

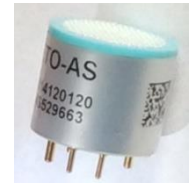
# Sensor Technical Data Summaries

## mPower Sensor Modules

mPower sensors are all smart sensors that can carry with them calibration data. The connecting adapters depend on the type of instrument: 7-pin connectors for all UNI instruments and black wedge-shaped connection modules for all POLI instruments.



POLI Sensor Module



UNI Sensor Module

## Temperature, Pressure and Humidity

All electrochemical sensors can be used in the temperature range  $-40$  to  $50^{\circ}\text{C}$  (except  $\text{ClO}_2$ , which has a range of  $-20$  to  $40^{\circ}\text{C}$ ) and pressures deviating by up to  $\pm 20\%$  from atmospheric pressure.

## Humidity Requirements

All electrochemical sensors operate in the humidity range of 15 to 95% RH (non-condensing). Some humidity is required for long-term use to prevent drying out of the internal electrolyte. Humidity is not required for NDIR, PID, or LEL sensors, which thus have a range of 0 to 95% RH (non-condensing). Humidity above 50% RH can reduce PID response and may need correction for highly accurate work.

## Oxygen Requirements

At least 10% by volume oxygen is required in the sampled gas for pellistor-type LEL sensors to sustain catalytic oxidation, but not for IR-type LEL sensors. A small amount of oxygen ( $\geq 1\%$ ) is needed for nearly all electrochemical sensors except those that measure strong oxidants, i.e.,  $\text{O}_3$ ,  $\text{Cl}_2$ , and  $\text{ClO}_2$ . Thus, most electrochemical sensors cannot be used to measure in dry, inert gases (such as nitrogen or argon) for long periods. However accurate measurements can be made in dry, inert gases for up to several minutes because the sensor electrolyte retains enough moisture and oxygen for this short time after moving from typical ambient air. Standard gases, which are often supplied in a dry nitrogen matrix, can be used for calibration because the exposure time is short enough. LEL measurements in inert gases can be made using an IR-type LEL sensor or a PID, neither of which require oxygen, as opposed to a pellistor-type LEL sensor, which needs oxygen for combustion.

## Lifetime & Storage

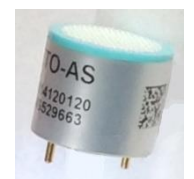
Most electrochemical sensors should be stored at 0 to  $20^{\circ}\text{C}$  in their sealed container for up to 6 months without shorten much their operating life. The  $\text{CO}$ ,  $\text{H}_2\text{S}$ , LEL,  $\text{O}_2$ , PID & IR sensors typically have warranties of 24 months in ambient air and expected operating lives of 36 months or more, depending on which instrument they are used in. All other electrochemical sensors have a standard warranty of 12 months from the date of shipment, although the typical operating life is usually longer.

## Biased Sensors (HCl & ETO)

Electrochemical sensors that use a bias voltage (e.g., HCl and ETO) require a longer equilibration time of up to 12 hours after installing into an instrument, before zeroing and calibrating. Most other sensors are ready for use within several minutes of installation.

## Instrument Limitations

The data listed below are from the supplier specification sheets and apply to the raw, 3-pin sensors without attached circuitry. In some cases the instrument limits the specifications further. For example, the temperature range for most sensors is  $-40$  to  $50^{\circ}\text{C}$ , whereas most mPower instruments have an operating range of  $-20$  to  $50^{\circ}\text{C}$ . In a few instances the measuring range is narrower in the instrument than for the raw sensor. POLI monitors can accept at most two high-power sensors, which include PID, NDIR and LEL.



3-Pin Raw Sensor

## DISCLAIMER

Due to our continuous improvement efforts these specifications may change without notice.

