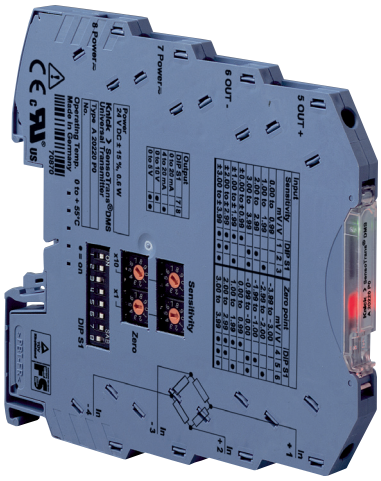


SensoTrans DMS A 20220

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

Task
In many different industrial applications, strain gauges are used to continuously measure mechanical variables like force/weight or bending/torsion. These variables are often used as input data for monitoring, safety shutdowns and similar critical tasks. Normally, the requirements for functionality, accuracy, flexibility, and electrical safety in particular are rigorous.

Strain gauges are highly sensitive resistors that react to mechanical stress with small changes in resistance. Bridge circuits can record these changes. The most frequently used type of circuit is the full bridge. In force transducers and load cells, strain gauges are already applied mechanically in a full bridge arrangement. The sensors transmit a raw signal that is processed and standardized for further processing with the help of a strain gauge transducer.

Problem
Commercial strain gauge sensors have individual characteristic values, and until now users have had to set their strain gauge transducer to these values in a complex, often time-consuming process via potentiometer.

Further, most conventional strain gauge transducers in a modular housing are very wide and have a large footprint in the control cabinet. For global use, several variants with different supply voltages are often available.

Solution
SensoTrans DMS A 20220, the universal strain gauge transducer series, offers connection options with a full bridge circuit for all common strain gauge force transducers and load cells. Via DIP and rotary switches or using a teach-in function, users can flexibly adapt SensoTrans DMS A 20220 to the relevant measuring task. The protection of personnel and systems and undistorted transmission of measurement signals are ensured by 3-port isolation with safe isolation in accordance with EN 61140 up to 300 V AC/DC. The SensoTrans DMS A 20220 series provides maximum performance on a compact footprint. Adjusting the zero point and sensitivity on individual strain gauge sensors is particularly convenient using the teach-in function – with a simple press of the button on the housing front. In the case of sensors whose characteristic values are known to the user, calibration is easy using four rotary switches and eight DIP switches.

SensoTrans devices whose parameters are set by Knick according to customer specifications solve special measuring tasks. Pre-set devices without any switches are used to make manipulation or mistakes impossible, for example.

Housing
The slim modular housing – only 6 mm – has an extremely compact footprint in the control cabinet, enabling high packing density. If required, DIN rail bus connectors inserted into the DIN rail facilitate the connection of the auxiliary power supply.

