

Measuring displacement for projection nut welding applications produces several quality measurements:

**Initial Thickness**--A measure of the initial dimension of the nut on top of the part with force applied but before current is fired.

- Checks for missing nut
- Checks for upside-down nut
- Checks for correct dimension of nut
- Monitors tool wear

**Setdown**--The dimensional difference in the position of the electrode before and after the weld.

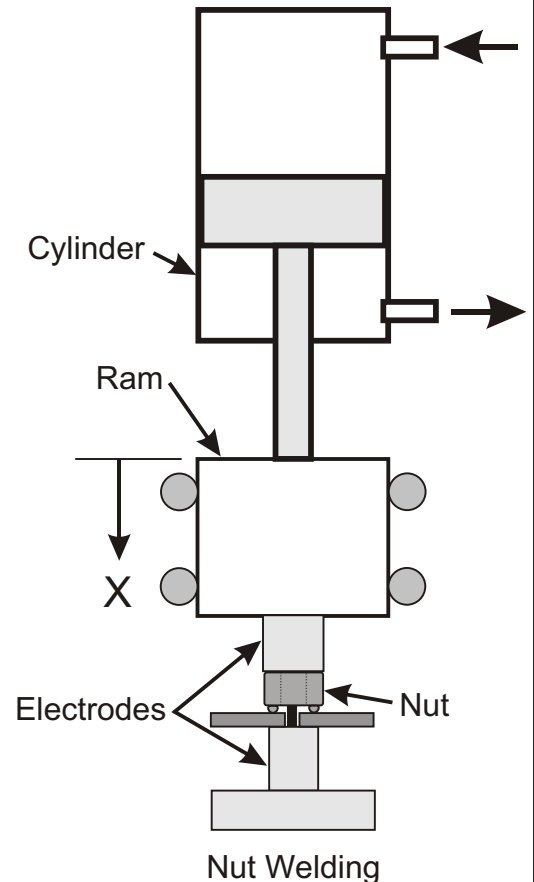
$$\text{Setdown} = \text{Initial Thickness} - \text{Final Thickness}$$

- Monitor correct "setdown" as one key element of weld quality for nut welding. Compare this with predetermined acceptable setdown limits.

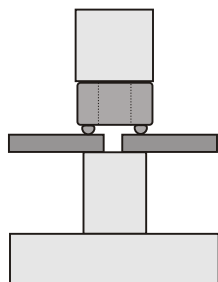
### Practical Considerations

**Recommended Sensors**--The setdown value for a typical nut weld is fairly large (0.02 to 0.06 inches or more). Sensotec recommends using a Linear Variable Differential Transformer (or LVDT for short) to get the most reliable data. Either a spring loaded or rodend version will work and depends highly on the complexity of the machine and the ease of mounting.

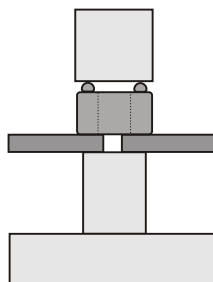
**Sensor Mounting**--It is important to mount the spring-loaded LVDT (see Tech Note 115) as close to the workpiece as possible, and to ensure that the housing or arm for the lower electrode is stiff. While the lower electrode may deflect during the weld, for most practical applications, this deflection will be repeatable and therefore will be accounted for during calibration.



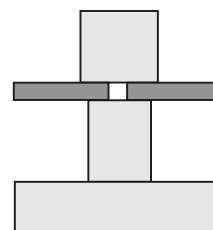
Correct Nut Placement



Upside-down nut



No nut



Welded Nut