## Ammonia (NH<sub>3</sub>)

SuAS

Parameter	Specification	Cross-Sensitivity	Test Conc.	Response
Sensor Type	Electrochemical	CO	50 ppm	0 ppm
Range	0-100 ppm	CO <sub>2</sub>	1000 ppm	0 ppm
Extended Linear Range	200 ppm	H <sub>2</sub>	1000 ppm	0 ppm
Resolution	1 ppm	H <sub>2</sub> S	25 ppm	60 ppm
t <sub>90</sub> Response Time	≤90 s	Isobutylene	100 ppm	0 ppm
Bias	0 mV			
Temp. Range	-40 to 50°C			
T Effect on Zero (-20 to 50°C)	-0.5 to 5 ppm			
T Effect on Signal (-20 to 50°C)	±40%			
Calibration Gas/Bal. Gas	50 ppm NH <sub>3</sub> /Air or N <sub>2</sub>			

## Carbon Dioxide (CO<sub>2</sub>)

DDMSHia

Parameter	Specification	Cross-Sensitivity	Test Conc.	Response
Sensor Type	NDIR			
Range	0-5% Vol			
Extended Linear Range	0-10% Vol			
Resolution	0.025% Vol			
t <sub>90</sub> Response Time	≤30 s			
Bias	NA			
Temp. Range	-20 to 50°C			
T Effect on Zero (-20 to 50°C)	±0.055% Vol			
T Effect on Signal (-20 to 50°C)	±15%			
Calibration Gas/Bal. Gas	0.5% Vol CO <sub>2</sub> /Air (equals 5000 ppm)			

## Carbon Monoxide (CO) All Ranges

SuSF

Parameter	Specification	Cross-Sensitivity	Test Conc.	Response
Sensor Type	Electrochemical	Cl <sub>2</sub>	10 ppm	0.5 ppm
Range	0-100 ppm	H <sub>2</sub>	50 ppm	8 ppm
Extended Linear Range	2000 ppm	NO	50 ppm	10 ppm
Resolution	1 ppm	NO <sub>2</sub>	30 ppm	1 ppm
t <sub>90</sub> Response Time	≤15 s	SO <sub>2</sub>	20 ppm	0 ppm
Bias	0 mV	H <sub>2</sub> S	100 ppm	0 ppm
Temp. Range	-40 to 50°C	VOC*		
T Effect on Zero (-20 to 50°C)	-1 to 10 ppm			
T Effect on Signal (-20 to 50°C)	±40%			
Calibration Gas/Bal. Gas	50 ppm CO/Air (0-500 ppm range) 100 ppm CO/Air (0-1000 or 1999 ppm range)			

\* An internal carbon/oxidant filter reduces response to VOCs. The filter effectiveness is reduced over the life of the sensor by an amount that depends on the VOC exposure level.

## Carbon Monoxide (CO) – Low Hydrogen Interference

AICOAX

Parameter	Specification	Cross-Sensitivity*	Test Conc.	Response
Sensor Type	Electrochemical	H <sub>2</sub> (@10°C)	900 ppm	18 ppm
Range	0-2000 ppm	H <sub>2</sub> (@20°C)	900 ppm	36 ppm
Maximum Overload	4000 ppm	H <sub>2</sub> (@30°C)	900 ppm	54 ppm
Resolution	1 ppm	Cl <sub>2</sub>	10 ppm	0 ppm
t <sub>90</sub> Response Time	≤30 s	NO*	500 ppm	≤10 ppm
Bias	0 mV	NO <sub>2</sub> *	10 ppm	≤0.1 ppm
Temp. Range	-30 to 50°C	NH <sub>3</sub>	20 ppm	0 ppm
T Effect on Zero (-20 to 50°C)	+4 to -6 ppm	SO <sub>2</sub> *	20 ppm	0 ppm
T Effect on Signal (-20 to 50°C)	±35%	C <sub>2</sub> H <sub>4</sub> (ethylene)	400 ppm	≤20 ppm
Calibration Gas/Bal. Gas	50 ppm CO/Air (0-500 ppm range) 100 ppm CO/Air (0-1000 or 1999 ppm range)			

\* Internal filter capacities: H<sub>2</sub>S: 250,000 ppm-hours, SO<sub>2</sub>: 250,000 ppm-hours, NO: 20,000 ppm-hours, NO<sub>2</sub>: 500,000 ppm-hours. Filter effectiveness is reduced over the life of the sensor by an amount that depends on the exposure level.

