



# Applied Nanotech, Inc.

A subsidiary of APPLIED NANOTECH HOLDINGS, INC.

3006 LONGHORN BLVD., SUITE 107 AUSTIN, TX 78758  
PHONE (512) 339-5020 ♦ FAX (512) 339-5021 ♦ WEBSITE: WWW.APPLIEDNANOTECH.NET

## MNPS-B Hydrogen Sensor

### Specifications

- Sensitive material: Pd nanoparticles
- Operating temperature\*: -30°C to 110°C
- Storage temperature: -60°C to 80°C
- Humidity: 0 to 95%
- Package: TO-5/TO-8
- Typical resistance: 1.5 kΩ
- Sensor power\*: ~1W
- Operation Range: 0 ppm – 10,000 ppm
- Lowest detection limit: 10 ppm
- Response time (T90): 4 sec at 1% H<sub>2</sub>
- Accuracy: ±30% of H<sub>2</sub> reading
- Repeatability: ±30% of H<sub>2</sub> reading
- Part # (sensor head): MNPSB-TO5
- Part # (sensor head): MNPSB-TO8

\*Using an integrated thermo electric cooler (TEC)

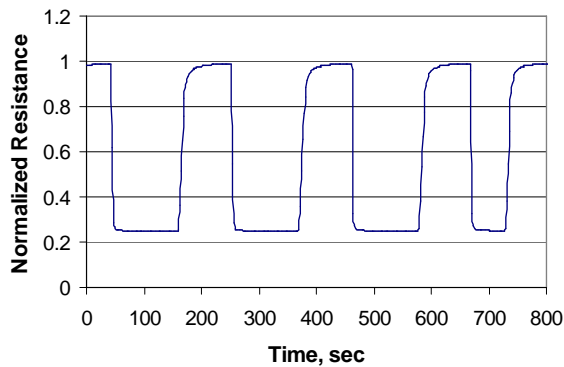
### Operating Principle

- Pd based nanoparticles undergo phase transition and expand in the presence of hydrogen.
- The resistivity of the sensor decreases with exposure to hydrogen.
- Temperature of the sensor is kept constant by an integrated TEC.
- Air or gaseous mixture containing O<sub>2</sub> is required

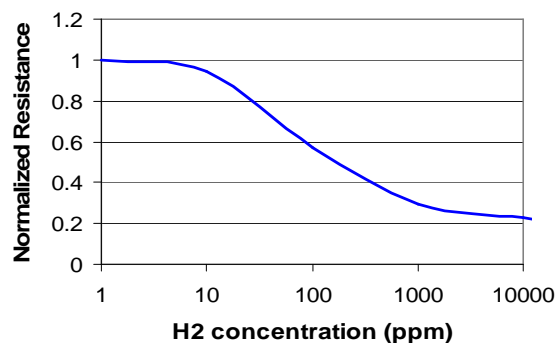
### Features

- Nano-sized palladium particles allow measurements with high sensitivity
- Low cost in volume
- Convenient electronic packages
- High selectivity to hydrogen
- Calibrated for operating in air environment
- Membrane for operation in liquid

### Response of MNPSB sensor to 1% H<sub>2</sub>

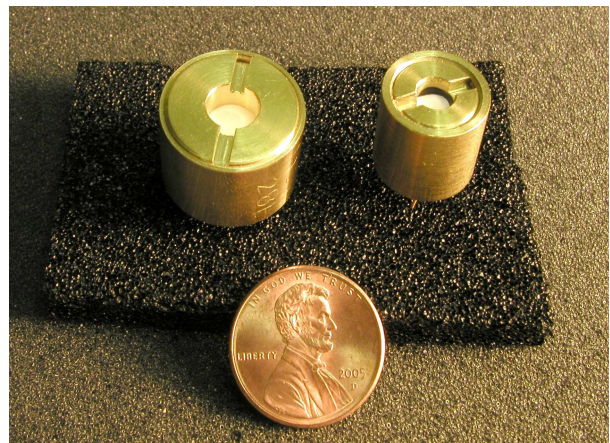


### Typical calibration plot for MNPSB sensor



### Applications

- Fuel cells
- Hydrogen storage and transportation
- Automotive
- Back-up power systems
- Portable gas detectors and monitors
- Power transformers
- Custom applications



TO-8 (left) and TO-5 (right) packages

Rev A 04/09

IN USA AND EUROPE

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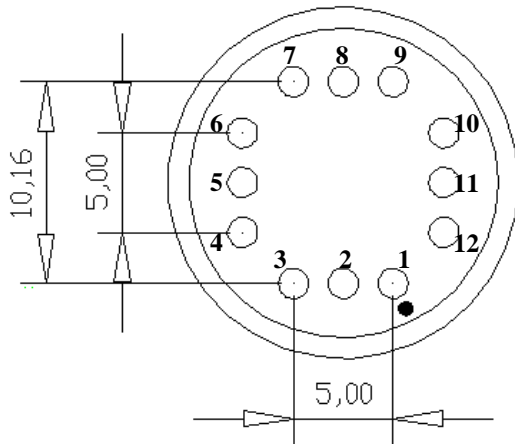


