iH2S **GAS SENSOR**

Hydrogen Sulfide (H₂S) Intelligent Series Gas Sensor (iseries)

DOCUMENT PURPOSE

The purpose of this document is to present the performance specification of the intelligent iH₂S hydrogen sulfide gas sensor. This document should be used in conjunction with the Product Safety Datasheet (PSDS 5). For guidance on the safe use of the sensor, please refer to the Communication Protocol (SDCS) and Sensor Mounting Application Note.

PORTFOLIO Compact, digital and intelligent gas sensors, iseries sensors are precalibrated, interchangeable and feature digital traceability. These sensors are rated for longer life and are designed to operate in extreme environmental

2 YEAR WARRANTY (24 months from date of despatch)



002706 Issue 3

Hydrogen Sulfide (H₂S) Sensor: iH2S Part Number: AC400-R00D-CIT

FEATURES AND BENEFITS



Digital interface -The sensor has a UART protocol to communicate with the instrument with chip select option as described in the Communication Protocol (SDCS)



Interchangeable -All intelligent sensors have the same dimensions and communication protocol. All sensors in the range will work with a supply voltage from 3.1 V to 3.3 V



Digital traceability -

Sensors contain the following data: serial number, manufacturing date, and gas type for quick and easy identification of the sensor



Pre-calibrated -

calibrated during

manufacturing and

written in the sensor.

calibration data is

Sensor will output

gas concentration

Sensors will be



OEM lock – Sensors have two levels of lock codes. The first one is an OEM specific code programmed in during manufacture and cannot be modified. This lock code is provided by the OEM. Instrument can check if the sensor has the unique code - if not the instrument can refuse the sensor. The second level of lock code is left blank and can be updated by OEM/Partners during sensor integration into the instrument as needed



Designed to meet global performance standards

ATEX and IEC Ex Certified per EN IEC 60079-0 and EN IEC 60079-11

Designed to meet performance standards: BS EN 45544-1, AS/NZS 4641 and ANSI/ISA 92.00.01



Predictive calibration - The recalibration alarm will be triggered when the countdown timer is reached



End-of-life indication - The alarm will be flagged when the sensor has taken/lost a considerable amount of water (electrolyte concentration is above or below limits)



Fault indication -Intelligent sensors can detect several internal faults like drift/ fault in reference electrode, electrolyte concentration out of range, counter electrode fault; therefore notifying the user to take corrective actions

