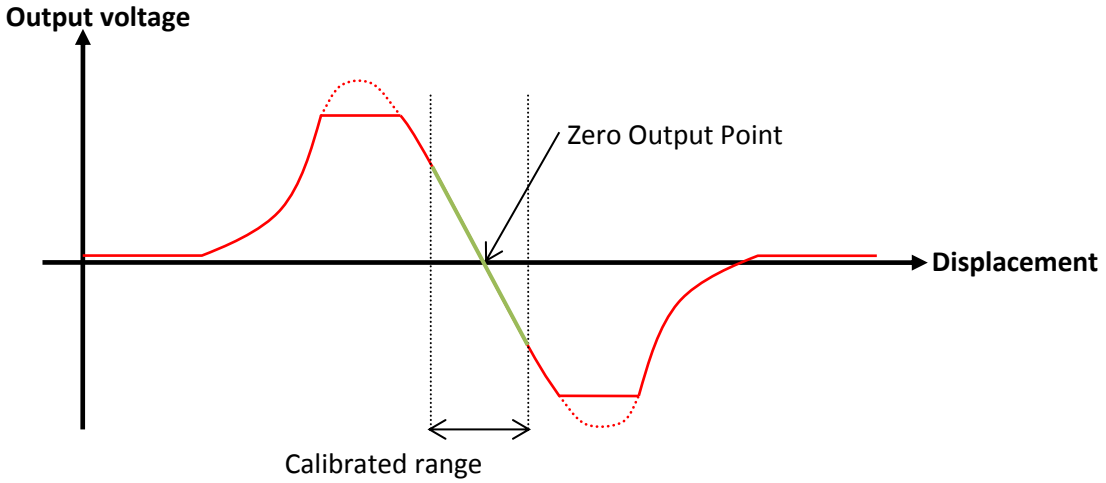
189 GDS Helpsheet

World Leaders in Computer Controlled Testing Systems for Geotechnical Engineers and Geologists

Hardware – LVDT outputs

An LVDT type (Linear Variable Differential Transformer) displacement transducer works by transferring an AC signal from an excitation solenoid into two secondary solenoids. The output of an LVDT varies according to the position of a magnetic core (armature) between these coils. When the magnetic core is in the mid-point of the transducer the secondary coils read equal and opposite signals, so the combined output is zero. As the block moves through the range the magnitude and phase of the combined AC output changes – this output is then fed into a signal conditioning unit that converts to a voltage reading for use with a DC data acquisition system.

LVDT based displacement transducers typically have a linear reading range surrounded by non-linear portions of travel. The graph below shows the typical output of an LVDT as you pass through the non-linear, linear and then non-linear ranges. In models with a captive armature it is not usually possible to move the armature outside of the linear range into the cropped portion of far travel regions of the output.



Transducer range will be ±X.Xmm around the Zero Output Point depending on which model is used.

DO NOT calibrate or use the transducer where red lines are shown in the non-linear ranges.

Note, the output signal will likely be cropped at some points of the travel. This is typically at ±10V to match the full scale on the data acquisition used, but might also be cropped at another voltage depending on the signal conditioning or power supply used for the LVDT. The solid red line above shows how this will typically appear in results for a free armature LVDT, while the dotted portion shows the true output of the LVDT.