04-29-2011, 02:08 AM #1

bussi04
Heretic

Join Date: Feb 2010
Location: Germany
Posts: 223

Water fuel capacitor measurement oscillator

Water Fuel Capacitor measurement oscillator

The water fuel capacitor is an important part of the Stan Meyer water fuel cell technology.

There are steel plate versions and concentric steel tube versions but they all have in common that their working environment is water.

Unfortunately conventional capacitance meter don´t produce reliant values for a water fuel capacitor in a water bath.

That´s the case because the water fuel capacitor is an extremely leaky capacitor and up to 2 volts it behaves like a battery.

Capacitance calculations derived from size informations aren´t reliable too.

So we need a measurement support tool to get the capacitance because that´s needed to build chokes going into electrical

resonance with the water cell capacitor.

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04-29-2011, 03:08 AM #2

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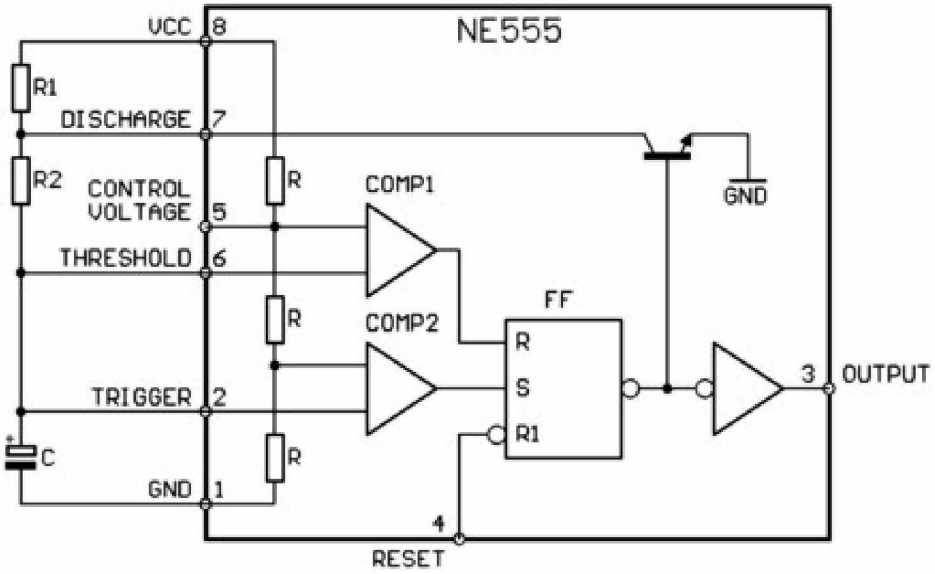
Water fuel capacitor measurement oscillator

The very well know oscillator NE555 uses a capacitor for astable oscillations.
Detailed informations how the NE555 works you´ll find at http://en.wikipedia.org/wiki/555_timer_IC.

The NE555 has a CMOS version called TLC555. It´s quite the same but has very low input ports leakage currents.

Short operation summary of 555 in astable mode:



A capacitor C is charged thru a well known resistor array R1 + R2 until it´s voltage reaches 2/3 of supply voltage. Then capacitor C is discharged by well known resistor R2 until capacitor voltage is 1/3 of supply voltage. then C is recharged again.

