Application Note

Title: Frequency measurement with an APM-FREQ meter

Date: 9th March 2015

Revision: 1st

1. Introduction:

The APM-FREQ meter can measure Frequencies between 30Hz and 400Hz

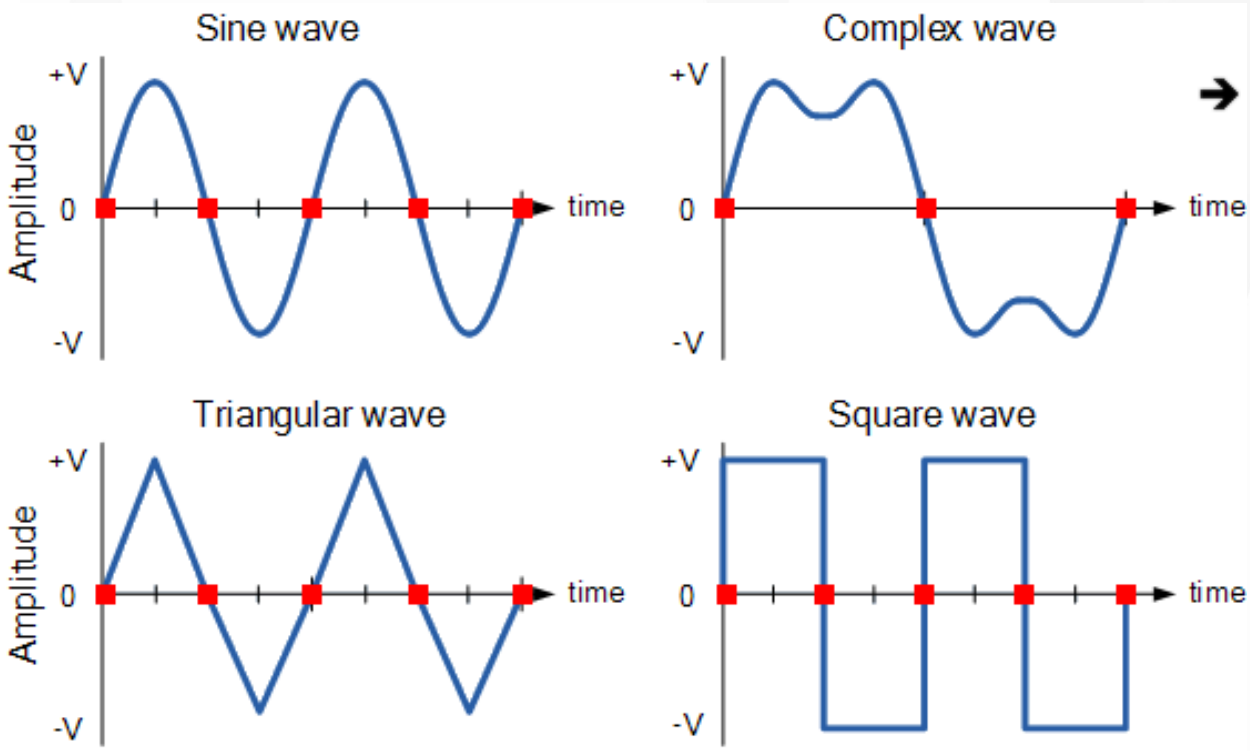
The APM-FREQ meter can detects frequency in two ways:

1) Zero Crossing Points
2) Upper and lower Threshold levels

The following sections discuss each configuration in more detail.

2. Setup

Using the free APM configurator software the APM-FREQ can be set to measure the period between zero crossing points as in the case of an AC waveform.



