

# Application Note

Title: Speed measurement with an APM-FREQ meter

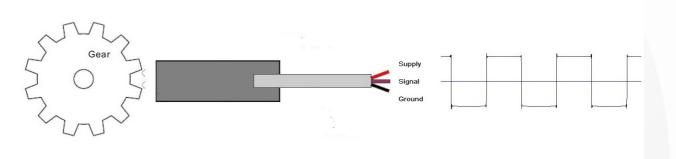
Date: 9<sup>th</sup> March 2015

1st

Revision:

1. Introduction:

The APM-FREQ meter is capable of measuring speed of a rotating wheel by using an inductive sensor looking at pulses from the sensor generated by non-magnetic teeth on a wheel. Such as the systems used in the automotive ABS sensor type applications

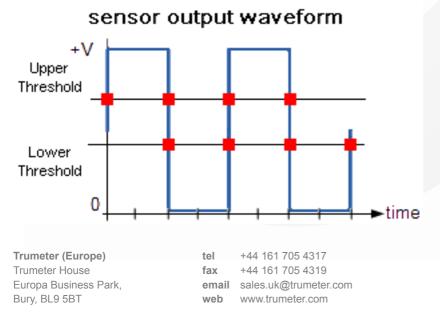


The APM-FREQ detects and measures the frequency of the output from the inductive sensor. The AMP-FREQ maximum frequency is 400Hz therefor consideration must be made when designing the system to ensure that the maximum frequency from the system will not exceed this.

To enable the APM-FREQ to accurately measure the frequency the threshold voltages must be correctly set and the following sections discuss each configuration in more detail.

### 2. Setup

Using the free APM configurator software the APM-FREQ needs be set to measure the pulses coming from the inductive pick up sensor, by setting the threshold voltages to trigger the counting circuitry such as in the diagram below:

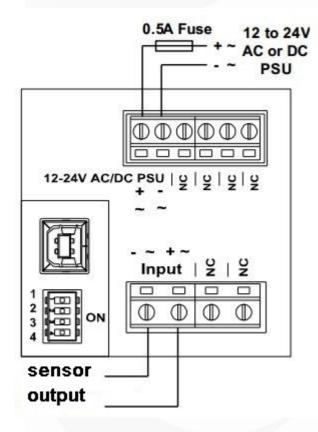




The upper threshold should be at least -10% of the maximum output voltage whilst the lower threshold should be at least 10% of the maximum output voltage, The period calculation is carried out over a 30mS sample period and an average is then calculated. Therefore any noise will lead to inaccurate calculations

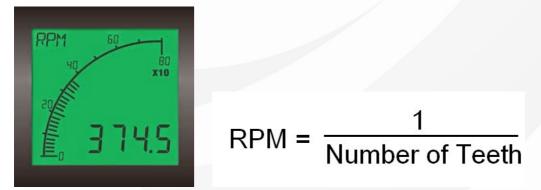
The input impedance of the APM-FREQ is approximately  $1.5M\Omega$ 

## 3. Wiring



#### 4. Showing RPM

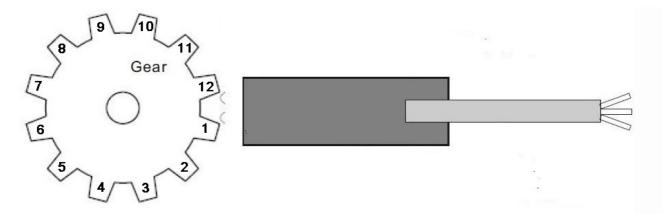
In order to show a meaningful value on the display of the APM such as revolutions per minute



You must first calculate one over the number of pulses from the wheel in one revolution this figure must then be entered into the display scalar section of the APM Configurator software

For instance in the application below the wheel has 12 teeth





Therefore the scale required is  $1 \div 12 = 0.083$  this is then entered into the scale box which will then mean the scale on the APM can read true RPM

	t Signal		Alarm 1 Alarm 2 Backlight Response			
T	t Signal Display Range Auto ranging	Display Scalar	<ul> <li>Analogue Output</li> <li>Alarm Mode</li> </ul>		Alarm 1	
	Fixed     Min 45 Max 65     Display Peak Bar	User     Scale 0.083 Offset 0	4 mA current is eq 20 mA current is eq			RPM RPM
	Peak Hold	Display Zero				
	C Zero Cross   Offset	Display Zero if below this threshold value 0 RPM	Switch Output 1	On	When the displayed value is Above Below Below Between Outside Hysterisis	
	Threshold Voltages Upper 8 Volts Lower 4 Volts	Limit Decimal Places 3 (0.000) 2 (0.00) 1 (0.0)	Change Backlight	<ul> <li>Off</li> <li>Red</li> <li>Green</li> <li>White</li> </ul>		50.5
Displayed Message		• 0 (0) <b>RPM</b>	Show Message		0% 1% 20%	

### 5. Using the outputs

We can also use the APM-FREQ-AXO to transmit a 4-20 mA signal to indicate RPM to a PLC by setting one of the Alarm outputs to Analogue Output and then by setting the upper and lower calibration set points for the speed required as above