

SOH-A2/SOH-A2+ Sulfur Dioxide – Hydrogen Sulfide

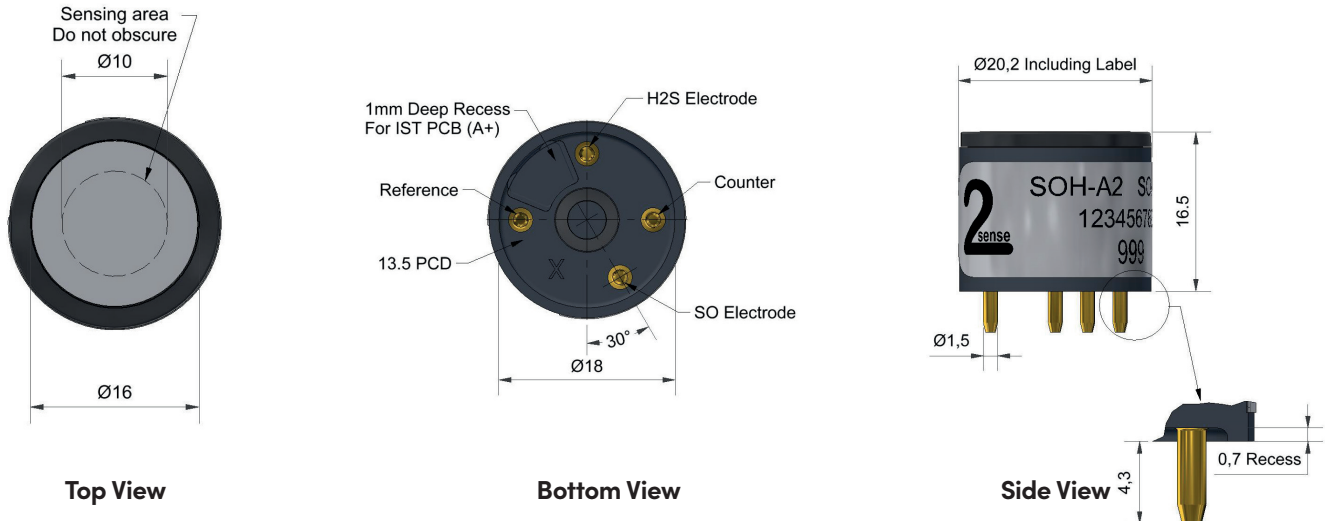


Introduction

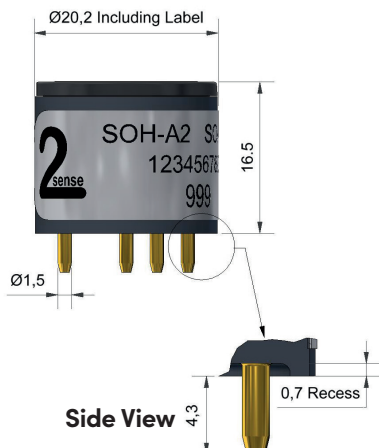
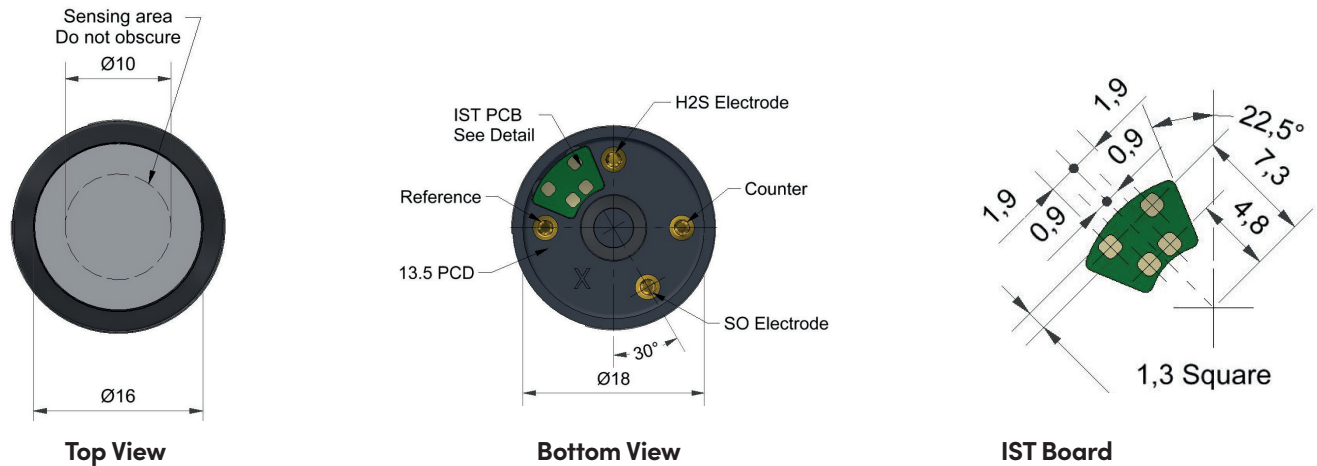
Personal gas safety monitors can be found in almost every industry, with the requirement for multiple gas detection becoming commonplace.