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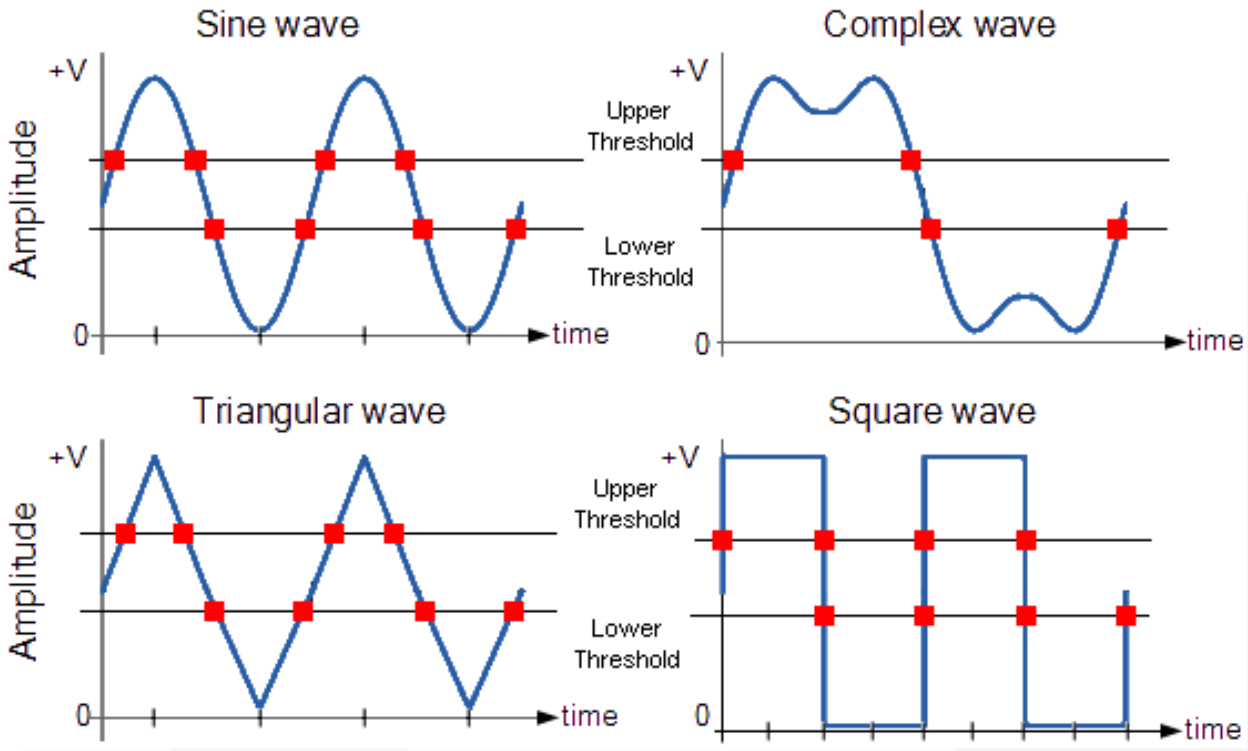
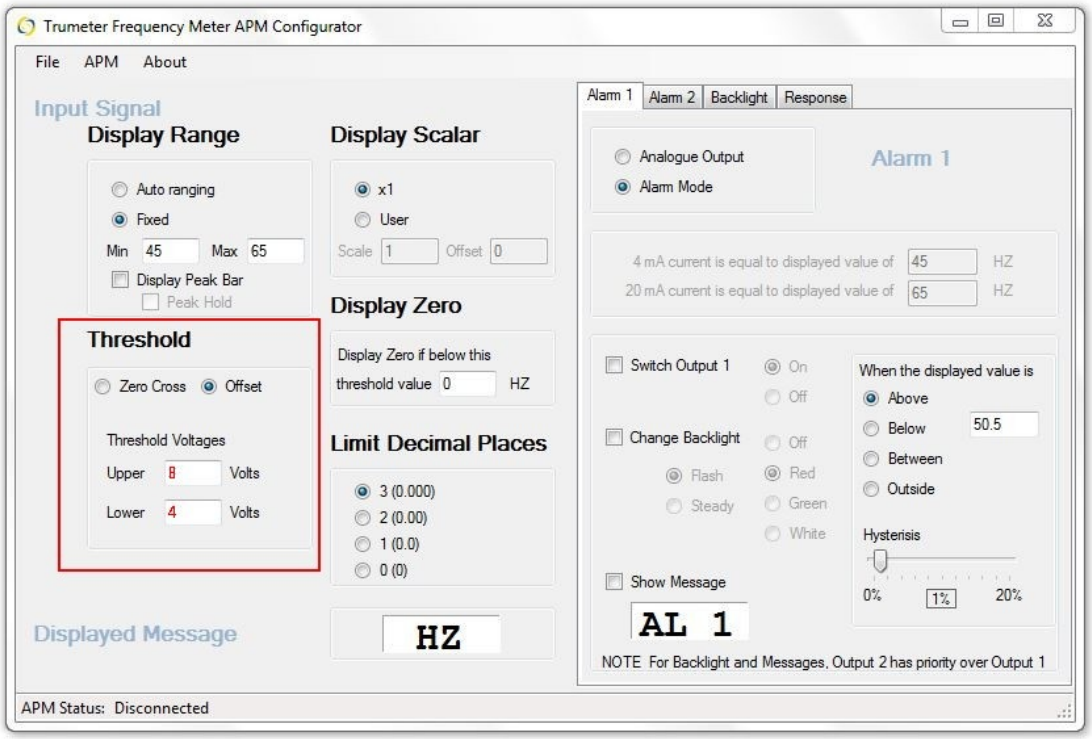
Zero crossing Points

