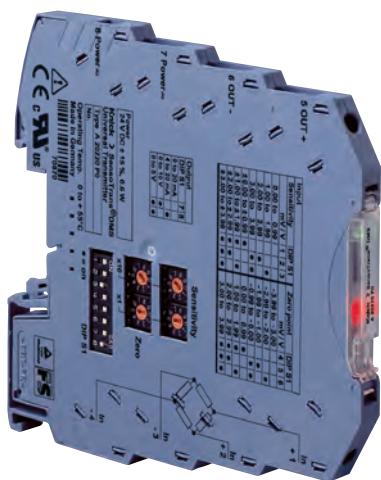


SensoTrans DMS A 20220

The transmitter for strain gauge full bridges in a 6 mm housing.



The Task

In many different industrial applications strain gauges are used to continuously measure mechanical quantities such as force/weight or deflection/torsion. In many cases they are used as a reference input for monitoring systems, safety shutdown systems, or for similar critical tasks. As a rule, high demands are placed on function, accuracy, flexibility and electrical safety.

Strain gauges are highly sensitive resistors which react to mechanical stress with a slight change in resistance.

These changes can be detected by a bridge circuit. The most common circuit design is the full bridge. In force transducers and load cells, the strain gauges are already mechanically applied in full bridge circuits. These sensors provide a raw signal which is prepared and standardized for further processing using a strain gauge transmitter.

The Problem

Customary strain gauge sensors have individual characteristics, which requires tedious and time-consuming adjustment of the respective strain gauge transmitter using potentiometers.

Furthermore, strain gauge transmitters up to now had a very wide modular housing and therefore occupied a large amount of space in the enclosure. For world-wide applications, several versions with different supply voltages were often used.

The Solution

The universal SensoTrans DMS A 20220 strain gauge transmitters provide connection possibilities for all standard strain gauge force transducers and strain gauge load cells in full bridge configuration. They can be flexibly adapted to the respective measuring task using DIP and rotary encoder switches or via a "teach-in function". 3-port isolation with protective separation up to 300 V AC/DC according to EN 61140 ensures optimum protection of personnel and equipment as well as unaltered transmission of measuring signals. The SensoTrans DMS A 20220 offer maximum performance in the smallest of spaces. Adjusting the zero point and sensitivity to the individual strain gauge sensor is particularly convenient using the "teach-in function" – just at the push of a button at the device front. Sensors with known characteristics can be very easily calibrated using four rotary encoder switches and eight DIP switches.

Special measuring tasks can be solved with SensoTrans devices which Knick configures according to individual specifications. Fixed-range devices without switch are used, for example, when manipulations or mix-ups must be precluded.

The Housing

The modular housing – 6 mm slim – is stingy with enclosure space and allows for high component density. DIN rail bus connectors inserted in the mounting rail facilitate the power supply connection if necessary.

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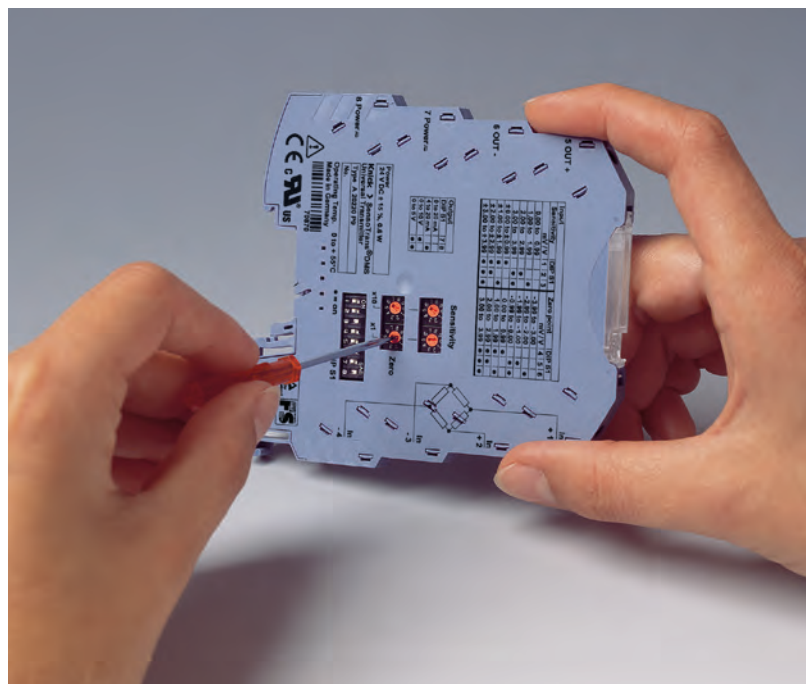
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SensoTrans DMS A 20220



