# TECH NOTE :: ClipX with strain gauge in quarter bridge circuit

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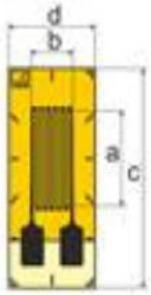
## Short description

This is an instruction for measuring strain with a strain gauge in a quarter bridge circuit using ClipX. This method can be used for any amplifier which does not have the opportunity to enter the bridge and gauge factor.

Note: The strain must be in the direction of measurement so that incorrect measurements will not occur.
The ClipX has to be set to carrier frequency sensor supply to prevent thermoelectric effects and temperature-dependent zero deviations.

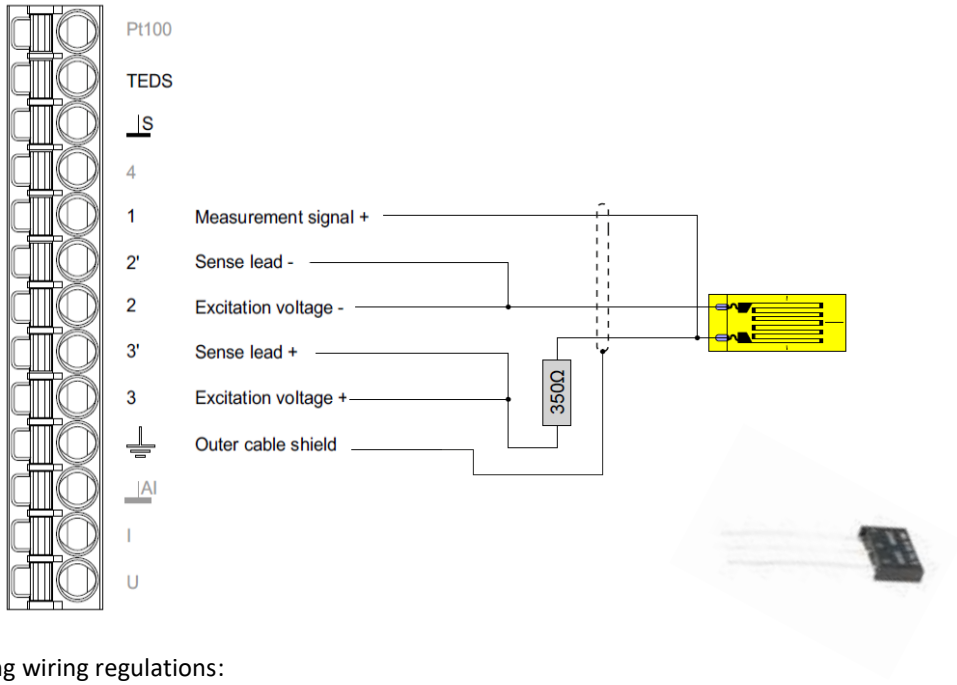
## Required Material

To carry out the measurement the following material is required:

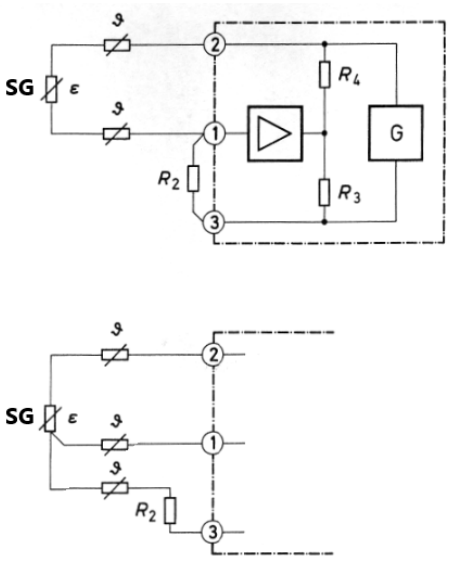
- ClipX amplifier
- Strain gauge (e.g. 1-LY41-3/350)
- Corresponding completion resistance (e.g. 3-3054.0282)

## Electrical connection

The connection is shown in the figure below. One of the resistances is the strain gauge, the other one is the completion resistance. Wire the completion resistor and the bridges between the bridge supply voltage and the sensor line to the plug-in terminal of the ClipX, not to the strain gauge.




