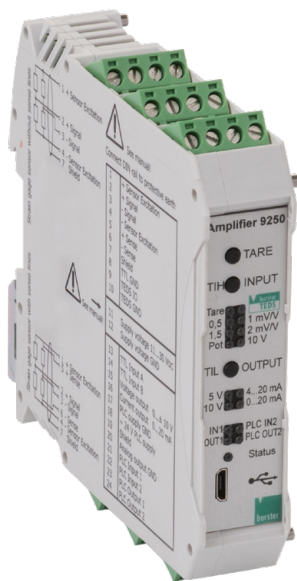


# Universal Instrumentation Amplifier for strain gage, potentiometric, DC/DC and incremental sensors

## MODEL 9250



### Highlights

- Ultra-fast pushbutton configuration
- Non-linearity < 0,005 % F.S.
- Outputs  $\pm 10$  V,  $\pm 5$  V and 0 (4) - 20 mA
- 6 wire technique
- Automatic sensor recognition due to burster TEDS
- Adjustable cut-off frequencies
- Versatile configuration using DigiVision PC software via USB port

### Options

- Digital I/O to the PLC
- Increased sampling rate up to 14400 Meas./s.
- Interface for the connection to fieldbus controller 9251
- TTL input for incremental sensors

### Applications

- All areas of mechanical engineering
- Assembly and joining equipment
- Hydraulic presses
- Measurement of cable strengths

### Product description

The new 9250/9251 amplifier generation unites all the features that make modern measurement data acquisition actually possible for the first time. Network-compatible, high-precision, user-friendly, smart and versatile: the combined system of amplifier module and fieldbus controller can be integrated into any existing setup. The amplifier 9250 takes signals exactly to the point where they can be combined, monitored and linked efficiently to other data. The fieldbus interfaces give you flexibility, speed and perfect connections, and save you time, money and other resources when integrating your measurement setup with existing systems. Automatic sensor recognition due to burster TEDS lets you play absolutely safe, protecting you from setting incorrect parameters.

The broad supply voltage range permits operation on standard power supplies used in switch gear cabinets. A highly accurate precision amplifier performs the amplification of the sensor signal being applied. The latest microprocessor technology made a 24 bit AD conversion with high accuracy possible. The sensor excitation is performed by the amplifier module itself so that no additional voltage source is required. It can also be set in steps of 2.5 V, 5 V, 10 V using configuration software DigiVision. The maximum feed current of 40 mA permits parallel connection of several strain gages sensors, e.g. for the addition of measurement variables. Measurement errors brought about by varying line lengths or due to temperature fluctuations effecting the sensor cable are avoided by having probe lines measuring the actual feed voltage directly on site at the sensor itself (6 wire technology). The cut-off frequency of the amplifier can be switched between 10 Hz and 1 kHz.



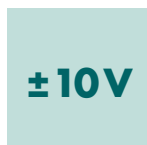
Instrumentation amplifier 9250 with bus interface for 9251



