HLD SERIES

Hydrogen Leak Detection Sensor

007090
Issue 2

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_2 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_2 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_2 ppm resolution to detect low levels of H_2 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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TABLE 1. GENERAL SPECIFICATIONS

Characteristic	Parameter	Unit	Note
Voltage	8 to 36	Vdc	
Current	16 mA at 12 Vdc typ. 8 mA at 24 Vdc typ.	mA	measure 12 V
Sensed media	0 to 40,000	H_2 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_2		Levels above 1 % of CO_2. 0.04 % is the normal range
Response time	<2	Second	
Start up time	<1	Second	
Sensor outputs	H_2 ppm, temperature, humidity, pressure	ppm, °C,RH%, Bar	
CAN			
Protocol	SAE J1939 CAN 2.0B		
CAN short circuit protection	Yes		
Bus rate	250	kBaud	
Update rate	100 msecond		
Environmental			
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^2 rms	IEC 60068-2-64	20 hours per axis
Mechanical shock	500 m/s^2	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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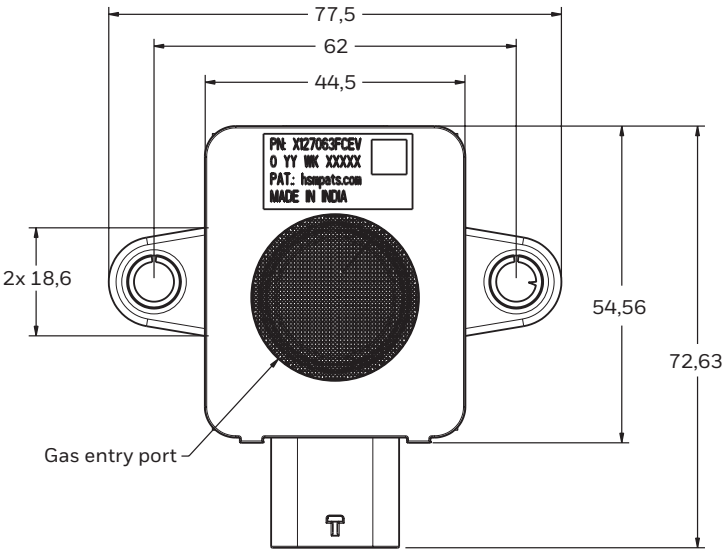
TABLE 1. GENERAL SPECIFICATIONS			
Parameter	**Value**	**Specification**	
EMC			
Radiated immunity	200 MHz to 1 GHz	ISO 11452-2	150 V/m
Radiated immunity	1 GHz to 6 GHz	ISO 11452-2	100 V/m
Conducted immunity	1 MHz to 400 MHz	ISO 11452-4	200 mA
Stripline immunity	10 kHz to 400 MHz	ISO 11452-4	200 V/m
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 420SE0 30% GF		

Figure 1. Product Dimensions (mm)



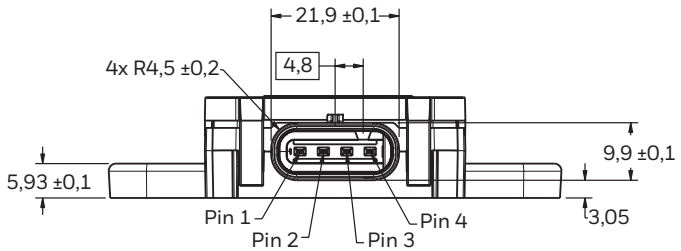


TABLE 2. PIN OUT	
Pin	**Description**
1	Power input
2	Ground
3	CAN H
4	CAN L

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Figure 3. Nomenclature/Order Guide

HLD - 1 1 1 - 1 1 1 - 001

SENSOR TYPE
HLD – H_2 Sensor for Fuel Cell

ELECTRICAL POWER
1 – 12 Vdc and 24Vdc (8 Vdc to 36 Vdc)

CONNECTOR
1 – USCAR 120-S-004-1-Z02 (keying option A)
2 – USCAR 120-S-004-1-Z02 (keying option B)*
3 – USCAR 120-S-004-1-Z02 (keying option C)*

SENSOR TYPE
1 – Fully Housed
2 – No Housing* (PCB only)

RESERVED FOR FUTURE USE

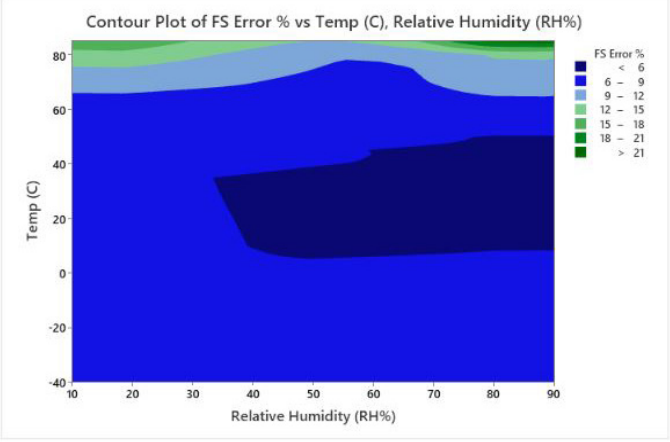
CAN ADDRESS
1 – 0xE4
2 – 0xE5
3 – 0xE6
4 – 0xE7

OUTPUT
1 – CAN 2.0B (Baud Rate 250 kbps)
2 – CAN 2.0B (Baud Rate 500 kbps)*
3 – Analog Voltage
4 – PWM*

REDUNDANCY
1 – None

** 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_2 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_2 sensor is 0 to 4 % H_2 (0 to 40,000 ppm)

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 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^2 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 $m*s^2$, 6 ms duration 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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