

TECH NOTE :: ClipX with TB21 Screw (Strain gauge)

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Short Description

This is an instruction to connect and operate a TB21 screw with strain gauges with ClipX. The TB21 Screw is used to measure axial forces, strain and vibration caused by dynamic loads.

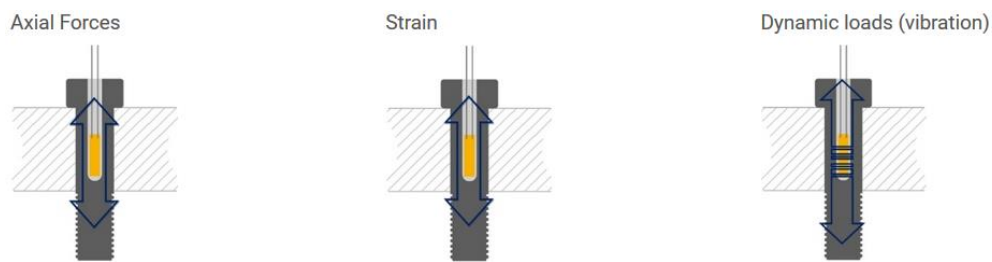


Figure 1: Measuring with TB21 Screw

The measurement takes place via two (LB11 only one) strain gauges glued into the screw. The use of two strain gauges causes an especially good temperature compensation. The strain gauge can theoretically be stretched up to 50.000 $\mu\text{m}/\text{m}$. How far it is stretched in the screw depends on the flexibility of the measuring body, so the screw.

Note: By using a LB11 screw take care of the strong temperature dependency!

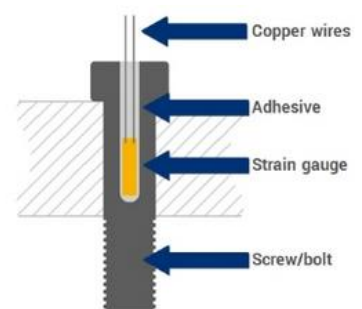
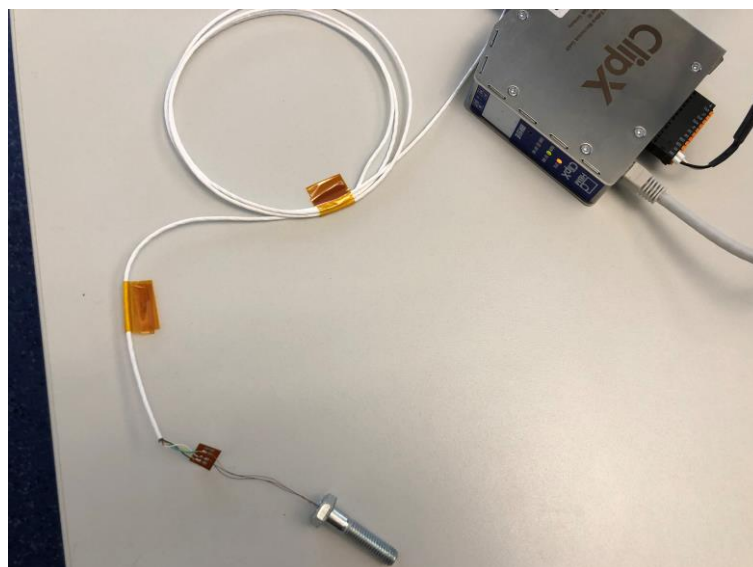


Figure 2: Construction LB11 (TB21 similar)



Preparation

To carry out this example, the following materials are required:

- 1x ClipX
- 1x Cable (5 wires)
- 1x TB21 screw

Connection:

The TB21 screw is operated in a half-bridge circuit. The pin assignment is as follows:

