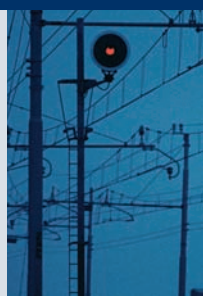
Knick

SensoTrans® DMS A 20220



The transmitter for strain gage full bridges in 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. Here, normally the highest demands are placed on function, accuracy, flexibility, and electrical safety.

Strain gages are high-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 gages 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 gage 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 worldwide applications, often several versions with different supply voltages were used.

The Solution

The universal SensoTrans® DMS A 20220 strain gage transmitters provide connection possibilities for all standard strain gage force transducers and strain gage load cells in full bridge configuration. They can be flexibly adapted to the respective measuring task using DIP and rotary coding switches or via a "teach-in function". 3-port isolation with Safe Isolation up to 300 V AC/DC according to EN 61140 ensures optimum protection of personnel and equipment as well as unaltered transmission of measurement signals. The SensoTrans® DMS A 20220 offer maximum performance in the smallest of spaces.

Adjusting the zero point and sensitivity to the individual strain gage 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 4 rotary coding switches and 8 DIP switches.
Special measuring tasks can be solved with SensoTrans devices that 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 devices meet the requirements of type of protection "n". This means they can be installed and used in Zone 2 hazardous areas in the EC, the USA, and in Canada. Thanks to their approval to Class 1, Division 2 (UL 1604), they can also be used according to the traditional North American classification system.

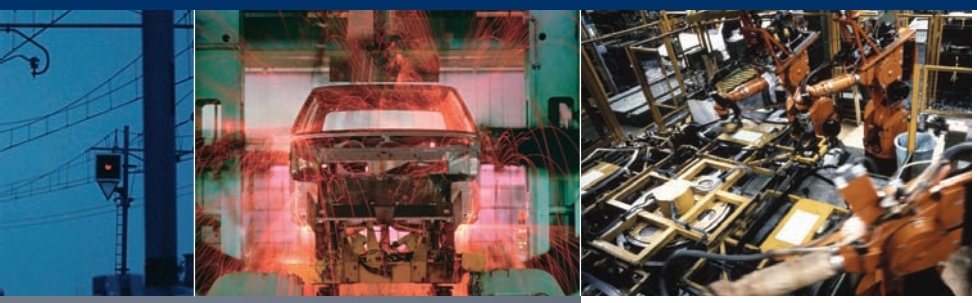
The Housing

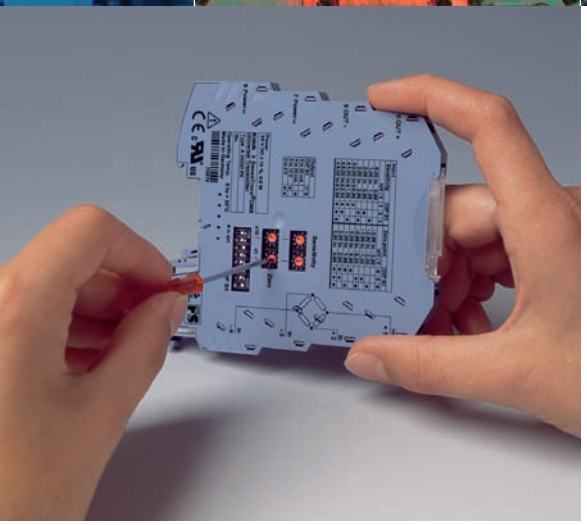
The modular housing – 6 mm slim – is stingy with enclosure space and allows high component density. DIN rail bus connectors inserted in the mounting rail facilitate the power supply connection if necessary.

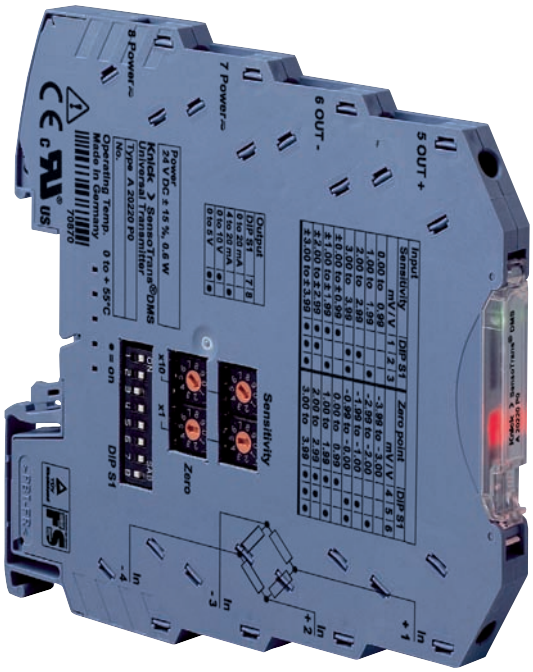
Warranty
5 years!