Facts and Features

- **Universal usability**
for strain gauges, pressure and load cells, and other resistive measuring bridges
- **Intuitive configuration**
of basic parameters – easy, without tools, using 4 rotary and 8 DIP switches
- **Calibrated range selection**
without complicated trimming
- **Convenient adjustment**
Zero point and sensitivity are directly adjusted “at the push of a button” using the teach-in function
- **Protective separation**
according to EN 61140 – protection of the maintenance staff and downstream devices against excessively high voltages up to 300 V AC/DC
- **High accuracy**
with innovative switching concept
- **Minimum space requirement**
in the enclosure – only 6 mm wide modular housing – more transmitters per meter of mounting rail
- **Low-cost assembly**
quick mounting, convenient, connection of power supply via DIN rail bus connectors
- **5-year warranty**



Product Line

SensoTrans DMS A 20220, adjustable

Order no. A 20220 P0

SensoTrans DMS A 20220, fixed setting

Order no. A 20220 P0 /

Customer-specific settings
(e.g., cutoff frequency,
zero point/sensitivity) As specified

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
n	n	n	n

Accessories

ZU 0628
DIN rail bus connector

Power supply bridging for two isolators, A 20XXX P0 or P 32XXX P0

Order no.

ZU 0628

IsoPower A 20900

Power supply unit 24 V DC, 1 A

A 20900 H4

ZU 0677 power terminal block

For connecting the 24 V DC supply voltage
to the ZU 0628 DIN rail bus connector

ZU 0677

ZU 0678
DIN rail bus connector

Tapping of supply voltage (A 20900),
routing to ZU 0628 DIN rail bus connector

ZU 0678

SensoTrans DMS A 20220

Specifications

Strain gauge input data

Input	± 7.5 mV/V
Bridge resistance	200 ohms ... 10 kohms
Zero adjustment	within the input range
Supply current (int. supply)	0 ... 5 mA
Supply voltage (ext. supply)	1 ... 2.8 V
Input error limits	$\pm (2 \mu\text{V/V} \pm 0.1 \% \text{ meas.val.})$ for spans ≥ 0.5 mV/V
Line monitoring	Short circuit or open circuit
Temperature coefficient at the input	< 50 ppm/K of adjusted sensitivity (average TC in allowable operating temp range, reference temp 23 °C)
Overload capacity	5 V across all inputs

Output data

Outputs	0 ... 20 mA, calibrated switching 4 ... 20 mA, (default setting 4 ... 20 mA) 0 ... 5 V, 0 ... 10 V
Control range	0 ... approx. 102.5 % of span at 0 ... 20 mA, 0 ... 10 V or 0 ... 5 V output -1.25 ... approx. 102.5 % of span at 4 ... 20 mA output
Resolution	16 bit
Load	Current output: ≤ 10 V (≤ 500 ohms at 20 mA) Voltage output: ≤ 1 mA (≥ 10 kohms at 10 V)
Output error limits	Current output: $\pm (10 \mu\text{A} + 0.05 \% \text{ meas. val.})$ Voltage output: $\pm (5 \text{ mV} + 0.05 \% \text{ meas. val.})$
Residual ripple	< 10 mV _{rms}
Temperature coefficient at the output	< 50 ppm/K full scale (average TC in allowable operating temperature range, reference temperature 23 °C)
Error signaling	0 ... 20 mA output: $I = 0$ mA or ≥ 21 mA 4 ... 20 mA output: $I \leq 3.6$ mA or ≥ 21 mA 0 ... 5 V or 0 ... 10 V output: $V = 0$ V or $V \geq 5.25$ V or $V \geq 10.5$ V via output signal and red LED for out-of-range conditions, incorrect parameter setting, sensor short circuit and line break, output load error, other device errors. See also "Error Signaling" table.

Response

Characteristic	Rising / falling linearly
Measuring rate	Approx. 3/s

Display

Green LED	Power supply
Yellow LED	Signaling the connection type
Red LED	Maintenance request/device failure

Specifications (continued)

Power supply

Power supply	24 V DC (-20 %, +25 %), approx. 1.2 W The power supply can be routed from one device to another via DIN rail bus connectors.
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Isolation

Galvanic isolation	3-port isolation between input, output, and power supply
Test voltage	2.5 kV AC, 50 Hz: power supply against input against output
Working voltage (basic insulation)	Up to 300 V AC/DC across all circuits with overvoltage category II and pollution degree 2 according to EN 61010-1. For applications with high working voltages, take measures to prevent accidental contact and make sure that there is sufficient distance or insulation between adjacent devices.
Protection against electric shock	Protective separation to EN 61140 by reinforced insulation according to EN 61010-1. Working voltage up to 300 V AC/DC across all circuits with overvoltage category II and pollution degree 2. For applications with high working voltages, take measures to prevent accidental contact and make sure that there is sufficient distance or insulation between adjacent devices.