when interrogated by instrument

Compact form factor

Five-year life

RoHS compliant



INTELLIGENT SERIES GAS SENSORS (ISERIES) IH2S SERIES

MEASUREMENTOperating PrincipleElectrochemicalTarget GasH2SRangeOppm to 200 ppmAccuracy±5 % of measuring valueT90* Response Time<30 seconds, typ.T50* Response Time:15 secondsGotputppm compensated for temperature rangeOutputppm compensated for temperature rangeOverload (maximum concentration that can be reached before damaging the sensor):180 secondsRecovery Time rom 200 ppm to <4 ppm:180 secondsLinearity*Linear (±5 % from linear, up to 200 ppm)Measurement Interval1 sample per second (1 H2)Resolution0.1 ppmBaseline Offset*:43 ppmShift from -40°C to Go°C:43 ppmChrientation SensitivityNoneSerial ComunicationUART with Chip SelectEnsating Theseure ange:40°C to 60°COperating Temperature sensor:40°C to 60°COperating Temperature sensor:40°C to 60°COperating Temperature sensor:40°C to 60°COperating Pressure ange:00 mbar to 1200 mbarPoperating Pressure ange:00 mbar to 1200 mbarFlow Rate:00 mbar to 1200 mbarChrister Sensor Mounting xpplication Note).LIFETIME:10% signal life per annumEvertod Operating Life sensor Mounting xpplication Note).Evertod Operating Life signal life per annumEvertod Operating Life signal life per annumEvertod Operating Life signal life per annumEvertod	MEASUREMENT Deprating Principle Electrochemical Target Gas H_S Range 0 ppm to 200 ppm Accuracy ±5 % of measuring value T90* Response Time <30 seconds, typ. 15 Seconds <30 seconds across temperature range Output ppm compensated for temperature Dutput 1000 ppm Resolution 0.180 seconds Equilibrium Baseline <±10.5 ppm H_2S equivalent Equilibrium Baseline <±20.5 ppm H_2S equivalent Equilibrium Baseline <±3 ppm Sore UART with Chip Select ENVIRONMENTAL OPC to 60°C Operating Pressure 0°C to 20°C Recommended Storage 0°C to 20°C	TABLE 1. TECHNICAL SE	PECIFICATIONS
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RangeSoutmaar to 1200 mbarRecommended Storage Temperature0°C to 20°CFlow RateTypical: 200 mL/min when using recommended gassing hood. (Consult iseries Sensor Mounting Application Note).LIFETIMELong-Term Output Drift*<10% signal life per annum	Range600 mbar to 1200 mbarRecommended Storage Temperature0°C to 20°CFlow RateTypical: 200 ml/min when using recommended gassing hood. (Consult iseries Sensor Mounting Application Note).LIFETIME10% signal life per annumLong-Term Output Drift*<10% signal life per annum		5 % RH to 95 % RH (non-condensing)
TemperatureOver to 20% TemperatureTypical: 200 mL/min when using recommended gassing hood. (Consult iseries Sensor Mounting Application Note).LIFETIMELong-Term Output Drift*<10% signal life per annum	Temperature Over to 2000 Typical: 200 ml/min when using recommended gassing hood. (Consult iseries Sensor Mounting Application Note). LIFETIME Long-Term Output Drift* <10% signal life per annum Expected Operating Life 5 years in air PHYSICAL CHARACTERISTICS Weight <6 g Contact Material Gold plated O-Ring Material FKM60 ±5 shore A Outer Plastic Body Modified PPO		600 mbar to 1200 mbar
Flow Raterecommended gassing hood. (Consult iseries Sensor Mounting Application Note).LIFETIMELong-Term Output Drift*<10% signal life per annum	Flow Rate recommended gassing hood. (Consult iseries Sensor Mounting Application Note). LIFETIME <10% signal life per annum Expected Operating Life 5 years in air PHYSICAL CHARACTERISTICS Weight <6 g Contact Material Gold plated O-Ring Material FKM60 ±5 shore A Outer Plastic Body Modified PPO	•	0°C to 20°C
Long-Term Output Drift*<10% signal life per annum	Long-Term Output Drift*<10% signal life per annum	Flow Rate	recommended gassing hood. (Consult iseries Sensor Mounting
Drift* <10% signal life per annum Expected Operating Life 5 years in air PHYSICAL CHARACTERIST Weight <6 g Contact Material Gold plated	Contact Material Cold Signal life per annum Expected Operating Life 5 years in air PHYSICAL CHARACTERISTICS Weight <6 g Contact Material Gold plated O-Ring Material FKM60 ±5 shore A Outer Plastic Body Modified PPO	LIFETIME	
PHYSICAL CHARACTERISTICS Weight <6 g Contact Material Gold plated	PHYSICAL CHARACTERISTICS Weight <6 g Contact Material Gold plated O-Ring Material FKM60 ±5 shore A Outer Plastic Body Modified PPO	•	<10% signal life per annum
Weight <6 g Contact Material Gold plated	Weight <6 g Contact Material Gold plated D-Ring Material FKM60 ±5 shore A Outer Plastic Body Modified PPO	Expected Operating Life	5 years in air
Contact Material Gold plated	Contact Material Gold plated O-Ring Material FKM60 ±5 shore A Outer Plastic Body Modified PPO	PHYSICAL CHARACTERIS	rics
	O-Ring Material FKM60 ±5 shore A Outer Plastic Body Modified PPO	Weight	<6 g
O-Ding Material EVM60 JE share A	Outer Plastic Body Modified PPO	Contact Material	Gold plated
O-King Material PKMO0 ±3 shore A	 Modified PP() 	O-Ring Material	FKM60 ±5 shore A
Outer Plastic Body Material Modified PPO			Modified PPO

* Specifications are valid at 20°C, 50 % RH, and 1013 mbar using Honeywell recommended circuitry. Performance characteristics outline the performance of sensors supplied within the first three months. Output signal can drift below the lower limit over time.

