INSTALLATION INSTRUCTIONS FOR THE

HLD SERIES HYDROGEN LEAK DETECTOR

3017-2236

Issue 1

1.0 GENERAL INFORMATION

The Honeywell Hydrogen Leak Detector is a thermal conductivity-based hydrogen gas sensor with high reliability, high stability and resistance to chemical poisoning for use in the detection of hydrogen leakage in different applications.

2.0 USE OF THE HYDROGEN LEAK DETECTOR SENSOR

The Honeywell Hydrogen Leak Detector is designed to provide the ppm level of hydrogen gas present in a clean air environment with high accuracy over a wide range of temperature and humidity.

3.0 CALIBRATION/COMPENSATION

The Hydrogen Leak Detector is calibrated for H_2 sensitivity over temperature. On-board temperature, humidity and pressure sensors are used to compensate/correct sensor output for environmental changes. The temperature, humidity, and pressure measurements are also available over the CANbus message.

4.0 INSTALLATION

Mount the sensor using two mounting bushings and two grade 8.8 M6 bolts. The mounting tabs accommodate various bolt head styles, such as hex, socket head cap, and hex flange bolt head. Torque mounting bolts to 8 Nm ±2 Nm.

The sensor should be mounted with the gas entry port pointed downwards to prevent water from pooling on the gas membrane, or dust collecting on the membrane. A buildup of liquid, water and dust on the membrane could inhibit free gas passage into the sensor. If a downward gas port orientation is impossible, the sensor could be positioned on its side to minimize water or dust collection on the gas membrane.

5.0 SENSOR DIAGNOSTICS

1. Voltage Interruption
2. Wrong Input Current
3. H_2 Sensor Error
4. Temperature Plausibility
5. Humidity Sensor Error
6. Overtemperature
7. Task Temporization Error
8. Pressure Sensor Error
9. Humidity Plausibility
10. Pressure Plausibility
11. H_2 Plausibility

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TABLE 1. SPECIFICATIONS	
Characteristic	**Parameter**
General	
Detection principle	Thermal conductivity
Hydrogen detection range	0 % to 4 % Full Scale (FS)
Start-up time	< 1 second
Response time	< 2 second
Resolution	50 ppm of H_2 in air
Cross sensitivity to humidity	Internally compensated
Interference	Also detects helium, large quantities of CO_2 or CO can reduce accuracy
Product life	up to 10 years (no calibration required)
Environment	
Operating temperature range	-40°C to 85°C [-40°F to 185°F]
Storage temperature range	-40°C to 105°C [-40°F to 221°F]
Humidity	10 %RH to 90 %RH non-condensing
Operating pressure	80 KPa to 110 KPa
Mechanical shock	50 g (3 drops in each ± direction, 3 axes)
Fluid compatibility	Resistant to typical automotive/industrial fluids
Electrical	
Supply voltage	8 V to 36 V
Current consumption	16 mA at 12 Vdc 8 mA at 24 Vdc

TABLE 2. INSTALLATION SPECIFICATIONS	
Characteristic	**Parameter**
Termination	4-pin 1,2 mm sealed USCAR connector per 120-S-004-1-Z02 Key Code A
Weight	50 g
Mounting bolt	M6 Grade 8.8 bolt (x2) , installation torque: 8 Nm ±2 Nm

6.0 FAULTS

6.1 Fault IDs

- Severity Level options are: Protect, Warning, Replace, Stop Now
- Light Options are: Off, On
- Flash Options are: Slow, Fast, NoFlash

TABLE 3. SERVICED FAULT FROM BOOT BLOCK

DTC	Severity	Light	Flash	Description
0x7E100	StopNow	Off	None	Fault_App_Missing
0x7E101	Replace	Off	None	Fault_App_CRC
0x7E110	StopNow	Off	None	Fault_Config_Missing
0x7E111	Replace	Off	None	Fault_Config_CRC
0x7E120	StopNow	Off	None	Fault_Build_Missing
0x7E121	Replace	Off	None	Fault_Build_CRC
0x7E130	Protect	Off	None	Fault_InBoot

