

E-Chem Sensor Data Model H10-HC Hydrocarbon Vapor Smart Sensor

Model H10-HC Hydrocarbon vapor sensor is an electrochemical device used for the detection of a variety of hydrocarbon vapors in ambient air. This sensor is used for measurement of ethylene oxide, formaldehyde, alcohols, acetylene, ethylene, and others. The cross-sensitivity table on page 2 lists the hydrocarbons that may be detected with this sensor. It is designed to be used in conjunction with ATI's Model C16 portable leak detector or Models D12 or F12 toxic gas transmitters. H10-HC sensors contain internal electronics and memory that control sensor bias and store calibration data, calibration history, and limited data log.

The HC sensor is a 3-electrode electrochemical cell and operates by generating a small electrical current proportional to the partial pressure of hydrocarbon vapor in the surrounding air. The current results from the direct oxidation of the hydrocarbon on the measuring electrode to form carbon dioxide. Oxidation of formaldehyde is shown in the formula below.



The table below provides the operational and performance specifications for the H10-HC hydrocarbon vapor sensor. Contact ATI or your ATI local representative with questions regarding specific applications for this sensor.

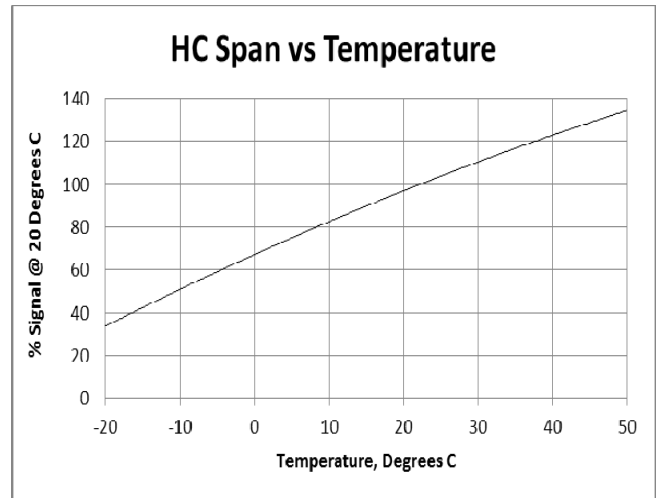
Primary Response	Volume % Formaldehyde (reference gas)
Measuring Range	0.5 – 200 PPM V/V
Sensor Current	0.05 μ A/PPM Nominal
Sensor Current Variability	0.02 – 0.10 μ A/PPM
Linearity	\pm 3%
Response Time	$T_{50} \leq 30$ Seconds, $T_{90} \leq 150$ seconds
Temperature Range	-20° to +50° C
Memory	Internal e^2 memory for Calibration Data and Calibration History
Pressure Range:	- 5 to + 50 PSIG
Pressure Variability	Output proportional to HC partial pressure
Operating Humidity	0-99% RH Non-condensing (Intermittent) 20-95% RH Non-condensing (Continuous)
Zero Stability	\pm 2 PPM at constant temperature \pm 3 PPM over \pm 10° C ambient temperature change
Span Drift	< 2%/Month
Temperature Effect on Span	See Graph
Operating Life	> 24 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-HC Hydrocarbon sensors exhibit response to a variety of gases and vapors. When applying this sensor to specific applications, the user should verify whether vapors other than the target vapor are present in the application. Note that cross-sensitivity data is approximate. In some cases, response to other gases may not be stable or may be transient.

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.

Gas	Symbol	Response to 1 PPM
Ethylene Oxide	C ₂ H ₄ O	1.0
Formaldehyde	HCOH	1.0
Methanol	CH ₃ OH	1.2
Ethanol	C ₂ H ₅ OH	0.7
Isopropyl Alcohol	C ₃ H ₇ OH	0.25
Acetylene	C ₂ H ₂	1.2
Ethylene	C ₂ H ₄	1.0
Vinyl Chloride	C ₂ H ₃ Cl	0.6
Propylene Oxide	C ₃ H ₆ O	0.7
Propylene	C ₃ H ₆	0.6
Methyl Methacrylate	C ₅ H ₈ O ₂	0.25
Acetaldehyde	CH ₃ CHO	0.25
Styrene	C ₈ H ₈	0.25
Carbon Monoxide	CO	0.5
Nitrogen Dioxide	NO ₂	0.1
Sulfur Dioxide	SO ₂	0.4
Methyl Mercaptan	CH ₃ SH	1.0
Hydrogen	H ₂	0.05
Nitric Oxide	NO	0.8



Shown below is a typical response time graph for an HC sensor exposed to Formaldehyde. Response to other hydrocarbons may be somewhat different. Note that response times can become significantly slower at temperatures below -20°C.

