

GRAYWOLF GAS SENSOR SPECIFICATIONS

January 2024



DirectSense® II (DSII) / DirectSense (DSI) Gas Sensor Specs Summary

SENSOR	RESOLUTION (PPM)	RANGE (PPM)	SENSOR L.O.D. (PPM)	TYPICAL DRIFT	T ₉₀ RESPONSE	RECOMMENDED CALIBRATION FREQUENCY ⁱ	EXPECTED LIFE
NDIR							
Carbon Dioxide (CO ₂) SEN-SMTX-CO2 (DSII)	1	0 to 10,000	<1	<80ppm /year ⁱⁱ	<20s	≤12 months ⁱⁱⁱ	>10 years
Carbon Dioxide (CO ₂) SEN-X-CO2 (DSI)	1	0 to 10,000	<1	<80ppm /year ^{iv}	<20s	≤12 months ⁱⁱⁱ	>10 years
PID (TVOC)							
Low range PPB VOC Gas Sensor	0.001	0 to 40	0.001	<5 ppb / day (at zero), <50 ppb / day (at span)	<8s	<2 weeks User ^v , 12 months Factory	>5 years ^{vi}
Mid-Low Range VOC Gas Sensor	0.01	0 to >200	0.02		<8s	<2 weeks User, 12 months Factory	>5 years ^{vi}
Mid-High PPM VOC Gas Sensor	0.1	0 to 4,000	0.1		<3s	<2 weeks User, 12 months Factory	>5 years ^{vi}
High Range PPM VOC Gas Sensor	0.1	0 to >10,000	0.5		<3s	<2 weeks User, 12 months Factory	>5 years ^{vi}
ELECTROCHEMICAL							
Ammonia (NH ₃)	0.1	0 to 100	<1	<20% / year	<75s	≤12 months	>24 months
Ammonia (NH ₃) TOX Range	1	0 to 1,000	<5	<20% / year	<75s	≤12 months	>24 months
Arsine (AsH ₃)	0.01	0 to 1	<0.02	<5% / month	<60s	<12 months ^{vii}	18-24 months
Carbon Monoxide (CO) 4-electrode (DSII)	0.1	0 to 500	<0.1	<10% / year	<30s	≤12 months	36-60 months ^{ix}
Carbon Monoxide (CO) 3-electrode (DSI)	0.1	0 to 500	<0.1	<10% / year	<30s	≤12 months	36-60 months ^{ix}
Chlorine (Cl ₂)	0.01	0 to 20	<0.02	<10% / year	<60s	≤12 months ^{vii}	>24 months
Chlorine Dioxide (ClO ₂)	0.01	0 to 1	<0.03	<10% / 6 months	<90s	≤6 months ^{vii}	>24 months
Diborane (B ₂ H ₆)	0.01	0 to 1	<0.02	<10% / 6 months	<30s	≤6 months ^{vii}	>18 months
Ethylene Oxide (EtO)	0.1	0 to 100	<0.1		<150s	≤12 months	>24 months
Fluorine (F ₂)	0.01	0 to 1	<0.01	<10% / 6 months	<60s	≤4 months ^{vii}	>18 months
Formaldehyde (HCHO) DSII mfg ≥ 09/2021 ^{xii}	0.001	0 to 1	<0.01		<80s	≤12 months	>36 months
Hydrogen (H ₂)	1	0 to 1000	<2	<2% / month	<35s	≤6 months	>24 months
Hydrogen Chloride (HCl)	0.1	0 to 20	<0.2	<2% / month	<60s	≤6 months	24 months



