

1. General Information



Warning!
Protection against electric shock

For applications with high working voltages, you should ensure there is sufficient spacing or isolation from neighboring devices and protection against electric shocks.



Caution!
Be sure to take protective measures against electrostatic discharge (ESD) when handling the devices!

Caution!

Installation of the SensoTrans® DMS A 20220 strain gage transmitters must be performed by trained and qualified personnel only. Do not connect the device to power supply before it is professionally installed. Do not change the measurement range during operation! Be sure to observe the national codes and regulations during installation and selection of cables and lines. A two-pole circuit breaker must be installed between device and mains supply.

Information on Explosion Protection:

The device is a category 3 electrical apparatus for application in Zone 2. The device must be installed in a housing with IP 54 protection according to EN 60529. The specified limits for mechanical or thermal loads must be observed. Only devices designed for operation in the hazardous areas of Zone 2 may be connected.

2. Application

The universal SensoTrans® DMS A20220 strain gage transmitters provide connection possibilities for all standard strain gage force transducers and strain gage load cells in full bridge configuration. The output signal is adjustable to 0 / 4 ... 20 mA or 0 ... 5 / 10 V. The calibrated range selection is performed using DIP and rotary coding switches.

3. Configuration

Set the DIP and rotary coding switches according to the table on the housing. An example is shown on the back.

Input sensitivity:

Adjust the input sensitivity in mV/V using the DIP1, DIP2, and DIP3 switches and the “Sensitivity” rotary switches.

Zero point:

Adjust the zero offset (tare) in mV/V using the DIP4, DIP5, and DIP6 switches and the “Zero” rotary switches.

Output signals:

Adjust the output signal using the DIP7, DIP8 switches.

Teach-in function:

The “teach-in function” can be used to adjust the measurement setup consisting of transmitter and strain gage. The currently measured value is stored as zero point (tare) or as end value.

The teach-in function is activated using the button on the device front. This can be done with a screwdriver (blade width max. 2.5 mm). The front cover provides a corresponding opening.

Caution!

Only use a screwdriver that is safely isolated from the voltage applied to the input.

Step 1 (initial configuration):

Adjust the suitable output signal using the DIP 7 and DIP8 switches. (The positions of the DIP1 to DIP6 and rotary switches have no effect.)

Step 2:

Call up zero (tare) adjustment:

Hit the front button once. The yellow LED will repeatedly flash briefly (timeout: 30 sec)

To save the currently measured value as zero point:

Press front button for 3 sec. The yellow LED will light up once.

Call up end value adjustment:

Hit the front button twice. The yellow LED will repeatedly double flash (timeout: 30 sec).

To save the currently measured value as end value:

Press front button for 3 sec. The yellow LED will light up once.

Step 3:

The data are stored in the teach-in configuration and can be activated with the following switch positions:

Teach-in configuration on, configuration cannot be changed:

All DIP switches = 0
All rotary switches = 0

Teach-in configuration on, configuration for start and end values can be changed by a new teach-in process:

All DIP switches = 1
All rotary switches = 0

Caution!

If you do not activate the teach-in configuration after having terminated the teach-in process, the transmitter uses the configuration adjusted by the DIP/rotary coding switches.

Caution! Important notice!

After completion of configuration you must cover the switches with the included self-adhesive polyimide tape.

4. Mounting, Electrical Connection

The transmitters are snapped onto TS 35 standard rails and are laterally fixed by suitable end brackets. See dimension drawing for terminal assignments. Conductor cross-section: 0.2 mm² ... 2.5 mm² (AWG 24-14).

5. Specifications


Strain gage input data	
Input	-7.5 mV/V ... 7.5 mV/V
Bridge resistance	200 ... 10 k
Zero adjustment	Within input range
Supply current (int. supply)	0 ... 5 mA
Supply voltage	1 ... 3 V
Line monitoring	For short circuits or open circuits
Input error limits	± (2 µV/V + 0.1 % meas.val.) for spans ≥ 0.5 mV/V
Temperature coefficient at the input	50 ppm/K of configured sensitivity (average TC in permitted operating temp range, reference temp 23 °C)
Overload	5 V across all inputs