Sulfur gases are toxic with a complex chemistry. Measuring both SO₂ and H₂S provides the information for separating the corrosive gases, but with different toxicologies.

SOH-A2 Sulfur Dioxide – Hydrogen Sulfide – 4-Electrode



SOH-A2+ Sulfur Dioxide – Hydrogen Sulfide – 4-Electrode (with Integrated Smart Technology)



Dimensions are in millimetres (± 0.15 mm).

Sensor Data

Specification Sulfur Dioxide Channel

Performance	Sensitivity	nA/ppm in 10ppm SO ₂	140 to 250
	Response time	t90 (s) from zero to 10ppm SO ₂	< 15
	Zero current	ppm equivalent in zero air	< ± 0.2
	Resolution	rms noise (ppm equivalent)	< 0.2
	Range	ppm SO ₂ limit of performance warranty	20
	Linearity	ppm error at full scale, linear at zero and 10ppm SO ₂	< ± 2
	Overgas limit	ppm maximum SO ₂ for stable response to gas pulse	50

Lifetime	Zero drift	ppm equivalent change/year in lab air	< 0.5
	Sensitivity drift	% change/year in lab air, monthly test	< 6
	Operating life	months until 80% original signal (24-month warranted)	24

Environmental	Sensitivity @ -20°C	% (output @ -20°C/output @ 20°C) @ 10ppm SO ₂	80 to 100
	Sensitivity @ 50°C	% (output @ 50°C/output @ 20°C) @ 10ppm SO ₂	70 to 100
	Zero @ -20°C	ppm equivalent change from 20°C	-0.2 to 0.2
	Zero @ 50°C	ppm equivalent change from 20°C	0.2 to 0.8

Cross Sensitivity	Filter capacity	ppm hours of Hydrogen Sulfide	nd
	H ₂ S sensitivity	% measured gas @ 20ppm	H ₂ S < 15
	NO ₂ sensitivity	% measured gas @ 10ppm	NO ₂ < -150
	Cl ₂ sensitivity	% measured gas @ 10ppm	Cl ₂ < -50
	NO sensitivity	% measured gas @ 50ppm	NO < 50
	CO sensitivity	% measured gas @ 400ppm	CO < 2
	H ₂ sensitivity	% measured gas @ 400ppm	H ₂ @ 20°C < 1
	C ₂ H ₄ sensitivity	% measured gas @ 400ppm	C ₂ H ₄ < 40
NH ₃ sensitivity	% measured gas @ 20ppm	NH ₃ < ± 0.5	

Key Specifications	Temperature range	°C	-30 to 50
	Pressure range	kPa	80 to 120
	Humidity range	% rh continuous (see note below)	15 to 90
	Storage period	months @ 3 to 20°C (stored in sealed pot)	6
	Load resistor	Ω (recommended)	10 to 47
	Weight	g	< 6