Product Dimensions

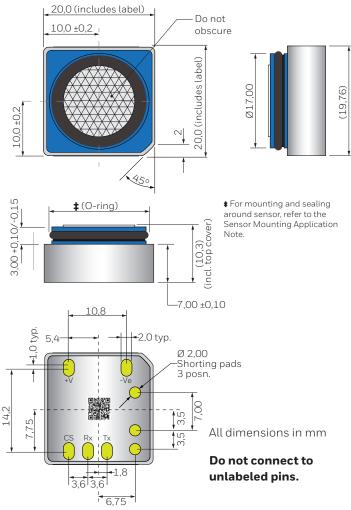


TABLE 2. ELECTRICAL SPECIFICATIONS				
	Min.	Max.	Тур.	Unit
Supply Voltage (Vdd)	3	3.6	3.3	Vdc
Voltage of any pin relative to ground	0	3.6	-	Vdc
Peak supply current (typ. volt)		25		mA
Current: at stand-by mode	-	-	15.49	μΑ
Current: at active mode	-	-	26.67	μΑ
Average power consumption	0.046	90	0.088	mW

For compatibility with the whole iseries range, the supply voltage should be between 3.1 V and 3.3 V.

TABLE 3. PINOUT			
Pin	Description		
+V	Positive power supply		
-V	Ground		
Rx	Data transmitted from instrument to sensor		
Тх	Data transmitted from sensor to instrument		
CS	Chip Select		
Other Deale	Device the second set of the line is the second set of the		

Other Pads Do not connect, shorting link contacts only

 $\mbox{NOTE:}\ \mbox{H}_2\mbox{S}$ cells are shipped with a shorting clip which must be removed prior to installation.

