

Smart Sense Application Builder

<p>Sensor Slot 1</p> <input type="checkbox"/> Photo Ionization 10.6 eV 0-20 PPM	<p>Sensor Slot 2</p> <input type="checkbox"/> Carbon Dioxide Infrared 0-5000 PPM	
<p>Sensor Slot 3</p> <input type="checkbox"/> Carbon Monoxide 0-400 PPM <input type="checkbox"/> Sulfur Dioxide 0-20 PPM	<p>Sensor Slot 4</p> <input type="checkbox"/> NO2 0-20 PPM	
<p>Sensor Slot 5</p> <input type="checkbox"/> Ozone 0-20 PPM <input type="checkbox"/> Hydrogen Sulfide 0-20 PPM <input type="checkbox"/> Hydrogen 0-400 PPM	<p>Particle Sensor</p> <input type="checkbox"/> Particle IAQ 2.5, 10 <input type="checkbox"/> Particle - OPC 1,2.5,10	
<p>Ambient Sensors</p> <input type="checkbox"/> Temperature 0-120 F <input type="checkbox"/> Pressure 950-1050 hPa		<p><input type="checkbox"/> Relative Humidity 0-100% <input type="checkbox"/> Accelerometer X,Y,Z</p>
<p>Input On/Off Sensors</p> <input type="checkbox"/> Differential Pressure <input type="checkbox"/> Motion		<p><input type="checkbox"/> Oxygen <input type="checkbox"/> Other</p>
<p>Output</p> <input type="checkbox"/> Sampling Pump <input type="checkbox"/> Sampling Pump		<p><input type="checkbox"/> Solenoid</p>

Characteristic	Parameter
Operating principle	laser scattering
Detection ¹	PM2.5 and PM10
Output data ¹	PM2.5 in µg/m ³ and PM10 in µg/m ³
Concentration range	0 µg/m ³ to 1,000 µg/m ³
Accuracy (at 25°C ±5°C)	±15 µg/m ³
0 µg/m ³ to 100 µg/m ³	±15 %
100 µg/m ³ to 1000 µg/m ³	±15 %
Response time	<1s
Supply voltage	5 V ±0.2 V
Standby current (at 25°C ±5°C)	<20 mA
Supply current (at 25°C ±5°C)	<80 mA
Temperature	
operating	-10°C to 50°C [-14°F to 122°F]
storage	-30°C to 60°C [-22°F to 148°F]

Particle Sensor Outdoor		
MEASUREMENT		
Particle range	µm spherical equivalent size (based on RI of 1.5)	0.38 to 17
Size categorisation	Number of software bins	16
Sampling interval	Histogram period (seconds)	1 to 30
Total flow rate (typical)	L/min	1.2
Sample flow rate (typical)	mL/min	200
Max particle count rate	Particles/second	10,000
Max coincidence probability	%concentration at 10 ⁴ particles/L	0.84
	%concentration at 500 particles/L	0.24
POWER		
Measurement mode	mA (typical)	175
Laser on, fan off	mA (typical)	95
Voltage range		4.8 to 5.2
Switch-on transient	mW for 1ms	< 5000
DATA		
Digital interface/connections	SPI (real-time data and communications)	
	Micro USB (firmware updates and standalone mode)	
Data storage	micro-SD (CSV format) (GB)	16
KEY SPECIFICATIONS		
Digital interface	SPI (Mode 1), USB	
Laser classification	as enclosed housing	Class 1
Temperature range	°C	-10 to 50
Humidity range	% rh (continuous)	0 to 99 (non-condensing)
Weight	g	< 105

Smart Sense Application Builder Sensor Considerations

Sensor Slot 1
10.6 eV list of compounds
https://en.wikipedia.org/wiki/Photoionization_detector
le://C:/Users/mcmahan/Downloads/TA-02-Ion-Science-PID-Response-Factors-US-V1.10%20(1).pdf

Sensor Slot 2 - CO²

KEY SPECIFICATIONS

Temperature Signal: Integral thermistor (NTC, R₂₅ = 3000 Ω B=3450 K)
 Operating Temperature Range: -20°C to +55°C (linear compensation from -10 to 40°C)
 Storage Temperature Range: -40°C to +75°C
 Humidity Range: 0 to 95% rh non-condensing

TYPE*	Range (Application)	Accuracy (%FS, using universal linearisation coefficients)	Zero Resolution	Full Scale Resolution	Zero Repeatability	Full Scale Repeatability
IAQ	0 to 5000ppm (IAQ)	1	1ppm	15ppm	±10ppm	±50ppm

Sensor Slots 3,4,5 Generally Applies to all Sensors in these slots

KEY SPECIFICATIONS

Temperature range: °C -30 to 50
 Pressure range: kPa 80 to 120
 Humidity range: % rh continuous (see note below) 15 to 90

Key Consideration is Cross Sensitivity in Choosing Sensors
 Important Note: Some Sensors can provide a negative signal based on certain compounds

