

## NTM SenseH<sub>2</sub>™ Hydrogen Sensor Key Technical Specifications



### Features

- High sensitivity and selectivity to hydrogen
- Fast response and recovery times
- Immune to signal saturation
- Robust to widely varying ambient flow rates
- Compact and rugged design
- 1.0 to 4.5V output, spans 0.25 to 4.0% H<sub>2</sub> in air (5 to 100% LFL)
- UL Classified, ATEX, CE for hazardous locations

### ➤ Overview

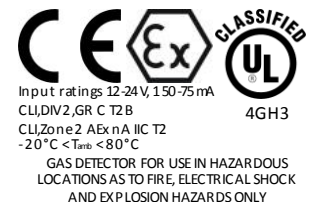
Designed for hydrogen monitoring, this ceramic sensor exhibits a highly sensitive, selective, and rapid response to the presence of hydrogen in ambient air. It reliably measures H<sub>2</sub> concentrations over a wide range of temperature and humidity variation and provides a repeatable response, even in the presence of other combustible gases. Additionally, the NTM SenseH<sub>2</sub>™ hydrogen sensor is immune to signal saturation upon continuous exposure to low levels of hydrogen, and recovers rapidly and completely upon hydrogen removal.

### ➤ System Components

**Sensor:** The sensor element employs a patent-pending, chemi-resistive ceramic technology, which provides accurate and reliable hydrogen detection.

**Electronics package:** The sensor provides a simple interface with a ratio-metric voltage output (1 to 4.5 VDC; 500mV increments), calibrated to detect up to 4% H<sub>2</sub> in air (100% of the LFL). Diagnostic states (< 1V, >4.5V) are provided to indicate error conditions. Microprocessor-based heater control ensures stable operation, in temperatures ranging from -20 to 80 C. The compact, rugged design and waterproof connector enable use of the NTM SenseH<sub>2</sub>™ hydrogen sensor in a range of application conditions. Mating connectors can be purchased separately for ease of installation.

**WARNING:** The NTM SenseH<sub>2</sub>™ hydrogen sensor is not a stand alone safety device and does not provide protection from hydrogen explosion. The 1 to 4.5 V output signal, quantifying the hydrogen concentration in air, is intended to be an input to customer safety system, enabling audible alarms, system shutdown, ventilation, or other measures to ensure safe handling and use of hydrogen gas.



## Disclaimer

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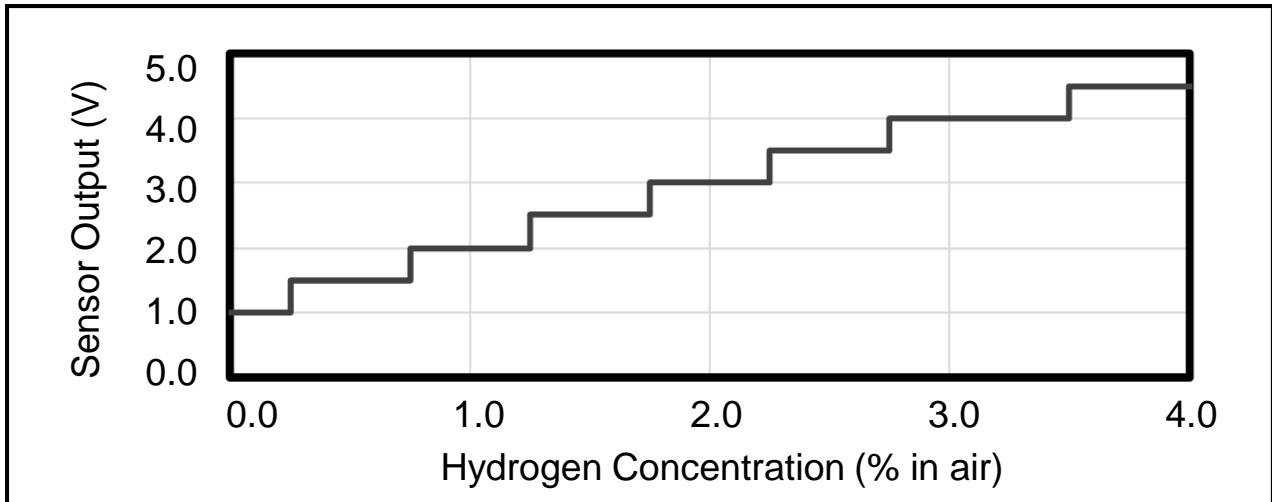
In the case of a defect in the sensor, NTM Sensors shall not be liable for any damages which may result, including, but not limited to, loss of revenue, property, or life. In any event, NTM Sensors shall limit liability to replacement of the defective unit. NTM Sensors does not convey any license under its patent rights nor the rights of others.



