

# HLD SERIES

007090  
Issue 2

## Hydrogen Leak Detection Sensor

### DESCRIPTION

The Hydrogen Leak Detector (HLD) Sensor uses the Honeywell advanced compensation algorithm to detect Hydrogen leaks in different applications. Designed with precision and reliability in mind, the HLD Sensor employs cutting-edge Thermal Conductivity Detection (TCD) technology to deliver lasting performance for many applications that require a highly accurate solution without manual intervention for ten years. Its advanced detection capabilities ensure the identification of hydrogen leakage of 50 ppm or greater. Honeywell HLD Sensors can be utilized in many industries, such as automotive, industrial safety equipment, and residential power generators.

The incorporation of TCD technology in the HLD sensor offers several key advantages over catalytic beads. These benefits include greater accuracy, extended sensor lifespan, and enhanced resistance to chemical poisoning. With these advantages, the HLD sensor gives users the confidence that both lives and assets are well-protected.

### CUSTOMIZATION

The HLD Sensor may be customized to meet application needs, such as lightweight applications and having auxiliary output. Solutions may be tailored to exact specifications for improved time to market, lower total system costs, and enhanced reliability. For technical assistance, we provide global engineering and service support for your needs.

### OPERATING MODES

The sensor functions in the following operating mode:

- **Continuous measurements:** When the equipment is keyed on, the H<sub>2</sub> leak detector is run in Continuous Mode. Hydrogen content in the surrounding air is reported to the system controller in 100 ms intervals

### APPLICATIONS

The HLD sensor is typically adjacent to the hydrogen storage tank, hydrogen gas piping, fuel cell, or vehicle cabin.

The following are examples of Hydrogen applications:

- Hydrogen-powered heavy-duty trucks
- Hydrogen-powered buses
- Hydrogen-power generators
- Hydrogen-powered automobiles
- Hydrogen-powered construction equipment
- Hydrogen-powered aircraft

### VALUE TO CUSTOMERS

- **Accurate:** Designed for precise H<sub>2</sub> measurements to improve safety, allowing enhanced protection of assets and life
- **Reliable:** TCD technology usage enables the customer to reduce downtime by eliminating false positives
- **Packaging:** The IP67 seal allows the use of HLD even in numerous applications



### FEATURES

- High accuracy
- CAN communication protocol (available) and voltage reading output (coming soon)
- Thermal conductivity base sense element
- Fast response time: <2 seconds
- Short startup time: <1 second
- Hydrogen sensing range: 0 % to 4 %
- Operating temperature range: -40°C to 85°C [-40°F to 185°F]
- 50 H<sub>2</sub> ppm resolution to detect low levels of H<sub>2</sub> leakage
- Resistant to chemical poisoning

### DIFFERENTIATION

- **Accuracy:** Temperature, pressure, and humidity are compensated to deliver accuracy over the specified operation range
- **Core Technology:** TCD technology offers superior performance and is reliable in detecting hydrogen gas, even at low concentrations
- **Integration:** The HLD Sensor is designed to provide output using different methods, such as CAN J1939

Contact your Honeywell representative if you are interested in additional output methods.

### PORTFOLIO

The HLD Series joins the New Energy Sensor Suite. To view the entire product portfolio, [click here](#).