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Hydrogen Cyanide (HCN)	0.01	0 to 100	<0.05		<70s	≤4 months	>12 months
Hydrogen Fluoride (HF)	0.1	0 to 10	<0.1	<5% / month	<90s	≤6 months ^{vii}	>18 months
Hydrogen Sulfide (H ₂ S)	0.01	0 to 50	<0.03	<2% / year	<30s	≤12 months	24-48 months ^{ix}
Nitric Oxide (NO)	0.1	0 to 250	<0.2	<5% / year	<45s	≤12 months	24-48 months ^{ix}
Nitrogen Dioxide (NO ₂) 4-electrode (DSII) ^{xi}	0.01	0 to 20	<0.02	<20ppb / year (at zero)	<80s	≤12 months	24-48 months ^{ix}
Nitrogen Dioxide (NO ₂) 3-electrode (DSI)	0.01	0 to 20	<0.02	<20ppb / year (at zero)	<50s	≤12 months	24-48 months ^{ix}
Ozone (O ₃)	0.01	0 to 1	<0.02	<10% / 6 months	<60s	≤12 months ^{viii}	12-18 months ^x
Phosgene (COCl ₂)	0.01	0 to 1	<0.02	<10% / 6 months	<150s	<12 months ^{vii}	>15 months
Phosphine (PH ₃)	0.1	0 to 10	<0.1	<10% / year	<25s	≤12 months	>24 months
Silane (SiH ₄)	0.1	0 to 50	<0.1	<2% / month	<60s	≤12 months	>24 months
Sulfur Dioxide (SO ₂)	0.1	0 to 50	<0.1	±15% / year	<20s	≤12 months	24-48 months ^{ix}
	RES %	RANGE%	LOD %	TYPICAL DRIFT	T₉₀ RESPONSE	CAL FREQUENCY	EXPECTED LIFE
Oxygen (O ₂)	0.1	0 to 25	<0.2	<1% / 3 months	<15s	≤12 months	24 - 36 months ^x

All specifications are subject to change without further notice.

Any sensor(s) used for safety critical situations, such as OSHA TWAs or STELs, must be User calibrated or, at minimum, exposed to a target gas (bump tested) to assure sensor response each day of use with a reference gas close to the critical level. Failure to carry out such tests may jeopardize the safety of people and property.

For optimum accuracy, it is advised to perform more frequent User calibrations of zero and/or span (dependent on application). GrayWolf makes the User calibration procedure simple and reliable. The software walks users through the calibration process. Calibration kits and appropriate reference gasses are available for shipment to most locations.

i Calibration may be User Cal or Factory/Lab Cal. However, annual Factory/Lab calibration is recommended even if User calibrations are being performed more often.

ii Over the "IAQ critical range" (350ppm to 2000ppm), based on GrayWolf data and long-term experience.

iii Exceptional accuracy of +/-35ppm over the "IAQ critical range" range, assuming quarterly calibration. GrayWolf offers User calibration kits to help maintain optimum accuracy between annual Factory/Lab calibrations.

iv Over the "IAQ critical range" (350ppm to 2000ppm), based on GrayWolf data and long-term experience. Accuracy of +/-50ppm, +/-3% of reading.

v While GrayWolf recommends <2 week User cal intervals, years of customer feedback has indicated that User calibrations at 4 to 8 week intervals is satisfactory for most IAQ applications.

vi PIDs carry a 1 year warranty. Their lamps and electrode stacks are rated 10,000 hours lit and usually perform far better. Unless clients are running probes 24/7, GrayWolf's experience is that it is rare to replace lamps or detector stacks <4 years.

vii For User calibrations, a surrogate reference gas is recommended. Contact GrayWolf for details.

viii For User calibrations, NO₂ surrogate ref. gas is recommended as it is easier to work with than O₃ gas.

ix This specification is enhanced vs. the sensor mfg. spec based on GrayWolf data & long-term experience.

x This specification is reduced vs. the sensor mfg. lifetime spec based on GrayWolf data & long-term experience.

xi The 4-electrode smart NO₂ sensor has significantly reduced cross-sensitivity with O₃.

xii DirectSense II probes manufactured after September 2021 may require a firmware update to accept the Formaldehyde sensor. Probes manufactured after June 2022 are fully compatible. Probes manufactured prior to Sept 2021 are NOT compatible with the Formaldehyde sensor.