## Carbon Monoxide/ Hydrogen Sulfide (CO/H<sub>2</sub>S) Dual Sensor

DDGS+4DT

Parameter	CO Specification	H <sub>2</sub> S Specification	
Sensor Type	Electrochemical	Electrochemical	
Range	0-1000 ppm	0-200 ppm	
Extended Linear Range	NA	NA	
Resolution	1 ppm	0.5 ppm	
t <sub>90</sub> Response Time	≤30 s	≤30 s	
Bias	0 mV	0 mV	
Temp. Range	-30 to 50°C	-30 to 50°C	
T Effect on Signal (-20 to 50°C)	±60%	±15%	
Calibration Gas/Bal. Gas	100 ppm CO/Air	25 ppm H <sub>2</sub> S/Air	
Cross-Sensitivity	Test Conc.	CO Response	H <sub>2</sub> S Response
CO	300 ppm	300 ppm	<5 ppm
H <sub>2</sub> S	25 ppm	<5 ppm	25 ppm
SO <sub>2</sub>	5 ppm	0 ppm	<1 ppm
NO	35 ppm	<0.1 ppm	<1 ppm
NO <sub>2</sub>	5 ppm	<0.1 ppm	0 ppm
Cl <sub>2</sub>	15 ppm	0 ppm	0 ppm
VOC*		*	

\* An internal carbon/oxidant filter reduces CO sensor response to VOCs, with a filter lifetime of >20,000 ppm-hours

## Chlorine (Cl<sub>2</sub>)

SuDS

Parameter	Specification	Cross-Sensitivity	Test Conc.	Response
Sensor Type	Electrochemical	ClO <sub>2</sub>	5.0 ppm	2.2 ppm
Range	0-10 ppm	O <sub>3</sub>	0.5 ppm	0.4 ppm
Extended Linear Range	50 ppm	CO	100 ppm	0 ppm
Resolution	0.1 ppm	H <sub>2</sub>	1000 ppm	0 ppm
t <sub>90</sub> Response Time	≤60 s	NO	50 ppm	0 ppm
Bias	0 mV	NO <sub>2</sub>	10 ppm	10 ppm
Temp. Range	-40 to 50°C	SO <sub>2</sub>	20 ppm	0 ppm
T Effect on Zero (-20 to 50°C)	0.2 to -0.4 ppm	H <sub>2</sub> S	25 ppm	-3 ppm
T Effect on Signal (-20 to 50°C)	±20%			
Calibration Gas/Bal. Gas	10 ppm Cl <sub>2</sub> /N <sub>2</sub>			

## Chlorine Dioxide (ClO<sub>2</sub>)

S43E10

Parameter	Specification	Cross-Sensitivity	Test Conc.	Response
Sensor Type	Electrochemical	Cl <sub>2</sub>	1 ppm	0.6 ppm
Range	0-1 ppm	O <sub>3</sub>	0.25 ppm	0.7 ppm
Extended Linear Range	0-1 ppm	CO	100	0 ppm
Resolution	0.03 ppm	H <sub>2</sub>	3000 ppm	0 ppm
t <sub>90</sub> Response Time	≤120 s	Alcohols	1000 ppm	0 ppm
Bias	0 mV	H <sub>2</sub> S	20 ppm	-5 ppm
Temp. Range	-20 to 40°C			
T Effect on Zero (-20 to 50°C)	0 to 0.06 ppm			
T Effect on Signal (-20 to 50°C)	±20%			
Calibration Gas/Bal. Gas	0.5 ppm ClO <sub>2</sub> /N <sub>2</sub> (Requires generator) or 1 ppm Cl <sub>2</sub> / N <sub>2</sub> (Available in gas cylinder)			

## Combustibles (LEL – Lower Explosive Limit)

S4LEL

Parameter	Specification	Cross-Sensitivity	Test Conc.	Response
Sensor Type	Catalytic Oxidation	Responds to most combustible gases including H <sub>2</sub> and VOCs up to C <sub>8</sub>		
Range	0-100% LEL			
Extended Linear Range	100% LEL			
Resolution	1% LEL			
t <sub>90</sub> Response Time	≤15 s			
Temp. Range	-20 to 55°C			
T Effect on Zero (-20 to 60°C)	±3% LEL			
T Effect on Signal (-20 to 60°C)	±10%			
Calibration Gas/Bal. Gas	50% LEL CH <sub>4</sub> /Air, 50% LEL Propane/Air or 20% LEL Pentane/Air			