Fieldbus controller 9251



Fieldbus controller 9251 with up to 8 instrumentation amplifiers 9250



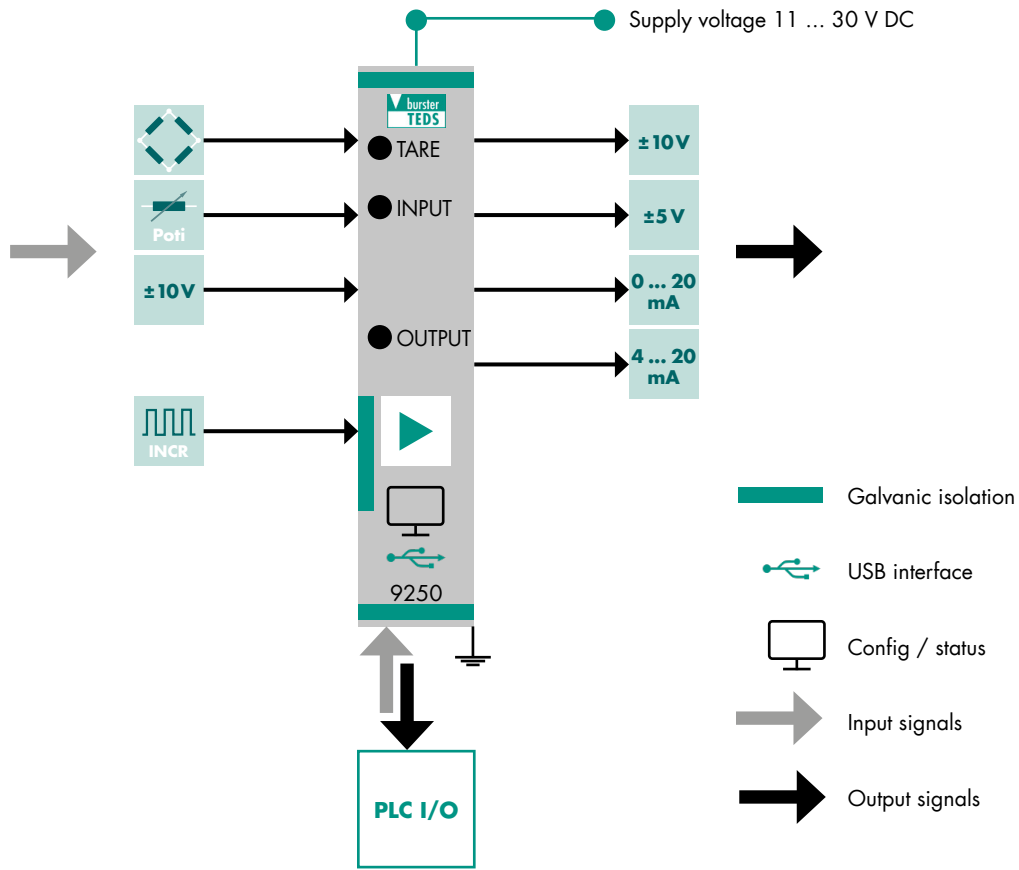
## Technical Data

| Connectable sensors   |  |   |
|---|--|---|
| <b>Strain gage full bridge</b>                                    |  |   |
| Excitation voltage  |  | 2.5 / 5 / 10 V, configurable, short-circuit proof   |
| Connection technology   |  | 4 or 6 wire, automatic recognition  |
| Excitation current  |  | approx. 40 mA   |
| Input impedance   |  | 1 GOhm  |
| Measuring ranges  |  | ±15 mV, ±30 mV, ±300 mV   |
| <b>Potentiometer</b>  |  |   |
| Excitation voltage  |  | 5 V   |
| Excitation current  |  | max. 40 mA  |
| Resistance  |  | > 200 Ohm   |
| Input impedance   |  | 1 GOhm  |
| <b>Voltage metering</b>   |  |   |
| Measuring range   |  | ±10 V   |
| Input impedance   |  | 1 GOhm  |
| <b>TTL inputs</b>   |  |   |
| Level   |  | TTL, 5V, approx. 3 mA, galvanically isolated from amplifier   |
| Counter depth   |  | 32-bit, 4 counter increments  |
| Cut-off frequency   |  | 2 MHz   |
| <b>Analog outputs</b>   |  |   |
| Voltage outputs   |  | ±5 V or ±10 V   |
| Internal resistance   |  | 100 Ohm   |
| Current output  |  | 0 ... 20 mA or 4 ... 20 mA,<br>Load 50 up to 500 Ohm  |
| Filter  |  | without, 4 Hz - 700 Hz in discrete bands  |
| <b>PLC IO</b>   |  |   |
| Two inputs  |  | PLC level DIN 61131   |
| Function  |  | Tare, peak-value buffer reset, limits reset, HOLD, counter reset  |
| Response time   |  | 20 ms   |
| Two outputs   |  | PLC level DIN 61131, p-switched, max. 500 mA,<br>24 V external supply necessary,<br>Inputs and outputs galvanically isolated from amplifier,<br>Function configurable via USB |
| Function  |  | Above limit, below limit, window modus  |
| Response time   |  | < 0.5 ms  |
| <b>Internal communication bus to the fieldbus controller 9251</b> |  |   |
| Transmission speed  |  | 3.6 kHz   |
| <b>Housing</b>  |  |   |
| Material  |  | polyamides, metal housing inside  |
| Dimensions  |  | 115 x 110 x 22.5 mm (D x H x W)   |
| Weight  |  | approx. 210 g   |
| Protection class  |  | IP20  |
| Connections   |  | Screw clamps, up to 2.5 mm <sup>2</sup>   |