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## HLD SERIES

**TABLE 1. GENERAL SPECIFICATIONS**

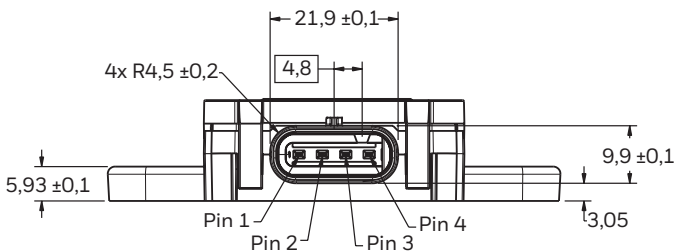
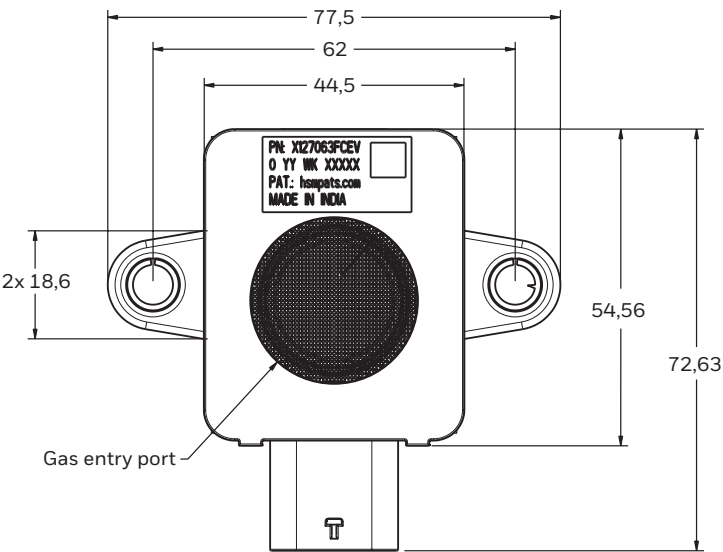
| Characteristic               | Parameter                                           | Unit               | Note                                                                |
|------------------------------|-----------------------------------------------------|--------------------|---------------------------------------------------------------------|
| Voltage                      | 8 to 36                                             | Vdc                |                                                                     |
| Current                      | 16 mA at 12 Vdc typ.<br>8 mA at 24 Vdc typ.         | mA                 | measure 12 V                                                        |
| Sensed media                 | 0 to 40,000                                         | H <sub>2</sub> PPM |                                                                     |
| Accuracy                     | ±10 %                                               | -40°C to 65°C      | Initial, over all environmental conditions (see Figure 4)           |
| In-rush current              | 100                                                 | mA                 | 16 V supply                                                         |
| Humidity operating range     | 10 to 90                                            | % RH               |                                                                     |
| Atmospheric pressure         | 80 to 110                                           | KPa                |                                                                     |
| Cross sensitivity            | He, CO <sub>2</sub>                                 |                    | Levels above 1 % of CO <sub>2</sub> .<br>0.04 % is the normal range |
| Response time                | <2                                                  | Second             |                                                                     |
| Start up time                | <1                                                  | Second             |                                                                     |
| Sensor outputs               | H <sub>2</sub> ppm, temperature, humidity, pressure | ppm, °C, RH%, Bar  |                                                                     |
| <b>CAN</b>                   |                                                     |                    |                                                                     |
| Protocol                     | SAE J1939 CAN 2.0B                                  |                    |                                                                     |
| CAN short circuit protection | Yes                                                 |                    |                                                                     |
| Bus rate                     | 250                                                 | kBaud              |                                                                     |
| Update rate                  | 100 msecond                                         |                    |                                                                     |
| <b>Environmental</b>         |                                                     |                    |                                                                     |
| Operating temperature        | -40 to 85                                           | °C                 |                                                                     |
| Storage temperature          | -40 to 105                                          | °C                 |                                                                     |
| Humidity                     | 10 %RH to 90 %RH                                    | % RH               |                                                                     |
| Thermal shock                | -40°C to 85°C / 200 cycles                          | IEC 60068-2-14     |                                                                     |
| Random vibration             | 13.3 m/s <sup>2</sup> rms                           | IEC 60068-2-64     | 20 hours per axis                                                   |
| Mechanical shock             | 500 m/s <sup>2</sup>                                | IEC 60068-2-27     |                                                                     |
| Drop test                    | 1 m to concrete                                     | ISO 16750-3        |                                                                     |
| Chemical compatibility       | Typical automotive fluids                           | SAE J3089          |                                                                     |
| Ingress protection           | IP67                                                | ISO 20653          |                                                                     |
| RoHS                         | yes                                                 |                    |                                                                     |
| REACH                        | yes                                                 |                    |                                                                     |
| ASIL                         | QM                                                  |                    |                                                                     |