## Ethylene Oxide & Acetaldehyde (ETO, C<sub>2</sub>H<sub>4</sub>O)

S4UAS

Parameter	Specification	Cross-Sensitivity	CF*
Sensor Type	Electrochemical	CO	1.6
Range	0-100 ppm	Formaldehyde	0.4
Extended Linear Range	200 ppm	Methanol	0.3
Resolution	1 ppm	Ethanol	0.8
t <sub>90</sub> Response Time	≤120 s	Isobutylene	0.9
Bias	300 mV	Formic Acid	1.4
Temp. Range	-40 to 50°C	Chloroethane	2.5
T Effect on Zero (-20 to 50°C)	-1 to 10 ppm		
T Effect on Signal (-20 to 50°C)	±25%		
Calibration Gas/Bal. Gas	10 ppm ETO/Air		

\* CF = Correction Factor = Response(ETO) / Response(Test Gas). After calibration to ETO, the true concentration of these gases is calculated as Reading x CF.

## Hydrogen (H<sub>2</sub>)

SUNT

Parameter	Specification	Cross-Sensitivity	Test Conc.	Response
Sensor Type	Electrochemical	CO	50 ppm	150 ppm
Range	0-1000 ppm	Cl <sub>2</sub>	10 ppm	0.5 ppm
Extended Linear Range	2000 ppm	NO	50 ppm	10 ppm
Resolution	10 ppm	NO <sub>2</sub>	30 ppm	1 ppm
t <sub>90</sub> Response Time	≤70 s	SO <sub>2</sub>	20 ppm	0 ppm
Bias	0 mV	H <sub>2</sub> S	100 ppm	0 ppm
Temp. Range	-40 to 50°C			
T Effect on Zero (-20 to 50°C)	-1 to 10 ppm			
T Effect on Signal (-20 to 50°C)	±300%			
Calibration Gas/Bal. Gas	700 ppm H <sub>2</sub> /Air			

## Hydrogen Chloride (HCl)

SuLS

Parameter	Specification	Cross-Sensitivity	Test Conc.	Response
Sensor Type	Electrochemical	CO	100 ppm	0 ppm
Range	0-50 ppm	CO <sub>2</sub>	500 ppm	0 ppm
Extended Linear Range	100 ppm	NO	20 ppm	50 ppm
Resolution	0.1 ppm	H <sub>2</sub> S	25 ppm	110 ppm
t <sub>90</sub> Response Time	≤70 s	SO <sub>2</sub>	20 ppm	30 ppm
Bias	200 mV			
Temp. Range	-40 to 50°C			
T Effect on Zero (-20 to 50°C)	-1 to 15 ppm			
T Effect on Signal (-20 to 50°C)	±20%			
Calibration Gas/Bal. Gas	10 ppm HCl/Air*			

\* Nitrogen balance gas can also be used if exposure is <5 minutes

## Hydrogen Cyanide (HCN)

SuLS

Parameter	Specification	Cross-Sensitivity	Test Conc.	Response
Sensor Type	Electrochemical	CO	100 ppm	0 ppm
Range	0-50 ppm	Cl <sub>2</sub>	16 ppm	0 ppm
Extended Linear Range	100 ppm	NO	18 ppm	0 ppm
Resolution	0.2 ppm	NO <sub>2</sub>	23 ppm	-1 ppm
t <sub>90</sub> Response Time	≤120 s	H <sub>2</sub> S	26 ppm	52 ppm
Bias	0 mV	SO <sub>2</sub>	23 ppm	8 ppm
Temp. Range	-40 to 50°C			
T Effect on Zero (-20 to 50°C)	-1 to 1 ppm			
T Effect on Signal (-20 to 50°C)	±25%			
Calibration Gas/Bal. Gas	10 ppm HCN/Air*			

\* Nitrogen balance gas can also be used if exposure is <5 minutes

## Hydrogen Fluoride (HF)

SuCS

Parameter	Specification	Cross-Sensitivity	Test Conc.	Response
Sensor Type	Electrochemical	CO	500 ppm	0 ppm
Range	0-20 ppm	HCl	10 ppm	50 ppm
Extended Linear Range	50 ppm	NO	50 ppm	29 ppm
Resolution	0.1 ppm	NO <sub>2</sub>	20 ppm	180 ppm
t <sub>90</sub> Response Time	≤120 s	Cl <sub>2</sub>		responds
Bias	0 mV			
Temp. Range	-40 to 50°C			
T Effect on Zero (-20 to 50°C)	0.4 to -1 ppm			
T Effect on Signal (-20 to 50°C)	±20%			
Calibration Gas/Bal. Gas	6 ppm HF/Air or 2 ppm HCl/Air*			