Or to measure the period between an upper and lower offset threshold as in the case of a DC waveform



The Threshold upper and lower voltages can be set in the software



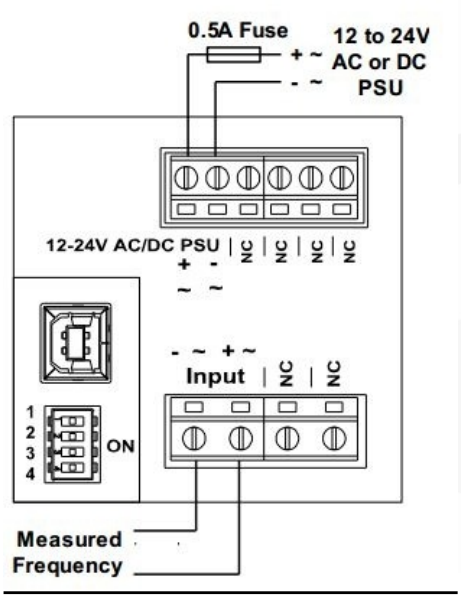
The Frequency of the applied waveform is calculated as

$$\text{Frequency} = \frac{1}{\text{Period}}$$

This calculation is carried out over a 30mS sample period and an average is calculated. Therefore any noise or runt pulses will lead to inaccurate display

The input impedance of the APM-FREQ is approximately 1.5MΩ

3. Wiring



Application Note

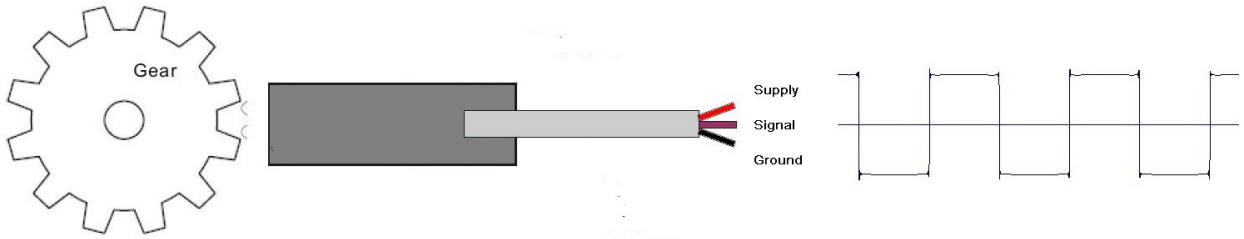
Title: Speed measurement with an APM-FREQ meter

