INSTRUCTIONS FOR THE USE OF STRAIN-GAUGE SENSORS

Dear Customer,

Thank you for deciding to use our sensors. In the next few pages you will find instructions and tips on how to avoid mistakes during the connection and use of our sensors and transducers. Please take a few moments to read these instructions since the guarantee is not valid if the sensor is not used correctly.

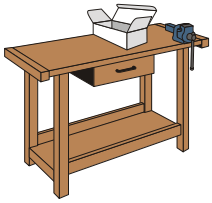
1. Checking the sensor before the first connection

Do not try to simulate Force, Pressure or Acceleration by pressing, pulling or twisting the sensor! This could result in sensor overload

The so-called “testing” of pressure sensors by pressing the membrane with fingers or other solid objects is one of the most common reasons for overloading.

The warranty does not apply in this case.

1.1 Visual Control



Please make sure that the sensor does not show external signs of damage that could be the result of improper transport.

1. 2 Electrical isolation

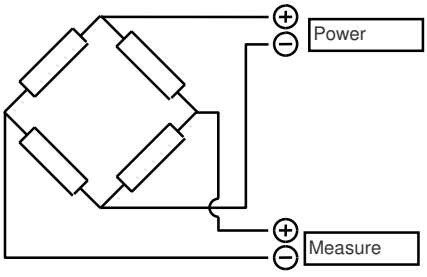
Connect all the wires except the shield together. Measure the resistance between these leads and the housing with a multimeter. The resistance should be higher than 100 M⎵.

1. 3 Measuring the bridge resistances

It is possible to measure the input and output resistance of sensors without amplifiers:

How to proceed:

Measure the resistance between the (+) and (-) leads of the excitation and output respectively at room temperature. The correct value is given in the calibration sheet of the sensor. The sensor is not in working order if the value is: 1) 10 % above or below the written value 2) infinite 3) unstable.



The values given in the commercial data sheets are nominal values and can differ considerably from those in the calibration sheet!

1 The colour code is given in the calibration sheet. Usually: Excitation: red/black, Output: green/white.

2 Rack mount systems may have higher current consumption.

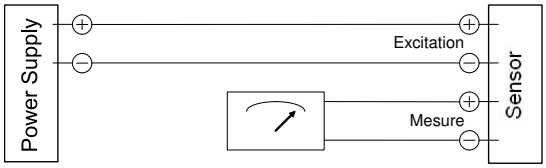
It is not possible to measure these if the sensor has a built-in or external amplifier. The current consumption of an amplifier in general does not exceed 70 mA[3]. If it does, you should contact Measurement Specialties.

2. Connecting the sensor

The sensor should be connected BEFORE mounting. The Zero drift should be controlled constantly to be able to recognise possible overloading in time.

Before connecting the sensor, compare the colour of the wires with colour coding given in the calibration sheet. In particular, check the excitation lead colours to prevent polarity inversion.

A polarity inversion can destroy the sensor if an amplifier is present!



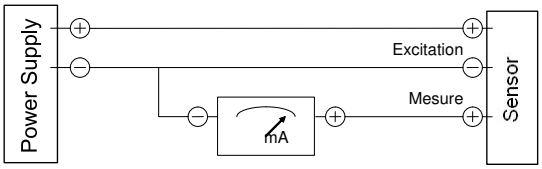
2. 1 Unipolar excitation

This connection scheme is used for sensors without amplifier, or with an integrated or extern amplifier with unipolar excitation, eg. 10 V

4 wires (Exc. and Meas. references separated)
Do never link (–) Excitation and (–) Measure of the sensor, the polarities are different.

3 wires (Exc. and Meas. references connected)
In this case, both references are common (inside the sensor or in the electronic). The signal reference cable can be duplicated to ease the connection.
Never short-circuit cable (–) Excitation and cable (–) Measure (as sensor 3 wires) if it is not clearly mentioned in the technical data or allowed by MEAS France.

A polarity inversion can destroy the sensor if an amplifier is present!
For sensors without amplifiers, however, it only results in polarity inversion of the output signal

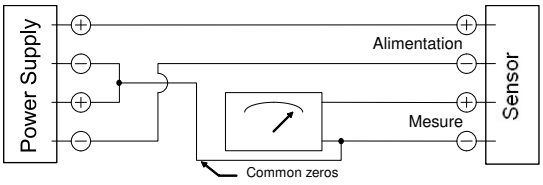


2. 2 Bipolar excitation

This connection scheme is used for sensors with an integrated or external amplifier with bipolar excitation, e.g. ±15 V.
'0 V', '0 V Common' or 'Common Zero Potential' means that the 0 V lead of the power supply and the (–) Measure of the output signal are shorted.
Polarity inversion of sensors with amplifiers can destroy the sensor!

