E-Chem Sensor Data
Model H10-42 Oxides of Nitrogen (NO_x) Smart Sensor

Model H10-42 Oxides of Nitrogen sensor is an electrochemical device used for the detection of NO_x gas leaks in ambient air. It is designed to be used in conjunction with ATI's Model D16 portable leak detector or Models D12 or F12 toxic gas transmitters. H10-42 sensors contain internal electronics and memory that control sensor bias and store calibration data, calibration history, and limited data log.

Oxides of Nitrogen sensors operate by generating a small electrical current proportional to the partial pressure of NO_x gas in the surrounding air. The current is the result of the electrochemical oxidation of NO_x on a catalytic electrode as shown below. Oxides of Nitrogen sensors are 3-electrode sensors and require oxygen levels above 5% to operate properly. They may not be used in oxygen free applications.

$$NO + 2H_2O \rightarrow NO_3^- + 3e^- + 4H^+$$

$$NO_2 + H_2O \rightarrow NO_3^- + e^- + 2H^+$$

The table below provides the operational and performance specifications for the H10-25 NO sensor. Contact ATI or your ATI local representative with questions regarding specific applications for this sensor.

Primary Response	Volume % NO_x
Measurement Range	2 – 500 PPM V/V
Sensor Current	0.20 μA/PPM Nominal
Sensor Current Variability	0.06 – 0.5 μA/PPM
Linearity	± 3%
Response Time	T_{50} = 15 Seconds, T_{90} = 30 seconds
Temperature Range	-40° to +50° C
Memory	Internal e^2 for Calibration Data and Calibration History
Pressure Range:	- 5 to + 50 PSIG
Pressure Variability	Output proportional to NO_x partial pressure
Operating Humidity	0-99% RH Non-condensing (Intermittent) 20-95% RH Non-condensing (Continuous)
Zero Stability	± 1 PPM at constant temperature ± 3 PPM over ±10° C ambient temperature change
Span Drift	< 2%/Month
Temperature Effect on Span	See Graph
Operating Life	> 18 Months Typical in Clean Conditions
Storage Recommendation	Recommended maximum of 1 year for best sensor performance. Store at less than 25° C in a sealed container.
Size	1" D x 1.25" H (25 mm x 32 mm)
Weight	17 grams

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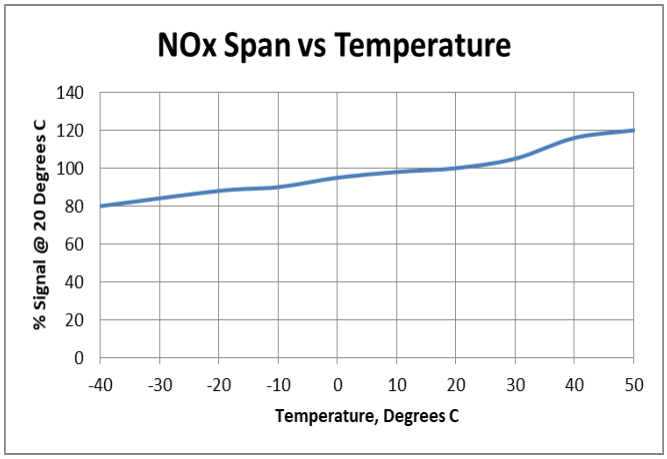
H10-42 NO_x sensors exhibit response to certain other gases. When applying this sensor to specific applications, it is good practice to verify whether or not any of these potential interferences are present and might present interference issues. Note that cross-sensitivity data is approximate. In some cases, response to other gases may not be stable or may be transient.

Gas	Symbol	Response to 1 PPM
Hydrogen	H_2	None
Ethylene	C_2H_4	None
Hydrogen Cyanide	HCN	None
Acetylene	C_2H_2	0.01
Phosphine	PH_3	0.25
Carbon Dioxide	CO_2	None
Hydrogen Chloride	HCl	0.05
Hydrogen Sulfide	H_2S	0.3
Nitrogen Dioxide	NO_2	0.1
Sulfur Dioxide	SO_2	0.04
Phosgene	$COCl_2$	None
Chlorine (Oxidants)	Cl_2	None

Electrochemical sensors exhibit a response that is temperature dependent to a limited extent. Although the effect of temperature is not large, it is useful to be aware of the effect. Shown below is a graph showing the effect on span (uA/PPM) of changing temperature.



Shown below is a typical response time graph for a nitric oxide sensor. Note that this response time can become significantly slower at temperatures below -20°C.