Date: 9th March 2015

Revision: 1st

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

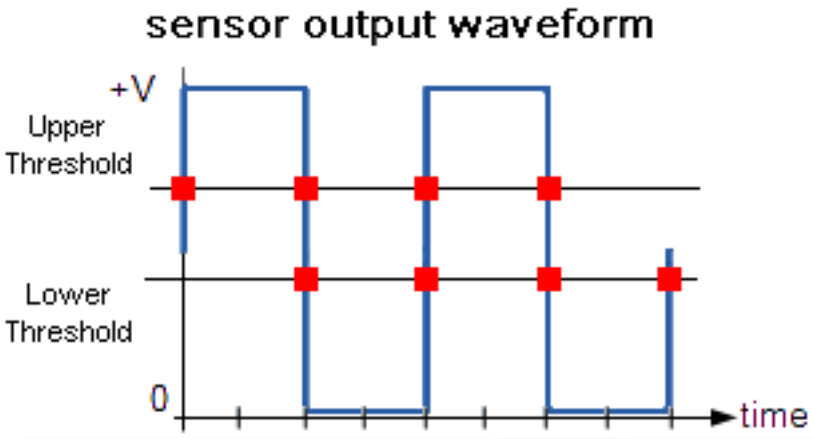


The APM-FREQ detects and measures the frequency of the output from the inductive sensor. The AMP-FREQ maximum frequency is 400Hz therefor consideration must be made when designing the system to ensure that the maximum frequency from the system will not exceed this.

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:



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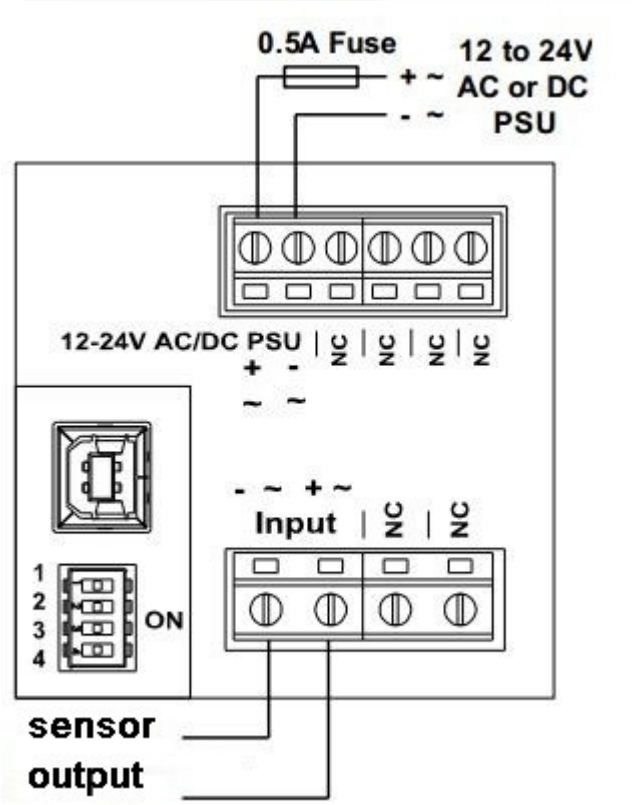
The upper threshold should be at least -10% of the maximum output voltage whilst the lower threshold should be at least 10% of the maximum output voltage, The period calculation is carried out over a 30mS sample period and an average is then calculated. Therefore any noise will lead to inaccurate calculations