\* Nitrogen balance gas can also be used if exposure is <5 minutes

## Hydrogen Sulfide (H<sub>2</sub>S) 0-50 ppm, 0-100 ppm & 0-200 ppm Ranges

SuAS

Parameter	Specification	Cross-Sensitivity	Test Conc.	Response
Sensor Type	Electrochemical	CO	300 ppm	0 ppm
Range	0-100 ppm	H <sub>2</sub>	1000 ppm	0 ppm
Extended Linear Range	500 ppm	NO	18 ppm	1 ppm
Resolution	0.1 ppm	NO <sub>2</sub>	23 ppm	0 ppm
t <sub>90</sub> Response Time	≤15 s	SO <sub>2</sub>	5 ppm	1 ppm
Bias	0 mV			
Temp. Range	-40 to 50°C			
T Effect on Zero (-20 to 50°C)	-0.2 to 1 ppm			
T Effect on Signal (-20 to 50°C)	±20%			
Calibration Gas/Bal. Gas	25 ppm H <sub>2</sub> S/Air*			

\* Nitrogen balance gas can also be used if exposure is <5 minutes

## Hydrogen Sulfide (H<sub>2</sub>S) 0-1000 ppm Range

SuNS

Parameter	Specification	Cross-Sensitivity	Test Conc.	Response
Sensor Type	Electrochemical	CO	300 ppm	0 ppm
Range	0-1000 ppm	H <sub>2</sub>	1000 ppm	0 ppm
Extended Linear Range	2000 ppm	NO	18 ppm	1 ppm
Resolution	0.1 ppm	NO <sub>2</sub>	23 ppm	0 ppm
t <sub>90</sub> Response Time	≤45 s	SO <sub>2</sub>	5 ppm	1 ppm
Bias	0 mV			
Temp. Range	-40 to 50°C			
T Effect on Zero (-20 to 50°C)	0 to 10 ppm			
T Effect on Signal (-20 to 50°C)	±20%			
Calibration Gas/Bal. Gas	≥25 ppm H <sub>2</sub> S/Air*			

\* Nitrogen balance gas can also be used if exposure is <5 minutes

## Methyl Mercaptan (CH<sub>3</sub>SH)

HOCH<sub>3</sub>SH

Parameter	Specification	Cross-Sensitivity	Test Conc.	Response
Sensor Type	Electrochemical	H <sub>2</sub> S	15 ppm	33 ppm
Range	0-10 ppm	SO <sub>2</sub>	5 ppm	<2.5 ppm
Extended Linear Range	20 ppm	CO	100 ppm	≤0.2 ppm
Resolution	0.1 ppm	H <sub>2</sub>	20,000 ppm	≤1 ppm
t <sub>90</sub> Response Time	≤40 s	NO	35 ppm	≤0.5 ppm
Bias	0 mV	NO <sub>2</sub>	5 ppm	<-3 ppm
Temp. Range	-20 to 50°C			
T Effect on Zero (-20 to 50°C)	0 to 0.7 ppm			
T Effect on Signal (-20 to 50°C)	±15%			
Calibration Gas/Bal. Gas	5 ppm CH <sub>3</sub> SH/Air*			

\* Nitrogen balance gas can also be used if exposure is <5 minutes

## Nitric Oxide (NO)

SuHS

Parameter	Specification	Cross-Sensitivity	Test Conc.	Response
Sensor Type	Electrochemical	CO	100 ppm	0 ppm
Range	0-250 ppm	H <sub>2</sub> S	26 ppm	35 ppm
Extended Linear Range	200 ppm	SO <sub>2</sub>	23 ppm	2 ppm
Resolution	0.5 ppm	NO <sub>2</sub>	20 ppm	10 ppm
t <sub>90</sub> Response Time	≤90 s	Cl <sub>2</sub>	18 ppm	1.5 ppm
Bias	+300 mV	HF	10 ppm	1 ppm
Temp. Range	-40 to 50°C			
T Effect on Zero (-20 to 50°C)	-2 to 10 ppm			
T Effect on Signal (-20 to 50°C)	±20%			
Calibration Gas/Bal. Gas	25 ppm NO/Air			

