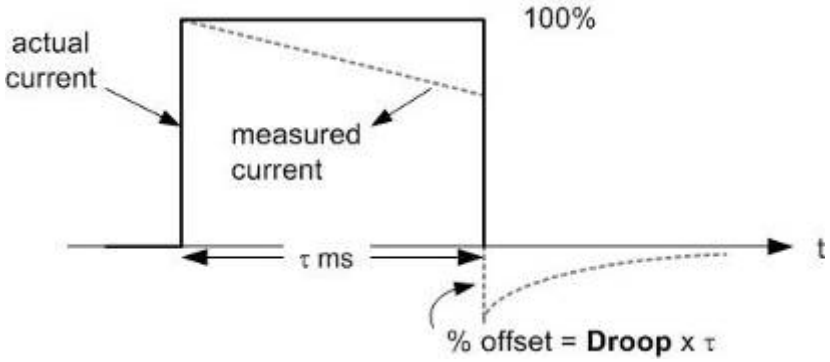
EXTENDED DATASHEET PERFORMANCE CHARACTERISTICS

Droop

For non-sinusoidal current waveforms (such as chopped or rectified current) the effect of the phase displacement at low frequencies can cause some distortion of the measured waveform. This also applies for pulses of relatively long duration. This distortion is termed droop, the droop for a rectangular pulse for a particular CWT Ultra mini model is quoted on the datasheet.

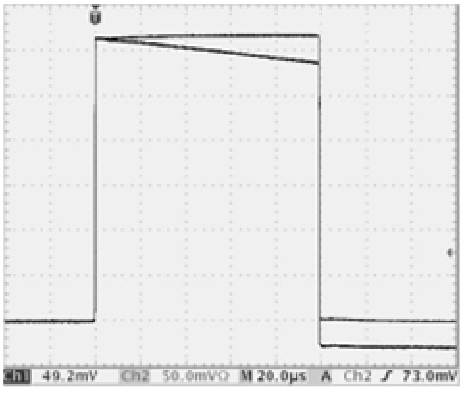


The droop rate for a rectangular pulse is worst case and in general

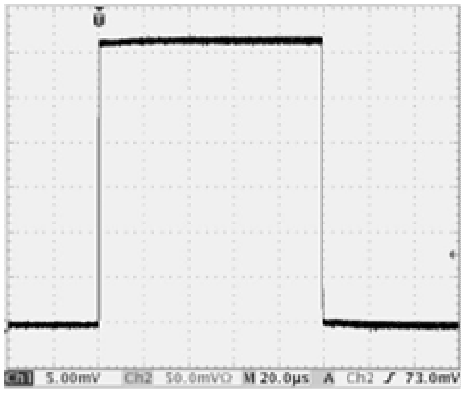
$$\% \text{ offset} = \tau \times (\text{mean value} / \text{peak value}) \times (\text{droop in \% / ms})$$

The calculation of droop assumes that the measured pulse duration $\tau << T$, where T is related to the low frequency bandwidth by approximately $T \approx 1/2\pi f_L$.

As an example, the response of both a CWT015 and CWT1 ULTRA Mini to a 100µs pulse *cf.* a dc shunt is shown below



CWT015 Ultra Mini
Offset = Droop x 100 = 10% (approx as measured)
Timebase 20µs per div



CWT1 Ultra Mini
Negligible droop distortion
Timebase 20µs per div

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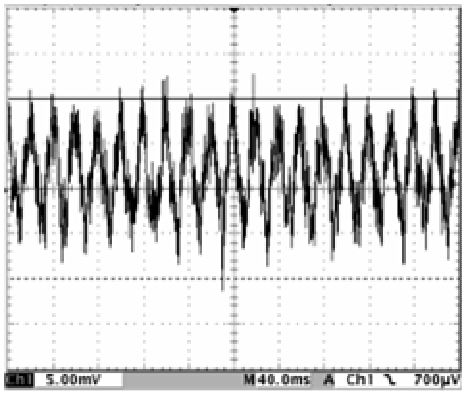
Noise Max – Low Frequency noise

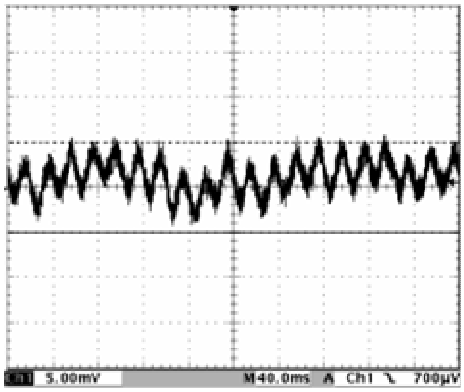
For the CWT ULTRA Mini Rogowski transducers the predominant sources of low frequency noise are

- **1/f noise.**
  This is generated within the integrator op-amp. This random noise is distributed around the low frequency cut-off f_L where the integrator gain is at a maximum.