## Technical Data

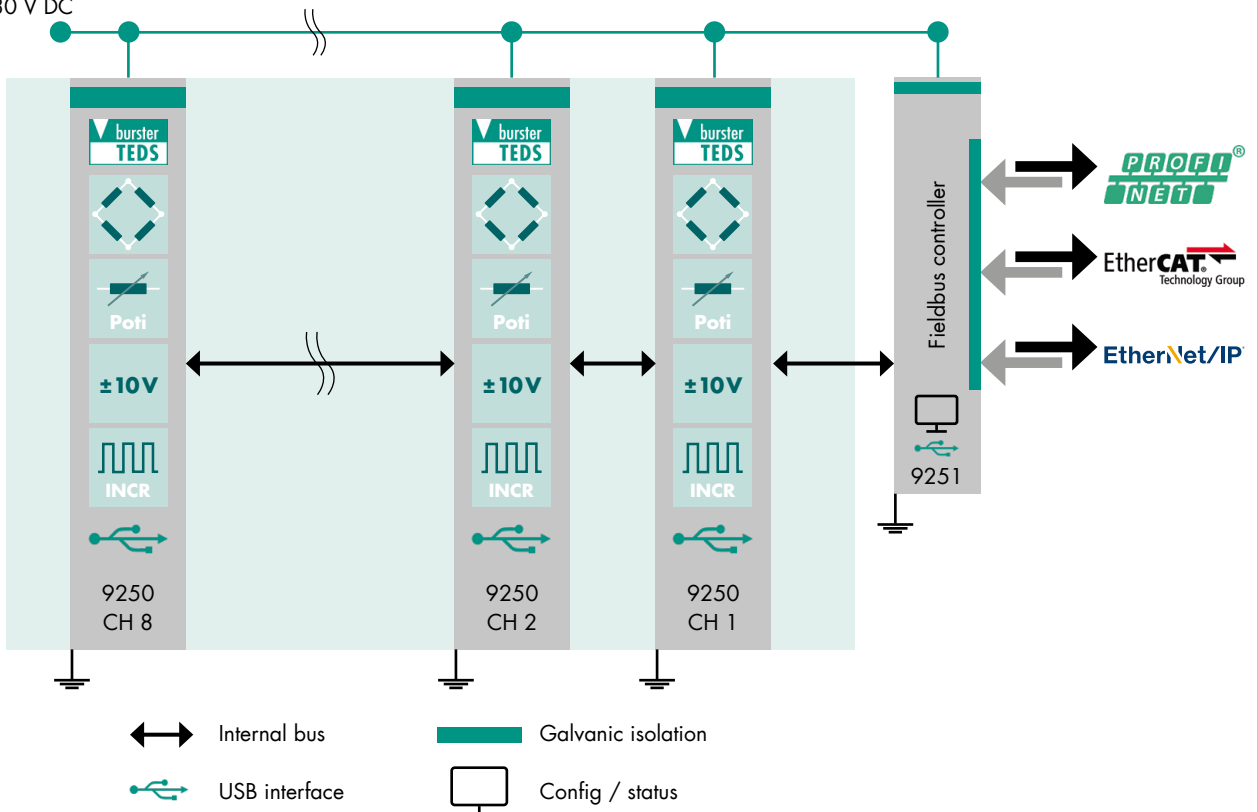
| General data                     |  |
|----------------------------------|--|
| Supply voltage                   | 11 ... 30 V DC,<br>Galvanic separation, overvoltage and pole protection  |
| Capacity                         | approx. 3 W  |
| Sensor recognition               | burster TEDS   |
| Operating temperature range      | 0 ... +50 °C   |
| Storage temperature range        | -25°C ... +70 °C   |
| Humidity                         | 0 ... 70 % non condensing  |
| Cut-off frequency                | 500 Hz at 1200 Meas./s. (standard), signal running time 1,9 ms<br>3000 Hz at 14400 Meas./s. (option), signal running time 0,4 ms |
| Installation                     | grounded mounting rail 35 mm to DIN EN 50022   |
| Electrical isolation             | Instrumentation amplifier, TTL inputs, PLC IO, supply voltage  |
| Error limit                      | ±0.03 % F.S.   |
| AD conversion                    | 24-Bit   |
| DA conversion                    | 16-Bit   |
| Max. measuring rate              | 14400 (option), 1200 standard Meas./s.   |
| Non-linearity                    | < 0.005 % F.S.   |
| Temperature coefficient Gain     | < 15 ppm F.S. / K  |
| Input zero drift                 | < 0.1 µV / K   |
| Common mode rejection (CMRR)     | 140 dB (Bei DC)  |
| Interfaces                       | Micro USB for configuration  |
| Ripple & Noise at voltage output | approx. 5 mVss at 1200 meas./s   |
| Other                            | Teach-in via button, tare function via button, I/O configuration via button or USB   |