## Nitrogen Dioxide (NO<sub>2</sub>)

SuCT

Parameter	Specification	Cross-Sensitivity	Test Conc.	Response
Sensor Type	Electrochemical	CO	400 ppm	0 ppm
Range	0-20 ppm	NO	30 ppm	0 ppm
Extended Linear Range	200 ppm	Cl <sub>2</sub>	11 ppm	-2 ppm
Resolution	0.1 ppm	H <sub>2</sub>	1000 ppm	0 ppm
t <sub>90</sub> Response Time	≤30 s	H <sub>2</sub> S	25 ppm	<1 ppm
Bias	0 mV	SO <sub>2</sub>	5 ppm	<3 ppm
Temp. Range	-40 to 50°C			
T Effect on Zero (-20 to 50°C)	0.3 to -1 ppm			
T Effect on Signal (-20 to 50°C)	±20%			
Calibration Gas/Bal. Gas	5 ppm NO <sub>2</sub> /Air			

## Oxygen (O<sub>2</sub>)

DDOx3

Parameter	Specification	Cross-Sensitivity	Response
Sensor Type	Galvanic Electrochemical	ppm levels of toxics including CO, Cl <sub>2</sub> , O <sub>3</sub> , NO <sub>2</sub> , H <sub>2</sub> S, SO <sub>2</sub> , VOCs, etc.	No Effect
Range	0-25% Vol		
Extended Linear Range	0-30% Vol		
Resolution	0.1 % Vol		
t <sub>90</sub> Response Time	≤10 s	Vol% levels of N <sub>2</sub> etc.	No Effect
Bias	0 mV	Vol% levels of oxidizing gases, e.g. Cl <sub>2</sub> & O <sub>3</sub>	Respond equal to their oxygen equivalence
Temp. Range	-30 to 50°C		
T Effect on Zero (-20 to 50°C)			
T Effect on Signal (-20 to 50°C)	±12%	Acid gases, e.g. CO <sub>2</sub> & SO <sub>2</sub>	0.3% of signal per 1% Vol CO <sub>2</sub> *
Calibration Gas	18% Vol O <sub>2</sub>		

\* Cannot be used to measure continuously in >25% Vol CO<sub>2</sub>

## Ozone (O<sub>3</sub>)

SUCS

Parameter	Specification	Cross-Sensitivity	Test Conc.	Response
Sensor Type	Electrochemical	Cl <sub>2</sub>	20 ppm	8 ppm
Range	0-1 ppm	ClO <sub>2</sub>	0.5 ppm	1.0 ppm
Extended Linear Range	50 ppm	NO <sub>2</sub>	25 ppm	3.6 ppm
Resolution	0.02 ppm	NO	50 ppm	<1 ppm
t <sub>90</sub> Response Time	≤60 s	H <sub>2</sub> S	25 ppm	-6.4 ppm
Bias	0 mV	SO <sub>2</sub>	20 ppm	0 ppm
Temp. Range	-40 to 50°C	CO	400 ppm	0 ppm
T Effect on Zero (-20 to 50°C)	0 to -0.5 ppm	H <sub>2</sub>	1000 ppm	0 ppm
T Effect on Signal (-20 to 50°C)	±20%	CH <sub>4</sub>	25000 ppm	0 ppm
Calibration Gas/Bal. Gas	1 ppm O <sub>3</sub> /Air (O <sub>3</sub> generator required) 2.5 ppm Cl <sub>2</sub> (available in gas cylinder)			

## Phosphine (PH<sub>3</sub>)

SUCS

Parameter	Specification	Cross-Sensitivity	Test Conc.	Response
Sensor Type	Electrochemical	CO	300 ppm	0 ppm
Range	0-20 ppm	H <sub>2</sub>	1000 ppm	0 ppm
Extended Linear Range	100 ppm	NO	18 ppm	1 ppm
Resolution	0.1 ppm	NO <sub>2</sub>	23 ppm	0 ppm
t <sub>90</sub> Response Time	≤60 s	SO <sub>2</sub>	5 ppm	1 ppm
Bias	0 mV	H <sub>2</sub> S	25 ppm	20 ppm
Temp. Range	-40 to 50°C			
T Effect on Zero (-20 to 50°C)	0 to 1 ppm			
T Effect on Signal (-20 to 50°C)	±20%			
Calibration Gas/Bal. Gas	5 ppm PH <sub>3</sub> /Air*			

