

Performance measurements of the S-330.4SD tip/tilt platform

The following report gives a quick overview on the measured performance of a S330.4SD piezo tip/tilt platform, including a mounted mirror, driven by a E-616.SSD controller. The controller settings were adjusted by the PI company, the optimization criteria were: maximum bandwidth in closed loop operation for small signals (1Vpp).

Step response

x-axis : Step response for a square wave input signal of 10Hz, 5V(offset) \pm 1.0V(amplitude), closed loop operation (Servo ON)

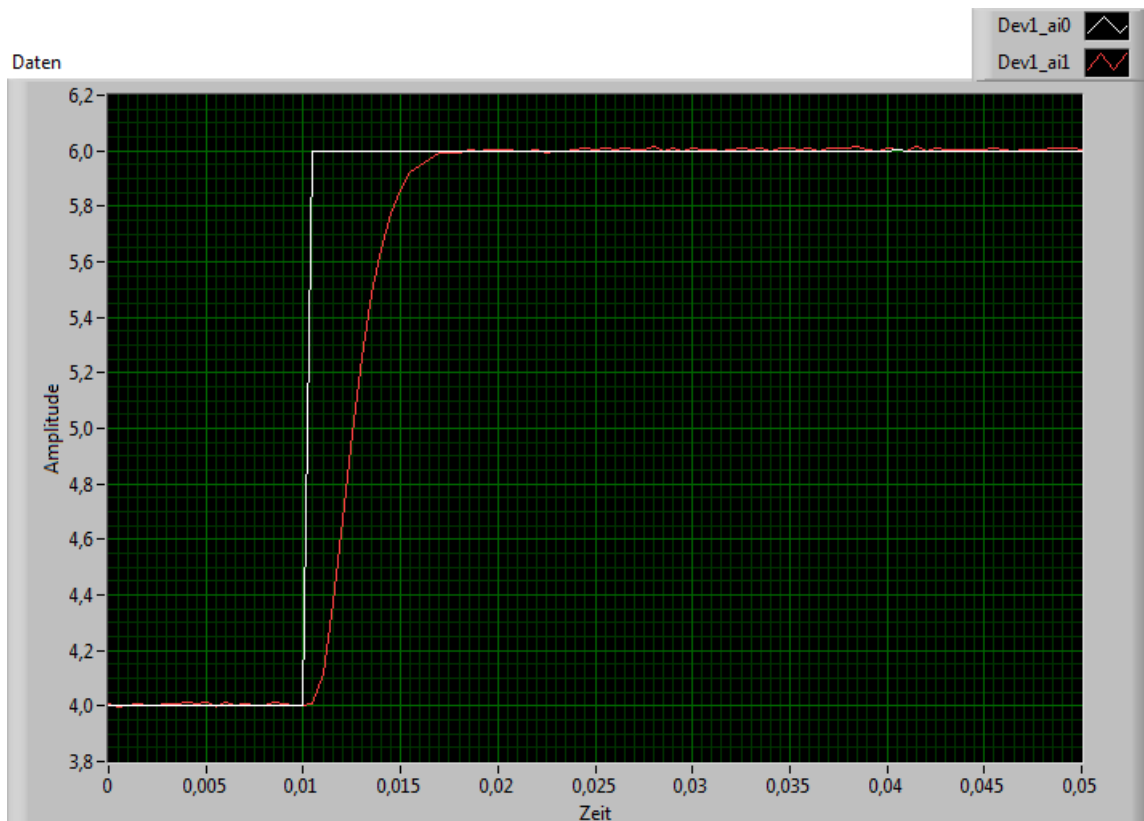


Fig. 1a: step response without overshoot

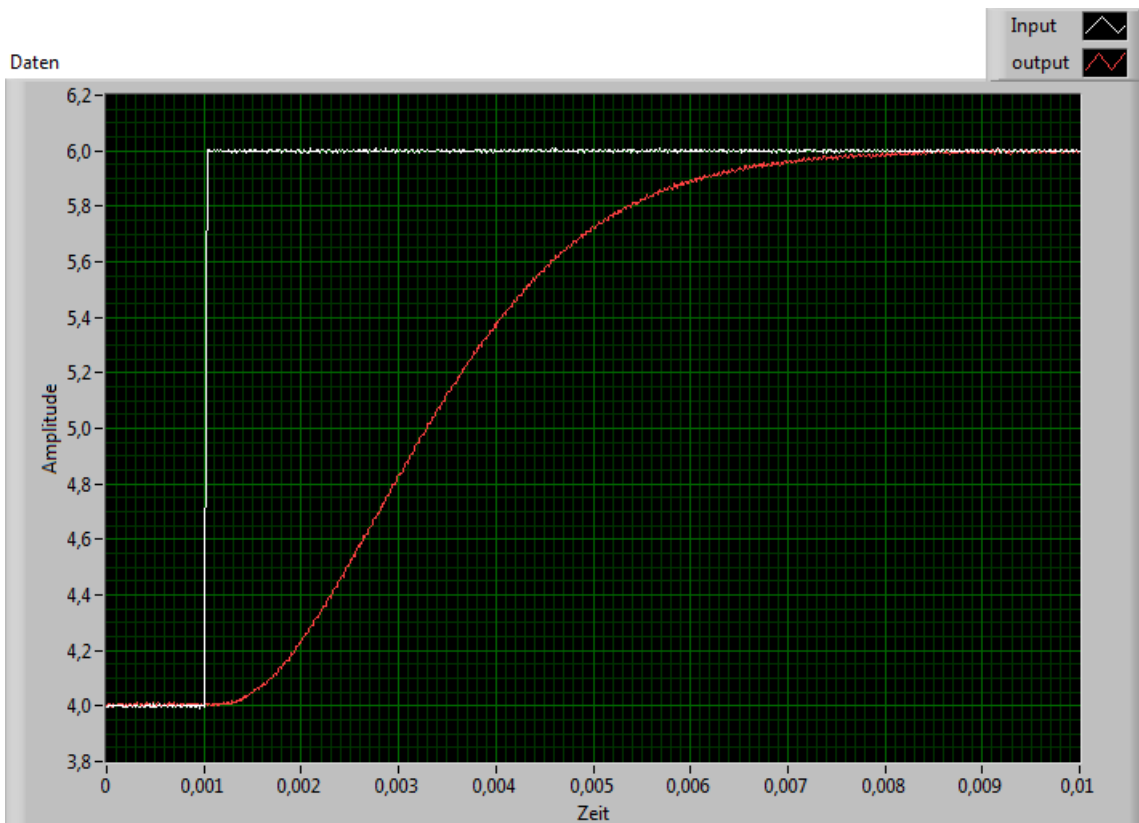


Fig. 1b: step response on positive transition

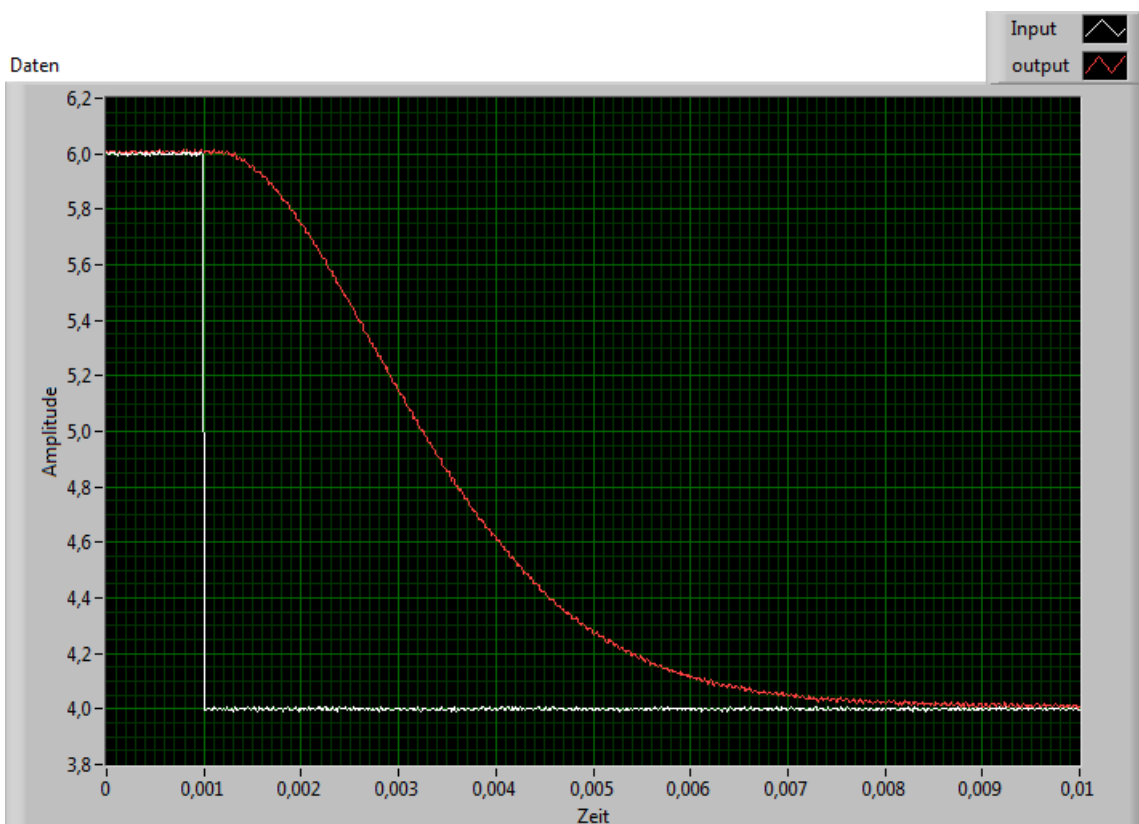


Fig. 1b: step response on negative transition

y-axis : step response for a square wave input signal 10Hz, 5V±1.0V, closed loop operation