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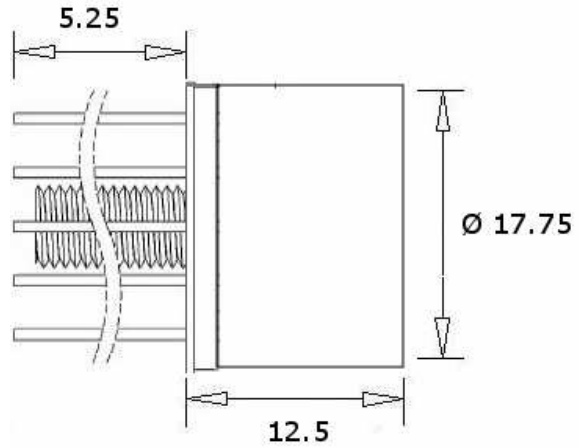
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**Sensor Head (Bottom view)**



**TO-8 (12 Pin) Header**

**Sensor Head (Side view)**

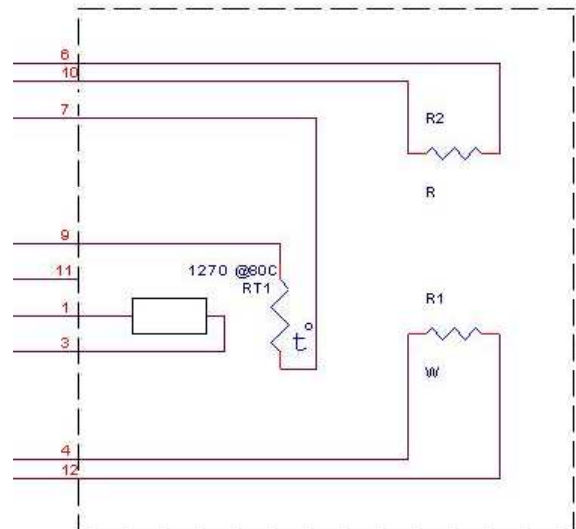


All units are in mm

**Sensor Head (Pin assignment)**

Pin #	Description
1,3	+/- Thermoelectric Cooler PWR
4,12	+/- Working Sensor Resistance
6,10	+/- Reference Sensor Resistance
7,9	+/- Thermistor Resistance

**Sensor Head (Electronic layout)**



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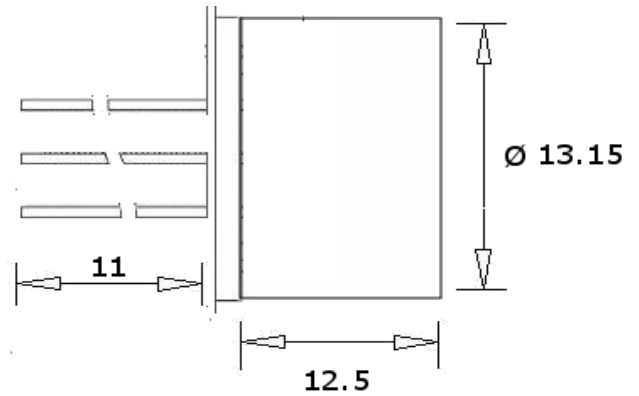
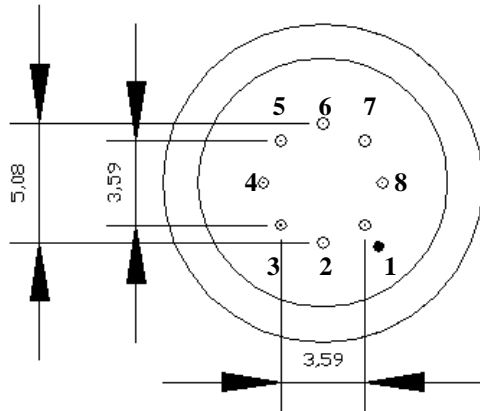
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**Sensor Head (Bottom view)**

**Sensor Head (Side view)**

All units are in mm

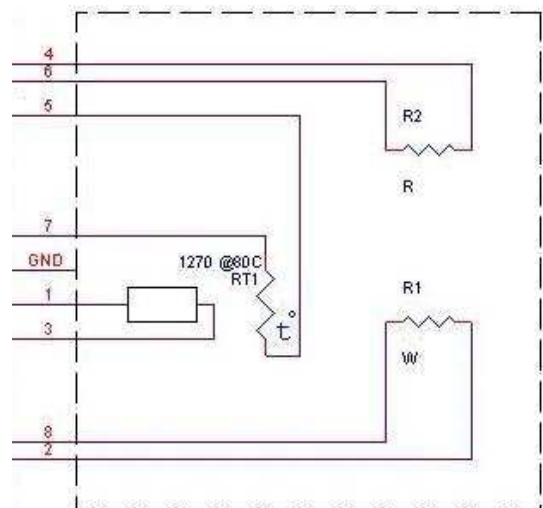


**TO-5 (8 Pin) Header**

**Sensor Head (Pin assignment)**

**Sensor Head (Electronic layout)**

Pin #	Description
1,3	+/- Thermoelectric Cooler PWR
8,2	+/- Working Sensor Resistance
4,6	+/- Reference Sensor Resistance
7,5	+/- Thermistor Resistance



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