Observe the following wiring regulations:

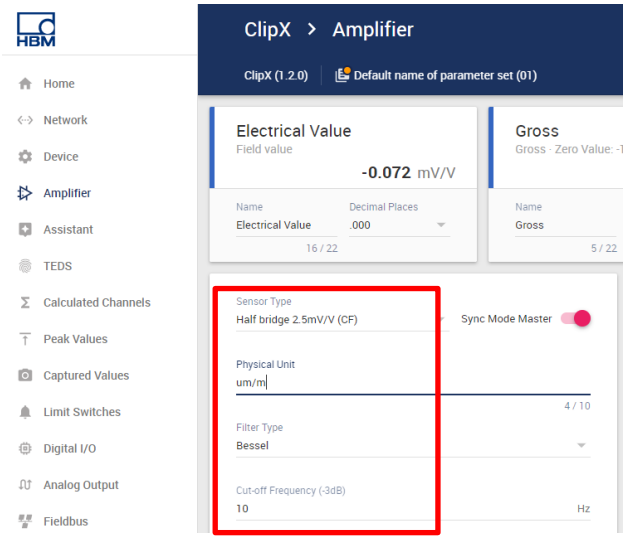



**Comparison of two-wire and three-wire connection of the quarter bridge circuit**
**A) Two-wire connection, return line in series with the SG**
**b) Three-wire connection, direct connection in series with the SG, return in series**

## ClipX setup

To carry out this measurement the sensor must be set up.

- Open the ClipX web server
- Go to ‘Amplifier’
- Set the sensor type to ‘Half-bridge 2.5mV/V (CF)’
- Enter ‘um/m’ as physical unit
- Set the cut-off frequency e.g. to 10Hz to avoid noise influence




Now the scaling parameters must be calculated and entered. The first point is 0mV/V corresponding to 0um/m. To get the second point we choose the electrical value to be 1mV/V.

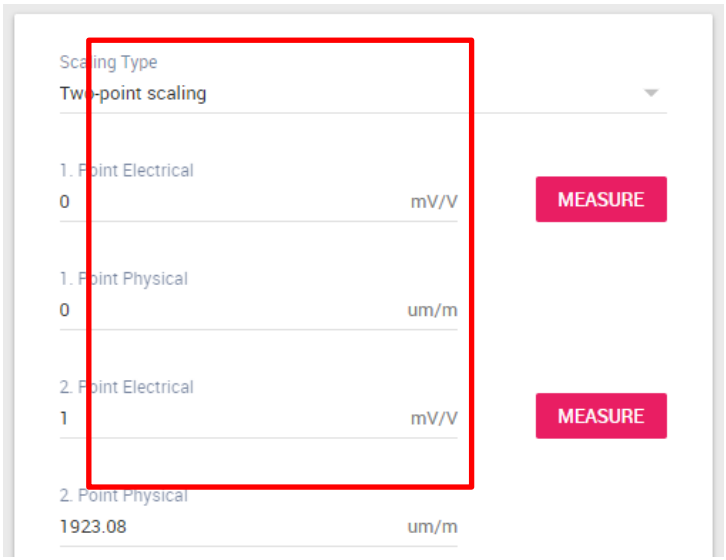
$$\varepsilon\left(\frac{\mu m}{m}\right) = 10^6 \times bf \times \frac{4}{k} \times \frac{0.001V}{1V}$$

$$\varepsilon\left(\frac{\mu m}{m}\right) = bf \times \frac{4000}{k}$$

With the bridge factor bf (quarter bridge = 1) and the gauge factor k = 2.08 (certificate) follows:

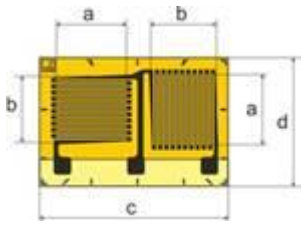
$$\varepsilon\left(\frac{\mu m}{m}\right) = 1 \times \frac{4000}{2.08}$$

$$1923.077\ \mu m/m$$




## Note:

Measurement with a half-bridge (T-rosette, e.g., 1-XY71-3 / 350):




This works if the strain acts only in one direction, namely in the direction of measurement. Otherwise, the transverse grating would be detuned in its measuring direction and thus the bridge as a whole. Advantage of this method: temperature compensated.

## Disclaimer

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