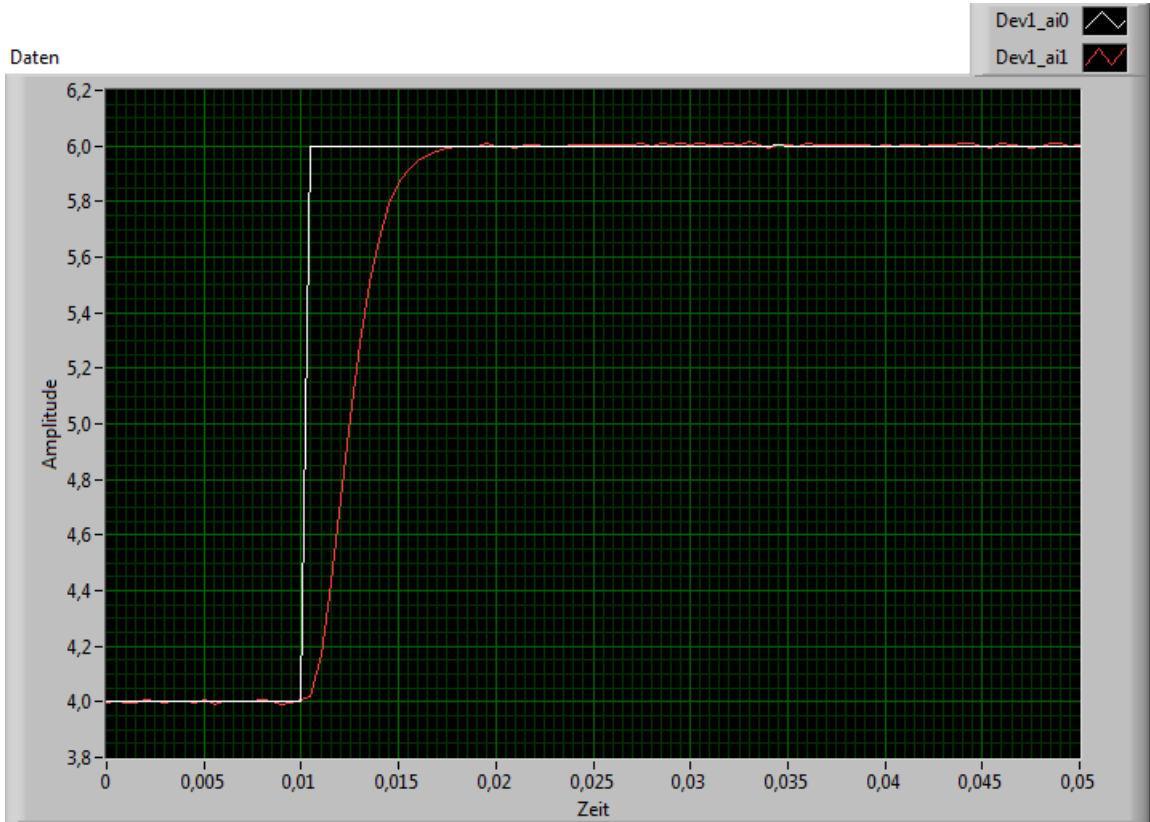


Fig. 2a: step response without overshoot

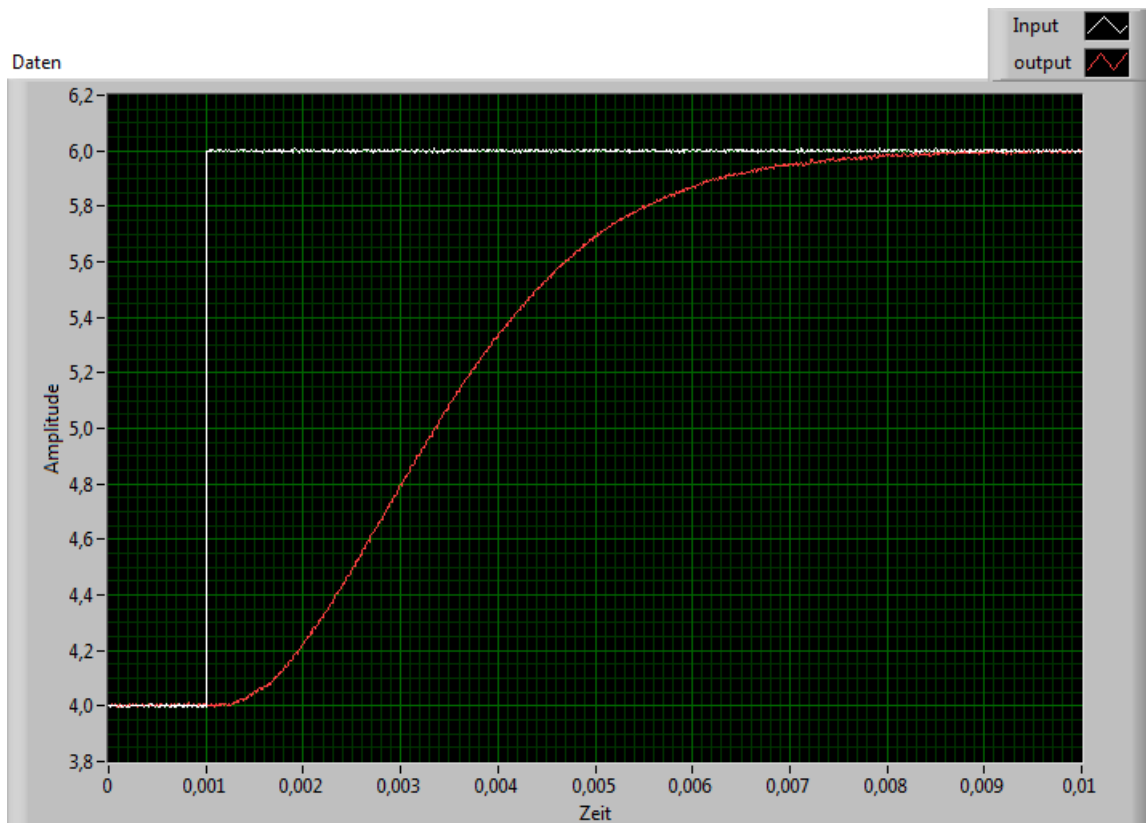


Fig. 2b: step response on positive transition

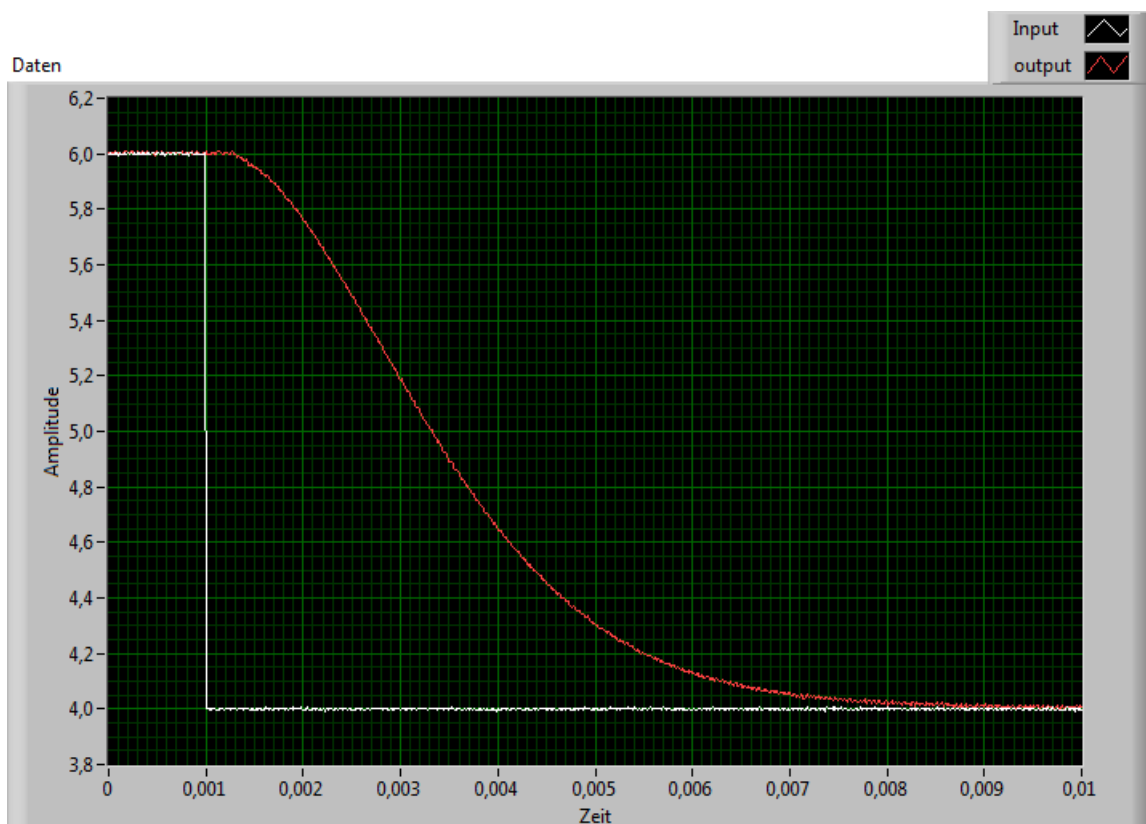


Fig. 2c: step response on negative transition

Latency period

The measured latency period is equal for positive and negative transitions on both axis (s. Fig. 1b, 1c and 2b, 2c).

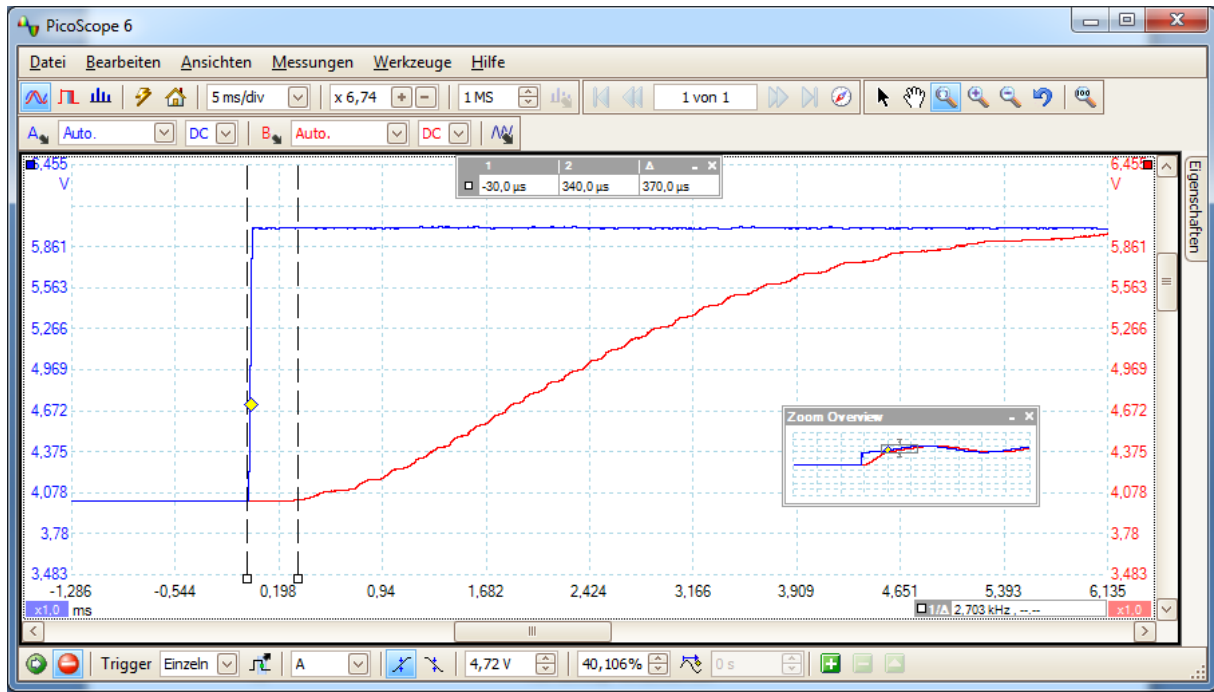