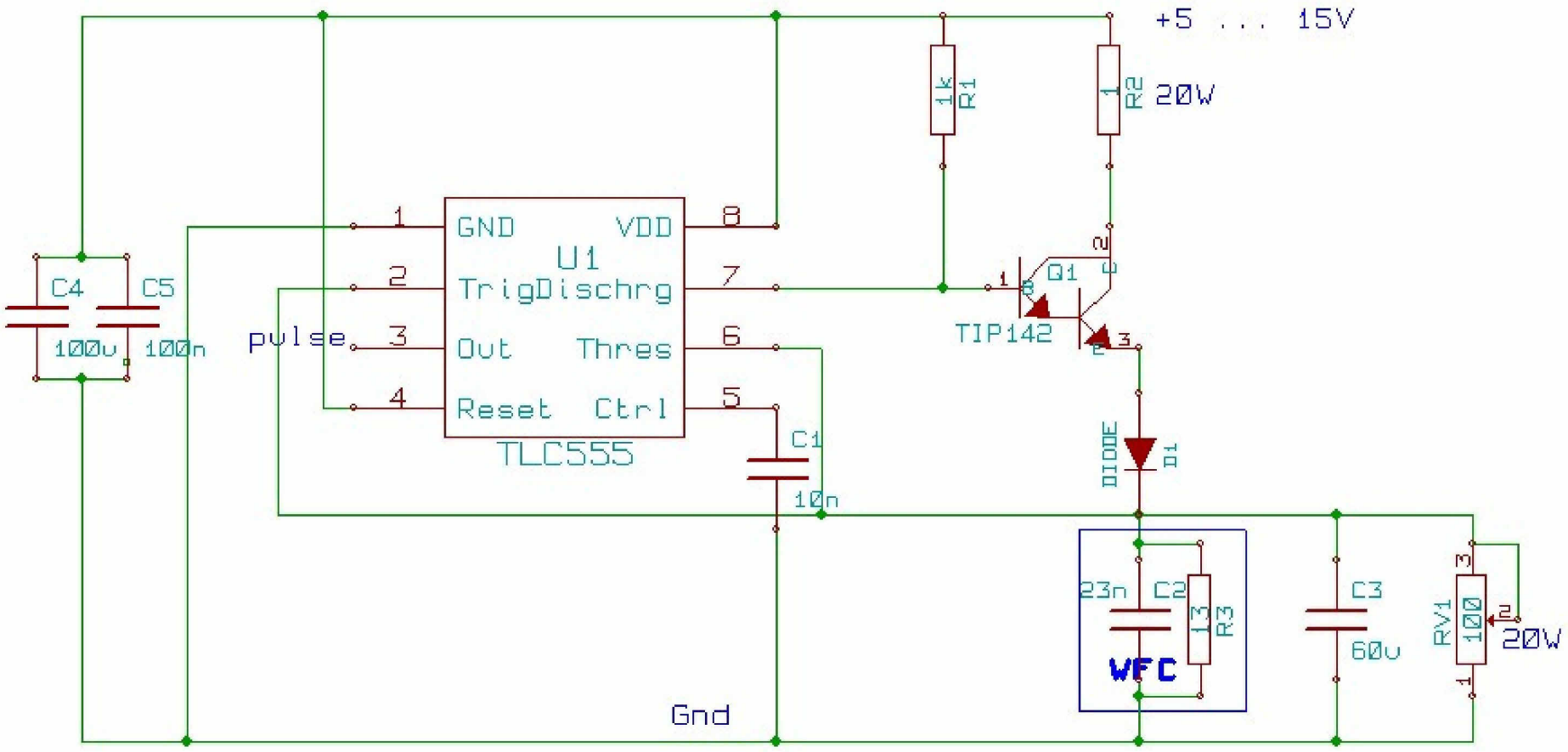
The capacitor charge state is indicated by high pulse level at output pin3.
The capacitor discharge state is indicated by low pulse level at output pin3.

Measuring the high and low time periods encloses informations about capacitance.

The circuit:

The water fuel capacitor can be seen as a capacitor C2 (range between 100pF and 30nF) paralleled by a resistor R3 (range of 1000 to 5 ohms).

That way a lot of charge gets immediately lost all time within the wfc. To drive the capacitor during astable oscillations needs quite a high current (1A or more). 555 can´t handle that job by itself and so a power darlington TIP142 (heatsink necessary!) has to support the job controlled by 555.



To take measurements you need an oscilloscope or a frequency counter with duty cycle measurement.

The special point of interest is always the wfc discharge time period. That corresponds to the low pulse time period at pin3 of 555.

