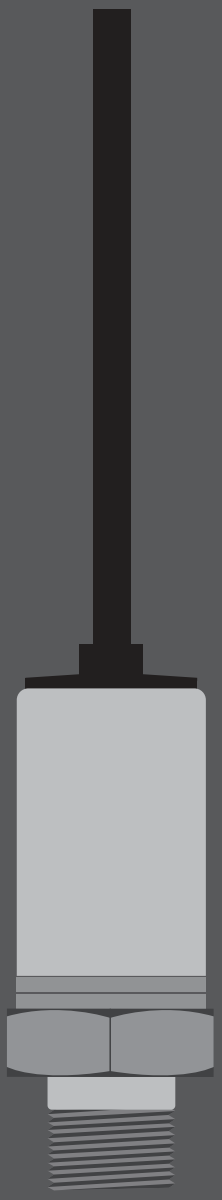
Atlas Scientific™
Environmental Robotics

V 1.2

Revised 9/21

A-10 Analog Pressure Sensor

Reads	**Pressure (PSIG)**
Range	**10 PSIG (68.947 kPa)**
Resolution	**1mv (.0025 PSI /0.017 kPa)**
Accuracy	**<± 0.1 PSI (0.689 kPa)**
Connector	**Tinned leads**
Response Time	**< 1ms**
Data protocol	**Analog voltage**
Data format	**0.5 VDC – 4.5 VDC**
Operating voltage	**5 VDC**
Durability	**IP67**

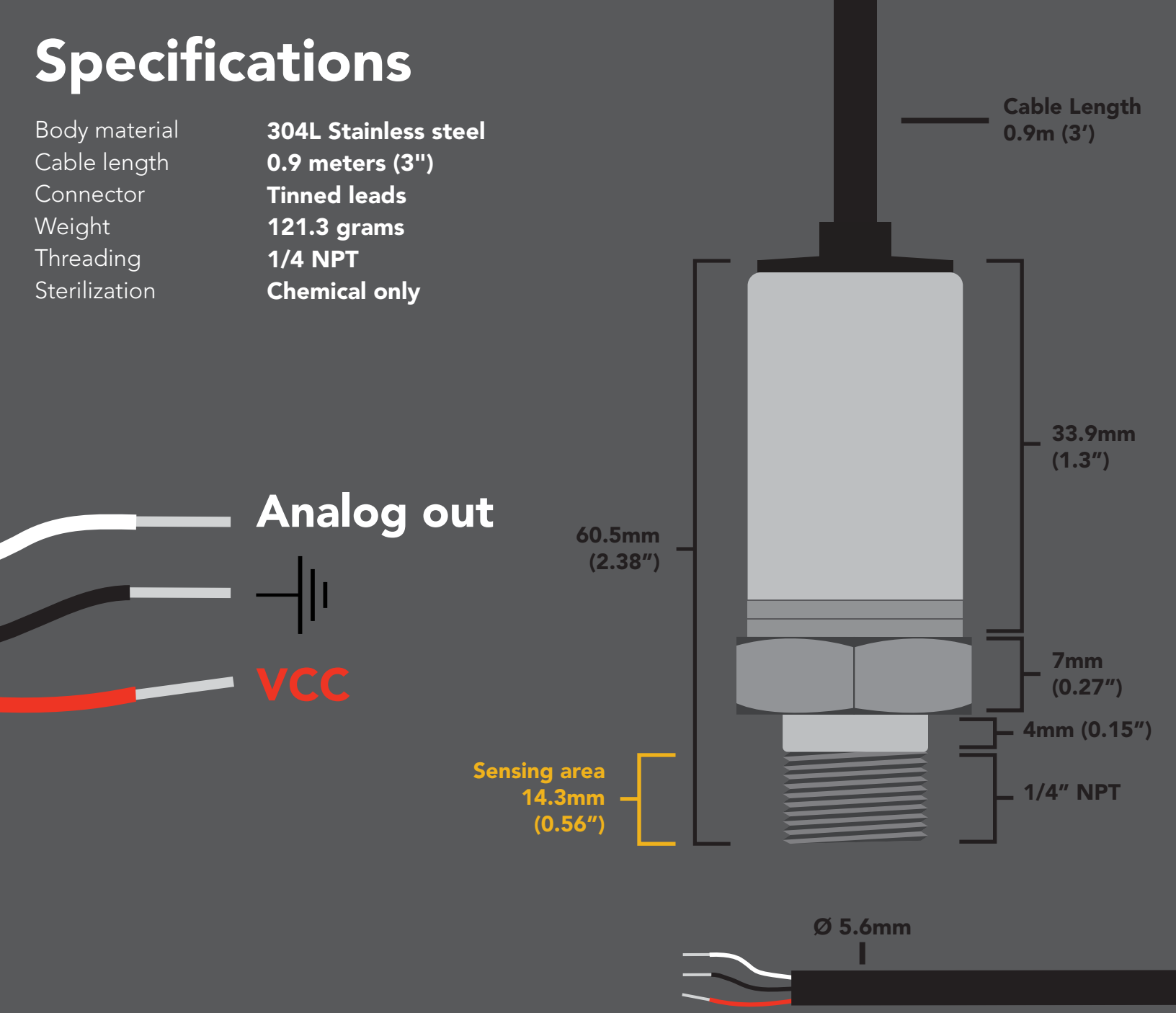


Written by Jordan Press
Designed by Noah Press

This is an evolving document, check back for updates.