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|---------------------------------|---------------------------------|---------------|-----------------|
| Parameter                       | Value                           | Specification |                 |
| EMC                             |                                 |               |                 |
| Radiated immunity               | 200 MHz to 1 GHz                | ISO 11452-2   | 150 V/m         |
| Radiated immunity               | 1 GHz to 6 GHz                  | ISO 11452-2   | 100 V/m         |
| Conducted immunity              | 1 MHz to 400 MHz                | ISO 11452-4   | 200 mA          |
| Stripline immunity              | 10 kHz to 400 MHz               | ISO 11452-4   | 200 V/m         |
| Radiated emission               | Meet CISPR 25                   | ISO 13766     | Class 3         |
| Conducted emission              | Meet CISPR 25                   | ISO 7637-2    | Class 3         |
| ESD direct discharge            | ± 8 KV                          | ISO 10605     |                 |
| ESD air discharge               | ± 25 KV                         | ISO 10605     |                 |
| General                         |                                 |               |                 |
| Connector                       | Integral US CAR 120-S-004-I-Z02 |               | Keying option A |
| Mounting                        | M6 GRADE 8.8 BOLT (x2)          |               | 8 ±2 N*m torque |
| Weight                          | 50                              |               | grams           |
| Size (L × W × H)                | 72.63 × 77.50 × 17,38           |               | mm              |
| Housing/Cover Material          | Valox 420SEO 30% GF             |               |                 |

Figure 1. Product Dimensions (mm)

