

### • Description

The eTape sensor is a solid state, continuous (multi-level) fluid level sensor for measuring levels in water, non-corrosive water based liquids and dry fluids (powders). The eTape sensor is manufactured using printed electronic technologies which employ additive direct printing processes to produce functional circuits.

### • Theory of Operation

The eTape sensor's envelope is compressed by hydrostatic pressure of the fluid in which it is immersed resulting in a change in resistance which corresponds to the distance from the top of the sensor to the fluid surface. The eTape sensor provides a resistive output that is inversely proportional to the level of the liquid: the lower the liquid level, the higher the output resistance; the higher the liquid level, the lower the output resistance.

### • Specifications

**Sensor Length:** 14.1" (358 mm)

**Thickness:** 0.015" (0.381mm)

**Width:** 1.0" (25.4 mm)

**Active Sensor Length:** 12.4" (315 mm)

**Sensor Output:** 2250Ω empty, 400Ω full, ±10%

**Resistance Gradient:** 150Ω /inch (59Ω/cm), ±10%

**Resolution:** < 0.01" (0.25 mm)

**Actuation Depth:** Nominal 1" (25.4 mm)

**Reference Resistor (Rref):** 2250Ω, ±10%

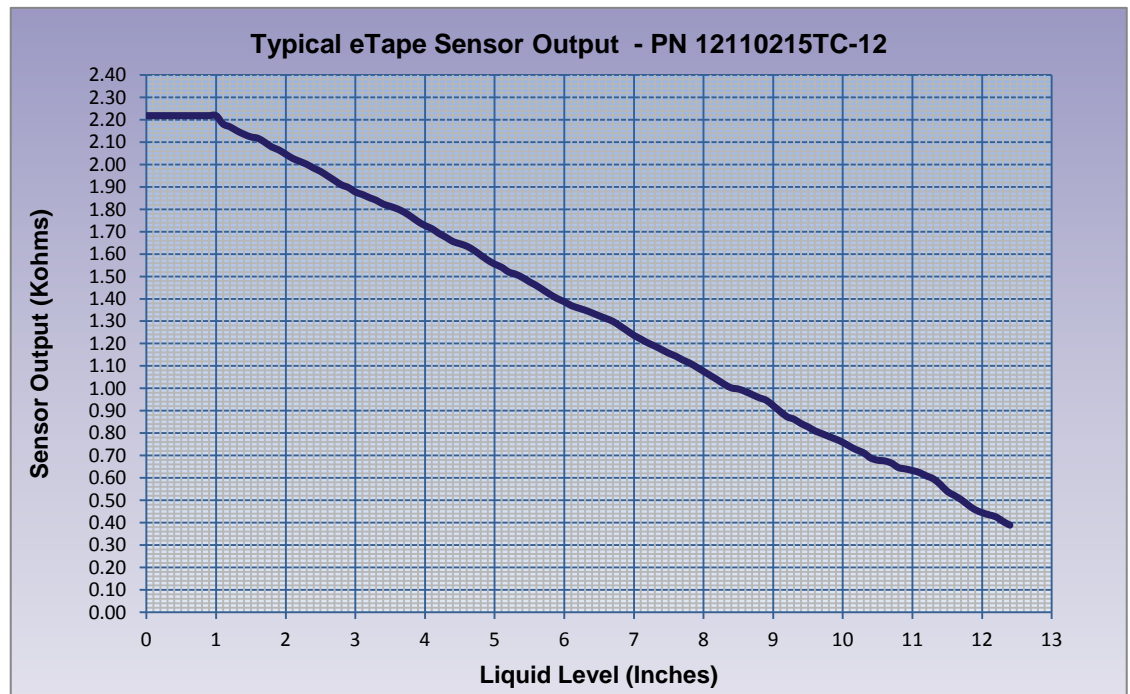
**Connector:** Crimpflex Pins

**Temperature Range:** 15°F - 150°F (-9°C - 65°C)

**Power Rating:** 0.5 Watts (VMax = 10V)

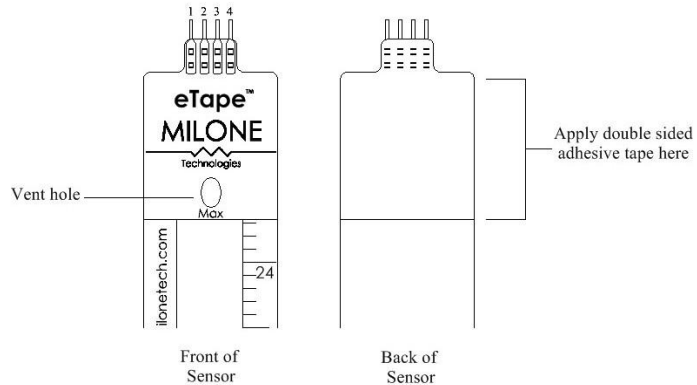
### • Sensor Output

The eTape can be modeled as a variable resistor (400 – 2250 Ω ± 10%). The typical output characteristics of the eTape sensor are show in the figure below:



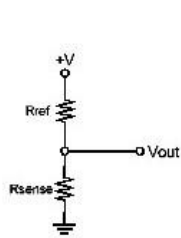
## • Connection and Installation

Connect to the eTape by attaching a 4 pin connector with pre-soldered wires to the Crimpflex pins. Do not solder directly to the Crimpflex pins. The inner two pins (pins 2 and 3) are the sensor output ( $R_{sense}$ ). The outer pins (pins 1 and 4) are the reference resistor ( $R_{ref}$ ) which can be used for temperature compensation. Suspend the eTape sensor in the fluid to be measured. To work properly the sensor must remain straight and must not be bent vertically or longitudinally. For best results install the sensor inside a section of 1-inch diameter PVC pipe. Double sided adhesive tape may be applied to the upper back portion of the sensor to suspend the sensor in the container to be measured. However, the liquid must be allowed to interact freely with both sides of the sensor. The vent hole located above the max line allows the eTape to equilibrate with atmospheric pressure. The vent hole is fitted with a hydrophobic filter membrane to prevent the eTape from being swamped if inadvertently submerged.

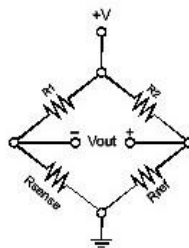


## • Sample Circuits

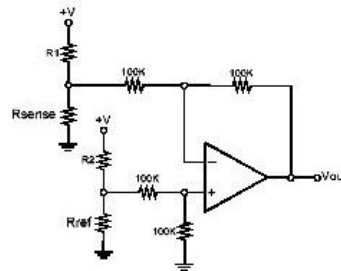
Simple Voltage Divider



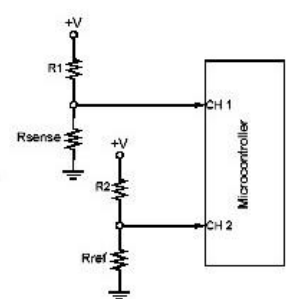
Wheatstone Bridge



Differential Op-Amp



Voltage Dividers and Microcontroller



## • Custom Applications

The eTape sensor can be manufactured in custom lengths to fit any application. Contact Milone Technologies if you have an application that requires specific length, configuration or output characteristics.

## • Technical Support

If you require technical support for the eTape liquid level sensor, please contact our technical support department by email at: [techsupport@milonetech.com](mailto:techsupport@milonetech.com).

**Innovative Fluid Sensing**

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