Specifications

Body material	**304L Stainless steel**
Cable length	**0.9 meters (3")**
Connector	**Tinned leads**
Weight	**121.3 grams**
Threading	**1/4 NPT**
Sterilization	**Chemical only**



Absolute max ratings

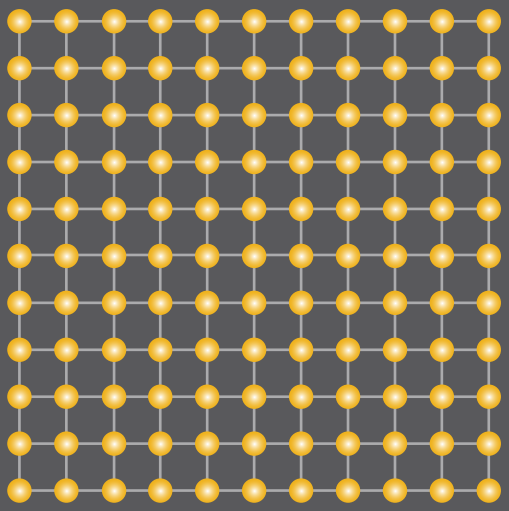
VCC	**5.5 VDC**
Output current	**0.45 mA**
Operating temperature	**-40°C – 105°C**
Proof pressure	**30 PSI (206 kPa)**
Burst pressure	**300 PSI (2,068 kPa)**

Power consumption

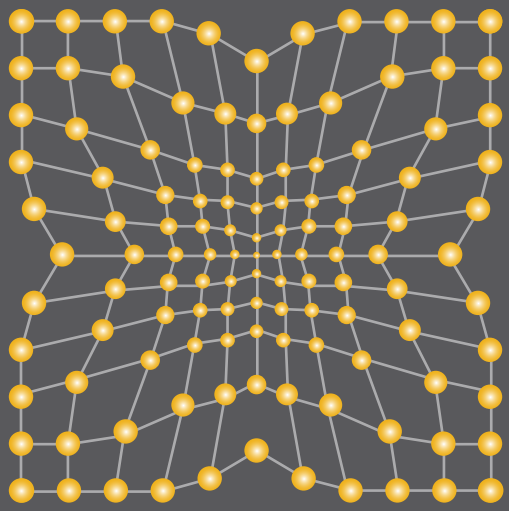
5V	**6 mA**

Operating principle

Internally the pressure sensor uses a piezoresistive semiconducting element. The semiconducting element *(a silicon wafer)* changes its resistance in proportion to pressure. As the pressure increases the atomic spacing of the silicon atoms decreases, this in turn lowers the resistance of the silicon wafer.



Atmospheric pressure
1MΩ



10 PSI (68.947 kPa)
500KΩ

An on-board microcontroller monitors the resistance and temperature of the semi-conducting element. By combining these two parameters, the microcontroller computes the pressure and convert it into an analog voltage.

Analog Output = 0.5 – 4.5 VDC

Pressure	Volts
0 PSI (atmosphere)	0.5
2 psi	1.3
4 psi	2.1
6 psi	2.9
8 psi	3.7
10 psi	4.5