TABLE 4. SERVICED FAULTS ADDED TO APPLICATIONS

DTC	Severity	Light	Flash	Description
0x7E210	Protect	Off	None	Fault_Voltage_High
0x7E211	Protect	Off	None	Fault_Voltage_Low
0x7E212	Protect	Off	None	Fault_Voltage_Interrupt
0x7E230	Protect	Off	None	Fault_BUS_Error
0x7E242	Protect	Off	None	Fault_TASK_Watchdog
0x7E250	Protect	Off	None	Fault_Temp_Hot
0x7E251	Protect	Off	None	Fault_Temp_Cold
0x7E260	Protect	Off	None	Fault_Press_High
0x7E261	Protect	Off	None	Fault_Press_Low
0x7E270	Protect	Off	None	Fault_Humidity_High
0x7E310	Protect	Off	None	Fault_Sensor_Error
0x7E311	Warning	Off	None	Fault_Sensor_CRC
0x7E330	Protect	Off	None	Fault_PressSensor_Error
0x7E332	Protect	Off	None	Fault_PressSensor_Range
0xE340	Protect	Off	None	Fault_RhSensor_Error
0x7E341	Warning	Off	None	Fault_RhSensor_CRC

- Faults are reported immediately when triggered using DM1
- Faults shall report every 1 second while active.
- Once all faults are removed, DM1 is used to report no faults

6.2 Fault Messages

DM1 (J1939-73 Standard)

The DM1 message reports the error characteristics. Severity, Light, Flash, and FMI are used to describe how the error, the DTC identifies the exact error, and occurrence reports how many times it has occurred.

PDU 0XFECA/65226														
Frame Format	29-BIT ID						DATA (8 BYTES)							
Field	P	EDP	DP	PF	PS	SA	Light	Flash	DTC			Occ	NA	NA
# Bits	3	1	1	8	8	8	8	8	8	8	8	8	8	8
CAN Message	0x18			0xFE	0xCA	0xE4	0x04	0x0C	0x71	0xE2	0xFF	0x03	0xFF	0xFF

DM2 (Previously Active DTCs)

PDU 0XFECB/65227														
Frame Format	29-BIT ID						DATA (8 BYTES)							
Field	P	EDP	DP	PF	PS	SA	Light	Flash	DTC			Occ	NA	NA
# Bits	3	1	1	8	8	8	8	8	8	8	8	8	8	8
CAN Message	0x18			0xFE	0xCB	0xE4	0x04	0x0C	0x71	0xE2	0xFF	0x03	0xFF	0xFF

DM3 (J1939-73 Standard)

The DM3 message is used to clear active DTCs.

PDU 0XFECA/65226														
Frame Format	29-BIT ID						DATA (8 BYTES)							
Field	P	EDP	DP	PF	PS	SA								
# Bits	3	1	1	8	8	8	8	8	8	8	8	8	8	8
CAN Message	0x18			0xFE	0xD3	0xE4	0xFF	0xFF	0xFF	0xFF	0xFF	0xFF	0xFF	0xFF

DM11 (Clear Previously Active DTCs)

PDU 0XFED3/65236														
Frame Format	29-BIT ID						No Data							
Field	P	EDP	DP	PF	PS	SA								
# Bits	3	1	1	8	8	8	8	8	8	8	8	8	8	8
CAN Message	0x18			0xFE	0xD3	0xE4	0xFF	0xFF	0xFF	0xFF	0xFF	0xFF	0xFF	0xFF

7.0 MESSAGES

HLD OUT

- CAN IDENTIFIER PER J1939
- Baud Rate: 250 kbps or 500 kbps
- 120 Ohm termination resistors required on both end of BUS

PDU 0XFF10/65281														
Frame Format	**29-BIT ID**						**DATA (8 BYTES)**							
Field	**P**	**EDP**	**DP**	**PF**	**PS**	**SA**	**DegC**	**RH**	**Bar**	**ppm** (low byte)	**ppm** (high byte)	**Alarm**	**Counter**	**NA**
# Bits	3	1	1	8	8	8	8	8	8	8	8	8	8	8
CAN Message	0x08			0xFF	0x10	0xE4	0x17	0x6E	0x82	0x24	0x00	02	0x74	0xFF