Fig. 3: the measured latency period is about 0.3ms

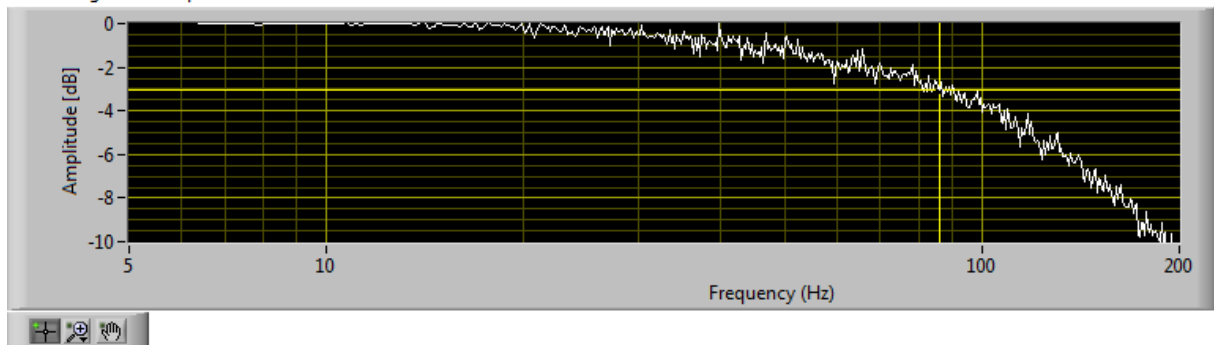
Frequency response

The frequency response was measured for closed loop operation using a frequency sweep (1-200Hz) as input signal. The following figures show the amplitude (dB and linear scale) and phase diagrams for 3 different input signals ($5V \pm 0.5V$, $5V \pm 1.0V$ and $5V \pm 2.0V$) and both axis.