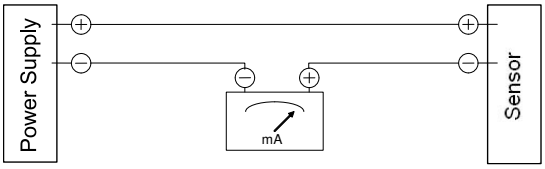
2. 3 4/20 mA connection (2 wires)

This connection scheme is only used for sensors with internal or external current amplifiers



2. 4 4/20 mA connection (3 wires)

This connection scheme is only used for sensors with internal or external current amplifiers.



3. Zero offset

After connecting the sensor without load it is possible to measure the zero offset of the sensor.

N.B. A zero offset does not mean that the quality of the sensor is poor since an absolute zero is not possible without additional electronics.

3. 1 Typical offset

Sensors using semiconductor strain gauges without amplifier may have offsets up to ±15 mV unless specified otherwise in the calibration sheet. Sensors with metal foil strain gauges have offsets up to ±1 mV.

Sensors with amplifiers amplify the offset as well. The offset of amplifiers that have a potentiometer can be adjusted.

Some sensors with amplifiers have a regulated offset between approx. +1 V to +10 V. The exact values are given in the calibration sheet of the sensor.

3. 2 Dérive thermique du zéro

Sensors and amplifiers warm up if they are connected to a power supply. This temperature drift results in a zero offset that stabilises itself after approx. 15 minutes. A zero adjustment should therefore be done after this period of time.

We recommend that the sensor should be connected to the power supply 60 minutes before the measurement has to be made to guarantee an optimal stability.

4. Installing the sensor

1. The sensor should not be loaded during mounting. This means for:
   - Load Cells: without application of force in any direction
   - Pressure Sensors: the sensor is under atmospheric pressure.
   - Accelerometers: no shock

2. Observe the Zero offset constantly during mounting! A zero offset of over 3 % could indicate overloading. For models incorporating the mechanical decoupling SanShift™ technology a zero offset of 1% can indicate overloading. Stop mounting the sensor immediately in this case and refer to MEAS France for instructions!

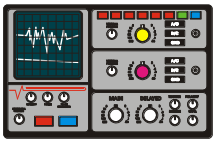
3. Make sure using materials which are similar to the sensor's for mounting or screwing to avoid different thermal expansions, and thus strain, due to temperature drifts. This is important for the zero offset stability of the sensor.

4. Tightening torque during the mounting of load cells and pressure sensors results in a zero offset. Although many of our sensors are equipped with the SanShift™ - technology that drastically minimises this effect, it is still necessary to make sure that the tightening torques are as low as possible and lie within the limits given in the calibration sheets / data sheets.

5. Accelerometers should be mounted on plane surfaces. Rigid mounting helps avoid unwanted resonance effects.

5 Sensor use

5. 1 Pressure / Load



1. Pressure sensors should only be used in gaseous or liquid media. Make sure that the membrane does not come in contact with hard objects, e.g. particles in the media. Make sure that liquid flow is not started suddenly. This creates an impact load (Water-Hammer-Effect) that results in a millisecond impulse with amplitude which is much higher than the regular pressure measured and can result in the destruction of the sensor.

2. The application of force on Load Cells should be only in axial direction since side forces may destroy the sensor. No torques should be applied. Ring or Disk type Load Cells require the force to be applied evenly over the surface of the sensorThe surface of the object applying the force should therefore match the surface of the sensor.

5. 2 Sensitivity

The Sensitivity given in the commercial data sheets are just nominal values. The exact value of the sensitivity and/or output signal at maximum load is given in the calibration sheet.

Instable excitation causes zero and sensitivity drifts in the output. The drift is linearly proportional to the instability of the excitation. Noise in the power supply also results in noise in the output signal. We therefore recommend low noise stabilised power supplies.

For sensors with integrated voltage stabilisers low noise unregulated power supplies are sufficient.

6 Warranty

1. Mechanical modification of sensors or their housings changes the technical specifications of the sensors. Such changes can therefore only be undertaken by the manufacturer or by written agreement with MEAS France.
2. The warranty does not apply if the sensors are connected incorrectly!
3. The warranty does not apply if the sensors are mounted incorrectly!
4. The warranty does not apply if the sensors are used incorrectly, particularly if they are overloaded!

7 Contacts

For any trouble with your equipment, do not hesitate to contact MEAS-France (or its local representative):

NORTH AMERICA

Measurement Specialties, Inc.,
a TE Connectivity Company
45738 Northport Loop West
Fremont, CA 94538
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