➤ **Table of Typical Characteristics:**

Metric	Min	Max	Units
<b>Characteristics:</b>			
H <sub>2</sub> range (in air)	0.25	4.0	%
Voltage input	12	24	Vdc
Output (sensing range)	1.0	4.5	Vdc
Error state (output signal)	0.0	0.75	Vdc
Error state (output signal)	4.75	5.00	Vdc
Power consumption (25 C)	0.10	0.15	A
Response time (T90)	—	5	Sec.
Recovery time (T10)	—	5	Sec.
<b>Environmental Conditions:</b>			
Ambient temperature	-20	80	C
Relative humidity	5	95	%R.H.
<b>Hazardous Location Approvals:</b>	UL Class I, Div 2, GR C, T2B ATEX Class I, Zone 2 AEx nA IIC, T2   		

➤ **Typical Calibration:**



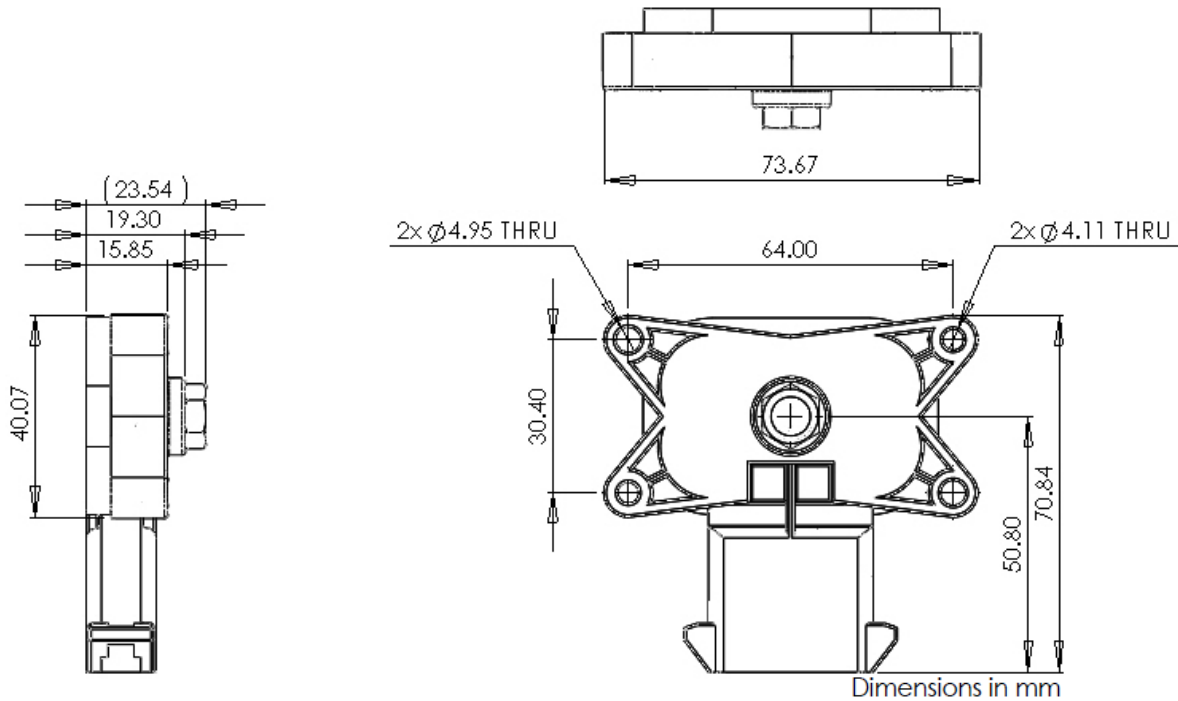
➤ **Intended Uses:**

- The NTM SenseH<sub>2</sub>™ is intended for use as a hydrogen gas detector in the range of 0.25 to 4% hydrogen in air.
- Typical applications include: Stationary fuel cells, Fuel cell powered forklift trucks, Hydrogen refueling stations, Hydrogen generation (electrolyzer) systems, On-site fuel reforming systems, Uninterruptible power supply (UPS) systems monitoring, Telecom systems monitoring, or Laboratory monitoring.