Defects occurring within 5 years from delivery are remedied free of charge at our works (carriage and insurance paid by sender).

Strain Gage Transmitters







The Facts

Universal usability
for strain gages, 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

Safe Isolation according to EN 61140 – protection of maintenance staff and subsequent devices against non-permitted 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

6 mm CLASS

SensoTrans® DMS A 20220

Product Line

Strain gage transmitter, adjustable		
SensoTrans® DMS A 20220	Order No.	A 20220 P0

Strain gage transmitter, with fixed settings			
SensoTrans® DMS A 20220	Order No.	A 20220 P0 /	□ □ □ □
Further customer-specific settings (e. g. cutoff frequency, zero/sensitivity)	As specified		n n n n

Accessories		Order No.
DIN rail bus connector ZU 0628	Power supply bridging for two devices, A 20XXX P0 or P 32XXX P0	ZU 0628
IsoPower® A 20900	Power supply, 24 V DC, 1 A, see Page 212	A 20900 H4
Power terminal block ZU 0677	Feeding the 24 V DC supply voltage to the ZU 0628 DIN rail bus connector	ZU 0677
DIN rail bus connector ZU 0678	Tapping of supply voltage (A 20900), routing to ZU 0628 DIN rail bus connector	ZU 0678

Specifications

Strain gage input data

Input	±7.5 mV/V
Bridge resistance	200 ohms ... 10 kohms
Zero adjustment	Within input range
Supply current (int. supply)	0 ... 5 mA
Supply voltage (ext. supply)	1 ... 3 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 input	< 50 ppm/K of adjusted sensitivity (average TC in permitted operating temp range, reference temp 23 °C)
Overload	5 V across all inputs

Specifications *(continued)*

Output data

Outputs	0 ... 20 mA, 4 ... 20 mA, 0 ... 5 V, 0 ... 10 V	Calibrated selection (factory setting 4 ... 20 mA)
Control range	0 ... ≈102.5 % span with 0 ... 20 mA, 0 ... 10 V or 0 ... 5 V output –1.25 ... ≈102.5 % span with 4 ... 20 mA output	
Resolution	16 bits	
Load	Current output: Voltage output:	≤ 10 V (≤ 500 ohms at 20 mA) ≤ 1 mA (≥ 10 kohms at 10 V)
Output error limits	Current output: Voltage output:	±(10 µA + 0.05 % meas. val.) ±(5 mV + 0.05 % meas. val.)
Residual ripple	< 10 mV_{rms}	
Temperature coefficient at output	< 50 ppm/K full scale (average TC in permitted operating temp range, reference temp 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, faulty settings, sensor short circuit or open circuit, output load error, other device errors. Also see "Error Signaling" Page 187.	

Transmission behavior

Characteristic	Linear rising / falling
Meas. rate	Approx. 3/s

Display

Green LED	Power supply
Yellow LED	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.

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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, you should ensure there is sufficient spacing or isolation from neighboring devices and protection against electric shocks.
Protection against electric shock	Safe Isolation according to EN 61140 by reinforced insulation in accordance with 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, you should ensure there is sufficient spacing or isolation from neighboring devices and protection against electric shocks.

Standards and approvals

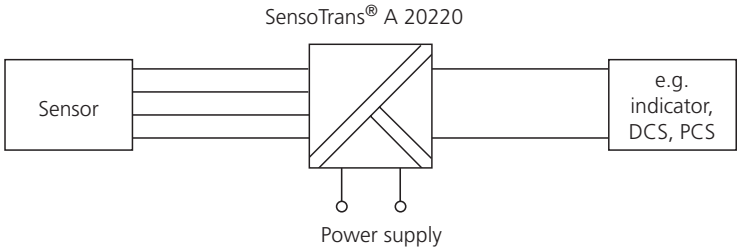
Explosion protection	ATEX Zone 2 (EN 60079-15) Class 1, Div 2 / Zone 2 (UL 1604)
EMC	Product family standard: EN 61326 Emitted interference: Class B Immunity to interference [1]: Industry
cURus	File No. 220033 Standards: UL 508 and CAN/CSA 22.2 no. 14-95

