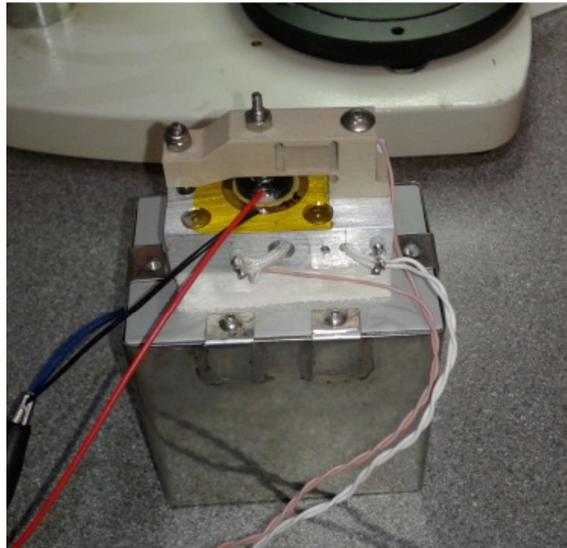


Tests on drilled and un-drilled 20mm piezo discs.

Ten 20mm diameter piezo discs were tested in a solenoid operated jig, the discs being compressed with a 10N ($\approx 1\text{kg}$) force from a spring, the solenoid releasing the pressure on the disc and an oscilloscope recording the output when the solenoid was switched off and the spring pressure re-applied.

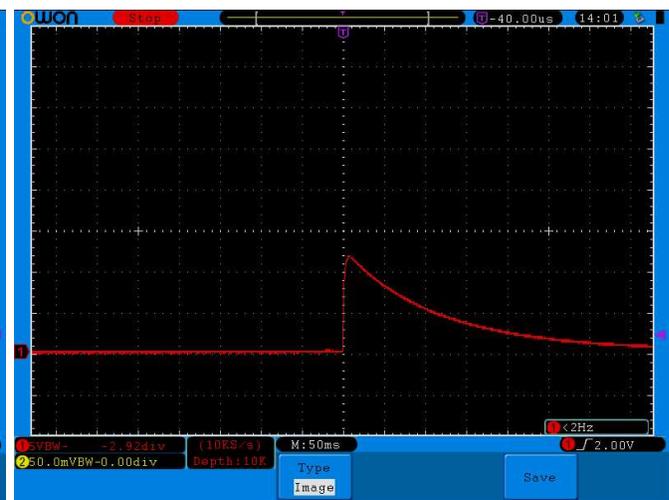


Test Jig

The polarity of the output with applied force on piezo discs is not specified and will vary between manufactures and individual discs in a batch, Although this only means reversing the connections to the amplifier, for speed of testing the discs were selected to all give the same polarity of response.



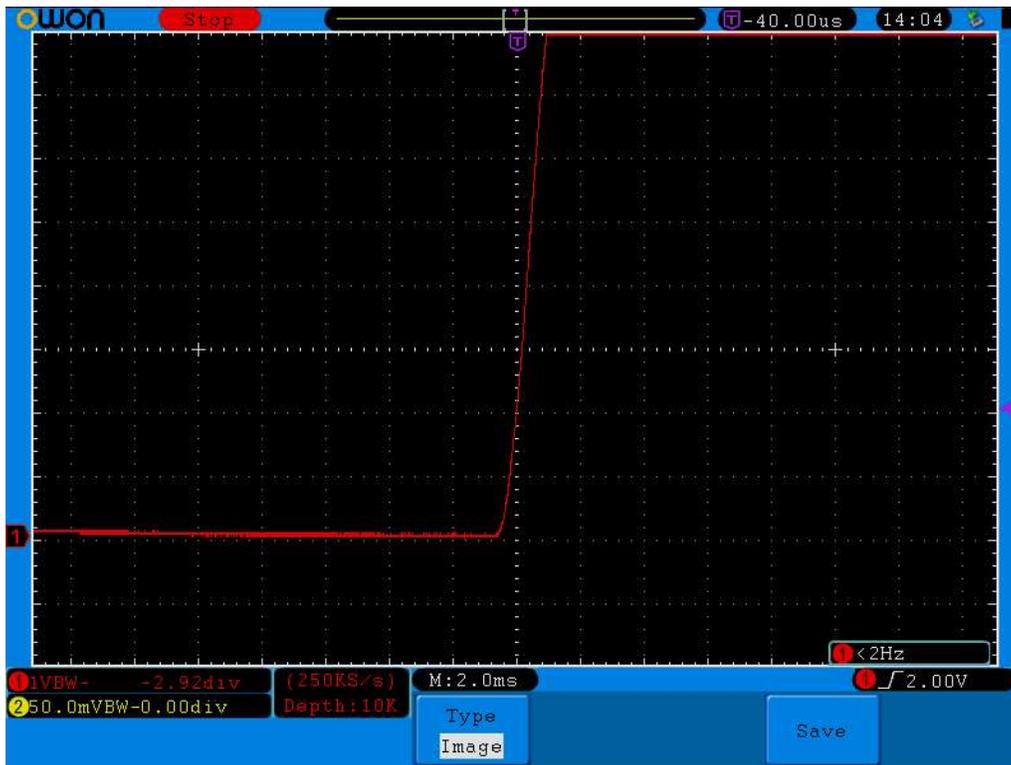
Response of disc sample 2 before drilling



Response of disc sample 2 after drilling

The result of the tests gave a spread of peak values between 9.7V and 19.0V with a mean value of 15.2V

A repeat test after the discs had been drilled gave a spread of peak values from 6.0V to 17.6V with most discs losing about 16% of their peak value although one increased its output from 14.5V to 17.0V. An additional test was done on the drilled discs to look at the rate of rise of voltage as it passed the 1V value: This gave results between 2.2V/ms and 5.8V/ms all of which are many times faster than is needed for a good probe.



Disc sample 4, rate of rise 5.8V/ms at 1V

A further repeat of the test was conducted with the disc and jig heated to 60°C. The output of the discs fell substantially to a range between 0.6V and 5.0V with two of the discs of under 0.5V/ms

Note on a simple method of classifying polarity of piezos

Where the output of a piezo disk is unknown a simple method of detecting which polarity it is is to make a simple test device with an LED connected with its anode to a red crocodile clip and cathode to a black crocodile clip. The LED needs to be a high efficiency low current type. Connecting this jig to the piezo, red crocodile clip to red piezo lead and black to black, placing the piezo on a firm flat surface and pushing down on the ceramic with a thumb should give a brief flash either on applying pressure or releasing it. I regard piezos which give a flash on pushing as being positively polarized and ones that give a flash on releasing the pressure as being negatively polarized.

Mike Simpson
6th April 2017