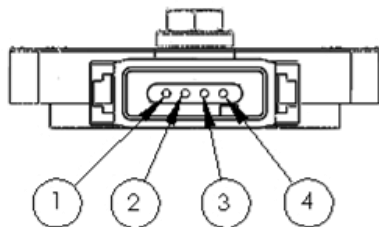
**Installation Instructions:**

- This device is required to be installed in accordance with Control Drawing No. 241900.
- Proper installation of the device makes operation suitable for use in Class I, Division 2, Groups A, B, C and D hazardous locations (ATEX CLI, Zone 2 AEx nA IIC T2), or nonhazardous locations only.
- **WARNING – Explosion Hazard –** Substitution of any component may impair suitability for Class I, Division 2.
- Connector wiring should be shielded and grounded in the installation.

**Sensor Dimensions:**



**Wire Pin-Out:**



Wire Pin Out

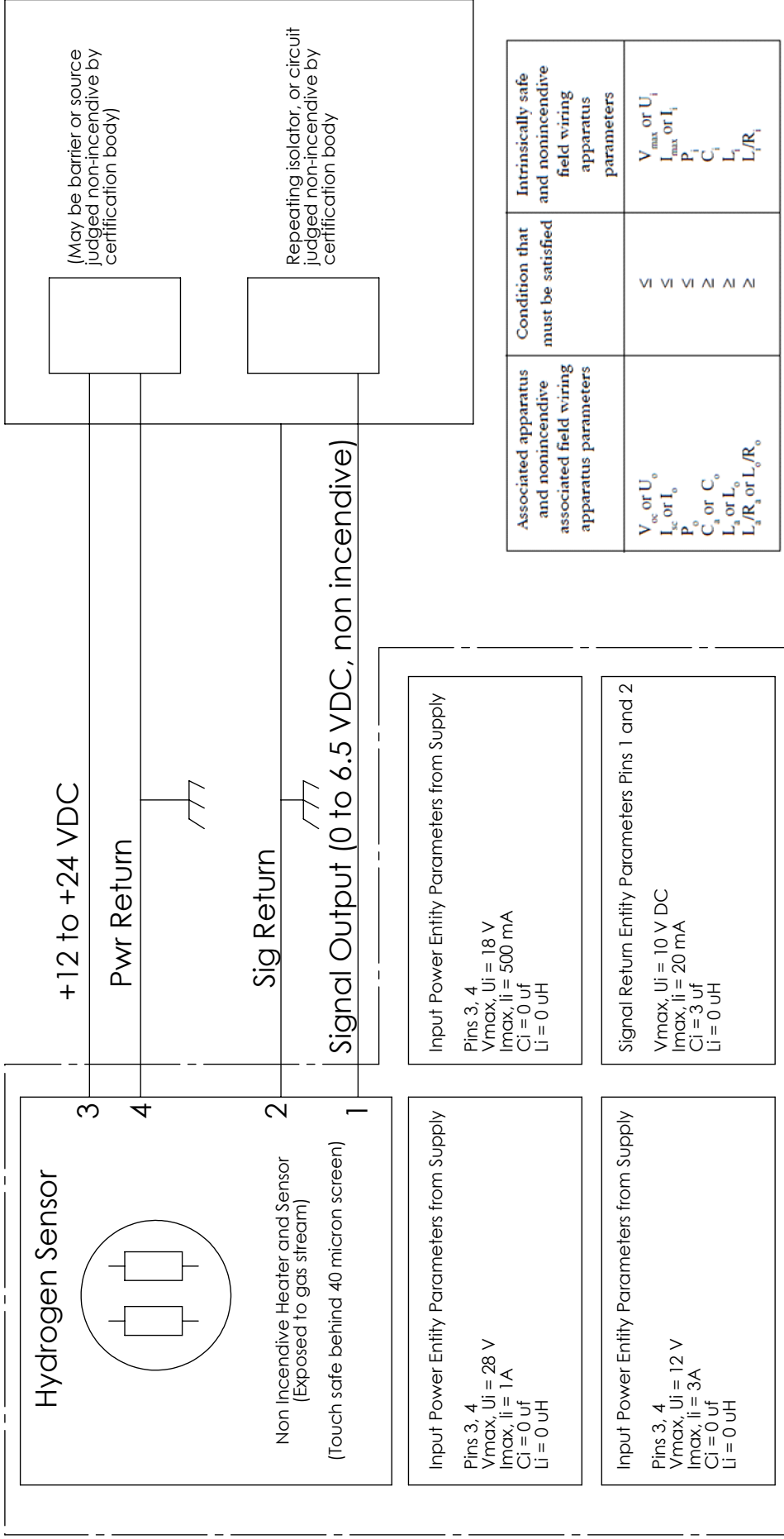
Pin	Symbol	Function	Wire color
1	SIG+	Output Signal (+)	Blue
2	SIG-	Output Signal Ground	Black
3	PWR-	Input Power Ground	Black
4	PWR+	Input Power (+)	Red