Temperature (±125°C)
Temperature (°C) = (int8_t)**DegC**

Humidity (0...100 %rH)
Humidity (%rH) = (uint8_t)**RH***0.5

Pressure (0.45...1.1Bar)
Pressure (Bar) = (uint8_t)**Bar***0.004+0.45

Hydrogen (-5k...200k ppm)
Hydrogen (ppm) = (int16_t)**PPM***50

Alarm
Bit 7 : Error Light

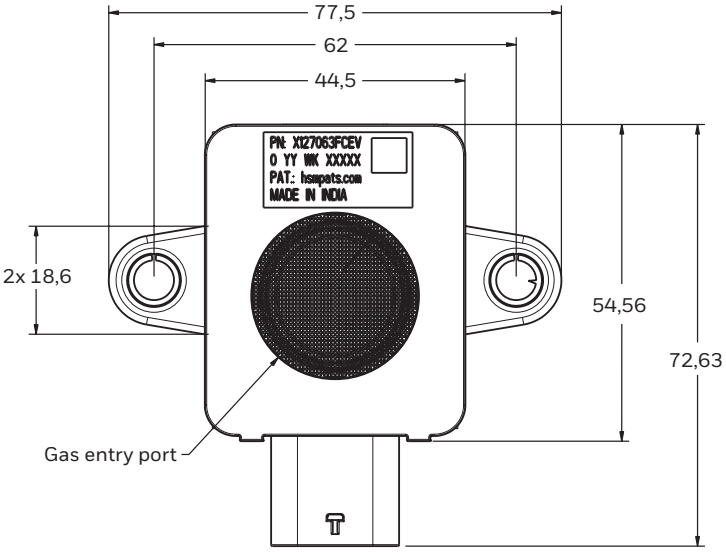
Counter
Rolling Counter (0-255)

Example

Broadcast Normal Operation at 23°C (0x17h=23d), 55% Rh(0x6E), 0.970Bar (0x82), 1800ppm (0x0024), pressure is rising faster than limit.

ID	Data
8FF10E4x	17 6E 82 24 00 00 74 FF

Figure 1. Product Dimensions (mm)



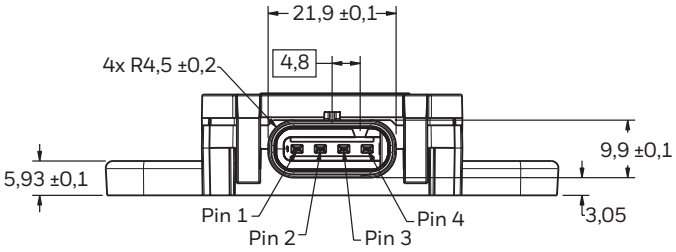


TABLE 5. PIN OUT

Pin	Description
1	Power input
2	Ground
3	CAN H
4	CAN L

8.0 ADDITIONAL SENSOR INSTALLATION NOTES

A. H_2 Sensor is not sensitive to orientation. However, the gas port should be pointed downwards to prevent fluids pooling on membrane. Orienting the Gas port on its side is another way to prevent fluids/debris collection on the gas port surface.

B. 120 Ohm termination resistor required on both ends of the CAN Bus.

C. Sensor is assembled with a Flame Suppressor. The flame suppressor is intended to contain any internally generated flame/explosion and will not initiate a flame/explosion in surrounding ambient environment.

D. Opening of the device/damage to the flame suppressor will eliminate the flame containment performance of this sensor.

E. The H_2 gas sensor is a highly sensitive device. Close contact with volatile chemicals (solvents and other volatile organic compounds – ketones (acetone), aldehydes (formaldehyde), alcohols (ethanol, methanol, isopropanol), aromatic (toluene), esters (glycol ester)) must be avoided

F. These chemicals are often a component of epoxies, glues and adhesives. These chemicals could be outgassed during baking/curing.

G. Exposure to acids (Hydrochloric, Sulfuric, Nitric) must be minimized or avoided.

H. Contact with other chemicals such as Ketenes, Ammonia (NH_3), Hydrogen Peroxide (H_2O_2) and Ozone (O_3) should be minimized/avoided

I. The H_2 sensor has been evaluated for a service temperature range of -40°C to 85°C.

J. H_2 sensors are not repairable. Faulty products should be returned to the manufacturer via the RMA process.

K. H_2 sensor is configured to work in ambient air. Ambient air composition should be comprised of:

   a. Nitrogen: 78.084 %

   b. O_2: 20.946 %

   c. Argon: 0.0934 %

   d. Carbon Dioxide: 0.036 %

L. Sensor output will be affected if the composition of the ambient air deviates from its nominal composition.

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.

⚠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.

For more information

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3017-2236-1-EN | 1 | 01/25
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