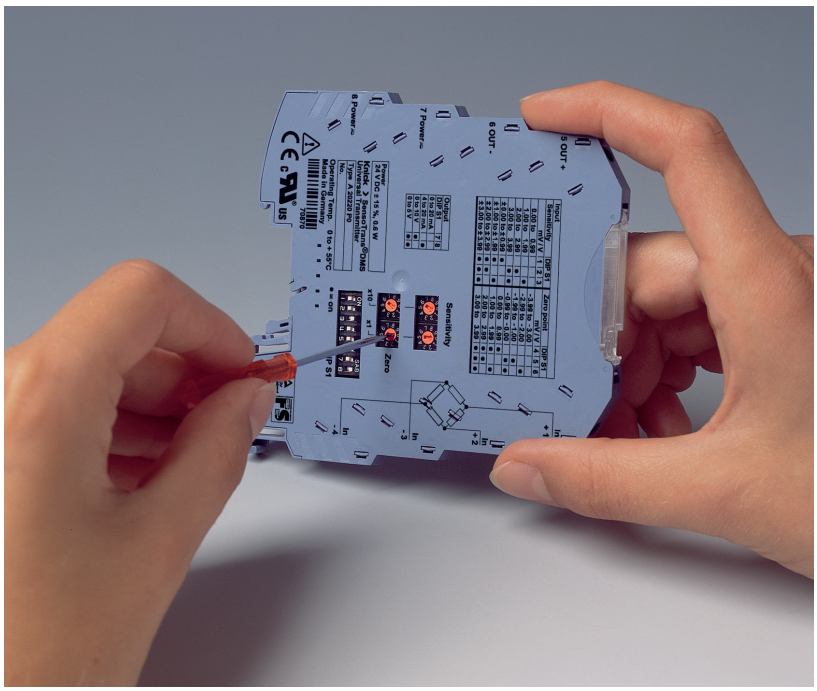
SensoTrans DMS A 20220

Facts and Features

- **Universal use**
  For strain gauges, load cells, and other resistive measuring bridges
- **Intuitive configuration**
  Of basic parameters – easy, without auxiliary aids, via 4 rotary switches and 8 DIP switches
- **Calibrated range switching**
  No time-consuming calibration necessary
- **Convenient adjustment**
  Zero point and sensitivity directly adjustable "with the press of a button" with the teach-in function
- **Safe isolation**
  In accordance with EN 61140 – Protection of maintenance pswersonnel and downstream devices against excessively high voltages up to 300 V AC/DC
- **High level of accuracy**
  Thanks to innovative circuit concept
- **Minimal footprint**
  In control cabinets – modular housing only 6 mm wide – more transducers per meter of DIN rail
- **Inexpensive assembly**
  Fast installation, convenient connection to power supply via DIN rail bus connectors
- **5-year warranty**

5 Year Warranty!

6 mm CLASS



Types

SensoTrans DMS A 20220, adjustable

Order no.	**A 20220 P0**

SensoTrans DMS A 20220, fixed settings

Order no.	**A 20220 P0 /**	☐	☐	☐	☐
Customer-specific settings (e.g., limit frequency, zero point/ sensitivity)	In accordance with information	**n**	**n**	**n**	**n**

Accessories		**Order no.**
DIN rail bus connector ZU 0628	Power supply jumper for two separators each A 20XXX P0 or P 32XXX P0	**ZU 0628**
IsoPower A 20900	Power supply 24 V DC, 1 A	**A 20900 H4**
Feed-in terminal ZU 0677	Feed-in of supply voltage 24 V DC into DIN rail bus connector ZU 0628	**ZU 0677**
DIN rail bus connector ZU 0678	Extraction of supply voltage (A 20900), passing onto DIN rail bus connector ZU 0628	**ZU 0678**

SensoTrans DMS A 20220

Specifications

Strain gauge input data	
Input	±7.5 mV/V
Jumper resistance	200 Ohm …10 kOhm
Zero point calibration	Inside 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% of measured value) for measuring spans ≥ 0.5 mV/V
Circuit monitoring	Short circuit and cable breakage
Temperature coefficient at input	< 50 ppm/K of configured sensitivity (average TK in permissible operating temperature range, reference temperature 23°C)
Overload capability	5 V among all inputs

Output data		
Outputs	0 … 20 mA, calibrated adjustable 4 … 20 mA, (factory setting 4 … 20 mA) 0 … 5 V, 0 … 10 V	
Dynamic range	0 … approx. 102.5% of measuring span at 0 … 20 mA, 0 … 10 V or 0 … 5 V output –1.25 … approx. 102.5% of measuring span at 4 … 20 mA output	
Resolution	16 bit	
Load	Current output: Voltage output:	≤ 10 V (≤ 500 Ohm at 20 mA) ≤1 mA (≥ 10 kOhm at 10 V)
Output error limits	Current output: Voltage output:	± (10 µA + 0.05% of measured value) ± (5 mV + 0.05% of measured value)
Ripple	< 10 mV_{eff}	
Temperature coefficient at output	< 50 ppm/K of input value (average TK in permissible operating temperature range, reference temperature 23°C)	
Error signals	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: U = 0 V or U ≥ 5.25 V resp. U ≥ 10.5 V via output signal and red LED for exceeding/falling short of measuring range, incorrect parameterization, sensor short circuit and cable breakage, output error load, other device errors. Also see “Error Signals” table.	