Figure 1 SO₂ Channel response to 20ppm SO₂

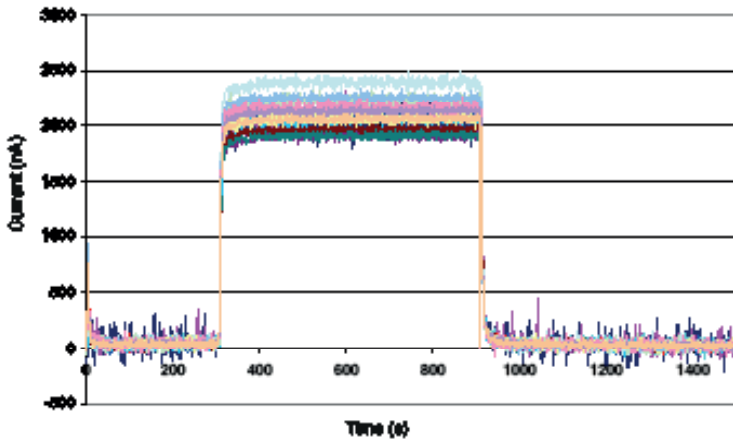


Figure 1 shows the SOH-A2 fast response, stable output and return to baseline in 20ppm SO₂.

Figure 2 SO₂ Channel Sensitivity Temperature Dependence

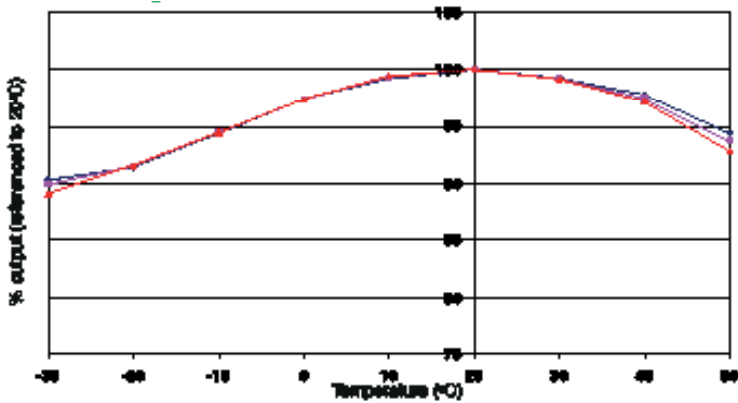


Figure 2 shows the % variation in sensitivity caused by changes in temperature. The data is taken from a typical batch of sensors.

Figure 3 Channel Zero Temperature Dependence

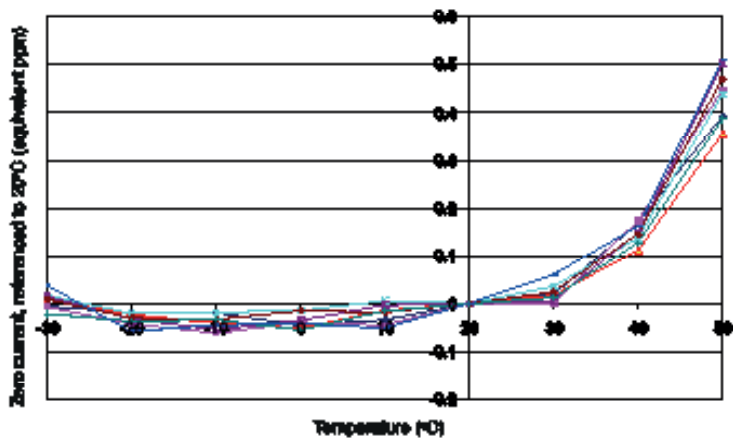


Figure 3 shows the variation in zero output caused by changes in temperature, expressed as ppm gas equivalent, referenced to the zero current at 20°C. This data is taken from a typical batch of sensors.

