PART NAMES AND MATERIALS



	Item	Description
(A)	Case	PBT (Glass fiber 30%)
(B)	Sensor cover	
(C)	Membrane filter	PTFE
(D)	Connector and Wires	Connector: 1-967587-3 (TE) Wire: AES SX 0.3f (Sumitomo Wiring Systems Ltd.)
(E)	Potting resins	Urethane resin
(F)	Fixtures	For M4 screw and bullets washer

Connector specification

Pin No.	Description	Wire color
1	+5V DC	Red
2	GND	Black
3	N.C.	Green
4	N.C.	Yellow
5	N.C.	
6	Signal	Green/White

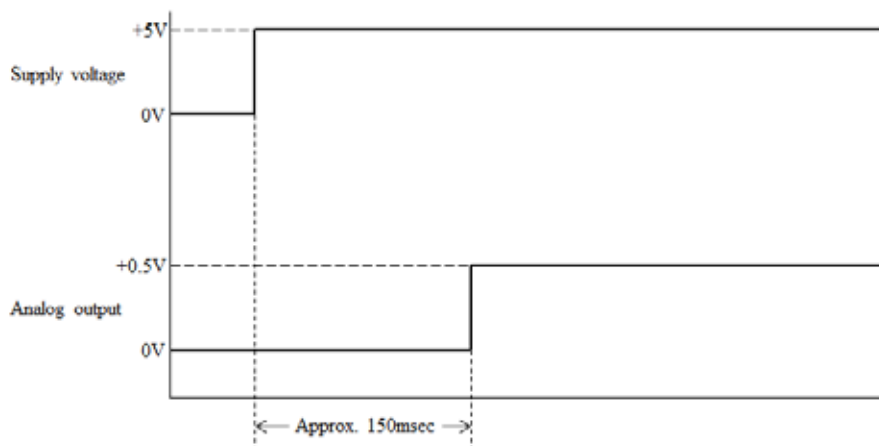
Note:

Pin No.3 and 4 are internal use only at Nissha FIS, Inc.

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6. START-UP CHARACTERISTICS

At start-up, the analog output shows 0 V for approximately 150 msec (defective output) before displaying the correct output reflecting the surroundings. (0.5 V in Air, as seen in diagram below)



7. PACKING SPECIFICATION

- ※Each module is placed in a Techbarrier and heat sealed.
- ※The modules will be packed with cushioning material in a cardboard box appropriate to the quantity of shipment.

8. PRECAUTIONS

- 1) Do not drop from a height or apply a strong shock to the module. The accuracy of detection may be affected.
- 2) Do not apply any sharp objects to the membrane filter. If the filter is broken the waterproof quality will be lost and will cause errors in detection.
- 3) Do not cover, paint or stick anything on the membrane. The ability to detect gas will be affected.
- 4) Do not apply any high-pressured air or liquid directly to the membrane. If the filter is broken the waterproof quality will be lost and will cause errors in detection.
- 5) Install with the gas detection side facing down.
- 6) Do not install the module on a curved surface which may cause the case to deform. This could result in the waterproof quality being lost.
- 7) Do not expose the module to ambient temperatures higher than 85°C. This may result in the case deforming and losing the waterproof functionality.
- 8) Do not connect terminal pin no. 2 to the GRD. Turning the power ON/OFF while connected to the GND may result in errors of the calibration data and a decrease in detection accuracy.
- 9) Do not expose the module to higher concentrations of gas than the Lower Explosion Limit (LEL), or silicone compounds and solvent gases. The accuracy of detection may be affected.
- 10) Do not spray any agents (hair spray, insect repellent) on the module.
- 11) Install the module at room temperature.

9. HANDLING OF SPECIFICATION DOCUMENT

- 1) This specification shall be exchanged between “ ” and Nissha FIS, Inc.
- 2) Other contents than specified in this specification shall be decided through mutual consultation between both parties.
- 3) All or a part of this specification shall not be disclosed to any third parties without advance consent of the other party. The above mentioned third party excludes agent.

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10. REVISION HISTORY

Version	Revision date	Contents of revision	Implemented by	Approved by
1	7. Aug. 2018	Created	Hiroki Yamamoto	Takashi Matsumoto
2				
3				
4				