

Measurement bridge

The electric power of the transducer can be a continuous voltage for static forces, generally comprised between 4 and 20 V, or an alternative frequency voltage, comprised between 60 Hz for static forces and 1,000 Hz for dynamic forces.

The transducer's output signal voltage depends on the sensitivity of the transducer. A 2 mV/V sensitivity corresponds to a maximum output voltage of 20 mV. Due precaution should therefore be taken in order to measure such voltages with precision.

The electric cable connecting the transducer and the measurement bridge is an integral and very important part of the measurement system. In fact, variations in room temperature induce resistance variations on the cable conductors, which sensibly modify the signal to be measured. Therefore, for 3 m lengths and above, it is preferable to use 6 wire cables. In these connections, 2 wires serve as supply for the transducer, 2 wires are used to measure the transducer's output voltage, and 2 additional wires are used to adjust voltage supply to the transducer terminal. The results of the calibration of a dynamometer depend on the connection cables used; it is therefore necessary to perform the calibration with the cables that will be used later with the transducer.

Measurement bridges generally allow to perform two adjustments: setting the indication to zero when the transducer is at zero load and the amplification gain in the output signal.

The zero setting function makes it easier to calculate transducer deflection.

Adjustment of the gain allows to set the ratio between the force applied to the transducer and the relevant indication, so as to obtain a simple ratio or indications allowing to read the force directly. This adjustment is generally applied during the calibration of a dynamometer. If this adjustment remains accessible to the operator, this can cause serious inconveniences, given that, in the absence of a calibration device, any subsequent action on the gain render the calibration results invalid.

The calibration device is an essential element of precision measurement bridges. It allows to ensure stability and continuity of adjustments to the measurement bridge between two calibrations. It consists in a very stable resistance replacing the transducer gauge bridge, or a reference voltage source allowing for the electric calibration of the measurement amplifier. This device accessible to the operator allows at all times to reset the measurement point to the reference conditions obtained during calibration of the dynamometer. It particularly allows to suppress of the evolution of the metrological characteristics constituting the measurement point throughout time.