Sensor Data

Specification Hydrogen Sulfide Channel

Performance	Sensitivity	nA/ppm in 20ppm H ₂ S	450 to 900
	Response time	t ₉₀ (s) from zero to 20ppm H ₂ S @ 20°C	< 25
	Zero current	ppm equivalent in zero air	± 0.25
	Resolution	rms noise (ppm equivalent)	< 0.1
	Range	ppm H ₂ S limit of performance warranty	100
	Linearity	ppm error at full scale, linear at zero and 20ppm H ₂ S	< ± 5
	Overgas limit	maximum ppm H ₂ S for stable response to gas pulse	200
Lifetime	Zero drift	ppm equivalent change/year in lab air	< 0.1
	Sensitivity drift	% change/year in lab air, monthly test	< 2
	Operating life	months until 80% original signal (24-month warranted)	24
Environmental	Sensitivity @ -20°C	% (output @ -20°C/output @ 20°C) @ 20ppm H ₂ S	75 to 90
	Sensitivity @ 50°C	% (output @ 50°C/output @ 20°C) @ 20ppm H ₂ S	100 to 112
	Zero @ -20°C	ppm equivalent change from 20°C	± 0.05
	Zero @ 50°C	ppm equivalent change from 20°C	0.2
Cross Sensitivity	NO ₂ sensitivity	% measured gas @ 10ppm	NO ₂ < -30
	Cl ₂ sensitivity	% measured gas @ 10ppm	Cl ₂ < -25
	NO sensitivity	% measured gas @ 50ppm	NO < 30
	SO ₂ sensitivity	% measured gas @ 10ppm	SO ₂ < 30
	CO sensitivity	% measured gas @ 400ppm	CO < 1.5
	H ₂ sensitivity	% measured gas @ 400ppm	H ₂ < 0.3
	C ₂ H ₄ sensitivity	% measured gas @ 400ppm	C ₂ H ₄ < 0.2
NH ₃ sensitivity	% measured gas @ 20ppm	NH ₃ < 2	

Figure 4 H₂S Channel Response to 25ppm H₂S

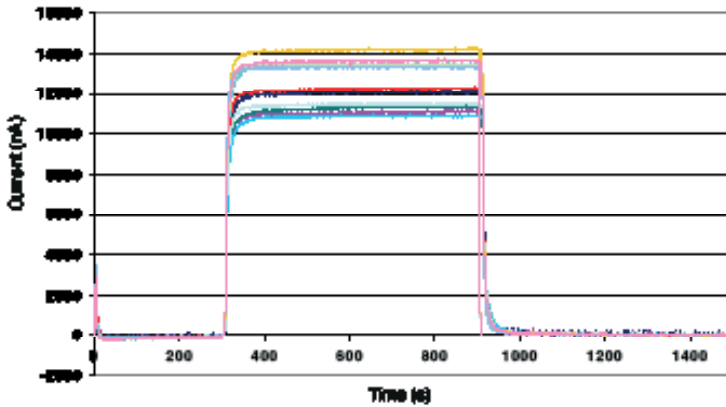


Figure 4 shows the SOH-A2 fast response, stable output and return to baseline in 20ppm H₂S.

Figure 5 H₂S Channel Sensitivity Temperature Dependence

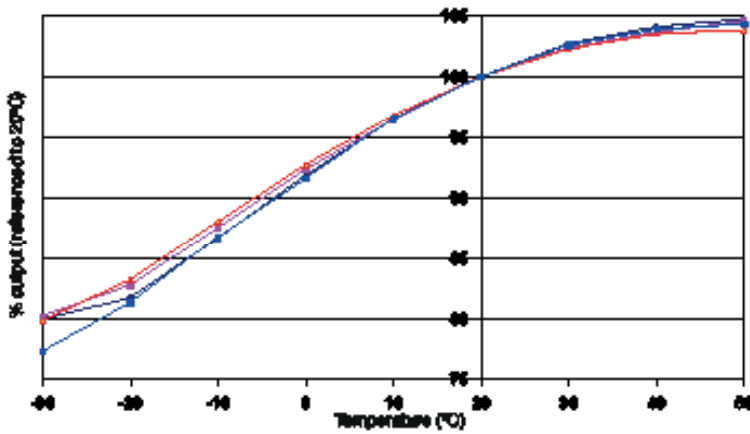


Figure 5 shows the % variation in sensitivity caused by changes in temperature. The data is taken from a typical batch of sensors.