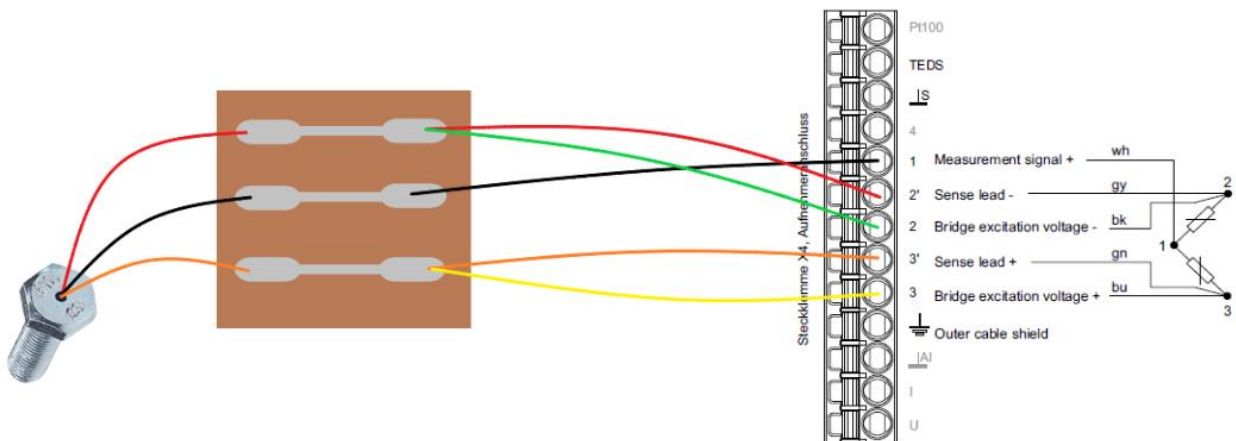


Figure 3: Pin assignment

Note: The colors have been chosen for ease of reading and are not consistent with the color scheme in the ClipX User Guide or the following photo.