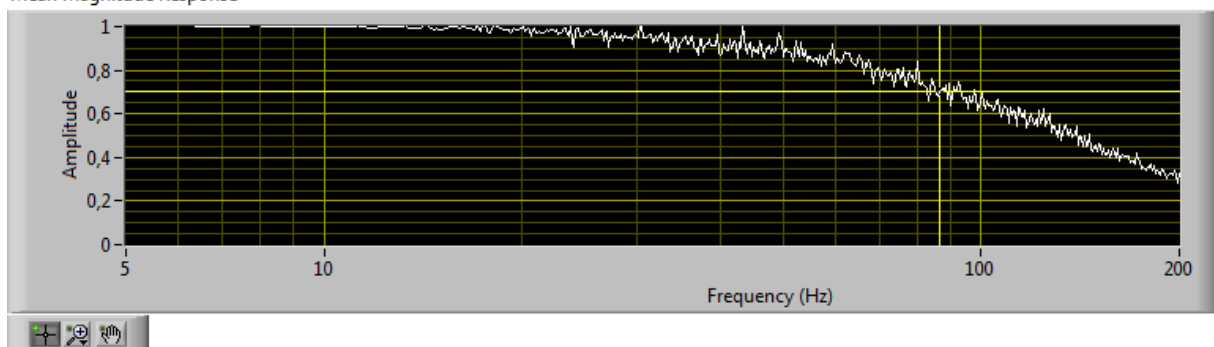
A shift of the -3dB frequency to higher values is measured for greater input signals ($\sim 85\text{Hz}$ @ $0.5V$ -> $\sim 105\text{Hz}$ @ $2V$).