Figure 6 H₂S Channel Zero Temperature Dependence

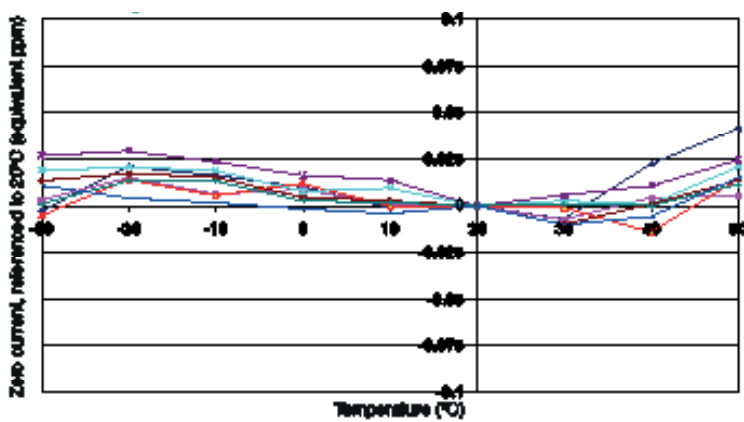


Figure 6 shows the variation in zero output caused by changes in temperature, expressed as ppm gas equivalent, referenced to the zero at 20°C. This data is taken from a typical batch of sensors.

IST Board Data

Interface	Communication Bus	Compatible with the 400 kHz I ² C protocol
	Max. Bus Speed	Up to 1 MHz
	Input Logic Levels	High (Recessive) < 2.3 V Low (Dominant) < 0.2 V
	Absolute Max. Input Signal	3.6 V
Electrical	Supply Voltage Range	1.7 V to 3.6 V
	Supply current – Stand-By	< 5 µA
	Supply current – Operating	< 0.15 mA (temperature reading only) < 2.15 mA (temperature reading + memory reading/writing)
	Power Supply Conditioning	Built-In 100 nF decoupling capacitor
	ESD Protection	4 kV (human body model) – Enhanced ESD / Latch-Up protection
	Bus Pins Input Capacitance	15 pF max.
Performance	Operational Temperature	-40 °C to +85 °C
	Temperature Sensor Accuracy	±1°C (-0°C to +70°C)
	Memory Data Retention	> 200 years
	Memory Write Cycles	> 4,000,000
Data & Communication	Memory IC & I2C Address	M24128X-FCU Device Address: R – 0xA0 / W – 0xA1
	Temperature IC & I2C Address	MAX31875R0TZS+T Device Address: R – 0x90 / W – 0x91
	Product Data Start Address	0x0900
	Calibration Data Start Address	0x0B00
	User Data Area	0x0D00 – 0x18FF (3,072 Bytes)
	CRC Polynomial	0x 01 04C1 1DB7
	Digital Signature Algorithm	SHA-256

Factory-populated data

Product Data
Data Format Version
Customer (OEM) ID
Product ID
Type of Sensor / Target Gas
Sensor Serial Number
End of Storage Period Date
Sensor Replacement Date
Product Data Checksum
Alphasense Digital Signature
Customer Digital Signature

Calibration
Calibration Data Units
Zero (clean dry air) Output
Calibration Span
Calibration Output
Sensitivity
Calibration Date
Calibration Data Checksum
Calibration Data Signature

Sensor Specification
Over-gas limit
Concentration Range
Temperature Range Low
Temperature Range High
Humidity Range Low
Humidity Range High
Pressure Range Low
Pressure Range High
Specification Checksum

15,000+ locations

Customer Specific
Custom Parameters
Re-Calibration Due Date
Operational Limits:
Low High STEL TWA
Next Bump Test Due Date
User Data Area

Note: Above 85% rh and 40°C a maximum continuous exposure period of 10 days is warranted. Where such exposure occurs the sensor will recover normal electrolyte volumes, when allowed to rest at lower %rh and temperature levels for several days.

At the end of the product's life, do not dispose of any electronic sensor, component or instrument in the domestic waste, but contact the instrument manufacturer, Alphasense or its distributor for disposal instructions. NOTE: all sensors are tested at ambient environmental conditions unless otherwise stated. As applications of use are outside our control, the information provided is given without legal responsibility. Customers should test under their own conditions, to ensure that the sensors are suitable for their own requirements.

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