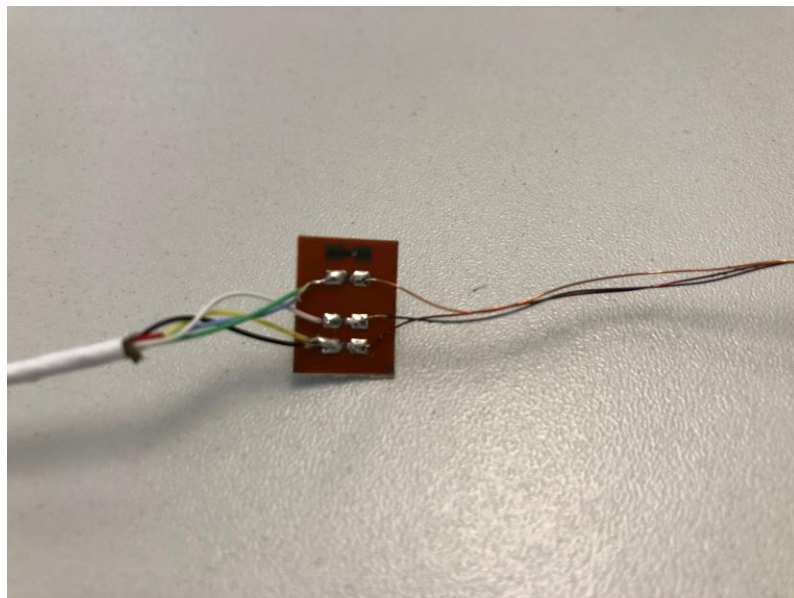


Figure 4: Connection at the connection plate

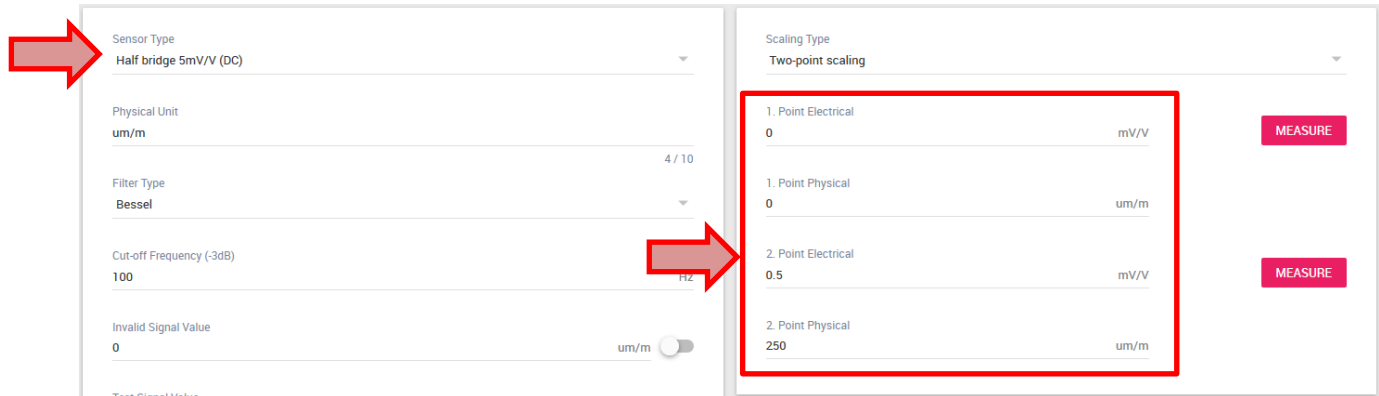
ClipX Settings

Now the ClipX amplifier settings must be adjusted:

- Switch to the menu item 'Amplifier' in the ClipX Webinterface
- Choose sensor type 'Half bridge 5mV/V (DC)'
- Set the scaling

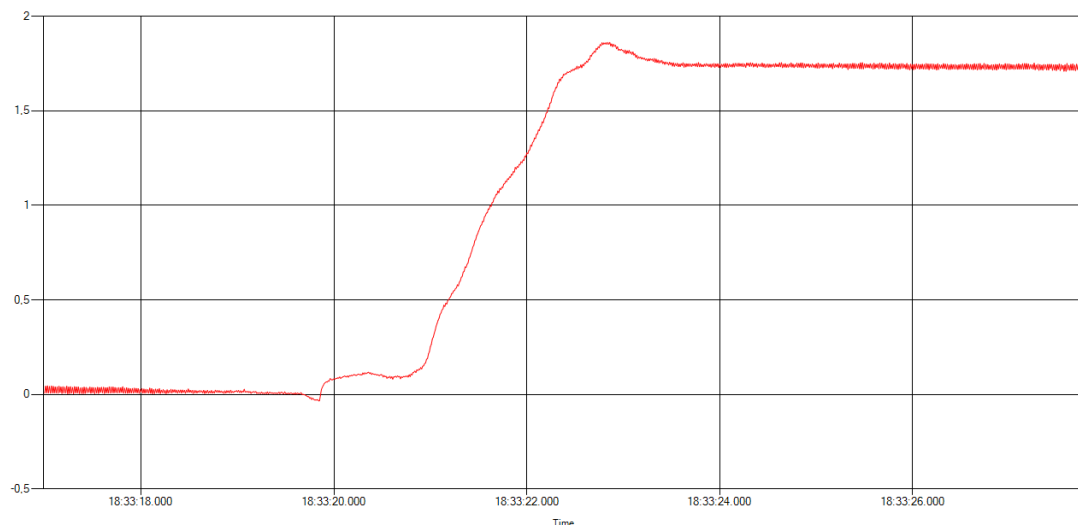
Scaling:

In contrast to e.g. force transducers, the strain gauge has no fixed scaling, because it is not calibrated. In DMS, the "k-factor" is randomly measured, which indicates the scaling factor between strain and stress ratio. Typical values when using an M8 screw are, for example, 100-500 $\mu\text{m}/\text{m}$ at approx. 0.5 mV / V.



Note: If the scaling is unknown, the TB21 scaling needs to be measured! The values in the illustration are only an example!

For example, a measurement while the screw is tightened is as follows:



Disclaimer

These examples are for illustrative purposes only. They cannot be used as the basis for any warranty or liability claims.