\* Nitrogen balance gas can also be used if exposure is <5 minutes



## Sulfur Dioxide (SO<sub>2</sub>) 0-20 and 0-100 ppm Ranges

SUCT

Parameter	Specification	Cross-Sensitivity	Test Conc.	Response
Sensor Type	Electrochemical	CO	400 ppm	<3 ppm
Range	0-20 ppm	H <sub>2</sub>	2000 ppm	<8 ppm
Extended Linear Range	150 ppm	NO	20 ppm	0 ppm
Resolution	0.1 ppm	NO <sub>2</sub>	20 ppm	<-24 ppm
t <sub>90</sub> Response Time	≤45 s	H <sub>2</sub> S	20 ppm	0 ppm
Bias	0 mV			
Temp. Range	-40 to 50°C			
T Effect on Zero (-20 to 50°C)	-0.1 to 1 ppm			
T Effect on Signal (-20 to 50°C)	±15%			
Calibration Gas/Bal. Gas	5 ppm SO <sub>2</sub> /Air*			

\* Nitrogen balance gas can also be used if exposure is <5 minutes

## Volatile Organic Compounds (VOCs) by NDIR

DynMSHiA

Parameter	Specification	Specification	Cross-Sensitivity	CF**
Sensor Type	Infrared Absorption	Infrared Absorption	Methane	3.3
Range	0-5% Vol CH <sub>4</sub> (0-100% LEL CH <sub>4</sub> or 0-100% LEL VOC)	0-100% Vol CH <sub>4</sub> (CH <sub>4</sub> only, no other VOCs for this range)	Ethane	1.0
Resolution	0.025% Vol CH <sub>4</sub> (0.5% LEL CH <sub>4</sub> )	0.5% Vol CH <sub>4</sub>	Propane	1.0
Accuracy	±2% of full scale @ 20°C		Butane	1.0
t <sub>90</sub> Response Time	≤30 s @ 20°C		Pentane	0.9
Warm-up Time	1 min to ±2% of full scale		Hexane	0.8
Long Term Zero Drift	±1% of full scale per month @ 20°C (max ±3% of full scale per year)		Ethylene	3.4
Temp. Range	-20 to 50°C		Propylene	1.7
T Effect on Signal (-20 to 50°C)	±2% of full scale @ 0-20% full scale ±10% of reading @ 20-50% full scale ±15% of reading @ 50-100% full scale		Cyclopentane	1.6
Sensor Expected Life	>5 years		Methanol	2.2
Calibration Gas/Bal. Gas	50% LEL CH <sub>4</sub> or Propane/Air or N <sub>2</sub> *	20% Vol CH <sub>4</sub> in Air or N <sub>2</sub> *	Ethanol	1.7
Compound Sensitivity	Responds to VOCs with C-H bonds		Isopropanol	1.4
			Ethylene Oxide	0.85
			Acetone	3.3
			Methyl ethyl ketone	1.9
			Ethyl acetate	1.7
			Toluene	1.2
			Xylene	1.5
			Chloromethane	5.0
			Dichloroethane	8.6
			Hydrogen	NR#

\* Cal gas type and concentration is preferably selected to be near the range of VOCs to be measured

\*\* CF = Correction Factor using propane calibration gas, for readings up to 100% LEL propane equivalent.

True Concentration = Reading x CF.

# No response to H<sub>2</sub>.

## Volatile Organic Compounds (VOCs) by PID

SiPID

Parameter	Specification	Specification
Sensor Type	Photo-ionization	Photo-ionization
Range	0-300 ppm	0-1000 ppm
Resolution	0.1 ppm	1 ppm
t <sub>90</sub> Response Time	≤3 s	≤5 s
Temp. Range	-40 to 50°C	-40 to 50°C
T Effect on Zero (-20 to 50°C)		
T Effect on Signal (-20 to 50°C)	+40% to -25%	+40% to -25%
Lamp Operating Life	10000 hours	10000 hours
Sensor Expected Life	5 years	5 years
Calibration Gas/Bal. Gas	10 ppm IBE*/Air	100 ppm IBE*/Air
Compound Sensitivity	Responds to thousands of VOCs. See TA-1 and TA-2 for more information	

\* IBE = isobutylene. Cal gas concentration is preferably selected to be near the concentration range of VOCs measured