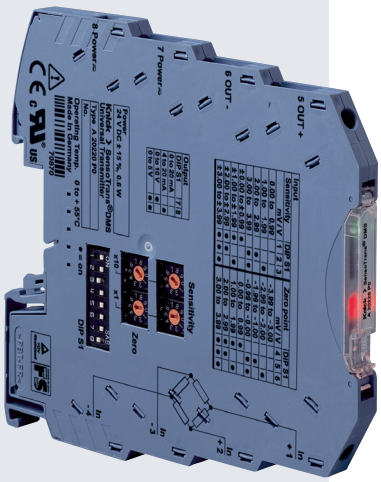


SensoTrans DMS A 20220

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

The Task

In many different industrial applications strain gages are used to continuously measure mechanical quantities such as force/weight or deflection/torsion. In many cases they are used as reference input for monitoring systems, safety shutdown systems, or for similar critical jobs. 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, in most cases a 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 gage sensors have individual characteristics, which requires tedious and time-consuming adjustment of the respective strain gage transmitter using potentiometers.

Furthermore, strain gage 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 on the front of the device. 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 SensoTransdevices which Knick configures according to individual specifications. Fixed-range models without switch are used, for example, when manipulations or mix-up are to be excluded.

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.

Knick

The Facts

– **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 subsequent devices against excessively high voltages up to 300 V AC/DC

– **High accuracy**
due to innovative circuit design

– **Minimum space consumption**
in the enclosure – only 6 mm wide modular housing – more transmitters per meter of mounting rail

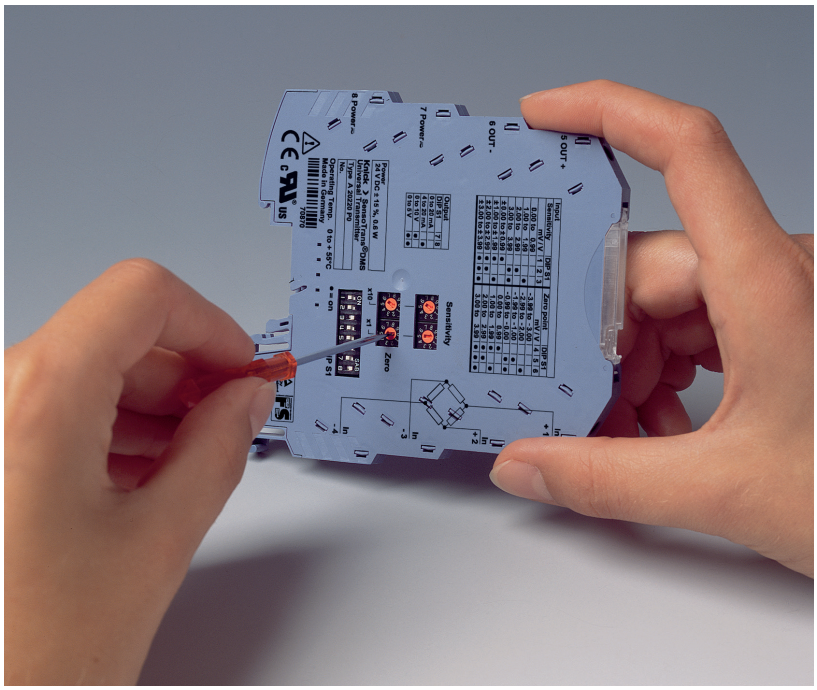
– **Low-cost assembly**
Quick mounting, convenient connection of power supply through DIN rail bus connectors

– **5-year warranty**

Warranty
5 years!

Warranty
Defects occurring within 5 years from delivery date shall be remedied free of charge at our plant (carriage and insurance paid by sender).

