

Car Dwell Angle and RPM Meter

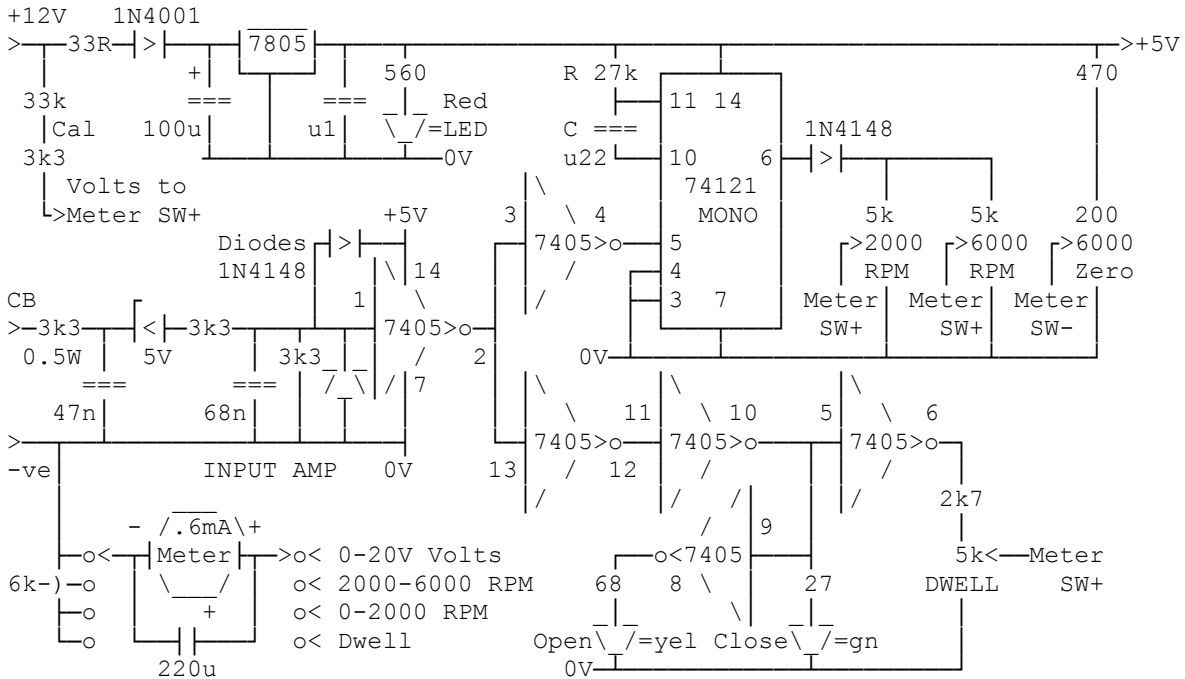
By G8MNY

(Updated Jan 09)

(8 Bit ASCII Graphics use code page 437 or 850)

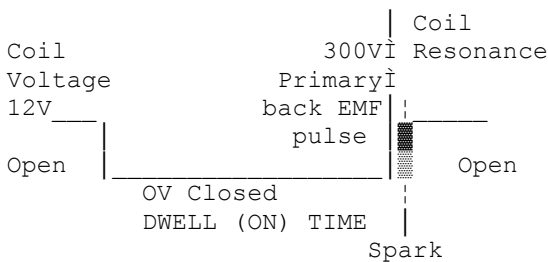
This old device (from an old mag article) is only suitable for petrol cars with standard distributor contact breakers. Just 3 leads are needed 12V, 0V, & the Contact Breaker. It give 4 ranges 0-20 DC, 0-2k RPM, 2-6k RPM, & Dwell time (90-0 4cyl & 60-0 6cyl).

It uses a reg & 2 74 ICs, a Hex inverter & a monostable timer.

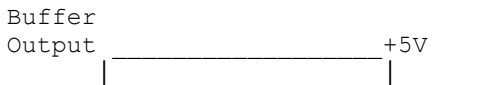


HOW IT WORKS

The 12V is regulated to 5V for the logic to maintain meter calibration (with a different regulator a 6V version could made.) A calibrated meter supply resistor (33k + 3k3 for my meter!) gives the voltage feed to the meter switch.

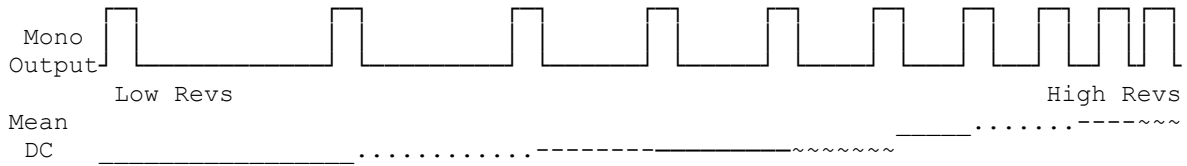


The high voltage spiky contact breaker input is filtered, offset voltage applied (for 12V) with the series 5V zener the 3 Rs, refiltered, then clipped before being buffered by the 1st hex amp.



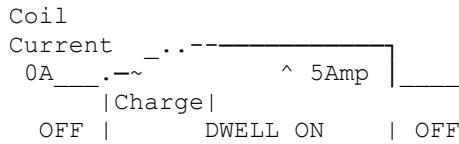
This gives a faithful inverted square wave output that represents the actual contact state.

This is re-inverted & fed to trigger the monostable IC to remove the on - to off ratio. The monostable's CR time is set to be a bit faster than the fastest 6000 RPM (10mS), so the resultant square wave output's on to off time varies with the engine revs.



This is the fed via a diode to lose any IC "off" DC, to the meter via 2 presets one with a -ve meter offset to give the 2 linear RPM scales. The meter is heavily damped with a 220uF, to give a steady reading at low Revs.

The dwell angle feed, uses up the rest of the Hex amps to further buffer the signal & drive 2 LEDs to show the contact status, & also the dwell meter feed via a calibration pot.



With contact breaker ignition it is important not to have to short a Dwell time as the coil takes time to build up to full current & "charge up" its magnetic circuit.

Typical recommended 4 cylinder values are 33-45% ON times depending on the maximum engine RPM & ignition coil type. So called "Sports" types are really 6V coils & an external 100W resistor to safely limit the stationary current (10A!) to give faster charge times for higher revs, then came along electronic ignition :-).

METER SCALES

The meter scales are quite linear, the Dwell scales are reversed & do not start at 100% !

Deflection	Volts	2K RPM	2-6K RPM	DWELL 4Cy	DWELL 6Cy
0%	0	0	2000	90%	60%
25%	5	500	3000	67½%	45%
50%	10	1000	4000	45%	30%
75%	15	1500	5000	22½%	15%
100%	20	2000	6000	0%	0%

Why there are different Dwell scales for 4 & 6 cylinders I do not know!

CALIBRATION

Using a square wave astable source like 555 with a frequency counter & ordinary analogue meter you can mimic the engine pulse on the workbench while varying the frequency & on to off ratio. Using just a low voltage 50Hz as the input you can only calibrate 3000 RPM it is a good enough if it is all working.

Why don't U send an interesting bul?

73 De John, G8MNY @ GB7CIP