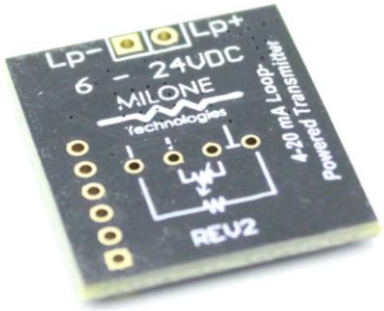
MILONE
Technologies

4-20mA Resistance to Current Module
PN-420MA0399 REV 2

Description

The 4-20mA resistance to current module was designed for the eTape liquid level sensors. The eTape sensor plugs directly into the four-pin header on the module. The module is designed to convert the variable resistance output of the eTape liquid level sensor, to a linear output current between ~4 to ~20 mA DC. Applying the output current of the module to a microcontroller, PLC or other current monitoring device can more accurately measure and monitor the liquid level output of the eTape sensor.



Theory of Operation

The module converts the variable resistive output of the eTape sensor to a current using a programmable signal conditioning chip designed to amplify the change in resistance. The programmable chip conditions the eTape input signals by amplification and digitization through an analog front end channel. With the programmed firmware in the on-chip ARM Cortex M0 processor, the chip performs pre-programmed compensation algorithms. The module has a push button to calibrate the module across the complete range of 5-inch to 70-inch eTape sensors.

Specifications

Thickness: 0.17" (4.3mm)

Length: 0.85" (21.6 mm)

Width: 0.75" (19.1 mm)

Connector: 4 Pin Female & 2 Pin Male Header

Temperature Range: -40°F - 257°F (-40°C - 125°C)

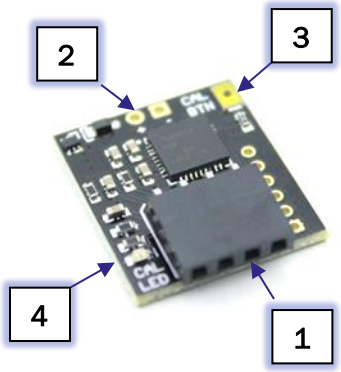
Power Requirements: 6 – 24VDC

Current Output Range: ~4 – ~20 mA +/-5%

Connection and Installation

Connect to the module by attaching the eTape sensor to the four pin socket [1] located at the bottom of the module. Then connect Power (VIN) and ground (GND) to the two-pin header [2] located at the top of the module (6 – 24 VDC). Connect your current monitoring device or load in series with the power connection to monitor the output (4-20mA).

1- eTape Sensor Socket
2- Power and Output header
3- Calibration Button
4- Calibration LED



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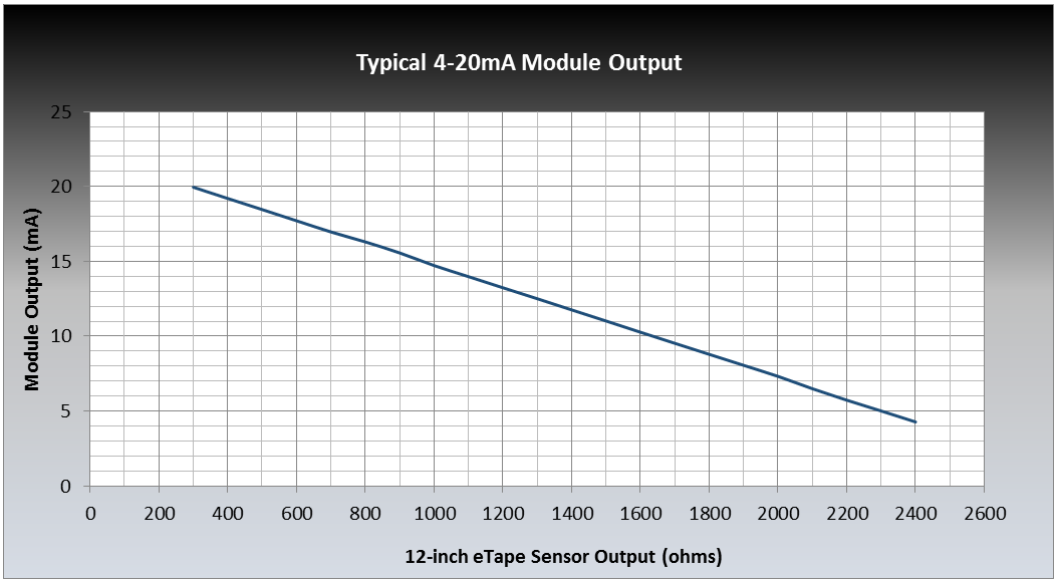
Calibration