Transmission behavior	
Characteristic	Linear rising/falling
Measurement rate	Approx. 3/s

Indicators	
Green LED	Power supply
Yellow LED	Connection type signal
Red LED	Maintenance required or device failure

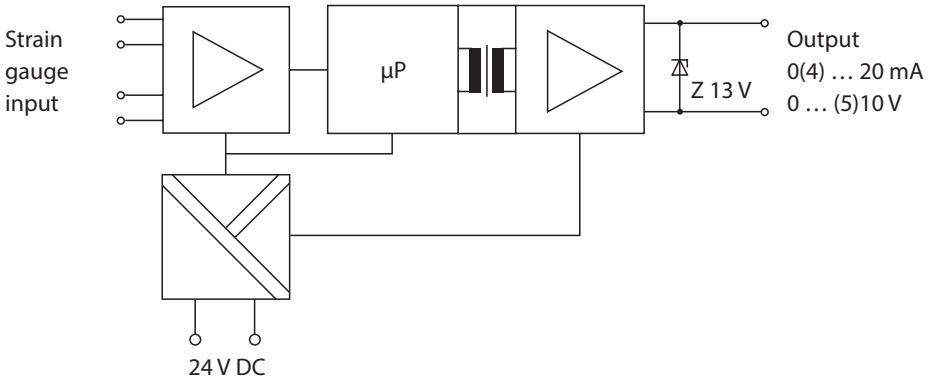
*Specification***s – continued**

Power supply	
Power supply	24 V DC (–20%, +25%), approx. 0.85 W The power supply can be passed on from one device to the next via DIN rail bus connectors.
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 for overvoltage category II and pollution degree 2 between all circuits in accordance with EN 61010-1. For applications with high working voltage, ensure that there is sufficient distance or isolation to slaves and touch protection.
Protection against dangerous body currents	Safe isolation in accordance with EN 61140 (VDE 0140 Part 1) with reinforced insulation in accordance with EN 61010-1 (VDE 0411 Part 1). Working voltage up to 300 V AC/DC for overvoltage category II and pollution degree 2 among all circuits. For applications with high working voltage, ensure that there is sufficient distance or isolation to slaves and touch protection.
Standards and approvals	
EMC	Product family standard: EN 61326 Emitted interference: Class B Immunity to interference[1]: Industrial applications
cURus	File no. 220033 Standards: UL 508 and CAN/CSA 22.2 No. 14-95
RoHS compliance	In accordance with Directive 2011/65/EU
Other data	
Ambient temperature	Operation: 0 … +55°C connected without space 0 … +65°C with space ≥ 6 mm Storage: –25 … +85°C
Ambient conditions	Fixed use, protected against weather; Relative humidity: 5 … 95%, no condensation Atmospheric pressure: 70 … 106 kPa Water or wind-driven precipitation (rain, snow, hail, etc.) excluded
Size	Modular housing with screw terminals, width 6.2 mm (for further dimensions, see dimension drawings)
Tightening torque	0.6 Nm
Protection class	Terminals IP20, housing IP40
Mounting	For DIN rail 35 mm in accordance with EN 60715
Connection	Connection cross-section: Single-wire: 0.2 … 2.5 mm^2 Fine-wire: 0.2 … 2.5 mm^2 24-14 AWG
Weight	Approx. 60 g

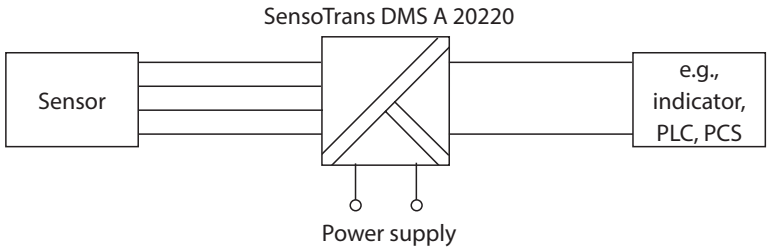
[1] During interference, small deviations are possible

