



1 DESCRIPTION

KELK Tensiometer Load Cell Assemblies are electromechanical sensors designed to measure strip tension accurately and reliably under severe rolling mill conditions.

Tension in the strip exerts force on a dynamically balanced sensing roll over which the strip is drawn. A Load Cell Assembly, mounted under the roll bearings at each end of this roll, senses the component of force normal to the base (Figure 1). The signal outputs, together with parameters for strip deflection or wrap-angles α and β and installation geometry, provide a direct indication of the strip tension.

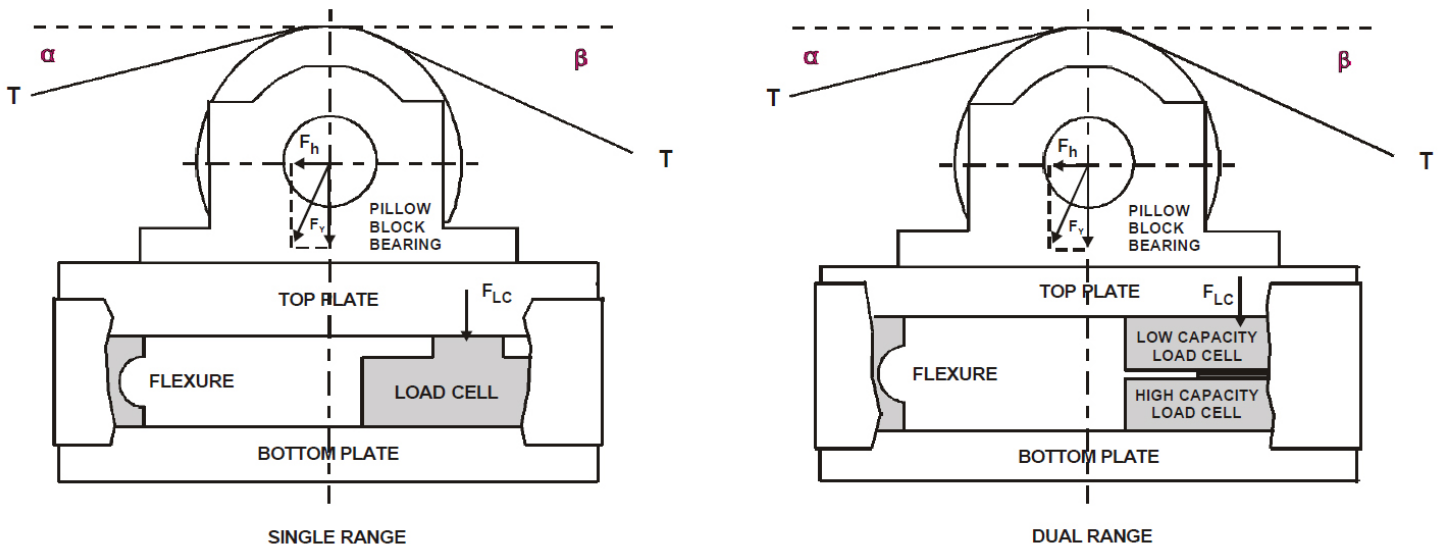


FIGURE 1 - TYPICAL ARRANGEMENT

By measuring the force normal to the Load Cell (FLC) and knowing the geometry dependent constant (k), strip tension (T) can be calculated.

$$T = FLC/k$$

The assemblies provide a rugged and stable platform for accurate tensiometer sensing roll operation. Their unique construction combines mill-worthy Tensiometer Load Cells and special flexures to assure clean transmission of strip tension force to the Load Cell while protecting the tensiometer from destructive side forces and massive overloads.

Both single and dual range systems are available to provide accurate tension measurement over a wide measuring range. When a dual range system is operating at the higher tensions, a built-in mechanical stop provides complete protection to the lower range load cell.

