

Shielding of strain gauge sensors

Wiring of sensors and data acquisition

The achievable signal quality for sensors with strain gages depends decisively on the shielding and the routing of the cables for supply voltage and output signal.

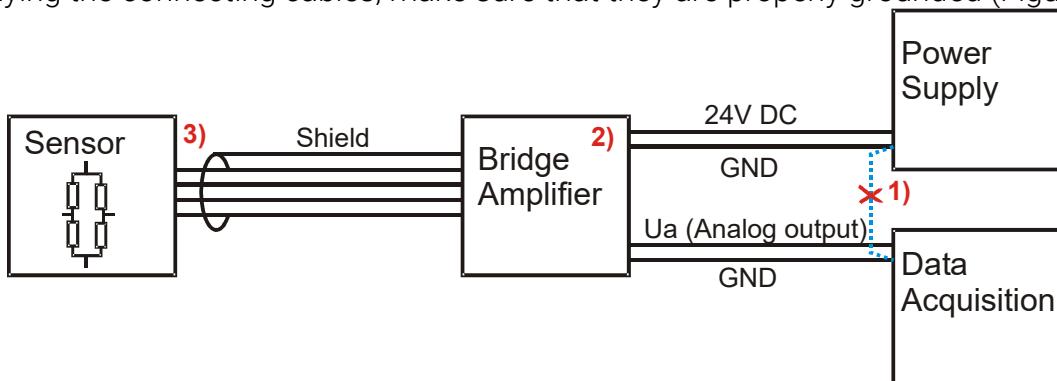
Due to the low signal level of maximum 10mV under full load, the sensor cabling is particularly sensitive to electrostatic and electromagnetic interferences.

Under ideal conditions, the signal level is resolved under full load in 10,000 display steps. Measuring amplifiers with integrated AD converter achieve 20,000 to 100,000 display steps, depending on the operating principle of the AD converter and the measuring rate.

In addition to the measures taken in the input circuit of the GSV measuring amplifiers (high common mode rejection, filter), the following points should be observed:

- a) Use of shielded sensor cables;
- b) Use of separate cable ducts for sensor cables and control cables
- c) Use of twisted pair sensor cables in environments with electromagnetic fields or cable lengths exceeding 10m,

When laying the connecting cables, make sure that they are properly grounded (Figure 1):



Picture 1: Installation of GND

zu 1) The ground connection between "Power Supply" and "Data Acquisition" must not be established directly, otherwise a ground loop will occur.

The output signal U_a of the measuring amplifier (0...10V or 4...20mA) should be fed together with GND from the measuring amplifier to the data acquisition. (2 wires are connected to the GND terminal of the measuring amplifier).

In devices of protection class 1, ground loops can form via the protective conductor. Linearly controlled power supplies are preferable to switching power supplies in measurement technology. A separate power supply for the measurement technology is advantageous.

zu 2) If the measuring amplifier is mounted outside the control cabinet on a machine housing, GND and earth have different potentials. The measuring amplifier should then be mounted isolated if GND and housing of the measuring amplifier are connected to each other (GSV-1A, GSV-2A, GSV-2AS, GSV-2ASD).

zu 3) The shielding of the sensor cable is connected to GND at the measuring amplifier. On the sensor side, the screen should then not be in contact.

zu 4) In the case of sensors with plug connectors, the shield lies on the sensor housing. In this case, the shield should not be connected to the measuring amplifier (Figure 2).

Power supply for measuring amplifiers and inductive loads

Ideally, separate power supplies for sensors and actuators are used.

If only one power supply is available, e.g. for battery operation, the wiring must be carried out in such a way that GND and supply lines for actuators and sensors are connected directly to the battery terminal.

Do not use any shared wiring harnesses!