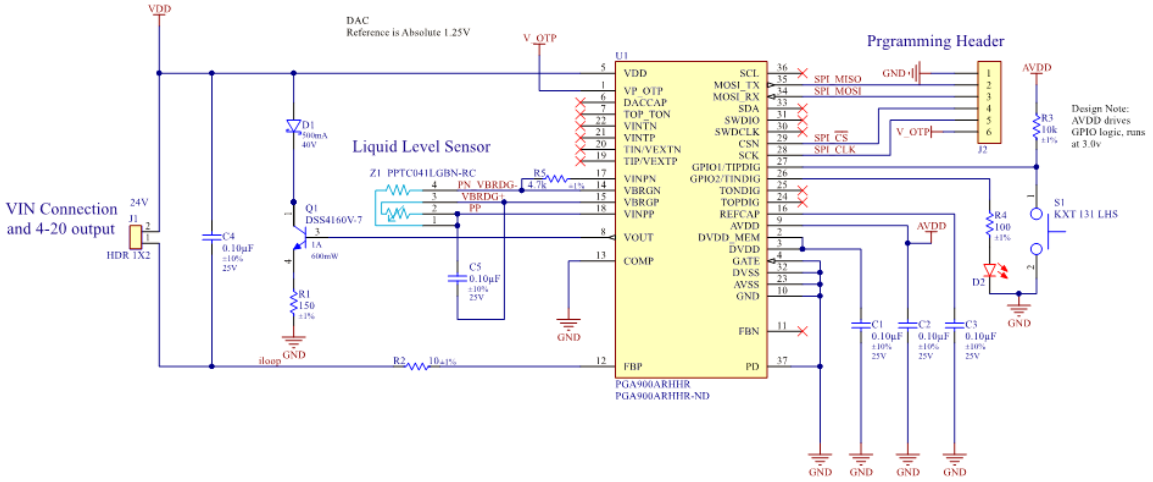
Connect the e-Tape sensor to be calibrated using the 4-pin socket. **(1)** Hold down the calibration button while powering on the module. The red calibration LED will light up solid. **(2)** With the sensor not submerged in any liquid, press the calibration button once. The LED will flash slowly after a couple of seconds. Once the LED stops flashing, the low end of the sensor is calibrated. **(3)** Add liquid to submerge the eTape sensor to the desired or max level and press the calibration button again. The LED will flash fast for several seconds. Once the LED stops flashing and stays off, calibration is complete and the module and eTape are now calibrated.
Note: The calibration process can be done in reverse, so that the measurement output is reversed (4mA output for high liquid level and 20mA output for low liquid level).

Module Output

The following graph represents the typical 4-20mA module output per the calibration sequence above and an idealized 12" eTape sensor input resistance range of 300 to 2400 ohms.



Circuit Diagram



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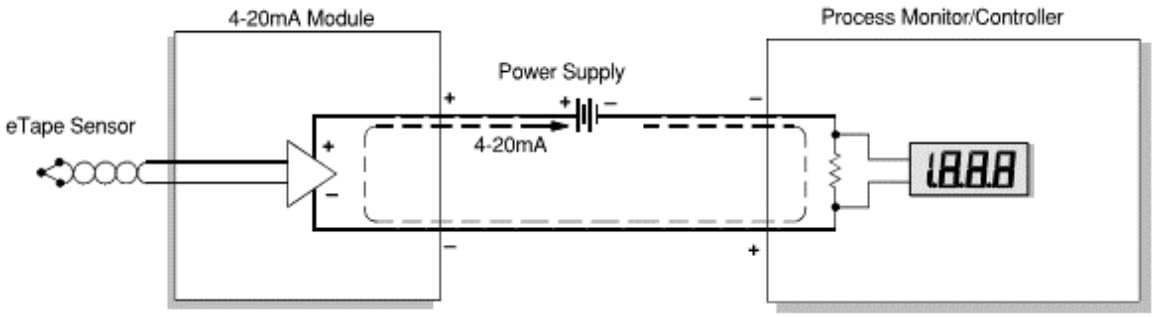
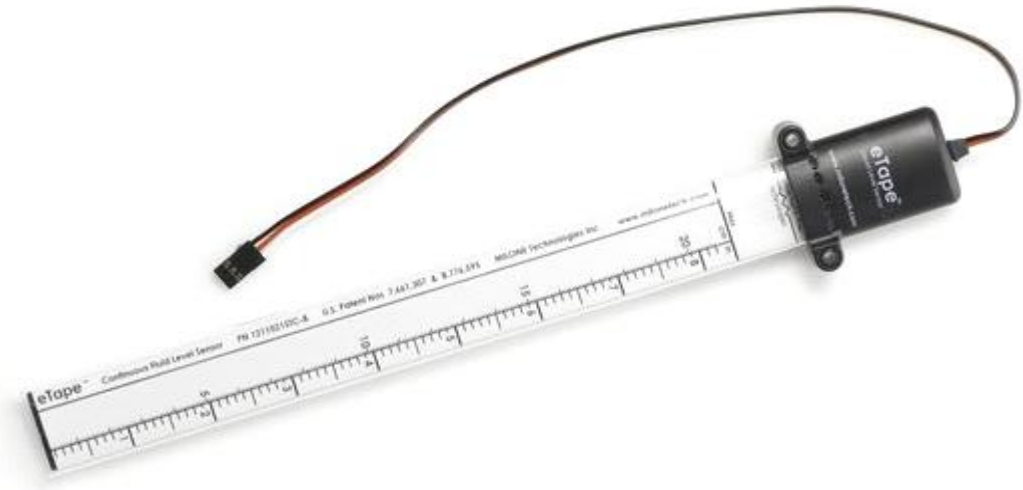
Typical Current Loop Connection Diagram



Complete eTape Assemblies

If you purchase a complete assembly with the polycarbonate tube and housing cap, the 4-20mA module will come pre-calibrated and potted inside the black housing cap. Therefore, there is no access for re-calibration of the module. There are three wires with the complete assemblies: red (V+), Black (V-) and White (not used) as shown below:



Technical Support

If you require technical support for the 4-20mA module or eTape liquid level sensor, please contact our technical support department by email at: techsupport@milonetech.com.

Innovative Fluid Sensing

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