Block diagram – **9250-VXXXXX0X**

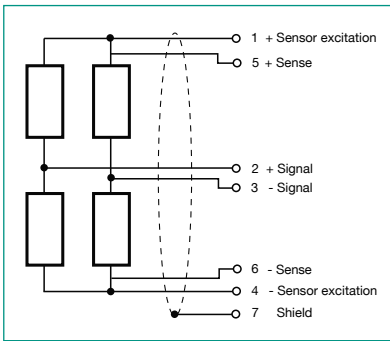


Block diagram – **9250-VXXXX1X (bus compatible)**

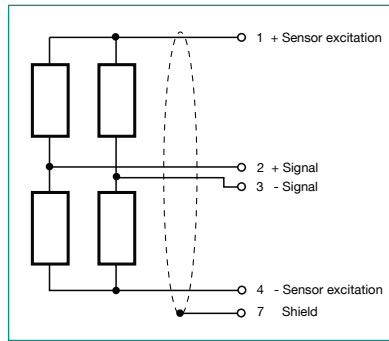
Supply voltage  
11 ... 30 V DC



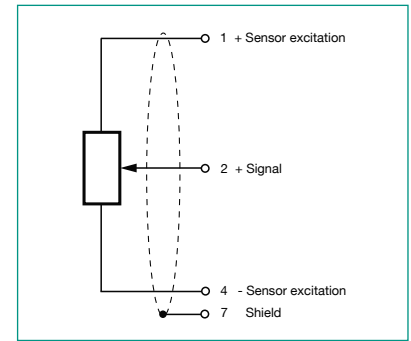
## Pin assignment



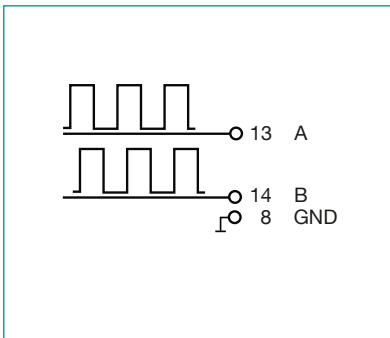
Strain gage 6 wire



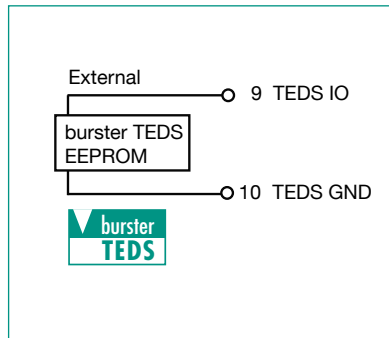
Strain gage 4 wire



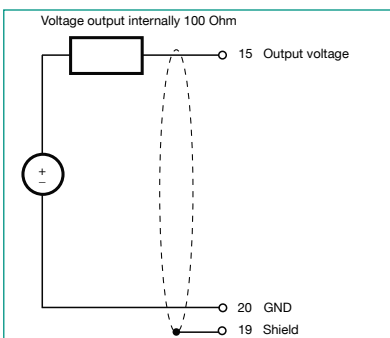
Poti



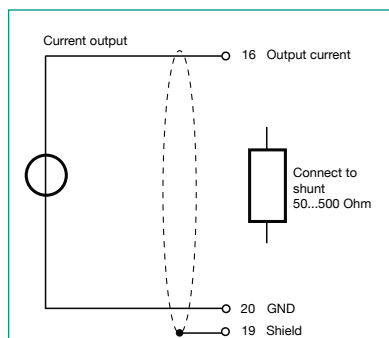
Counter



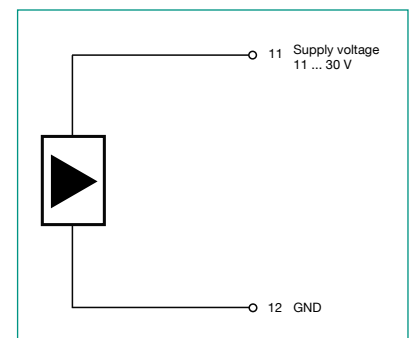
TEDS



Output Voltage



Output current

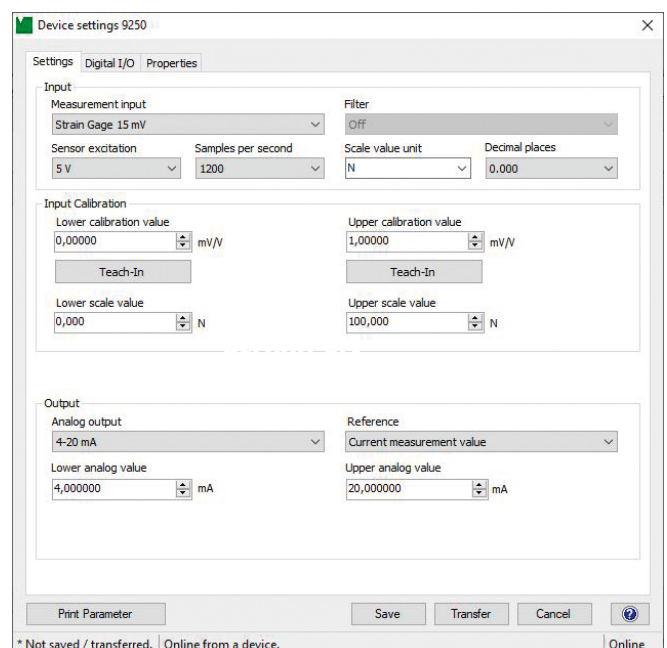


Supply voltage

## DigiVision PC Software

The amplifier module model 9250 is used wherever measurement signals from strain gage, potentiometric, DC/DC or incremental sensors have to be converted into standard signals. Simply by mounting on conventional DIN-mount rails, it is possible to position the amplifier module on location, in the proximity of the sensor.

- Convenient device configuration via front-panel USB port
- Automatic recognition of amplifier modules in DigiVision
- Manage a range of parameter sets
- Backup facility for storing settings
- Choice of output parameter (current or voltage)
- Manual configuration of calibration data in the module
- Simplified measuring operation for service purposes
- Easy parameterization of the measurement input
- Scale value parameterization for connection to fieldbus controller 9251



## Ultra-fast pushbutton configuration

- ▶ Select input
- ▶ Select output
- ▶ Get started

## Accessories

| Order Code |  |
|------------|--|
| 9900-K358  | USB cable for configuration                        |
| 9250-Z001  | 1 set of terminals (included in scope of delivery) |

## Adjustment for measurement chains

| Adjustment        |  |
|-------------------|--|
| 92ABG             | Compensation of measurement chain in preferential direction of the sensor of output 10 V |
| 92ABG-S           | Compensation of measurement chain according to customer request                          |
| 92ABG-2 (at TEDS) | Compensation of measurement chain with TEDS sensors of output 10 V                       |

## Calibration certificate with accreditation symbol

Calibration certificate with accreditation symbol for Instrumentation amplifier 9250. The calibration is based on the accreditation of the calibration laboratory D-K-15141-01-00 for the scope of accreditation listed in the annex. The traceability to national standards as well as wide international recognition (DAkkS as a signatory of the multilateral agreements of EA, ILAC and IAF) are guaranteed.