Other data

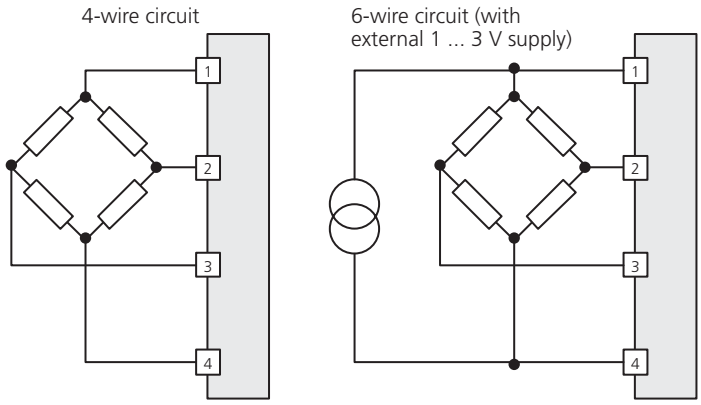
Ambient temperature	Operation: 0 ... +55 °C in row, without spacing 0 ... +65 °C with spacing ≥6 mm Storage: –25 ... +85 °C
Ambient conditions	Stationary application, weather-protected relative air humidity: 5 ... 95 %, no condensation barometric pressure: 70 ... 106 KPa water or wind-driven rain, snow, or hail excluded
Design	Modular housing with screw terminals, width 6.2 mm, see dimension drawings for further measurements and conductor cross section
Ingress protection	Terminal IP 20, housing IP 40
Mounting	For 35 mm top hat rail to EN 50022
Weight	Approx. 60 g

1) Slight deviations are possible while there is interference

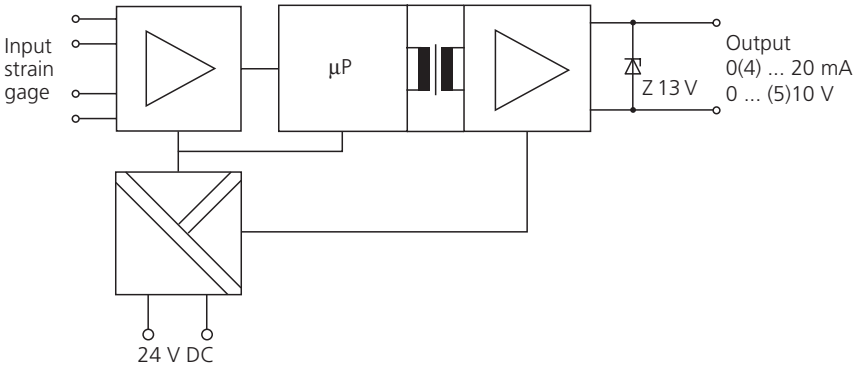
Application Examples



Connection of Strain Gages



Block Diagram



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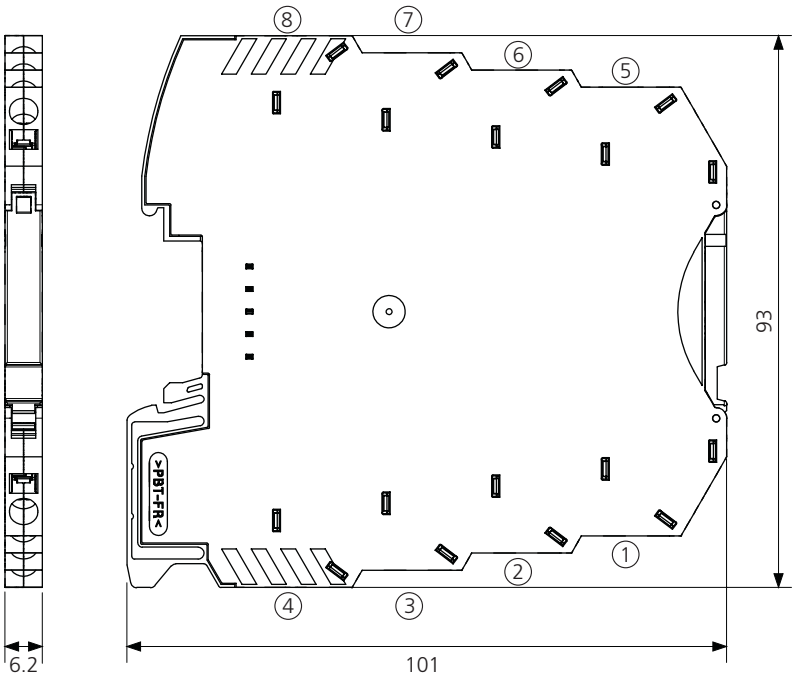
Dimension Drawings and Terminal Assignments



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 mm^2
– Fine-wire 0.2 ... 2.5 mm^2
– 24-14 AWG

All dimensions in mm!

Error Signaling

No.	Error	Message 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	Basic resistance invalid	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	Parameter 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 by restart (power supply on/off).

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