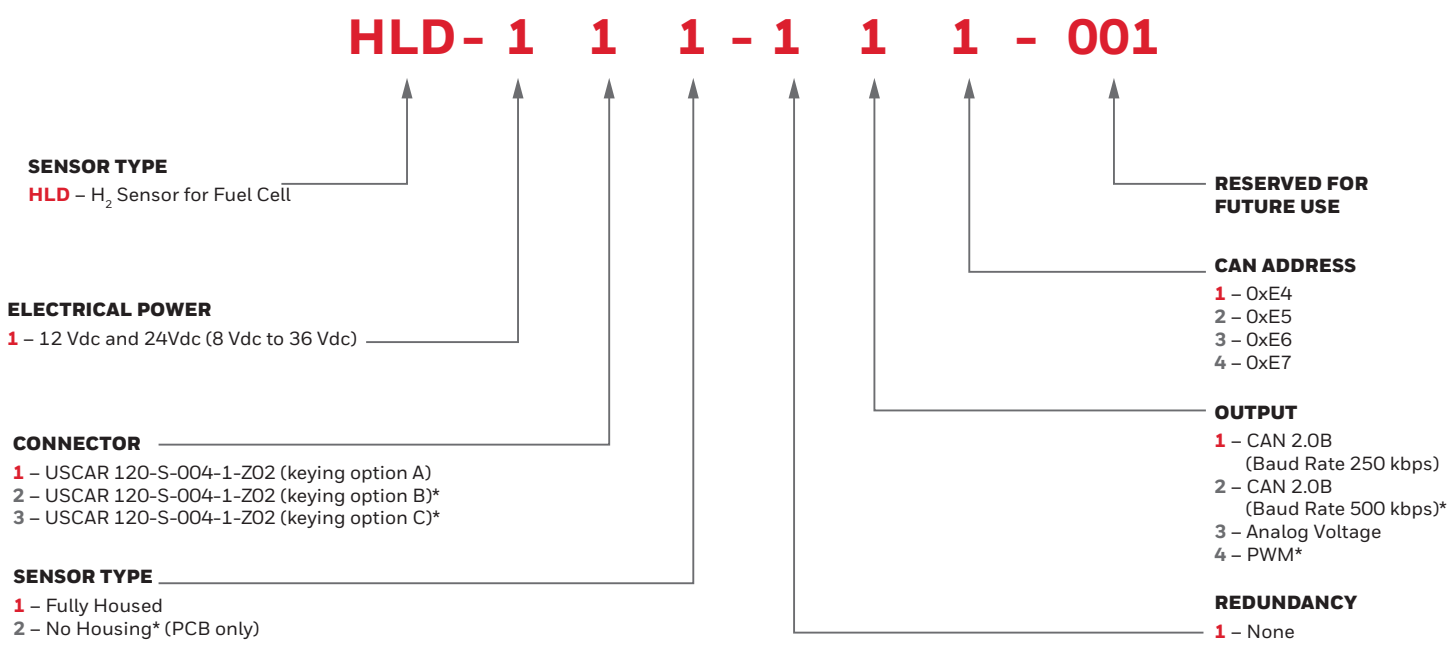


| TABLE 2. PIN OUT |             |
|------------------|-------------|
| Pin              | Description |
| 1                | Power input |
| 2                | Ground      |
| 3                | CAN H       |
| 4                | CAN L       |

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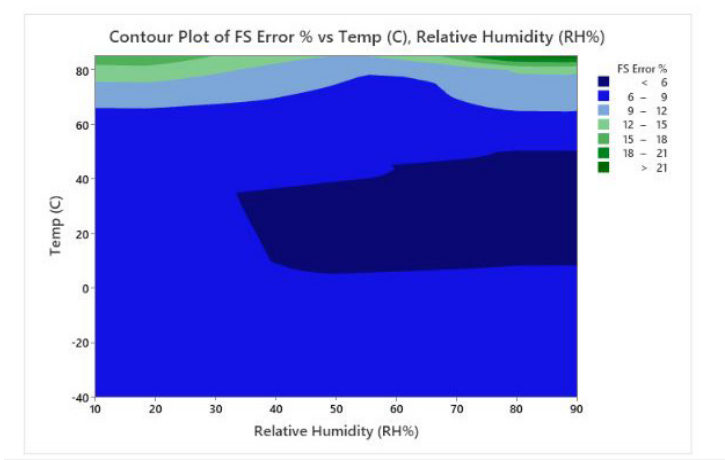
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Figure 3. Nomenclature/Order Guide



\* Please contact your Honeywell representative if you are interested in HLD product configuration marked with (\*)

Figure 4. State Diagram



The contour plot graphs the H<sub>2</sub> sensor accuracy (as a percentage of the sensor’s Full-Scale Range) as a function of Application Temperature and Humidity.

- -The operational limits for Temperature is -40°C to 85°C
- -The operational limits for Relative Humidity is 10 % to 90 %
- -The “Full Scale” range of the H<sub>2</sub> sensor is 0 to 4 % H<sub>2</sub> (0 to 40,000 ppm)

# HYDROGEN LEAK DETECTION SENSOR

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**TABLE 3. EMC TEST SPECIFICATIONS**

| Test                                      | Standard      | Procedure                                                                      |
|-------------------------------------------|---------------|--------------------------------------------------------------------------------|
| CISPR 25 Conducted RF Emissions - Voltage | CISPR25       | According to CISPR 25:2008 Commission Form of Testing                          |
| CISPR 25 Conducted RF Emissions -Current  | CISPR25       | According to CISPR 25:2008 Commission Form of Testing                          |
| CISPR 25 Radiated Emissions               | CISPR25       | According to CISPR 25:2008 Commission Form of Testing                          |
| Bulk Current Injection (BCI) Test         | ISO 11452-4   | According to ISO 11452-4                                                       |
| RF Radiated Immunity - ALSE               | IEC 61000-4-3 | According to ISO IEC 61000-4-3                                                 |
| Electrostatic Discharge                   | ISO 10605     | Powered-up direct contact discharge: ±8 kV<br>Powered-up air discharge: ±25 kV |
| Fast Transients Burst Immunity Test       | IEC 61000-4-4 | 2 kV Power port, 1 kV signal port                                              |
| Conducted/Coupled Immunity                | ISO 11452-4   | According to ISO 11452-4, test CCC and ICC                                     |