x-axis: $5V \pm 0.5V$

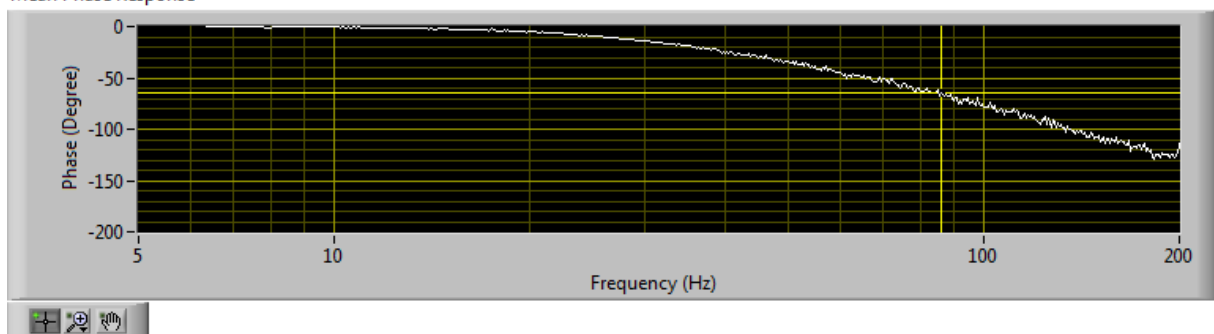
Mean Magnitude Response



Mean Magnitude Response

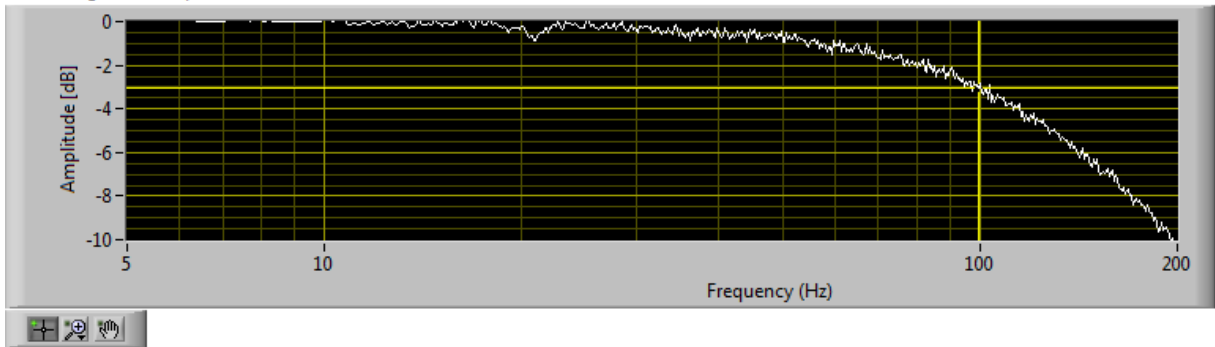


Mean Phase Response

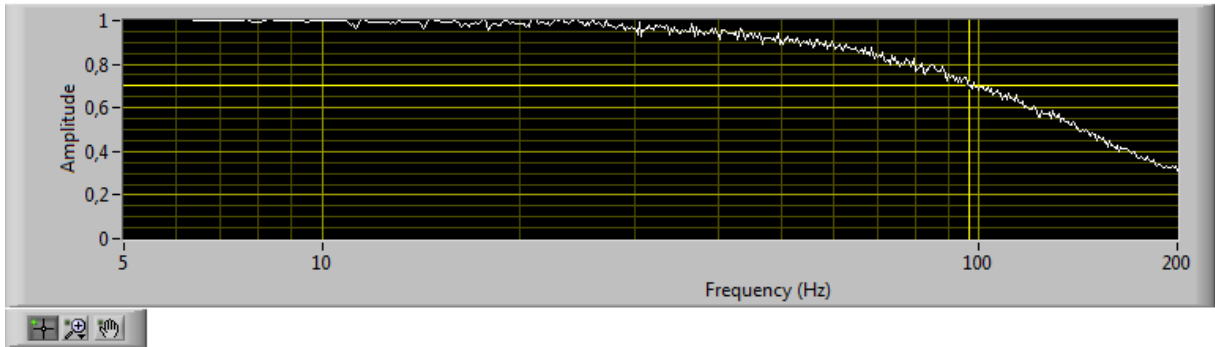


x-axis: $5V \pm 1.0V$

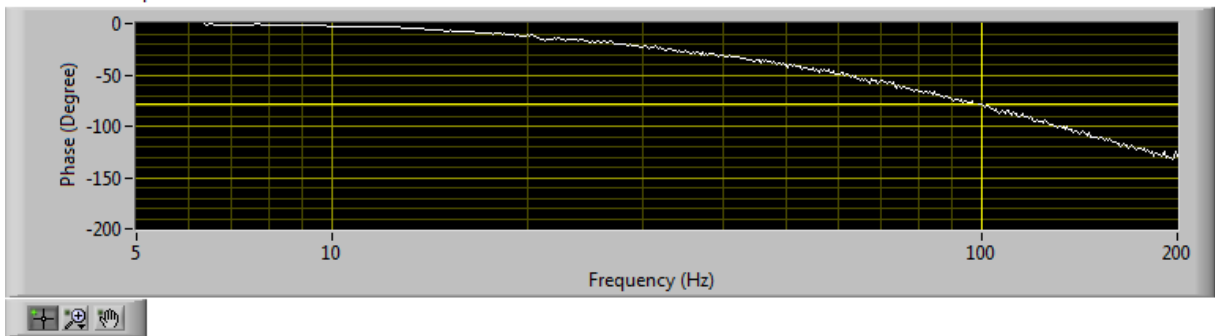
Mean Magnitude Response



