



# What is a Load Cell?

A load cell is a sensor that detects a force (the load) and outputs an electrical signal. A strain gauge or multiple strain gauges are attached to the object for which load will be detected. As the object is subjected to stress by a load, it deforms, causing the strain gauge to deform with it. The deformation (strain) changes the electrical resistance of the strain gauge. The load cell has the gauge in a Wheatstone bridge configuration (four resistors arranged into two parallel branches each having two resistors in series). A load cell may use a strain gauge as each of the four resistors in the bridge or as only two (half bridge) or one (quarter bridge) of the resistors. The bridge is balanced (no output voltage) when the ratio of the resistances in one branch equal the ratio of the resistances in the other branch. A change in the resistances of the Wheatstone bridge causes a voltage difference between the two branches. This voltage signal can be used to calculate the force on the object (the relations between voltage and resistance, resistance and strain, and strain and force are known).

Load cells are used in web control applications to maintain proper tension in the web. The load cell is mounted to a shaft and sends its signal to a tension controller which can control brakes or clutches as necessary to regulate the tension.

