

Modular Housings

Knick ➤

SensoTrans® DMS P 32200

The transmitters for strain gage full bridges – in a 6-mm housing with infrared interface, SIL approval, and broad-range power supply.



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 accuracy, flexibility, and functional safety as well as 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 P 32200 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 switches or via an IrDA® port. The broad-range power supply covers all common supply voltages from 24 to 230 V and ensures maximum safety even with unstable mains supplies.

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 P 32200 offer maximum performance in the smallest of spaces.

Adjusting the zero point and sensitivity to the individual strain gage sensor is particularly convenient via the infrared port, for example using a PDA. 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.

Knick offers the SensoTrans® DMS P 32200 transmitters with SIL approval for applications with high demands on functional safety. The requirements of EN 61508 were implemented by a specially developed hardware and software. The fail-safe concept makes use of structural measures at the device level (redundancy of system components) and diagnostics methods for selective fault detection. The product is SIL 2 approved (EN 61508) by an authorized body (TÜV Rheinland).



Strain Gage Transmitters

Isolation Amplifiers
Transmitters

Indicators

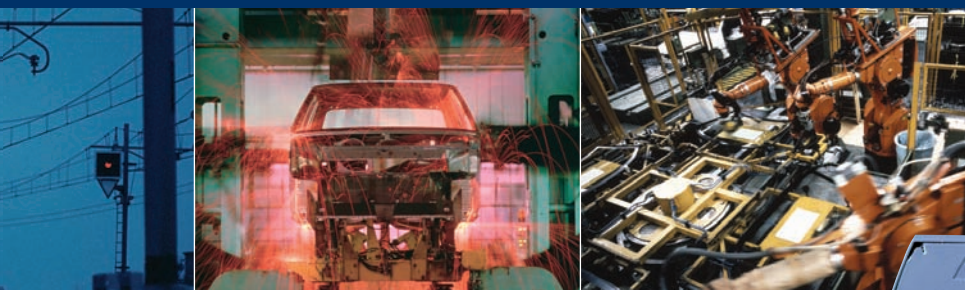
Process Analytics

Portable Meters

Laboratory Meters

Sensors

Fittings



Knick 

The Operating Software

The user-friendly, menu-guided Paraly® SW 111 communication software runs on standard and pocket PCs and opens a number of further options such as input of customer-specific linearization curves, readout of the connection configuration, as well as the use of extensive diagnostic functions. Configuration, documentation and, if necessary, maintenance of entire plant components can be accomplished by "infrared remote control". Moreover, the output current or voltage can be specified independently of the input value using the simulation function – a useful feature for plant commissioning or revision.

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).

6 mm CLASS



The Facts

Universal usability for strain gages, pressure and load cells, and other resistive measuring bridges

Convenient parameter setting via IrDA® port – uncomplicated, menu-guided adjustment also "on site" including archiving of configuration data

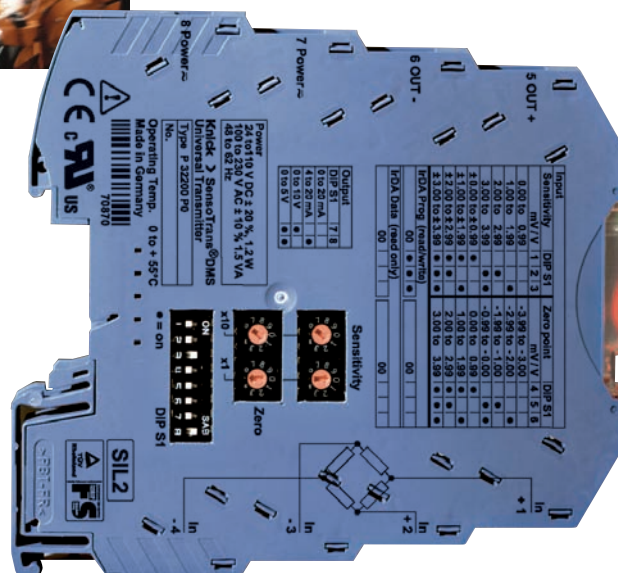
Intuitive configuration Easy, without tools, using 4 rotary and 8 DIP switches

Calibrated range selection without complicated adjustments

Convenient adjustment Zero point and sensitivity adjustable via IrDA®

Simulation of any desired output values for correct installation/ commissioning

World-wide usability due to broad-range power supply 24 ... 110 VDC, 110 ... 230 VAC



Safe Isolation according to EN 61140 – protection of maintenance staff and subsequent devices against non-permitted high voltages up to 300 V AC/DC

Functional safety up to SIL 2 (up to SIL 3 in the case of redundant configuration) with TÜV certificate – systematically developed according to EN 61508

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

IrDA® is a registered trademark of the Infrared Data Association.