Output data	
Outputs	0 ... 20 mA, 4 ... 20 mA, 0 ... 10 V or 0 ... 5 V, calibrated selection
Control range	0 % to approx. 102.5% of span for 0 ... 20 mA, 0 ... 10 V or 0 ... 5 V output -1.25 % ... approx. 102.5 % of span for 4 ... 20 mA output
Resolution	16 bits
Load	Current output Voltage output
Output error limits	≤ 10 V (≤ 500 at 20 mA) ≤ 1 mA (≥ 10 k at 10 V)
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 of end value (average TC in permitted operating temp range, reference temp 23 °C)
Error signaling	Output: 4 ... 20 mA: Current ≤ 3.6 mA or ≥ 21 mA (see table on back for more data)

Transmission behavior	
Characteristic	Rising / falling linearly
Measurement rate	Approx. 3/sec
Response time t ₉₉	300 ms

Power supply	
24 V DC power supply unit	24 V DC (- 20%, + 25 %), appr. 1.2 W

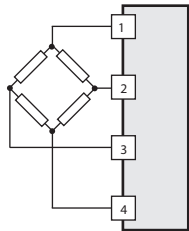
Isolation	
Test voltage	2.5 kV, 50 Hz: power supply against input against output
Working voltage (basic insulation)	Up to 300 V AC/DC across all circuits with overvoltage category II and pollution degree 2. For applications with high working voltages, you should ensure there is sufficient spacing or isolation from neighboring devices and protection against electric shocks.
Protection against electric shock	Safe Isolation 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, you should ensure there is sufficient spacing or isolation from neighboring devices and protection against electric shocks.

Standards and approvals	
EMC	Product standard EN 61326 Emitted interference: Class B Immunity to interference*: Industry EMC-requirements for devices with safety-related functions IEC 61326-3 * Slight deviations are possible while there is interference
 (coming soon)	Standards: UL 508 and CAN/CSA 22.2 no. 14-95
Explosion protection (coming soon)	ATEX Zone 2 (EN 60079-15) Class 1, Div 2 / Zone 2 (UL 1604)

Other data	
Ambient temperature during operation	0 ... +55 °C (mounted in row) 0 ... +65 °C (spacing ≥ 6 mm)
during storage	-25 ... +85 °C
Ambient conditions	Stationary application, weather-protected Rel. air humidity 5 ... 95 %, no condensation Barometric pressure: 70 ... 106 kPa Water or wind-driven rain, snow, or hail excluded
Protection	Terminal IP 20, housing IP 40
Fastening	For 35 mm top hat rail (EN 50022)
Weight	Approx. 60 g

 In compliance with the EU directives 89/336/EEC “Electromagnetic Compatibility” and 73/23/EEC “Low-Voltage Directive”, 94/9/EC “ATEX Directive” (coming soon).

6. Input Wiring



Strain gage, internal supply (4-wire)
Terminal 1: Bridge supply voltage (+)
Terminal 4: Bridge supply voltage (-)
Terminal 2: Measured signal (+)
Terminal 3: Measured signal (-)

7. LED and Error Signaling on Device

Notice: Green and red LED flash briefly when the device is started.

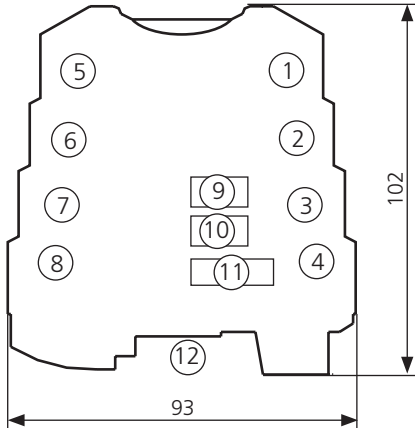
Green: Supply voltage provided

Yellow: Yellow: The identified connection type is signaled once at the start
1-time blinking corresponds to internal supply
2-time blinking corresponds to external supply

Red: Error status; LED flashing indicates error number

No.	Error	Output [mA]		Output [V]	
		4 ... 20	0 ... 20	0 ... 5	0 ... 10
1	Value below range limit	3.6	0	0	0
2	Value above range limit	21	21	5.25	10.5
3	Sensor short circuit	21	21	5.25	10.5
4	Sensor open	21	21	5.25	10.5
5	Pot/strain gage: resistance error	21	21	5.25	10.5
6	- not connected for A 20220 -				
7	Identification of connection	21	21	5.25	10.5
8	Switch misadjusted	21	21	5.25	10.5
9	Adjustment error	21	21	5.25	10.5
10	Device error	3.6	0	0	0