## Calibration certificates for instrumentation amplifiers

| Standard factory calibration certificate for instrumentation amplifiers (WKS)          |  |
|--|--|
| On request   | Calibration is performed by electrical simulation of the input variables.  |
| Calibration certificate with accreditation symbol for instrumentation amplifiers (DKD) |  |
| On request   | Our ISO 17025 accredited calibration laboratory (DAkkS) offers accredited calibration certificates according to its scope of services. Calibration is performed by electrical simulation of the input variables. |

## Calibration certificates for measurement chains

| Standard factory calibration certificate for measurement chains (WKS)          |  |
|--|--|
| Optional available   | Normally, our standard factory calibration certificate contains measuring points which are recorded starting from zero in 5 steps (distributed as evenly as possible over the measuring range) until the nominal sensor value is reached. In this process, the change of the physical input variable takes place with increasing and decreasing signal with unchanged installation position of the sensor.<br><br>Calibration is performed in conjunction with a transducer (sensor) for physical quantities and is based on the procedure specified in the sensor data sheet. |
| Special factory calibration certificate for measurement chains (WKS)           |  |
| On request   | We are happy to calibrate sensors and measurement chains to the customer's specification.  |
| Calibration certificate with accreditation symbol for measurement chains (DKD) |  |
| Optional available   | Our ISO 17025 accredited calibration laboratory (DAkkS) offers accredited calibration certificates according to its scope of services. The applied calibration procedures can also be taken from the data sheet of the used transducer (sensor).<br><br>Calibration is performed in conjunction with a transducer (sensor) for physical quantities.  |

## Order Code

|   |          |          |          |          |          | Standard |   |   |   |   |   |
|---|----------|----------|----------|----------|----------|----------|---|---|---|---|---|
|   |          |          |          |          |          | 0        | 0 | 0 | 0 | 0 | 0 |
| <b>9</b>  | <b>2</b> | <b>5</b> | <b>0</b> | <b>-</b> | <b>V</b> |          |   |   |   |   |   |
| <b>Housing version</b>                                  |          |          |          |          |          |          |   |   |   |   |   |
| ■ IP20 mounting rail housing                            |          |          |          |          |          | 0        |   |   |   |   |   |
| <b>Input signal</b>                                     |          |          |          |          |          |          |   |   |   |   |   |
| ■ Strain gage, poti and normalized signal               |          |          |          |          |          | 0        |   |   |   |   |   |
| ■ Strain gage, poti, normalized signal and TTL          |          |          |          |          |          | 1        |   |   |   |   |   |
| <b>Output signal</b>                                    |          |          |          |          |          |          |   |   |   |   |   |
| ■ Analog output $\pm 10$ V and 0 (4) ... 20 mA          |          |          |          |          |          |          | 0 |   |   |   |   |
| <b>PLC interface</b>                                    |          |          |          |          |          |          |   |   |   |   |   |
| ■ without   |          |          |          |          |          |          |   | 0 |   |   |   |
| ■ Digital I/O (2 inputs and 2 outputs)                  |          |          |          |          |          |          |   | 1 |   |   |   |
| <b>Multi-channel operation with fieldbus controller</b> |          |          |          |          |          |          |   |   |   |   |   |
| ■ without bus interface                                 |          |          |          |          |          |          |   |   | 0 |   |   |
| ■ with bus interface for fieldbus controller            |          |          |          |          |          |          |   |   | 1 |   |   |
| <b>Sampling rate</b>                                    |          |          |          |          |          |          |   |   |   |   |   |
| ■ Sampling up to 1200 Meas./s.                          |          |          |          |          |          |          |   |   |   | 0 |   |
| ■ Sampling up to max. 14400 Meas./s.                    |          |          |          |          |          |          |   |   |   | 1 |   |