Modular Housings

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SensoTrans® DMS P 32200

■ Product Line

Strain gage transmitter,
adjustable

Order No.	P 32200 P0 /	<input type="checkbox"/>	<input type="checkbox"/>
Without		0	
SIL 2 (up to SIL 3 in the case of redundant configuration)		1	
Broad-range power supply			
24 ... 110 V DC, 110 ... 230 V AC via screw terminals only,		1	
24 V DC via screw terminals or DIN rail bus connectors		0	

Strain gage transmitter,
with fixed settings

Order No.	P 32200 P0 /	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Without		0				
SIL 2 (up to SIL 3 in the case of redundant configuration)		1				
Broad-range power supply						
24 ... 110 V DC, 110 ... 230 V AC		1				
24 V DC via screw terminals or DIN rail bus connectors		0				
As specified			n	n	n	n

Accessories

Order No.	
SW 111	Communication software
ZU 0628	Power supply bridging for two devices, A 20XXX P0 or P 32XXX P0
A 20900 H4	Power supply, 24 V DC, 1 A, see Page 212
ZU 0678	Tapping of supply voltage (A 20900), routing to ZU 0628 DIN rail bus connector
ZU 0677	Feeding the 24 V DC supply voltage to the ZU 0628 DIN rail bus connector

■ 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

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Specifications (continued)

Strain gage input data (continued)

Supply voltage (ext. supply)	1 ... 3 V
Input error limits	$\pm (2 \mu\text{V/V} + 0.1 \% \text{ meas. val.})$ for spans $\geq 0.5 \text{ mV/V}$
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

Output data

Outputs	0 ... 20 mA, Calibrated selection 4 ... 20 mA, (factory setting 4 ... 20 mA) 0 ... 5 V, 0 ... 10 V
Control range	0 ... $\approx 102.5 \% \text{ span}$ with 0 ... 20 mA, 0 ... 10 V or 0 ... 5 V output $-1.25 ... \approx 102.5 \% \text{ span}$ with 4 ... 20 mA output
Resolution	16 bits
Simulation mode adjustable via IrDA®	0 ... 20 mA current output: 0 ... 21 mA 4 ... 20 mA current output: 3 ... 21 mA 0 ... 5 V voltage output: 0 ... 5.25 V 0 ... 10 V voltage output: 0 ... 10.5 V
Load	Current output: $\leq 10 \text{ V}$ ($\leq 500 \text{ ohms}$ at 20 mA) Voltage output: $\leq 1 \text{ mA}$ ($\geq 10 \text{ kohms}$ 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	$< 10 \text{ mV}_{\text{rms}}$
Temperature coefficient at output	50 ppm/K (average TC in permitted operating temp range, reference temp 23 °C)
Error signaling	0 ... 20 mA output: $I = 0 \text{ mA}$ or $\geq 21 \text{ mA}$ 4 ... 20 mA output: $I \leq 3.6 \text{ mA}$ or $\geq 21 \text{ mA}$ 0 ... 5 V or 0 ... 10 V output: $V = 0 \text{ V}$ or $V \geq 5.25 \text{ V}$ or $V \geq 10.5 \text{ V}$ via output signal, red LED, and IrDA® for out-of-range conditions, faulty settings, sensor short circuit or open circuit, output load error, unintentional adjustment of switches during operation (for SIL devices only), other device errors. Also see "Error Signaling" Page 179.

Transmission behavior

Characteristic	Linear rising / falling, curves defined by sampling points (via IrDA® port)
Meas. rate	Approx. 3/s

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Specifications (continued)

Display

Green LED

Yellow LED

Red LED

Power supply

Connection type, IrDA® communication

Maintenance request or device failure

Power supply

Power supply

24 V DC power supply unit

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.

Broad-range power supply unit

24 V ... 110 V DC (±20 %), approx. 1.2 W

110 V ... 230 V AC (±10 %),

48 ... 62 Hz, approx. 1.5 VA

Isolation

Galvanic isolation

Test voltage

Working voltage
(basic insulation)

Protection against
electric shock

3-port isolation between input, output, and power supply

2.5 kV AC, 50 Hz: Power supply against input against output

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.