The input impedance of the APM-FREQ is approximately 1.5MΩ

3. Wiring



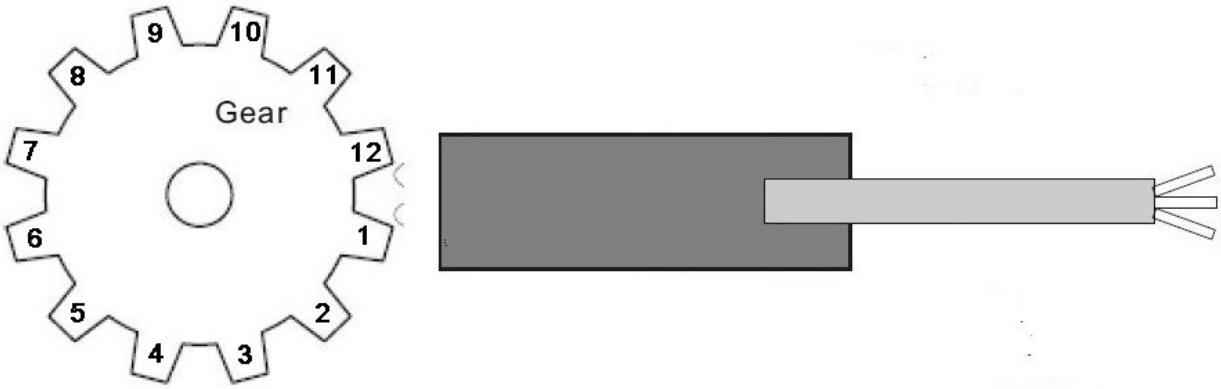
4. Showing RPM

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

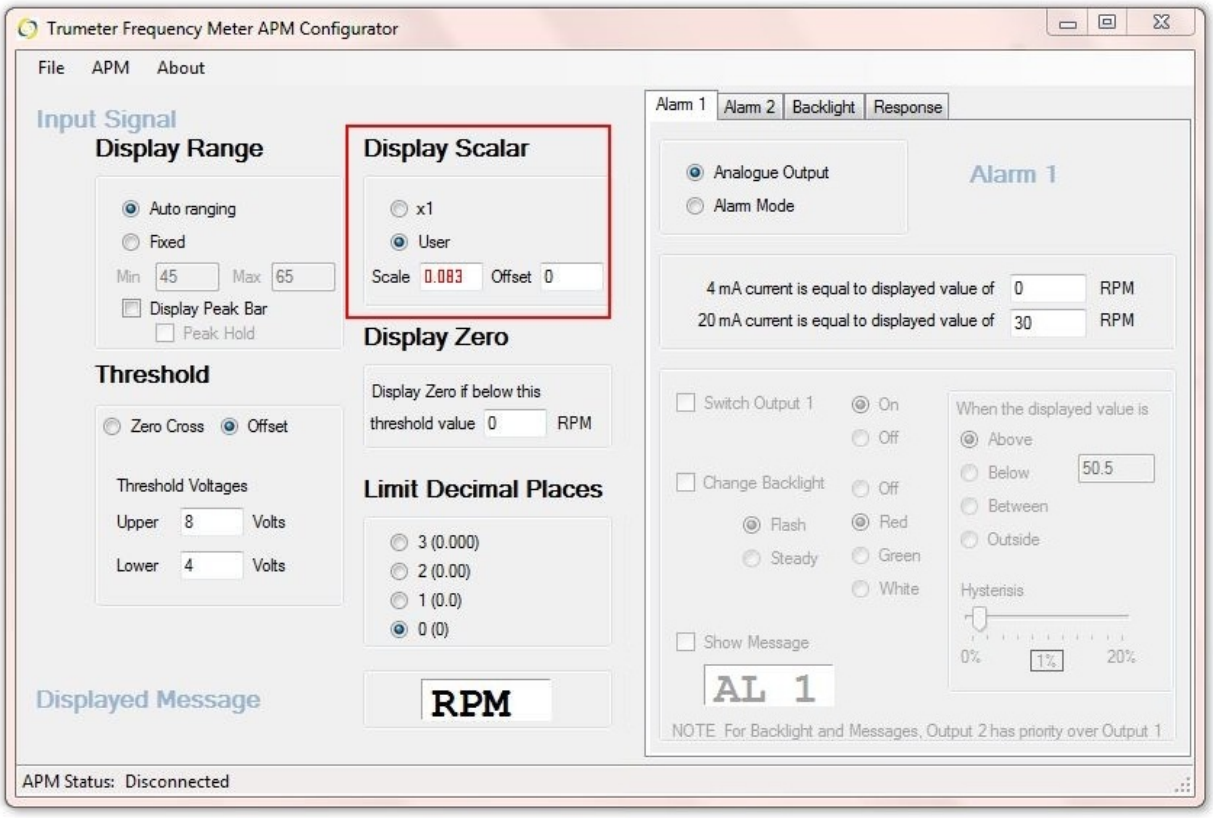
$$RPM = \frac{1}{\text{Number of Teeth}}$$

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 ÷ 12 = 0.083 this is then entered into the scale box which will then mean the scale on the APM can read true RPM



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