Mean Magnitude Response

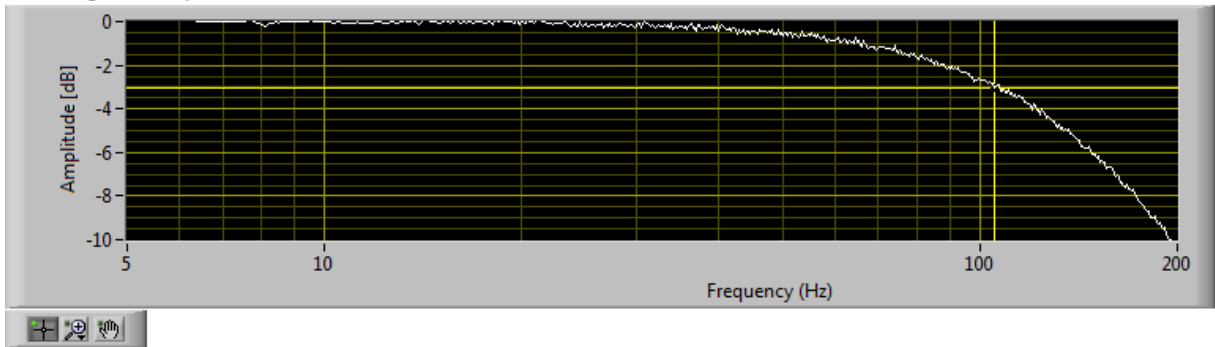


Mean Phase Response

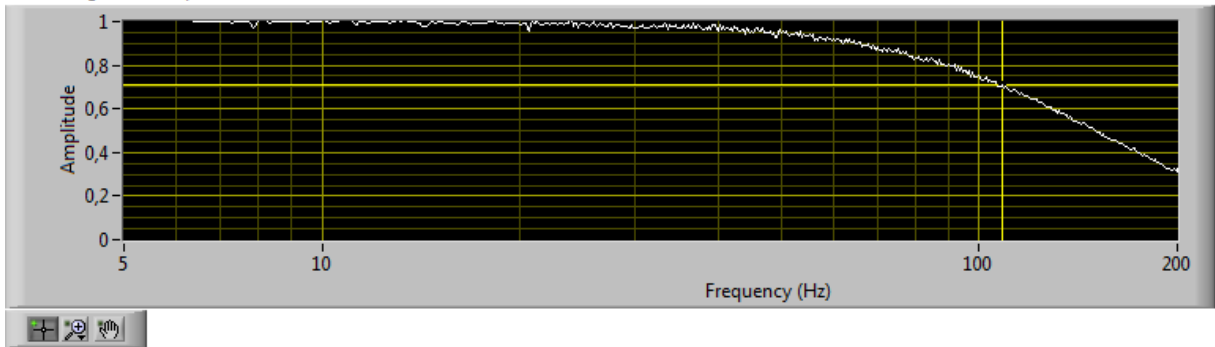


x-axis: $5V \pm 2.0V$

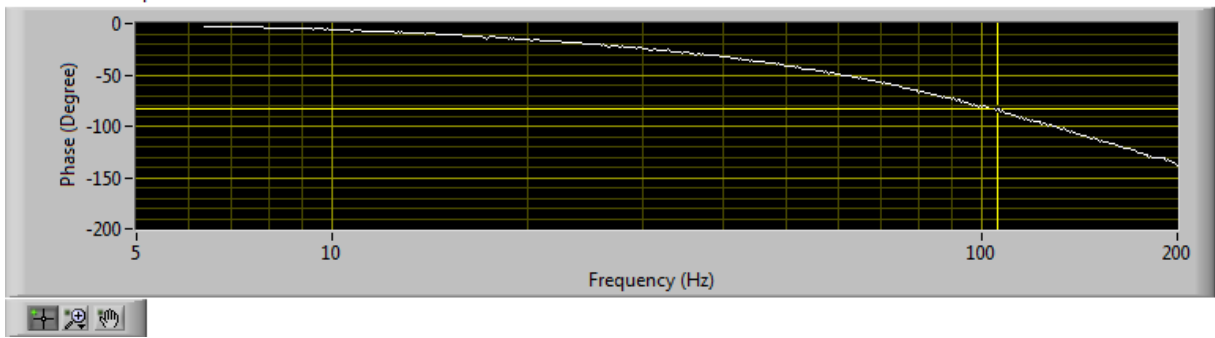
Mean Magnitude Response



Mean Magnitude Response

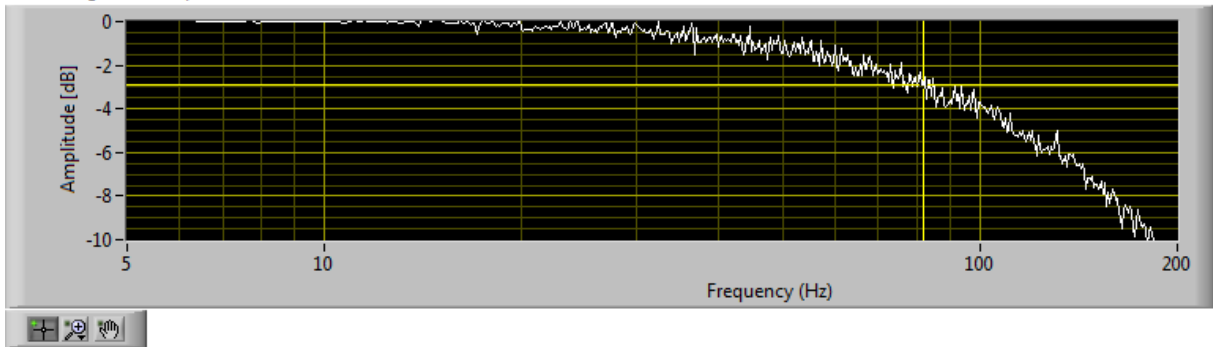