Sensor Slots 3,4,5

CO CROSS SENSITIVITY

Filter capacity	ppm-hrs	H ₂ S	250,000
H ₂ S sensitivity	% measured gas @ 5ppm	H ₂ S	< 0.1
NO ₂ sensitivity	% measured gas @ 5ppm	NO ₂	< -2
Cl ₂ sensitivity	% measured gas @ 5ppm	Cl ₂	< -0.1
NO sensitivity	% measured gas @ 5ppm	NO	< -2
SO ₂ sensitivity	% measured gas @ 5ppm	SO ₂	< -0.1
H ₂ sensitivity	% measured gas @ 100ppm	H ₂ at 20°C	< -10
C ₂ H ₄ sensitivity	% measured gas @ 100ppm	C ₂ H ₄	< -0.5
NH ₃ sensitivity	% measured gas @ 20ppm	NH ₃	< -0.1

SO₂ CROSS SENSITIVITY

Filter capacity	ppm-hrs	H ₂ S	450
H ₂ S sensitivity	% measured gas @ 5ppm	H ₂ S	< -40
NO ₂ sensitivity	% measured gas @ 5ppm	NO ₂	< -160
Cl ₂ sensitivity	% measured gas @ 5ppm	Cl ₂	< -70
NO sensitivity	% measured gas @ 5ppm	NO	< -1.5
CO sensitivity	% measured gas @ 5ppm	CO	< 2
H ₂ sensitivity	% measured gas @ 100ppm	H ₂	< 1
C ₂ H ₄ sensitivity	% measured gas @ 100ppm	C ₂ H ₄	< 1
NH ₃ sensitivity	% measured gas @ 20ppm	NH ₃	< -0.1
CO ₂ sensitivity	% measured gas @ 5%	CO ₂	< -0.1

NO₂ CROSS SENSITIVITY

O ₂ sensitivity	Filter capacity (ppm hrs) @ 2ppm	O ₂	> 500
H ₂ S sensitivity	% measured gas @ 5ppm	H ₂ S	< -80
NO sensitivity	% measured gas @ 5ppm	NO	< 5
Cl ₂ sensitivity	% measured gas @ 5ppm	Cl ₂	< -75
SO ₂ sensitivity	% measured gas @ 5ppm	SO ₂	< -5
CO sensitivity	% measured gas @ 5ppm	CO	< -5
C ₂ H ₄ sensitivity	% measured gas @ 100ppm	C ₂ H ₄	< 1
NH ₃ sensitivity	% measured gas @ 20ppm	NH ₃	< 0.2
H ₂ sensitivity	% measured gas @ 100ppm	H ₂	< 0.1
CO ₂ sensitivity	% measured gas @ 5% Vol	CO ₂	0.1

O₃ CROSS SENSITIVITY

H ₂ S sensitivity	sensitivity % measured gas @ 5ppm	H ₂ S	< 100
NO sensitivity	sensitivity % measured gas @ 5ppm	NO	< 5
Cl ₂ sensitivity	sensitivity % measured gas @ 5ppm	Cl ₂	< 85
SO ₂ sensitivity	sensitivity % measured gas @ 5ppm	SO ₂	< -6
CO sensitivity	sensitivity % measured gas @ 5ppm	CO	< -0.1
C ₂ H ₄ sensitivity	sensitivity % measured gas @ 100ppm	C ₂ H ₄	< 0.1
NH ₃ sensitivity	sensitivity % measured gas @ 20ppm	NH ₃	< 0.1
H ₂ sensitivity	sensitivity % measured gas @ 100ppm	H ₂	< 0.1
CO ₂ sensitivity	sensitivity % measured gas @ 5% Vol	CO ₂	0.1

H₂S CROSS SENSITIVITY

NO ₂ sensitivity	% measured gas @ 5ppm	NO ₂	< -20
Cl ₂ sensitivity	% measured gas @ 5ppm	Cl ₂	< -8
NO sensitivity	% measured gas @ 5ppm	NO	< 3
SO ₂ sensitivity	% measured gas @ 5ppm	SO ₂	< 15
CO sensitivity	% measured gas @ 5ppm	CO	< 1
H ₂ sensitivity	% measured gas @ 100ppm	H ₂	< 0.5
C ₂ H ₄ sensitivity	% measured gas @ 100ppm	C ₂ H ₄	< 0.5
NH ₃ sensitivity	% measured gas @ 5ppm	NH ₃	< 0.1
CO ₂ sensitivity	% measured gas @ 5%	CO ₂	< 0.1

H₂ CROSS SENSITIVITY

Filter capacity	ppm-hrs	H ₂ S	nd
CO sensitivity	% measured gas @ 400ppm	CO	< 2
NO ₂ sensitivity	% measured gas @ 10ppm	NO ₂	< 1
Cl ₂ sensitivity	% measured gas @ 10ppm	Cl ₂	< 1
NO sensitivity	% measured gas @ 50ppm	NO	< 40
SO ₂ sensitivity	% measured gas @ 20ppm	SO ₂	< 4
H ₂ S sensitivity	% measured gas @ 20ppm	H ₂ S	< 2
C ₂ H ₄ sensitivity	% measured gas @ 400ppm	C ₂ H ₄	< 25
NH ₃ sensitivity	% measured gas @ 20ppm	NH ₃	< 1
CO ₂ sensitivity	% measured gas @ 5%	CO ₂	< 1

Other Sensors upon request include but not limited to
 Chlorine, Formaldehyde, Ethylene Oxide, Hydrogen Chloride, Hydrogen Cyanide, Ammonia, Phosphine