2 FEATURES

2.1 Tensiometer Load Cell:

- 2.1.1 Manufactured from high-strength alloy steel.
- 2.1.2 Hermetically sealed and filled with inert gas for long term stability.
- 2.1.3 Full temperature compensation provides virtual freedom from error due to temperature changes or temperature gradients.
- 2.1.4 Overload capability of at least 20 times the rated capacity.
- 2.1.5 Excellent linearity and repeatability.

2.2 Tensiometer Load Cell Assemblies:

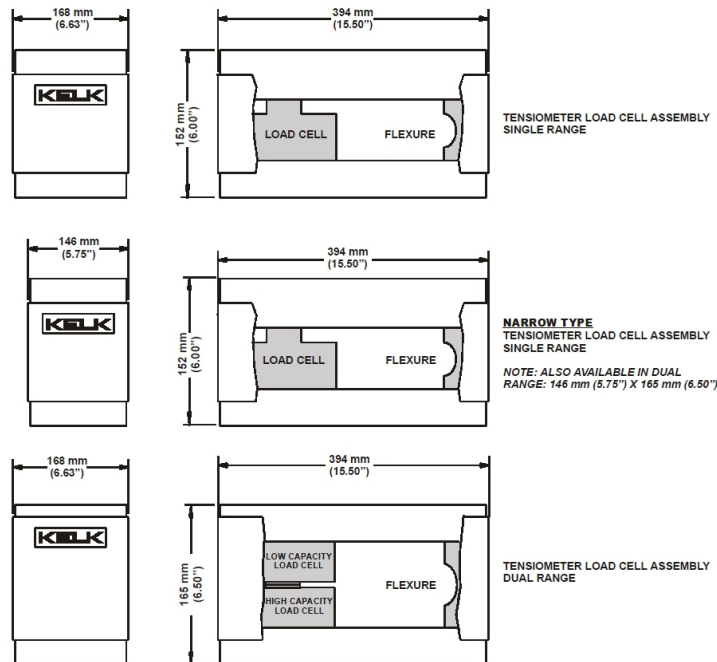
- 2.2.1 Single and dual range systems provide accurate tension measurement over a wide measurement range.
- 2.2.2 Custom and standard sizes available. To help ensure a successful installation, a detailed drawing, showing the load cell assembly and adjacent mill components is prepared by KELK engineers.

3 SPECIFICATIONS

- 3.1 **Capacity:** Related to installation geometry. Single and dual range load cell assemblies available to suit any tension and wrap angle compensation.
- 3.2 **Bridge Resistance:** 700 ohms.
- 3.3 **Excitation Voltage:** 15 VDC or VAC maximum.
- 3.4 **Output:** 1.0 to 1.5 mV per volt of excitation at rated load.
- 3.5 **Response Time:** Less than 1.0 mS (at amplifier output).

- 3.6 Linearity:** Within 0.25% of full scale output through rated load range.
- 3.7 Hysteresis:** ±Less than 0.1% of full scale output.
- 3.8 Repeatability:** Within 0.05% of full scale output.
- 3.9 Thermal Zero Shift:** ±0.005% (50 parts per million) of full scale output per °C over the compensated range of 20°C to 100°C (68°F to 212°F).
- 3.10 Load Limits:** Overload stop inside and integral with the load cell allows at least 20 times overload without mechanical damage.
- 3.11 Operating Temperature Range:** 0°C to 150°C (32°F to 302°F).
- 3.12 Storage Temperature Range:** -40°C to +180°C (-40°F to +356°F).
- 3.13 Accuracy of Calibration:** ±0.1% of full scale output at rated load traceable to the National Institute of Standards and Technology (formerly the U.S. National Bureau of Standards).
- 3.14 Deflection:** 0.11 mm (0.005 inches) maximum.

5 TYPICAL DIMENSIONS



NOTE:

1. Tensiometer Load Cell Assembly can be custom designed to suit applications.
2. Size and location of top and bottom plate mounting holes drilled and tapped to suit application.