



Operating instructions

Baumer Electric AG

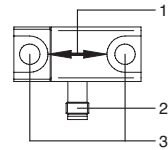
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Safety

See enclosed leaflet

Scope of delivery

Article	Quantity
Sensor	1
Screw (M4 x 12, quality 12.9, 2 zink flake coated)	2

Construction and function

- 1 Strain direction
2 Connection plug (M5 x 0.5; 4 pin)
3 Mounting holes

The sensor is screwed to a machine element and measures its strain. Changes in strain are measured using strain gauges and converted into an electric signal. If the sensor experiences a tensile force, the signal is positive, and it is negative in case of a compression.

Signal word

ATTENTION In situations that can lead to property damage

Transport and storage**ATTENTION**

Damage to the sensor due to falling.

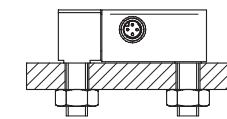
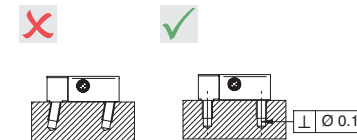
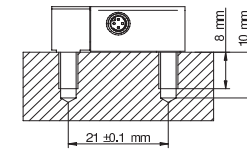
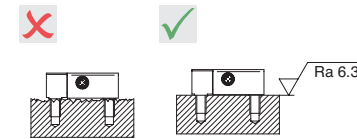
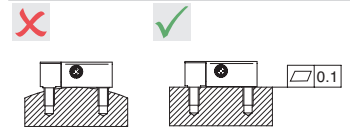
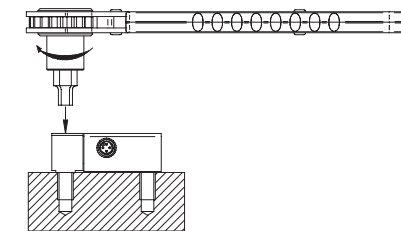
- ▶ Do not drop the sensor in its unpackaged condition.
- ▶ Check packaging and sensor for damage.
- ▶ In the event of damage: Do not use sensor.
- ▶ Transport or store the sensor only in its original packaging.
- ▶ Store sensor where it will be secure against shock.
Storage temperature: $-40 \dots +85 \text{ }^{\circ}\text{C}$

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Preparing for mounting**Important**

The sensor provides inaccurate measurement results when the measuring surface is dirty or when the sensor is incorrectly mounted.

- ▶ Avoid contamination from grease or oil.
- ▶ Mount the sensor on a machined, flat surface.
- ▶ Observe surface roughness.

**Mounting**

- ▶ Check for evenness tolerance.
Evenness tolerance $\leq 0.1 \text{ mm}$
- ▶ Check for surface roughness.
 $Ra \leq 6.3 \text{ }\mu\text{m}$
- ▶ 2 Drill 2 threads in machine element.
Depth boreholes: min. 10 mm
Distance between boreholes: $21 \text{ mm} \pm 0.1 \text{ mm}$
Screws: M4 x 12
- ▶ Make sure that boreholes are drilled perpendicular to the contact surface of the sensor
- ▶ Mounting option with through-holes
- ▶ Make sure that the machine element is not loaded.
- ▶ Hand-tighten the fastening screws.
- ▶ Tighten the SW3 hexagonal socket fastening-screws using a torque wrench.
- ▶ Tightening torque: 5 Nm

Electrical connection

Important

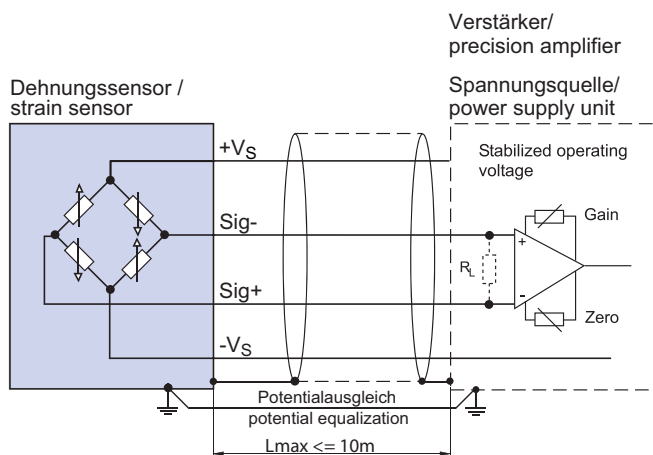
For stable measurement results, the sensor must be mounted correctly.

- ▶ Provide a supply voltage of max. VDC(UL class 2). For a UL 1310 installation, the device must be protected using a UL-listed fuse (nominal current: max. 5 A at 20 VDC or $\leq 100 \text{ W/VDC [A]}$).
- ▶ Switch off the supply voltage before connecting. Connect the sensor according to pin assignment.
- ▶ Use shielded connection cables with a maximum length of 10 m.

Pin assignment



In order to meet the PELV requirements according to EN 60204-1, § 6.4.1, it is recommended to connect GND to protective earth at one point.