Safe Isolation according to EN 61140 by reinforced insulation in accordance with EN 61010-1. Working voltages 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

Functional safety

SIL 2 to EN 61508, SIL 3 with redundant configuration

Explosion protection

ATEX Zone 2 (DIN EN 60079-15), Class 1, Div 2 / Zone 2 (UL 1604)

EMC

Product family standard: EN 61326
Emitted interference: Class B
Immunity to interference¹⁾: Industry
EMC requirements for devices with safety-related functions
IEC 61326-3: draft

cURus

File No. 220033
Standards: UL 508 and CAN/CSA 22.2 no. 14-95

Interfaces

IrDA®

Specification 1.1, slave device for bidirectional communication
Paraly® SW 111 communication software, free download at www.knick.de

Other data

Ambient temperature

Operation: 0 ... +55 °C in row, without spacing
0 ... +65 °C with spacing ≥ 6 mm
Storage: –25 ... +85 °C

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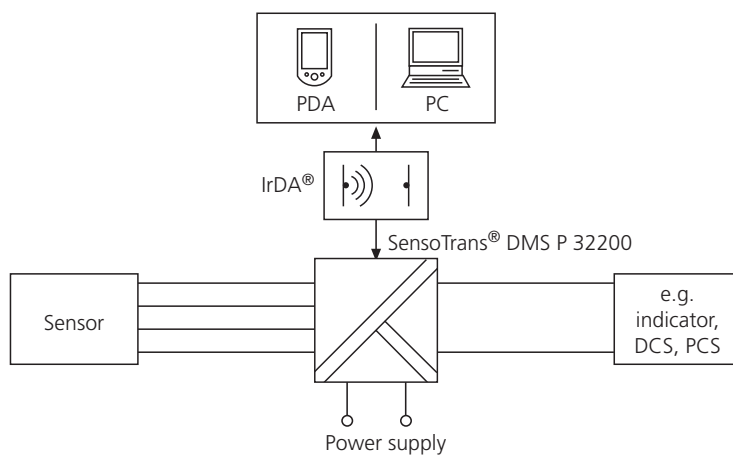
Specifications (continued)

Other data (continued)

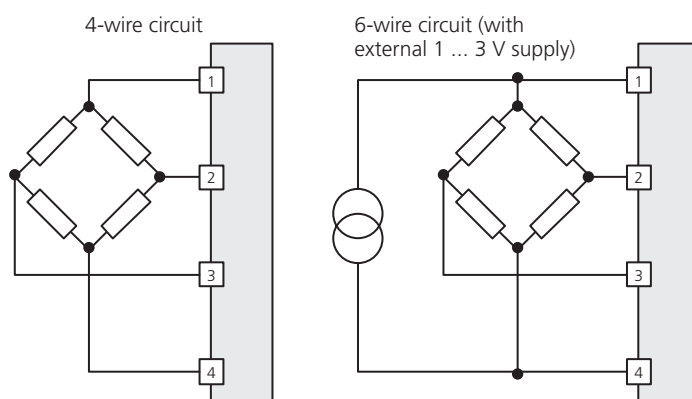
Ambient conditions	Stationary application, weather-protected relative air humidity: 5 ... 95 %, no condensation barometric pressure: 70 ... 106 KPa water or wind-driven rain, snow, or hail excluded
Design	Modular housing with screw terminals, 6.2 mm wide, see dimension drawing for further measurements 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