6 mm CLASS



SensoTrans DMS A 20220

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		**n**	**n**	**n**	**n**

Accessories		Order No.
ZU 0628 DIN-rail bus connector	Power supply bridging for two isolators, resp., A 20XXX P0 or P 32XXX P0	**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**

Specifications

Strain gauge input data	
Input	±7.5 mV/V
Bridge resistance	200 ohms …10 ohms
Zero adjustment	within the input range
Supply current (int. supply)	0 … 5 mA
Supply voltage (ext. supply)	1 … 2.8 V
Input error limits	± (2 µV/V ± 0.1 % 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

Specifications (continued)

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: ± (10 µA + 0.05 % meas. val.) Voltage output: ±(5 mV + 0.05 % 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 ≤ 3.6 mA or ≥ 21 mA 0 … 5 V or 0 … 10 V output: V = 0 V or V ≥ 5.25 V or V ≥ 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".

Response

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

Display

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

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.

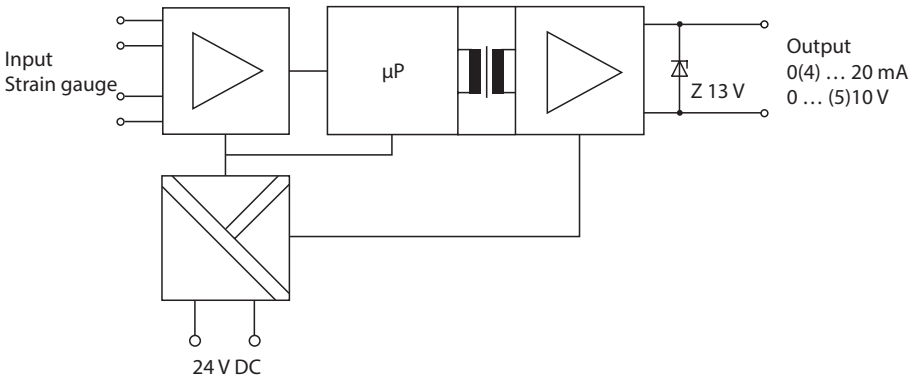
SensoTrans DMS A 20220

Specifications (continued)

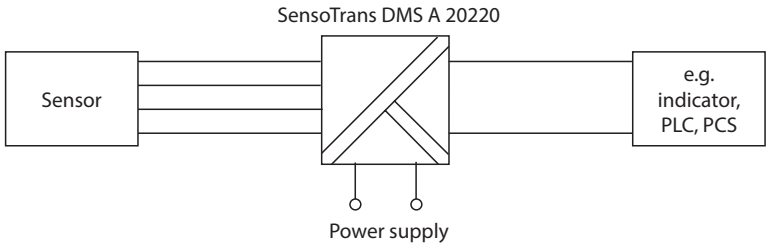
Isolation	
Galvanic isolation	3-port isolation between input, output and power supply
Test voltage	2.5 kV AC, 50 Hz: Power supply against input against output
Working voltage (basic insulation)	Up to 300 V AC/DC across all circuits with overvoltage category II and pollution degree 2 according to EN 61010-1. For applications with high working voltages, ensure there is sufficient spacing or isolation from neighboring devices and protection against electric shocks.
Protection against electric shock	Protective separation according 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, ensure there is sufficient spacing or isolation from neighboring devices and protection against electric shocks.
Standards and approvals	
EMC	Product family standard: EN 61326 Emitted interference: Class B Immunity to interference[1]: Industry
cURus	File No. 220033 Standards: UL 508 and CAN/CSA 22.2 No. 14-95
Other data	
Ambient temperature	Operation: 0 … +55 °C mounted without gaps 0 … +65 °C with gaps ≥ 6 mm Storage: -25 … +85 °C
Ambient conditions	Stationary operation, weatherproof 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 and conductor cross-section
Ingress protection	Terminals IP 20, housing IP 40
Mounting	For 35-mm mounting rail according to EN 50022 See dimension drawing for conductor cross-section
Weight	Approx. 60 g