First you measure the discharge time period t1 in microseconds. Then you add another capacitor C3 in parallel to wfc, measure discharge time period t2 again until t2 = 2 * t1.

you have to try different values or better a capacitor decade box if avalilable.
When you have found a fitting capacitor for doubling the discharge time t1 that C3 capacitance is the capacitance of the wfc capacitor.

Now you have to get the resistance of the wfc capacitor.

First you add a capacitor C3 of round about 60µF parallel to the wfc to raise total capacitance.
Then you measure the discharge time period t3 (in miliseconds range) again.

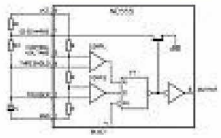
Then you add a variable resistor RV1 (20W) of 100ohm in parallel, measure discharge time period t4 again and then you reduce resistance value of RV1 until half discharge time is found: t4 = t3/2

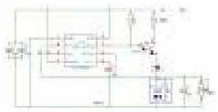
At the end you measure the resistance of RV1, that´s identical with the wfc resistance.

Enjoy!

bussi04

Attached Thumbnails





~~Last edited by bussi04~~; 04-29-2011 at 10:23 AM.

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05-01-2011, 02:53 AM #3

~~streetluger06~~
Journeyman

Join Date: Feb 2010
Location: Michigan, U.S.
Posts: 62

Re: Water fuel capacitor measurement oscillator

Thanks Bussi,

I have been trying to determine this this past week and haven't had any luck yet. I will try your method and post my results.

Quote

09-01-2011, 09:52 PM #4

Farside
Heretic

Join Date: Feb 2010
Posts: 106

Re: Water fuel capacitor measurement oscillator

Thanks!

I guess the best way to construct a WFC is to build the capacitors and then determine everything else based on their values?

If we have an array (of say 12), should we do the calculations based off 12 individual measured capacitance values or the system as a whole (12 capacitors in series and apply this method)?

I'm looking at tubes and was wondering what the ideal gap is. If I have the option of 1.5mm and 0.13mm (almost a factor of 10), from your experience, which is better? I feel it's the bigger gap as it will offset some of the leakyness of water and improve the ability to eject bubbles. The downside is of course physical size as I'll need a larger surface area.

Last edited by Farside; 09-01-2011 at 10:27 PM.

Quote

09-01-2011, 10:40 PM #5

bussi04
Heretic

Join Date: Feb 2010
Location: Germany
Posts: 223

Re: Water fuel capacitor measurement oscillator

Quote:

> Originally Posted by **Farside**
> *Thanks!*

> *I guess the best way to construct a WFC is to build the capacitors and then determine everything else based on their values?*
>
> *If we have an array (of say 12), should we do the calculations based off 12 individual measured capacitance values or the system as a whole (12 capacitors in series and apply this method)?*

If the tubes are wired serially capacitance reduces 1/Ctot = 1/C1+1/C2+..+1/C12 and the resistance raises.

Of course you have to take the capacitance of the serial array.

the most variable parts are the tubes and the inductors/transformers.

voltage and frequency adjustments are quite easy and easily made variable.

nevertheless you have to think in ranges:

i.e. designing a pulsing transformer needs a lowest frequency fixed. the lower the minimum frequency the larger the magnetic core must be. you also need a maximum frequency defined at first because ferromagnetic material changes characteristics at maximum frequency and because switching mosfets at high frequencies have special issues.

for details please take a look at the relevant datasheets.

so it´s a good idea to build a wfc with a given capacitance range. your theoretical calculations must be observed by physical measurement.

then you have to calculate the inductor/transformer values, build it and measure the real values.

then you can build the easiest part (electronics) producing variable voltage and frequency within a fixed range.

for the electronic part I set up modules for pulsing/gating, voltage regulation, power amplification and disortion control. once I have fixed the parameters for the electronics I will make circuit boards.

bussi04

~~Last edited by bussi04~~; 08-13-2012 at 09:53 AM. Reason: added answer to capacitance of serial array

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bussi04

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