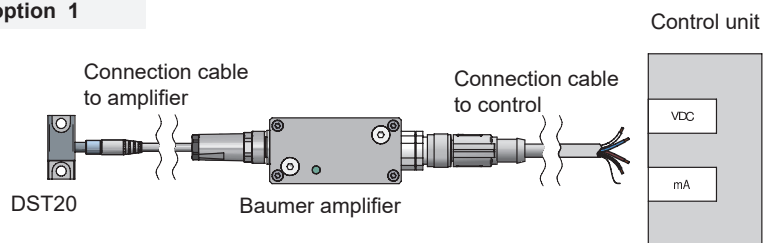
Betriebsspannung / supply voltage.....+Vs / -Vs: max. 10 VDC
 Lastwiderstand / load resistance.....RL: > 10 MΩ
 Ausgangssignal typisch / typical output signal.....Sig+ / Sig-: ±1.00 mV/V

Initial commissioning

The strain sensors DST20 are passive strain sensors without amplifier electronics. The output signal is in mV/V and proportional to the strain. The exactly measured sensitivity in mV/V at the respective measuring range is indicated on the top of the sensor. The strain sensors can be connected via a Baumer amplifier providing an amplified standard signal of +/- 10 V or 4 ... 20 mA to the control (see accessories for strain sensors at www.baumer.com). If a controller has an integrated amplifier with mV/V input, the DST20 strain sensors can also be connected directly to the controller.

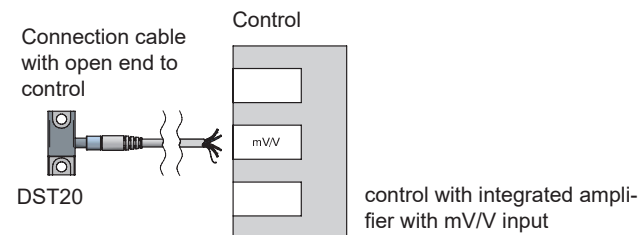
Connection option 1

With amplifier



Connection option 2

Directly to control



- ▶ Connect sensor.
- ▶ For a stable zero point: screw on sensor firmly, warm-up sensor 3 minutes with power supply switched on.
- ▶ To minimize the impact of setting behavior, load the sensor to full load 10 times if possible.
- ▶ Tare the sensor at zero load to compensate for signal changes during mounting

Operation

Depending on the application, the sensor can be cyclically tared by the machine control to compensate for zero drift or temperature influences.

- ▶ Make sure that the sensor does not experience a change in strain.
- ▶ Make sure that the machine is in the correct zero position.
- ▶ Tare the sensor at zero load.

Maintenance and repair

Maintenance

Regular maintenance is not required.

Repair

- ▶ Do not repair the sensor yourself.
- ▶ Send damaged sensor to Baumer.

Contact addresses can be obtained from www.baumer.com.

Disposal

- ▶ Do not dispose of in household waste.
- ▶ Separate materials and dispose of in compliance with nationally applicable regulations..

Applicable documents

For general information, see insert.

For technical data, see data sheet: www.baumer.com

For accessories and connection cables see www.baumer.com

FAQ

The sensor does not output a stable signal. Why is that?

The sensor is not firmly screwed on. To obtain stable measurement results, the sensor must be firmly screwed onto a machine element.

Calculation example: Sensor outputs certain signal in mV/V, how much strain is this?

A 500 $\mu\text{m/m}$ DST20 with a sensitivity of 1.12 mV/V delivers at a supply voltage of Vs of 7V an output signal Sig of 6.65 mV. How much strain is this?
 Sensor 1.12 mV/V = 500 $\mu\text{m/m}$,
 $V_s/\text{Sig} = 6.65 \text{ mV} / 7 \text{ V} = 0.95 \text{ mV/V}$
 $500 \mu\text{m/m} \times 0.95 / 1.12 = 424.1 \mu\text{m/m}$

Calculation example: Sensor signal with an amplifier 1.25 e.g. DABU-How much strain is this?

A 1000 $\mu\text{m/m}$ strain sensor DST20 has a sensitivity of 1.15 mV/V and is connected to an amplifier DABU AD2T-FB 1.25. The amplifier delivers an output signal of 8.5 V. How much strain is this?
 Amplifier 1.25 mV/V = 10V
 $\text{DST20 } 1.15 \text{ mV/V} = 1000 \mu\text{m/m}$
 8.5 V corresponds to an input signal at the amplifier of $1.25 \text{ mV/V} \times 8.5 \text{ V} / 10 \text{ V} = 1.0625 \text{ mV/V}$
 $\text{Strain} = 1000 \mu\text{m/m} \times 1.0625 \text{ mV/V} / 1.15 \text{ mV/V} = 923.9 \mu\text{m/m}$

Can I also use other screws??

The enclosed screws are high-strength, stainless screws (M4 x 12 mm) with strength class 12.9. To obtain an accurate strain measurement, the same screws must be used.