Voltage to PSI equation

PSI = 2.5 x (Volts) - 1.25

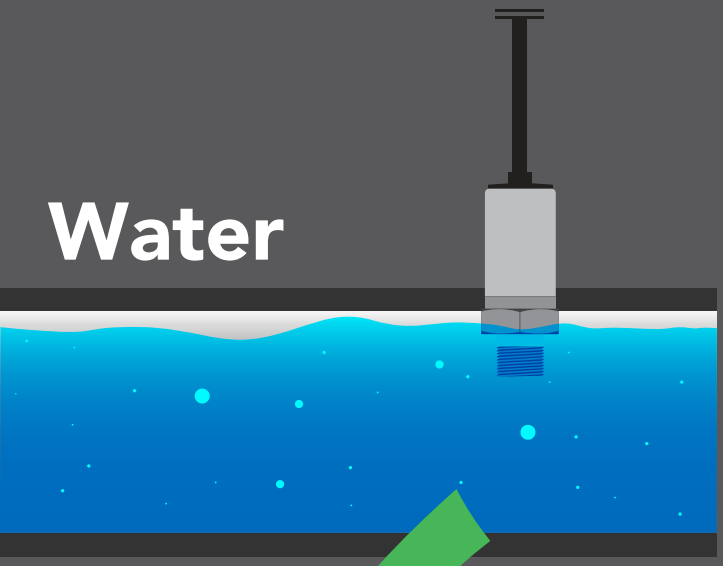
Voltage to kPa equation

kPa = 17.237 x (Volts) - 8.6185

When the sensor is not under any pressure it may read a slight negative pressure. It is common to see negative readings from ***-0.01*** to ***-0.04.*** This is due to floating point error when the sensor is not under pressure and should be ignored.

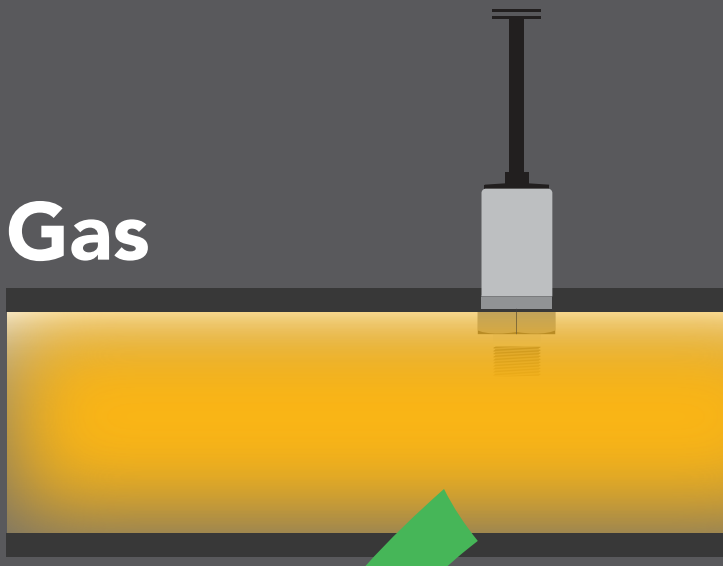
Typical applications

Water



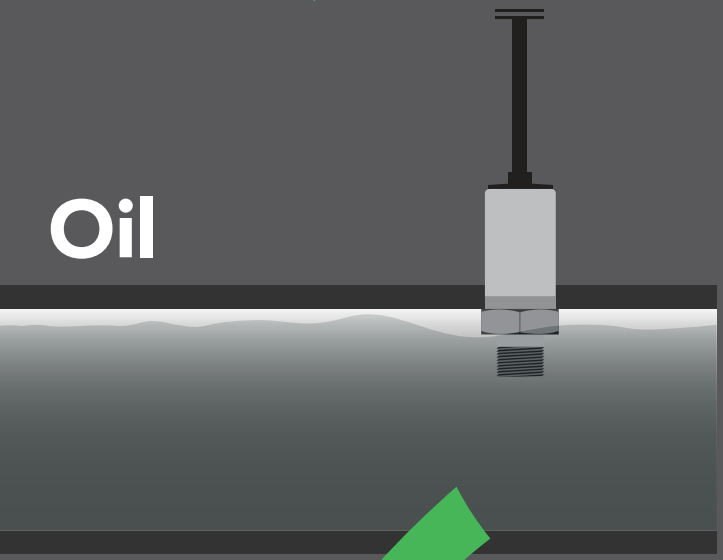
OK

Gas



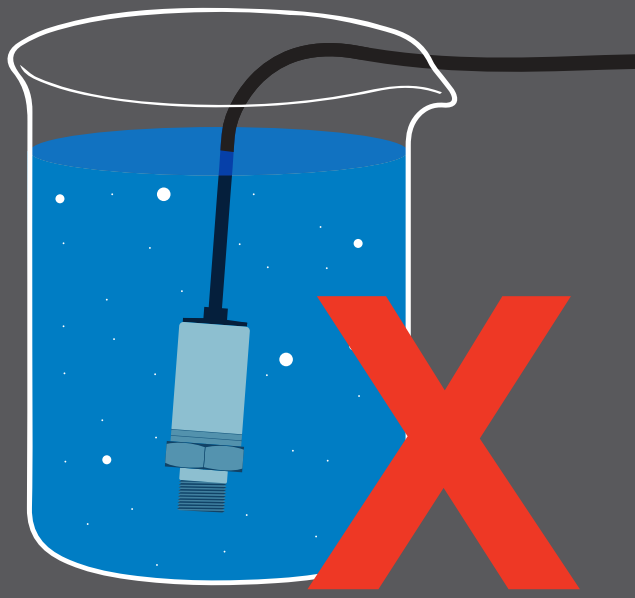
OK

Oil



OK

Submerge



DO NOT submerge

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