[1] Slight deviations are possible while there is interference

Block Diagram

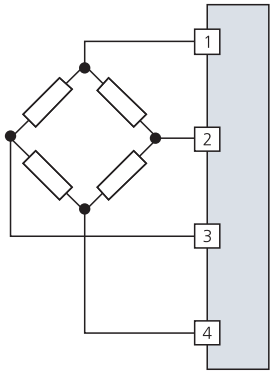


Typical Applications

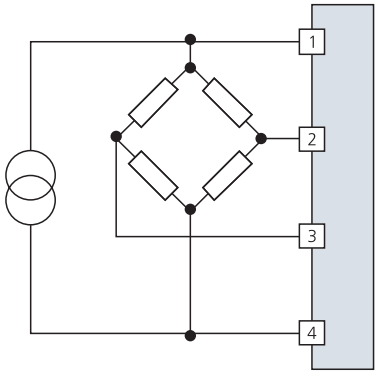


Connection of Strain Gauges

4-wire connection

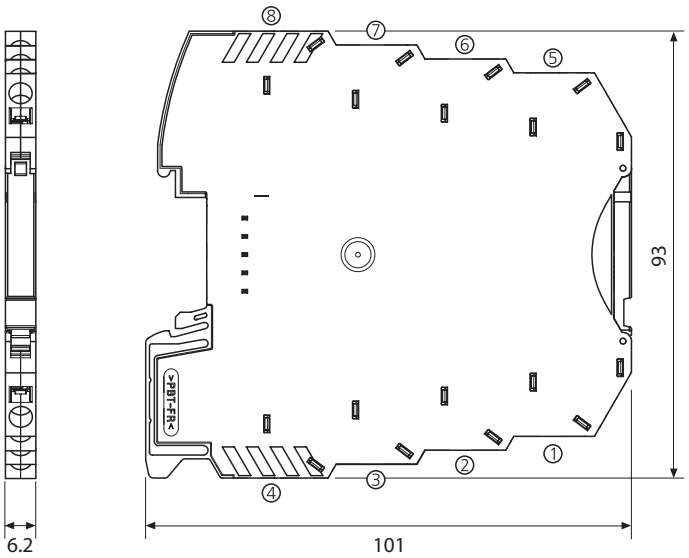


6-wire connection
(with external supply 1 … 3 V)



SensoTrans DMS A 20220

Dimension Drawings and Terminal Assignments



All dimensions in mm

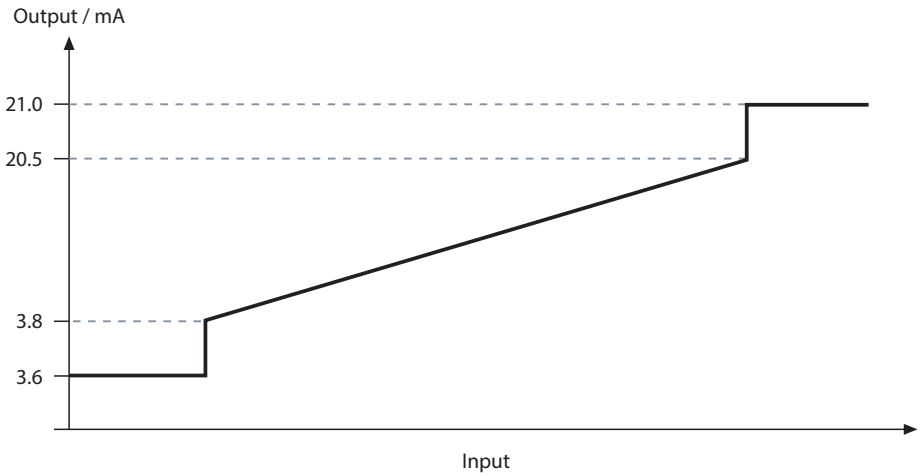
Terminal assignments

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

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	Value below range	Not self-locking	3.6	0	0	0
2	Value above range	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