Mean Phase Response

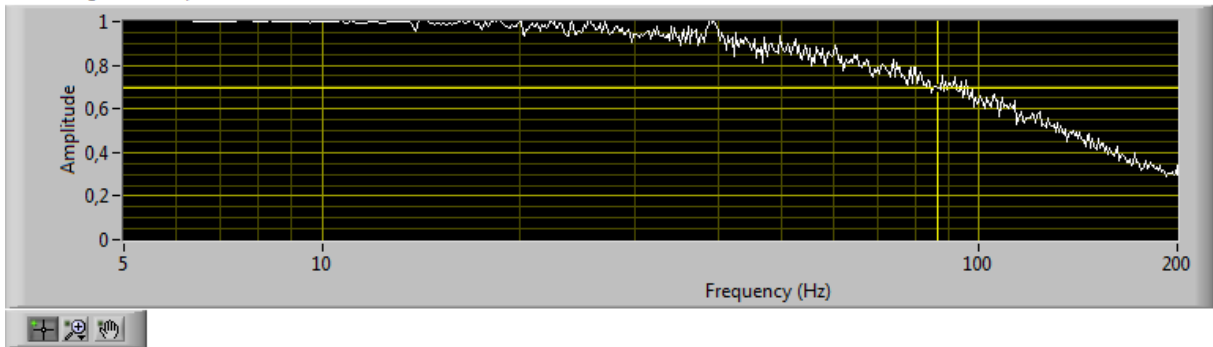


y-axis: $5V \pm 0.5V$

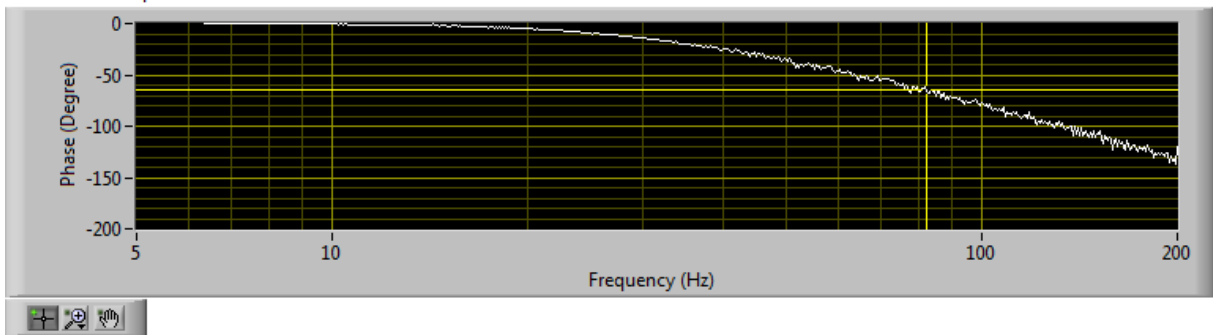
Mean Magnitude Response



Mean Magnitude Response

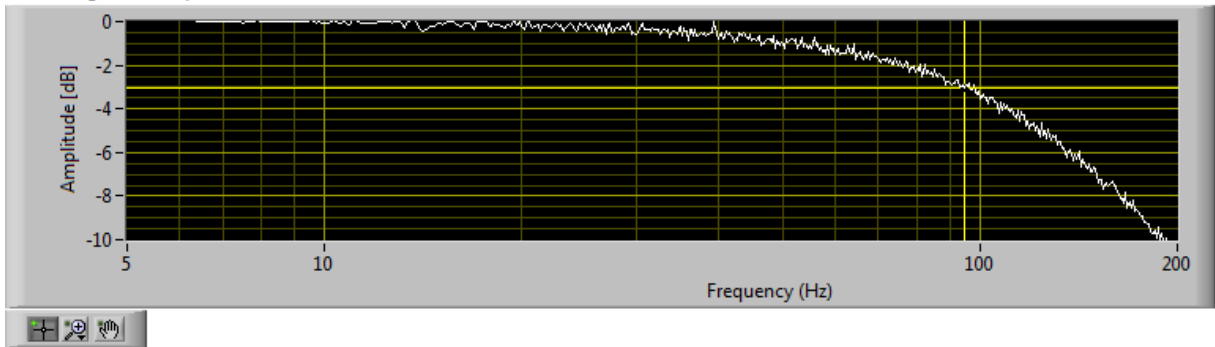


Mean Phase Response

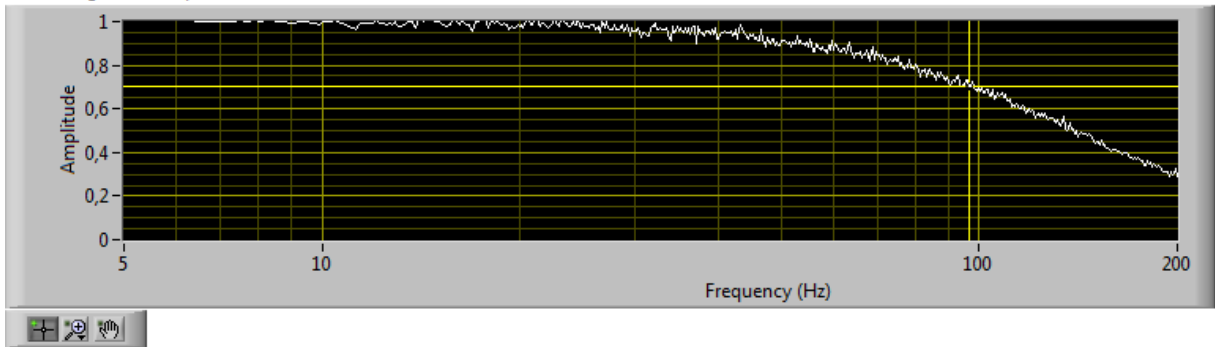


y-axis: $5V \pm 1.0V$

