



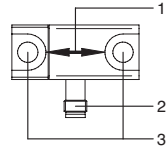
Operating instructions


**Baumer**  
Passion for Sensors
**Baumer Electric AG**
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 Phone +41 (0)52 728 1122  
 Fax +41 (0)52 728 1144
**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**

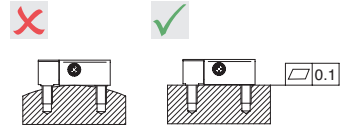
Damage to the sensor due to falling.

- ▶ 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 ... +85 °C

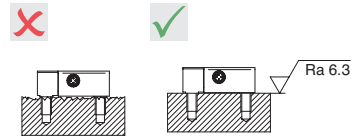
 2020-02-24:  
 81336826
**Preparing for mounting****Important**

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

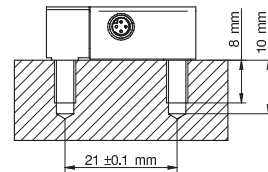
- ▶ Avoid contamination from grease or oil.
- ▶ Mount the sensor on a machined, flat surface.
- ▶ Observe surface roughness.



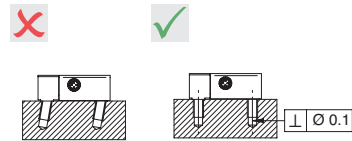
- ▶ Check for evenness tolerance.  
Evenness tolerance  $\leq 0.1$  mm



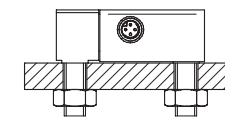
- ▶ Check for surface roughness.  
 $Ra \leq 6.3$   $\mu\text{m}$



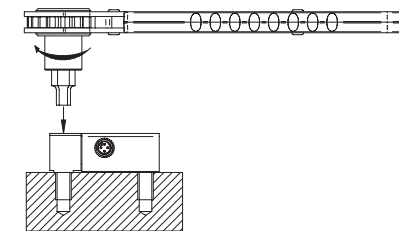
- ▶ 2 Drill 2 threads in machine element.  
Depth boreholes: min. 10 mm  
Distance between boreholes:  $21 \text{ mm} \pm 0.1 \text{ mm}$   
Screws: M4 x 12



- ▶ Make sure that boreholes are drilled perpendicular to the contact surface of the sensor



- ▶ Mounting option with through-holes

**Mounting**

- ▶ 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

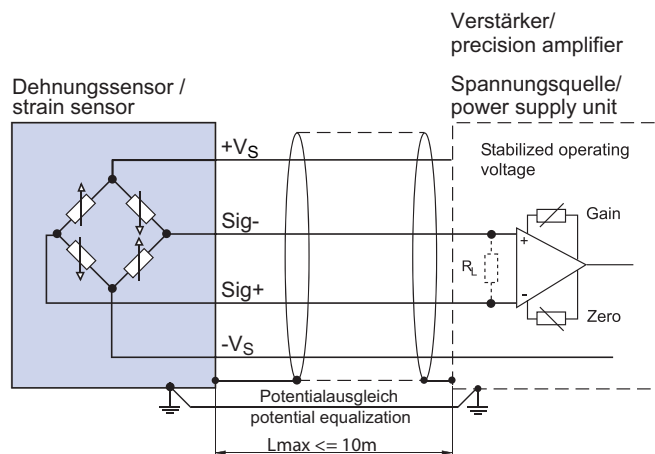
For stable measurement results, the sensor must be mounted correctly.

- ▶ 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  $\leq 100$  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.



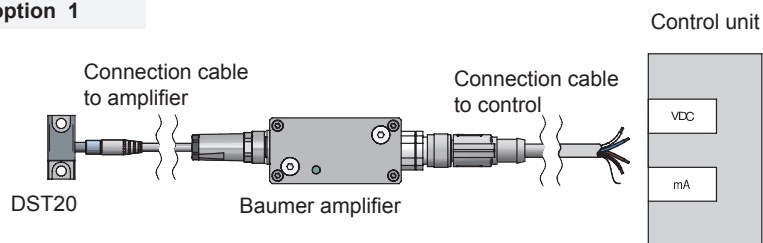
Betriebsspannung / supply voltage.....+Vs / -Vs: max. 7 VDC  
 Lastwiderstand / load resistance.....RL: > 10 MΩ  
 Ausgangssignal typisch / typical output signal.....Sig+ / Sig-: ±1.00 mV/V

### 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](http://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.

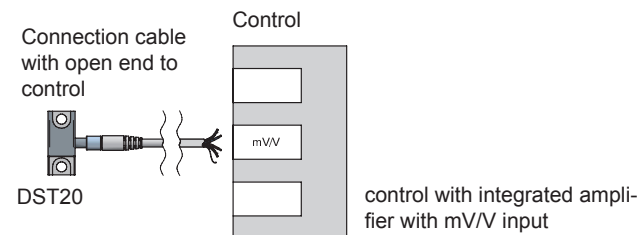
### Connection option 1

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](http://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](http://www.baumer.com)

For accessories and connection cables see [www.baumer.com](http://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  
 $\text{DST20 } 1.15 \text{ mV/V} = 1000 \mu\text{m/m}$   
 $8.5 \text{ V}$  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.