### ➔ Operation Guidelines:

- Exposure to 100% hydrogen and other reducing conditions can damage the sensor and will invalidate the warranty. The sensor should be revalidated if exposed to these conditions and replaced if damaged. The NTM SenseH<sub>2</sub>™ has an error state (4.75V output signal) to indicate that the sensor has been exposed to high levels of hydrogen. When the device enters this state the sensor element will go into hibernate mode to attempt to protect the element from permanent damage. During this time the output signal will remain at 4.75V. This state can be reset by cycling the input power to the device.
- The sensor is calibrated for hydrogen detection in air. Use in oxygen concentrations other than air (21% O<sub>2</sub>) can result in inaccurate output.
- The NTM SenseH<sub>2</sub>™ has been designed to be resistant to silicones; however, exposure to silicone-containing products such as sealants, hoses, and caulking compounds including those commonly found in environmental test chambers should be minimized, particularly if the compounds are uncured (wet). Even fully cured silicone products may continue to off-gas silicone vapors, particularly at elevated temperatures. Exposures to such vapors may make the NTM SenseH<sub>2</sub>™ hydrogen sensor more sensitive to hydrogen over time, causing it to over-report the actual hydrogen concentration.
- Hydrogen has a low molecular weight and is very buoyant. To ensure detection of hydrogen, the sensor must be mounted above the source of the potential hydrogen leak.
- The sensor should be mounted with the sensing element facing the source of the potential hydrogen leak.
- The sensor should be mounted in a position to minimize exposure to liquids and particulate matter that may obstruct diffusion of hydrogen gas to the active sensing component.
- 12 inch wiring harness with mating connector, Deutsch DTLP06-4S, is available for purchase.
- NTM Sensors has established a documented test protocol for validating the functionality of its NTM SenseH<sub>2</sub>™, provided upon request. Please contact NTM Sensors Engineering.

**Hazardous (Classified) Location**  
 Class I, Division 2, Group B  
 Class I, Zone 2

**Unclassified (Safe) Location**  
 Non Incendive Power Source  
 (May also be in hazardous location if  
 marked suitable for Div/Zone 2)



**Notes:**

1. Non Incendive Wiring Practices must be in accordance with NFPA 70 or National and Local Codes of Authority Having Jurisdiction.
2. Field Wiring must be rated at least 5 deg C higher than ambient temperature at installation site.
3. Sensor may be installed inside instrumentation system certified for Class I, Division 2 or Zone 2 location (Identified by dotted lines).
4. This drawing may not be altered without notice to the Certification Body.
5. A power source judged non incendive by the Certification Body requires a 3 ampere maximum fuse.
6. Power return and signal return are connected internally in Sensor, only one wire is required.

NAME	DATE	COMMENTS:
DRAWN CIS	08/26/11	
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		

TITLE:  
 NTM SenseH2 Control Drawing  
 DWG. NO. 241900



SIZE	CHANGE REASON	REV
<b>A</b>	Rev. Date: 08/26/11	<b>A</b>

SCALE: 1:1 WEIGHT: g SHEET 1 OF 1