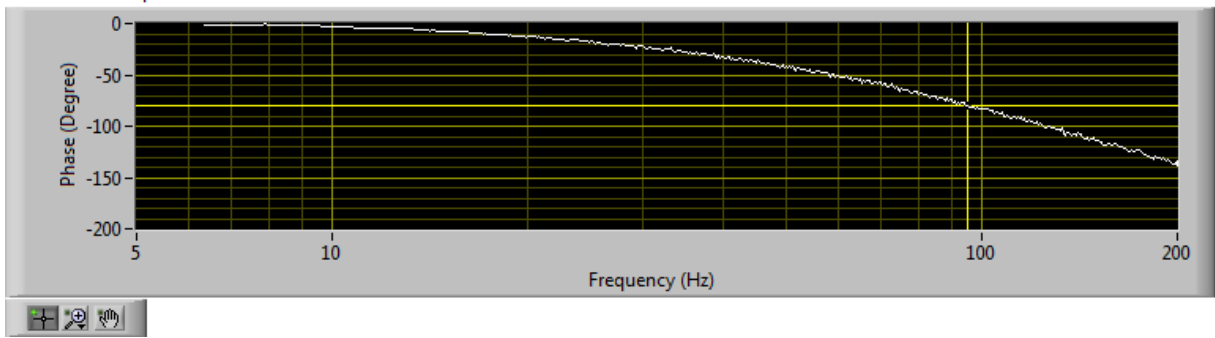
Mean Magnitude Response



Mean Magnitude Response

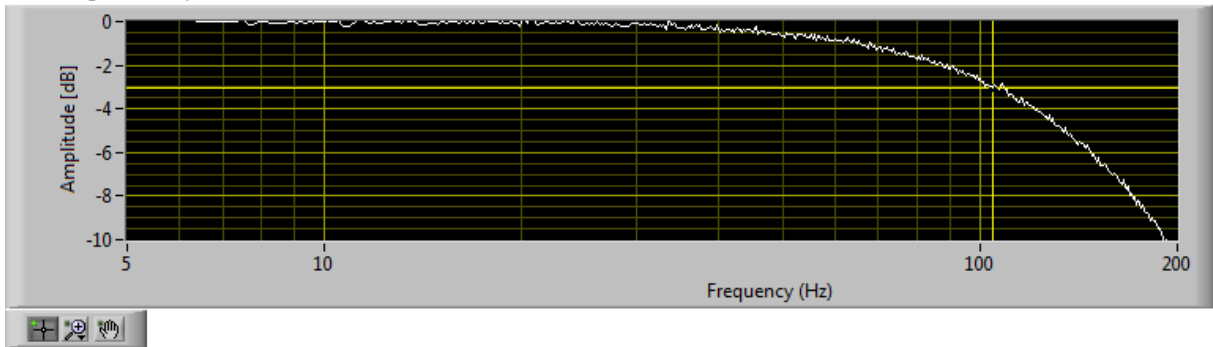


Mean Phase Response

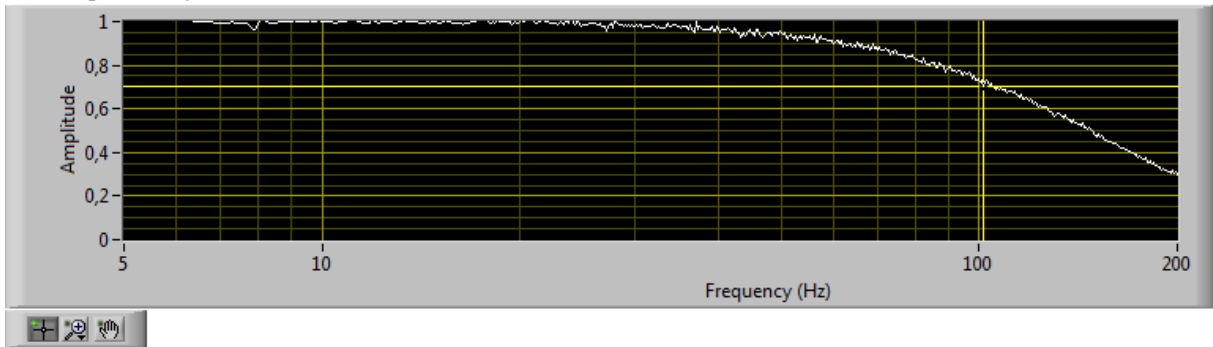


y-axis: $5V \pm 2.0V$

Mean Magnitude Response



Mean Magnitude Response



Mean Phase Response