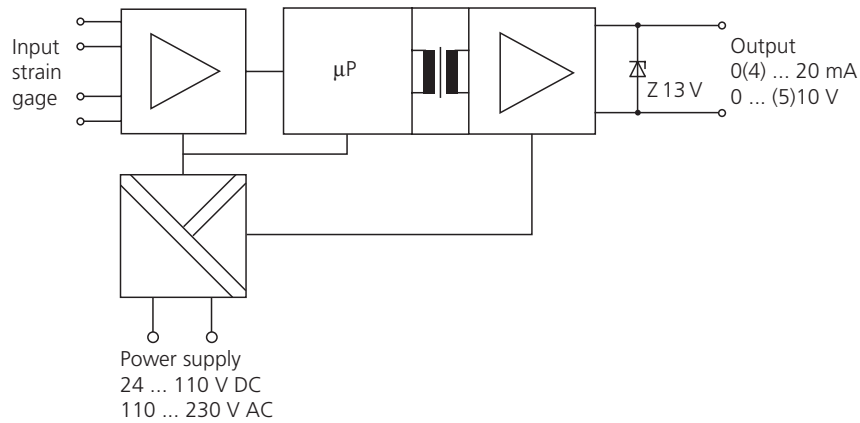
Connection of Strain Gages



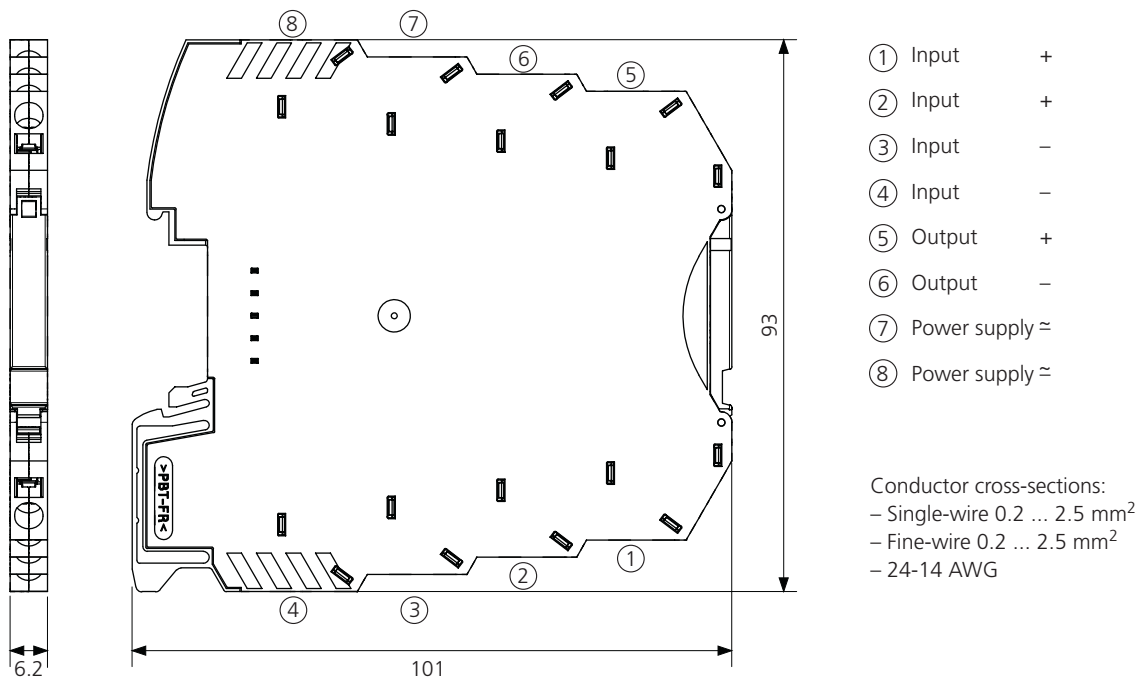
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■ Block Diagram



■ Dimension Drawings and Terminal Assignments



All dimensions in mm!

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■ Error Signaling

No.	Error	Message configuration ²⁾		Output			
		With SIL	Without SIL	4 ... 20 [mA]	0 ... 20 [mA]	0 ... 5 [V]	0 ... 10 [V]
0	None	Not self-locking	Not self-locking	—	—	—	—
1	Value below range	Not self-locking	Not self-locking	3.6	0	0	0
2	Value above range	Not self-locking	Not self-locking	21	21	5.25	10.5
3	Sensor short circuit	Self-locking	Not self-locking	21	21	5.25	10.5
4	Sensor open	Self-locking	Not self-locking	21	21	5.25	10.5
5	Basic resistance invalid	Self-locking	Not self-locking	21	21	5.25	10.5
6	Load output error ³⁾	Not self-locking	Not self-locking	3.6	0	0	0
7	Identification of connection	Self-locking	Not self-locking	21	21	5.25	10.5
8	Switch misadjusted	Self-locking	Not self-locking	21	21	5.25	10.5
9	Parameter error	Self-locking	Not self-locking	21	21	5.25	10.5
10	Device error (subordinated error number distinguished via IrDA® port)	Self-locking	Self-locking	3.6	0	0	0

2) 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 or via IrDA® port).

3) With SIL models P 32200 P0/1x only

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