**TABLE 4. ELECTRICAL TEST SPECIFICATIONS**

| Test                               | Standard          | Procedure                                                                                                  |
|------------------------------------|-------------------|------------------------------------------------------------------------------------------------------------|
| Electrical – Long Term Overvoltage | ISO16750-2- 4.3.1 | 65°C Test Temperature, 36 V input for 60 minutes                                                           |
| Electrical –Transient Overvoltage  | ISO16750-2- 4.3.2 | 36 V for 400 ms                                                                                            |
| Electrical –Ripple Voltage         | ISO16750-2- 4.4   | 1 V (10 minute dwell), 2 V, (2 minute dwells) Pk to Pk Ripple superimposed on 24 V supply, 15 Hz to 30 KHz |
| Electrical –Reverse Polarity       | ISO16750-2- 4.7   | Apply 26 V (24 V systems) for 60 seconds                                                                   |
| Electrical – Short Circuit         | ISO16750-2- 4.10  | 24 Vdc short to signal lines for 60 seconds                                                                |
| Insulation Resistance Test         | ISO16750-2-4.12   | 500 Vdc ±10 Vdc for 60 s; Resistance criteria: ≥10 MOhm                                                    |

**TABLE 5. ENVIRONMENTAL TEST SPECIFICATIONS**

| Test                            | Standard               | Procedure                                                                                                                                                                                                                                         |
|---------------------------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| High Temperature Operating Test | IEC 60068-2-2          | 600 hours, 85°C. Performance test before and after test from -40°C to 85°C                                                                                                                                                                        |
| Thermal Cycle Test              | IEC60068-2-14          | 150 cycles, one cycle contains -40°C (15 minute soak) & 85°C (15 minute soak). Transition time = 25 minutes. Performance test before and after test at ambient                                                                                    |
| Vibration                       | IEC60068-2-64          | 13.3 m/s <sup>2</sup> rms, 10 Hz to 500 Hz, 20 hour/axis, 3 axes. 25°C Performance test before and after at ambient temperature                                                                                                                   |
| Mechanical Shock                | IEC 60068-2-27         | Half sine pulse, 500 m*s <sup>2</sup> , 6 ms duration<br>Performance test before and after test at ambient                                                                                                                                        |
| Handling Drop                   | ISO 16750-3            | 1st fall of each DUT at a different dimensional axis, 2nd fall with the given DUT at the same dimensional axis but on the opposite side of the housing, from 1 m on concrete floor. Performance test before and after test at ambient temperature |
| Humidity/Frost Cycle            | Mil-Std-202 Method 106 | 504 hour, 21 Cycle, -10°C, 25°C, 65°C Temperatures with Humidity (no vibration). Performance test before and after test at ambient temperature                                                                                                    |

## WARNING

### PERSONAL INJURY

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

**Failure to comply with these instructions could result in death or serious injury.**

## WARNING

### MISUSE OF DOCUMENTATION

- The information presented in this product sheet is for reference only. Do not use this document as a product installation guide.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

**Failure to comply with these instructions could result in death or serious injury.**

## WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship during the applicable warranty period. The Honeywell standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgment or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items that Honeywell, in its sole discretion, finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

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Specifications may change without notice. The information we supply is believed to be accurate as of this writing. However, Honeywell assumes no responsibility for its use.

## For more information

Honeywell Sensing Solutions services its customers through a worldwide network of sales offices and distributors. For application assistance, current specifications, pricing, or the nearest Authorized Distributor, visit [our website](#) or call:

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