SensoTrans DMS A 20220

Schematic diagram

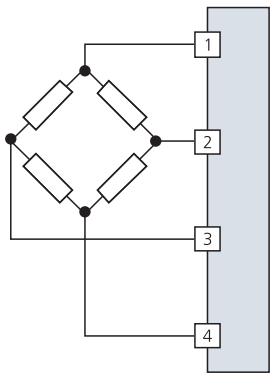


Application examples

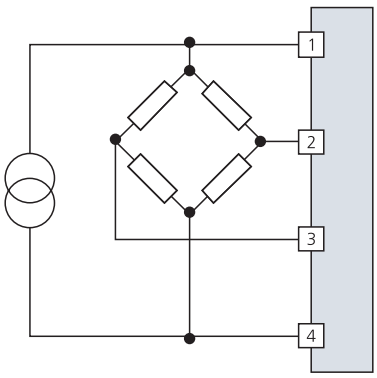


Connection of strain gauges

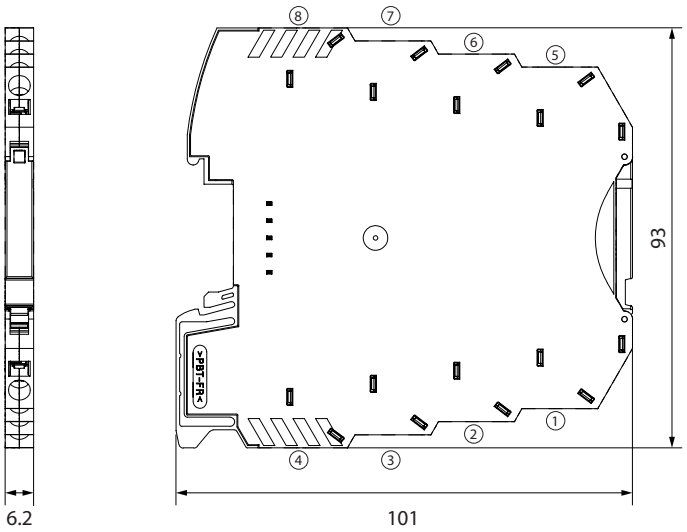
4-wire circuit



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



Dimension drawing and terminal assignment



Terminal assignment

1	input	+
2	input	+
3	input	–
4	input	–
5	output	+
6	output	–
7	power supply	+
8	power supply	–

Connection cross-section:

Single-wire	0.2 … 2.5 mm²
Fine-wire	0.2 … 2.5 mm²
24-14 AWG	

Error signals

No.	Error	Message configuration[1)]	Output			
			4 ... 20 [mA]	0 ... 20 [mA]	0 ... 5 [V]	0 ... 10 [V]
0	None	Not self-sustaining	–	–	–	–
1	Measurement range shortfall	Not self-sustaining	3.6	0	0	0
2	Measurement range overshoot	Not self-sustaining	21	21	5.25	10.5
3	Sensor short-circuit	Not self-sustaining	21	21	5.25	10.5
4	Sensor open	Not self-sustaining	21	21	5.25	10.5
5	Basic resistance invalid	Not self-sustaining	21	21	5.25	10.5
6	Output error load	Not self-sustaining	3.6	0	0	0
7	Connection detection	Not self-sustaining	21	21	5.25	10.5
8	Switch misaligned	Not self-sustaining	21	21	5.25	10.5
9	Parameterization error	Not self-sustaining	21	21	5.25	10.5
10	Device error	Self-sustaining	3.6	0	0	0

[1)] For the configuration "self-sustaining", the error signal remains after the error cause has ended. The error message can be reset with a restart (power supply on/off).

Behavior of output current (4 … 20 mA) for shortfall/overshoot of the measurement range