- **50Hz 'pick-up' noise**.
  A Rogowski coil can never be perfectly wound and necessarily has a discontinuity where the coil clips together. It is therefore susceptible to interference from electromagnetic fields external to the Rogowski coil (albeit this pick up is very small see 'Positional accuracy and external currents'). Typically predominant fields are those at power frequency 50/60Hz. When the integrator gain is very high these fields create measurement disturbance. Hence it is necessary to limit the low frequency cut-off of the CWT015 and CWT03 probes to greater than 60Hz to ensure the pick up noise is not significant.



CWT015 – Noise max: 20mVp-p
Measured value approx 15.0mVp-p
Volts per div 5.0mV / Timebase 40ms per div



CWT1 – Noise max: 10mVp-p
Measured value approx 8.0mVp-p
Volts per div 5.0mV / Timebase 40ms per div

Care should also be taken to keep the coil and particularly the coil clip-together mechanism as far as possible from large 50Hz sources such a power supply transformers.

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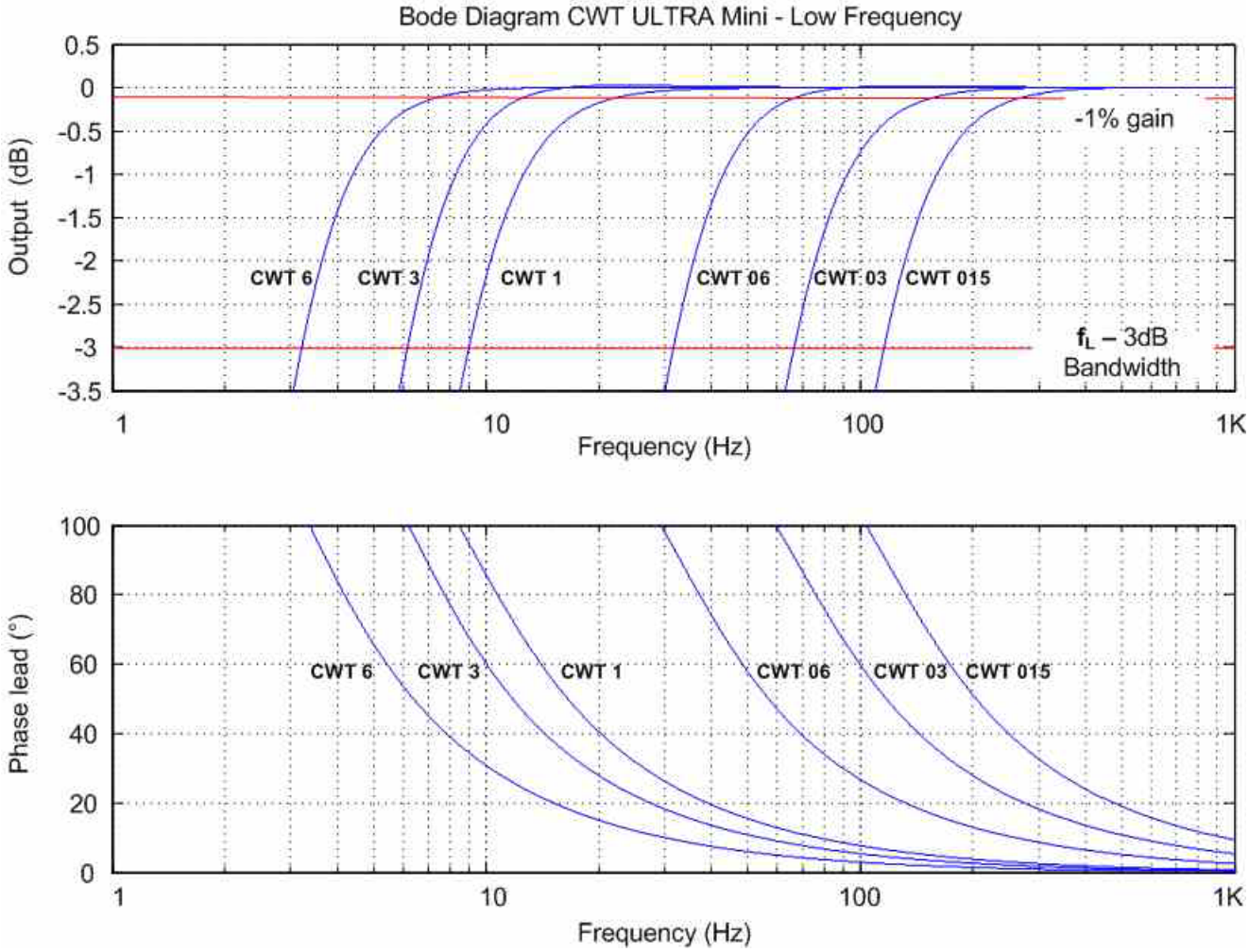
Low Frequency Bandwidth



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