Standards and approvals

EMC	Product family standard: EN 61326 Emitted interference: Class B Immunity to interference ¹⁾ : Industrial environment
cURus	File no. 220033 Standards: UL 508 and CAN/CSA 22.2 No. 14-95
RoHS conformity	According to directive 2011/65/EU

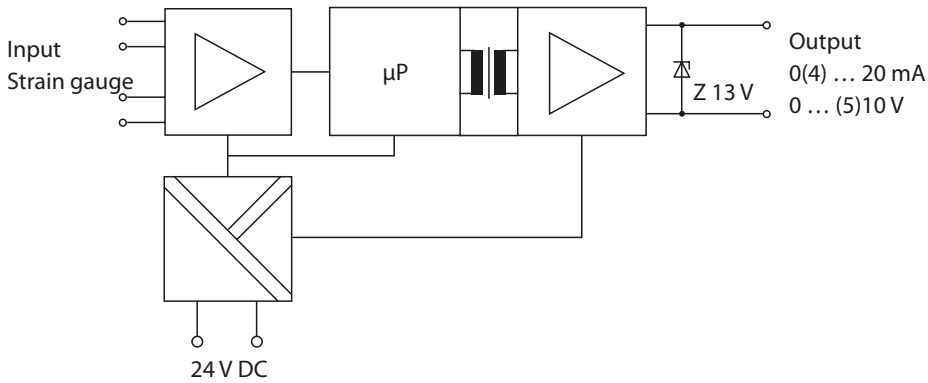
Further data

Ambient temperature	Operation: 0 ... +55 °C mounted without gaps 0 ... +65 °C with gaps ≥ 6 mm Storage: -25 ... +85 °C
Ambient conditions	Stationary, weather-protected operation; relative humidity: 5 ... 95 %, no condensation Barometric pressure: 70 ... 106 kPa Water or wind-driven precipitation (rain, snow, hail, etc.) excluded
Design	Modular housing with screw terminals, 6.2 mm wide See dimension drawings for further measurements
Tightening torque	0.6 Nm
Ingress protection	Terminals IP 20, housing IP 40
Mounting	For 35 mm DIN rail acc. to EN 60715
Connection	Conductor cross sections Single wire 0.2 ... 2.5 mm ² Stranded wire: 0.2 ... 2.5 mm ² 24-14 AWG
Weight	Approx. 60 g

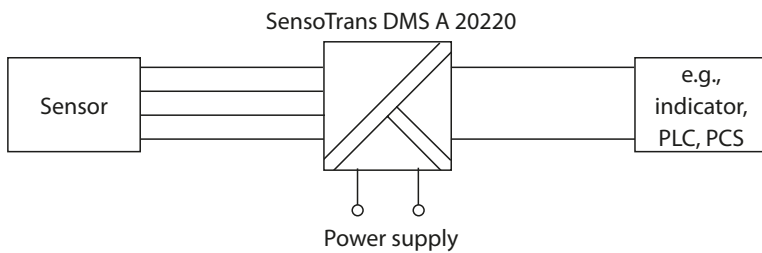
¹⁾ Slight deviations are possible while there is interference

