



Troubleshooting for sensors with strain gauges

In order to define the cause of trouble it is recommended to measure the sensor resistance and the voltages on the measuring amplifier.

The precise set values are in the data sheets of the sensor and measuring amplifier as well as in the test report of the sensor. The table below shows the reference values.

	Parameter	Set value	Notes
1	Supply voltage	+10V ...+26V	Between supply voltage "U _B " and GND
2	Output voltage	±10V or 4...20mA	between output signal U _A and GND
3	Bridge supply	+2,5V or +5,0V	between +U _s and -U _s , positive and negative bridge supply
4	Bridge output	-1mV ... +1mV	When the bridge supply is applied, the output signal should be within ± 1mV (use mV measuring range of the multimeter)
5	+U _d vs. -U _s	0,5 x bridge supply	When the bridge supply is applied, the potential of + U _d should be approx. half of the bridge supply.
6	-U _d vs. -U _s	0,5 x bridge supply	with applied bridge supply the potential of -U _d should be on about the half of the bridge supply.
7	Input resistance	350...450 Ohm or 1000...1400 Ohm 700...900 Ohm	Disconnect sensor. Between +U _s and -U _s , (wire colour mostly brown and white or red and black)
8	Output resistance	350 Ohm or 700 Ohm or 1000 Ohm	Disconnect sensor. Between +U _d and -U _d , (wire colour mostly green and yellow or green and white)
9	Insulation resistance 1	>200 MOhm	Disconnect sensor. Between +U _d and sensor housing. Do not touch test probes
10	Insulation resistance 2	>200 MOhm	Disconnect sensor. Between shield and sensor housing. Do not touch test probes
11	Insulation resistance 3	>200 MOhm	Disconnect sensor. Between shield and +U _d . Do not touch test probes.

Table 1: Verification of sensor and measuring amplifier

Note: For sensors series LCB and LCS and KR80, a different colour code is used.



In the case of 6-wire technology, the positive sensor cable (+ sense) and the positive sensor supply are connected with each other (0 Ohm).

The same refers to the negative sensor line and the negative sensor supply.

Parallel connection of sensors

If 3 or 4 sensors are parallel connected, e.g. in a platform scale, please check first the connection resistance of the parallel circuit.

In case of 3 load cells, one third of the input and output resistance of a single load cell must be measurable, for 4 load cells one quarter, etc.

Causes of failures

Result	Possible causes	Effect
The resistance measurement shows, that one or more sensor cables have no contact	Cable break in the sensor, in the cable gland or in the sensor cable; wire not correctly applied, not correctly stripped, wire end ferrule not correctly installed	Output signal of the measuring amplifier is not stable, Drifts from zero to the maximum output signal or the measuring amplifier always shows positive or negative maximum value.
Output voltage >20V	Voltage measuring device on measuring amplifier with current output?	
Output current 0mA	Fuse of current meter defective?	
Output or input resistance is 75% of the set value, e.g. 90 Ohm instead of 120 Ohm or 262 Ohm instead of 350 Ohm or 750 Ohm instead of 1000 Ohm	Incorrect cable configuration, Incorrect assignment of the wires to the bridge supply and the sensor signal	Output signal of the measuring amplifier can not be adjusted to zero; Measuring amplifier always shows positive or negative maximum value.
Insulation resistance <200 MOhm	Problem in the sensor or on the cable gland of the sensor or in the sensor cable	Strong noise, mostly with 50Hz or 100Hz or measuring amplifier always shows positive or negative maximum value.
Input resistance 75% of the set value	Connection error or cable break within the sensor	Measuring amplifier always shows positive or negative maximum value.
Bridge supply is 0V	No supply voltage;	Amplifier does not respond



Result	Possible causes	Effect
	Short circuit between positive and negative bridge supply or GND; Note: the bridge feed at GSV-15 is not short circuit proof.	to input signal. Output remains constant e.g. at 0V
Bridge output $\pm 2\text{mV}$ up to $\pm 50\text{mV}$	Sensor overloaded	Measuring amplifier always shows a positive maximum value or can not be adjusted to 0;
Bridge output $\pm 0,5\text{V} \dots \pm 3\text{V}$	Incorrect cable connection or cable break in the sensor	Measuring amplifier always shows positive or negative maximum value.
+ Ud vs. -Us or -Ud vs. -Us is not equal to 0.5x bridge supply	Connection error or cable break within the sensor	Measuring amplifier always shows positive or negative maximum value.

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