8. Dimension Drawing and Switching Elements



- 1 Input 1 +
- 2 Input 2 +
- 3 Input 3 -
- 4 Input 4 -
- 5 Output +
- 6 Output -
- 7 Power supply
- 8 Power supply
- 9 Sensitivity (2 rotary coding switches)
- 10 Zero point (2 rotary coding switches)
- 11 DIP switches with the following assignments:
1,2,3: Sensitivity offset
4,5,6: Zero offset
7,8: Output signal selection
24 VDC power supply via DIN rail bus connector
- 12

9. Typical Configuration

Sensor: Pressure/force sensor,
Nominal sensitivity: 1.5 mV/V
Range: 0 ... 1.5 mV/V
Output signal: 4 - 20 mA

Adjust input sensitivity:
1.5 mV/V

This input sensitivity is composed of:
numerical value = 50, offset = 1 mV/V.

Adjust the numerical value at the coding switches
(see fig. above, pos. 9): 50
Adjust offset 1 mV/V: DIP1 = DIP2 = 0, DIP3 = 1

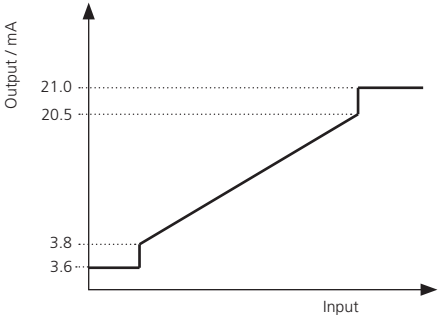
Adjust zero point: 0 mV/V
Adjust the numerical value at the coding switches
(see fig. above, pos. 10): 00
Adjust offset 0 mV/V: DIP4 = 1, DIP5 = 0, DIP6 = 0

Adjust output signal:
4 ... 20 mA: DIP 7 = 0, DIP 8 = 1


Caution!

After completion of configuration you must cover the switches with the included self-adhesive polyimide tape.

10. Behavior of Output Current (4 ... 20 mA) in the Case of Overrange



11. Order Information

Type	Order No.
Strain gage transmitter, adjustable	A 20220 P0
Order code for fixed-range models: A 20220 P0/  further customer-specific settings (e.g. cutoff frequency, zero/sensitivity)	
Accessories	Order No.
DIN rail bus connector: power supply bridging for 2 A 20220 P0 devices each	ZU 0628
IsoPower® A 20900 power supply 24 V DC, 1 A A 20900 H4 power supply	A 20900 H4
DIN rail bus connector: tapping of supply voltage, routing to ZU 0628	ZU 0678
Power terminal block Feeding the supply voltage to the DIN rail bus connectors ZU 0628	ZU 0677

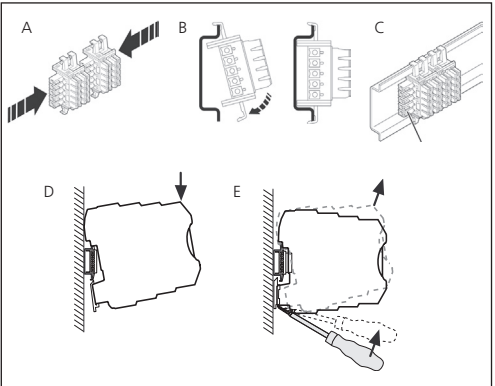


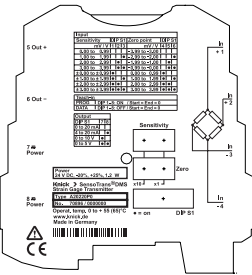
Fig: A Mounting ZU 0628 DIN rail bus connectors in a row
B Snapping the bus connectors onto a DIN rail
C Bus connectors on a DIN rail
D Snapping a transmitter onto a DIN rail
E Removing a transmitter from a DIN rail

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SensoTrans® DMS A 20220

Strain Gage Transmitters



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