SensoTrans DMS A 20220

Block Diagram

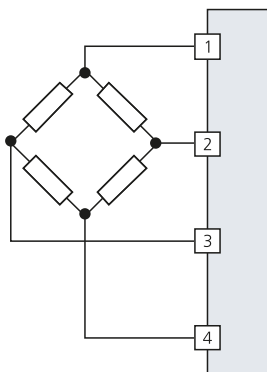


Typical Applications

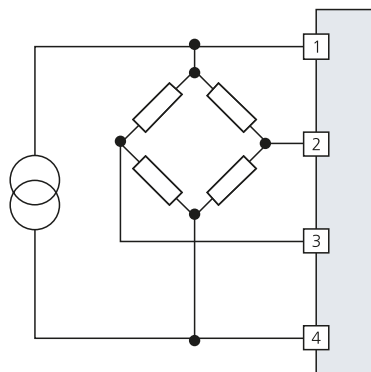


Connection of Strain Gauges

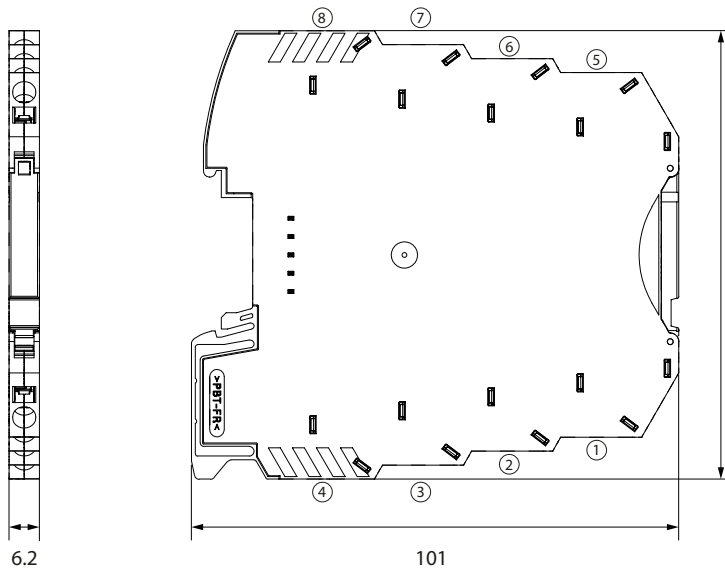
4-wire connection



6-wire connection
(with external supply 1 ... 3 V)



Dimension Drawing and Terminal Assignments



Terminal assignments

- 1 Input +
- 2 Input +
- 3 Input -
- 4 Input -
- 5 Output +
- 6 Output -
- 7 Power supply +
- 8 Power supply -

Conductor cross-sections:
 single wire 0.2 ... 2.5 mm²
 stranded wire 0.2 ... 2.5 mm²
 24-14 AWG

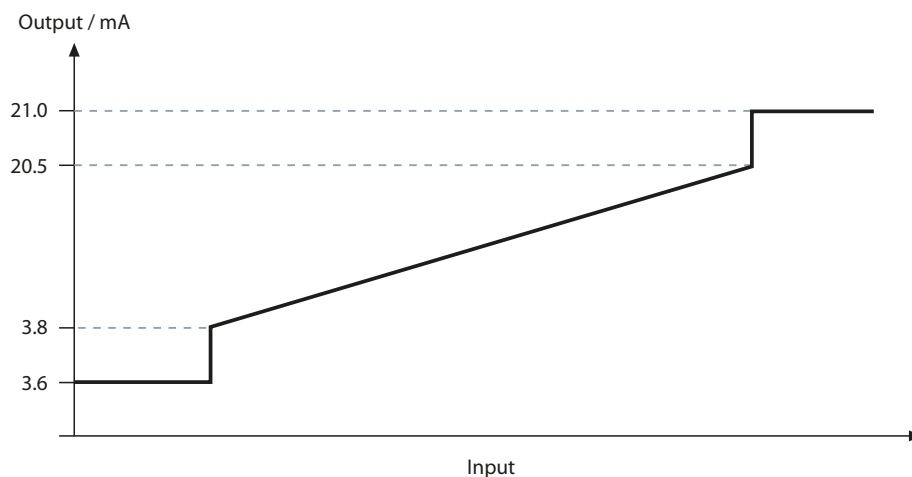
SensoTrans DMS A 20220

Error Signaling

No.	Error	Signal configuration ¹⁾	Output			
			4 ... 20 [mA]	0 ... 20 [mA]	0 ... 5 [V]	0 ... 10 [V]
0	None	Not self-locking	–	–	–	–
1	Underrange	Not self-locking	3.6	0	0	0
2	Overrange	Not self-locking	21	21	5.25	10.5
3	Sensor short circuit	Not self-locking	21	21	5.25	10.5
4	Sensor open	Not self-locking	21	21	5.25	10.5
5	Resistance error	Not self-locking	21	21	5.25	10.5
6	Output load error	Not self-locking	3.6	0	0	0
7	Identification of connection	Not self-locking	21	21	5.25	10.5
8	Switch misadjusted	Not self-locking	21	21	5.25	10.5
9	Adjustment error	Not self-locking	21	21	5.25	10.5
10	Device error	Self-locking	3.6	0	0	0

¹⁾ With the "self-locking" configuration, the error signal is maintained after termination of the error cause. The error message can be reset through a restart (power supply on/off).

Response of the Output Current (4 ... 20 mA) to Out-of-Range Conditions



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