INTELLIGENT SERIES GAS SENSORS (iSERIES) iH2S SERIES

TABLE 4. IH2S PARAMETERS						
iH	2S parameters	Default Values	Configurable Range	Customisable: Implemented by Honeywell (Non-configurable through the communication protocol)	Configurable: The parameter can be changed through the communication protocol by users	Notes
OEM Lock	OEM code (First level)	Password is customisable.* (NoLock will be set by default in case the OEM lock is not required)	No more than 6 characters (ASCII format)	V		* OEM code will be set by Honeywell during sensor manufacturing. Code to be provided by OEM
Ö	Partner code (Second level)	-	No more than 6 characters (ASCII format)		\checkmark	Once this code has been set by user, it is not possible to change it
User Factor		User factor 0: 100 User factor 1: 95 UF 2-3: Reserved UF 4-9: Customisable User factors can be added to include auto- compensation for using different membranes or instruments	10 allocated slots 2 user factors are already implemented (no additional membrane and with recommended membrane), 2 are reserved and the remaining 6 can be customised	√*	√**	* User factor 0 and 1 programmed into the sensor during manufacturing. Additional User Factors can be added to the selectable list during the manufacturing process. This user factor has to be provided by the user. ** Users can select the desired user factor from the selectable list
Calibration	Zero (clean air)	0 ppm			×	Calibration is performed at two points throughout the operating range of the sensor. The calibration points are defined by the zero and span values. The zero value represent the response of the sensor in clean air
Cali	Span (target gas)	target gas) 20 ppm 🗸 the target gas. The span concentral		Span is the calibration point that is done in the presence of the target gas. The span concentration can be configured through the communication protocol		
	Low	10 ppm	Limit LOW lower: 0.5 Limit LOW upper: 100		\checkmark	
	High	20 ppm	Limit HIGH lower: 0.5 Limit HIGH upper: 100		\checkmark	
Alarms	STEL	15 ppm over 15 minutes	Limit STEL lower: 0.5 Limit STEL upper: 100		\checkmark	Short-Term Exposure Limit: STEL is a limit value above which exposure to a chemical substance should not occur. It usually references a 15-minute period. STEL works to prevent adverse health effects along with other unwanted effects due to peak exposure that could possibly not be controlled by the application of an 8 hour TWA limit
	TWA	10 ppm over 8 hours	Limit TWA lower: 0.5 Limit TWA upper: 100		*	Time-Weighted Average: TWA for chemical exposure can be used when each of the chemical concentration and time for exposure varies over time. It conveys the average exposure to a contaminant to which workers may be exposed without adverse effect over a period of time such as an 8-hour day or 40-hour week (an average work shift). The measurement is expressed in units of ppm
	The recalibration at	larm will be triggered whe	en either the countdown or the	accuracy th	reshold are r	eached (whichever is triggered first).
tive	(Cal due days)	180 days			\checkmark	The alarm will be flagged when the countdown reaches 0. The countdown restarts when the sensor is calibrated
Predictive Calibration	Accuracy threshold	±20%	±10% to ±50%		~	The predictive calibration estimation will depend on the accuracy of the sensor (this parameter can be configured by the user). The tighter the accuracy value, the more frequent calibration needed. The sensor will request a recalibration when the default accuracy(±20% of measuring value) is reached
Je		be triggered when either	the countdown or the future p	rediction alg	orithm cond	
End of Life	Future prediction algorithm				×	The algorithm triggers an alarm when the sensitivity < 50% of original sensitivity at minimum recent temperature
	Countdown timer	1825 days			×	The countdown timer is set for 1825 days, i.e. 5 years
Deadband	Active by default	~			~	With the deadband enabled the sensor will read zero until the concentration exceeds the deadband value. Is normally used to prevent measurement oscillations. This function can be configured to different limits
Dea	Incoming	0.1 ppm	Whole measurement range		\checkmark	Incoming: As the reading decays down it will read zero once it has fallen below the incoming threshold
	Outgoing	0.2 ppm	Incoming ≤ Outgoing		\checkmark	Outgoing: As the reading increases it will read zero until it exceeds the outgoing threshold
Bump Due Days		1 day			~	A bump test is a brief exposure of the sensor to the target gas. The test has the objective of verifying that the sensor responds and the instrument acts accordingly. The sensor will tell the user when the bump interval has been exceeded.

INTELLIGENT SERIES GAS SENSORS (iSERIES) iH2S SERIES

TABLE 5. INTRINSIC SAFETY CERTIFICATIONS			
Intrinsic Safety			
Entity Parameters	Ui = 5.88 V, Ii = 1.1 A, Pi = 1.2 W, Ci = 13.14 uF, Li = 0 uH		
Intrinsic Safety Rating	IIC T4, ia, 60°C		
ATEX Marking	<a>x	l M1 ll 1G Ex ia l Ma Ex ia lIC Ga	

Poisoning

Gas sensors are designed for operation in a wide range of environments and harsh conditions. However, it is important that exposure to high concentrations of solvent vapours is avoided, both during storage, fitting into instruments, and operation. When using sensors with printed circuit boards (PCBs), degreasing agents should be used before the sensor is fitted.

Do not glue directly on or near the sensor as the solvent may cause crazing of the plastic.

WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship during the applicable warranty period. Honeywell's 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.

While Honeywell may provide application assistance personally, through our literature and the Honeywell web site, it is buyer's sole responsibility to determine the suitability of the product in the application.

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

A 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.

SAFETY NOTE

This sensor is designed to be used in safety-critical applications. To ensure that the sensor and/or instrument in which it is used, are operating properly, it is a requirement that the function of the device is confirmed by exposure to target gas (bump check) before each use of the sensor and/or instrument. Failure to carry out such tests may jeopardize the safety of people and property.

Under no circumstances should intelligent sensor pads be soldered to, as this can cause leakage of electrolyte. Connection should be made via a mounting socket and spring connector.

WARNING: SOLDERING TO PADS WILL RENDER YOUR WARRANTY VOID.

FOR MORE INFORMATION

Honeywell Advanced Sensing Technologies services its customers through a worldwide network of sales offices and distributors. For application assistance, current specifications, pricing, or the nearest Authorized Distributor, visit sps.honeywell.com/ast or call:

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