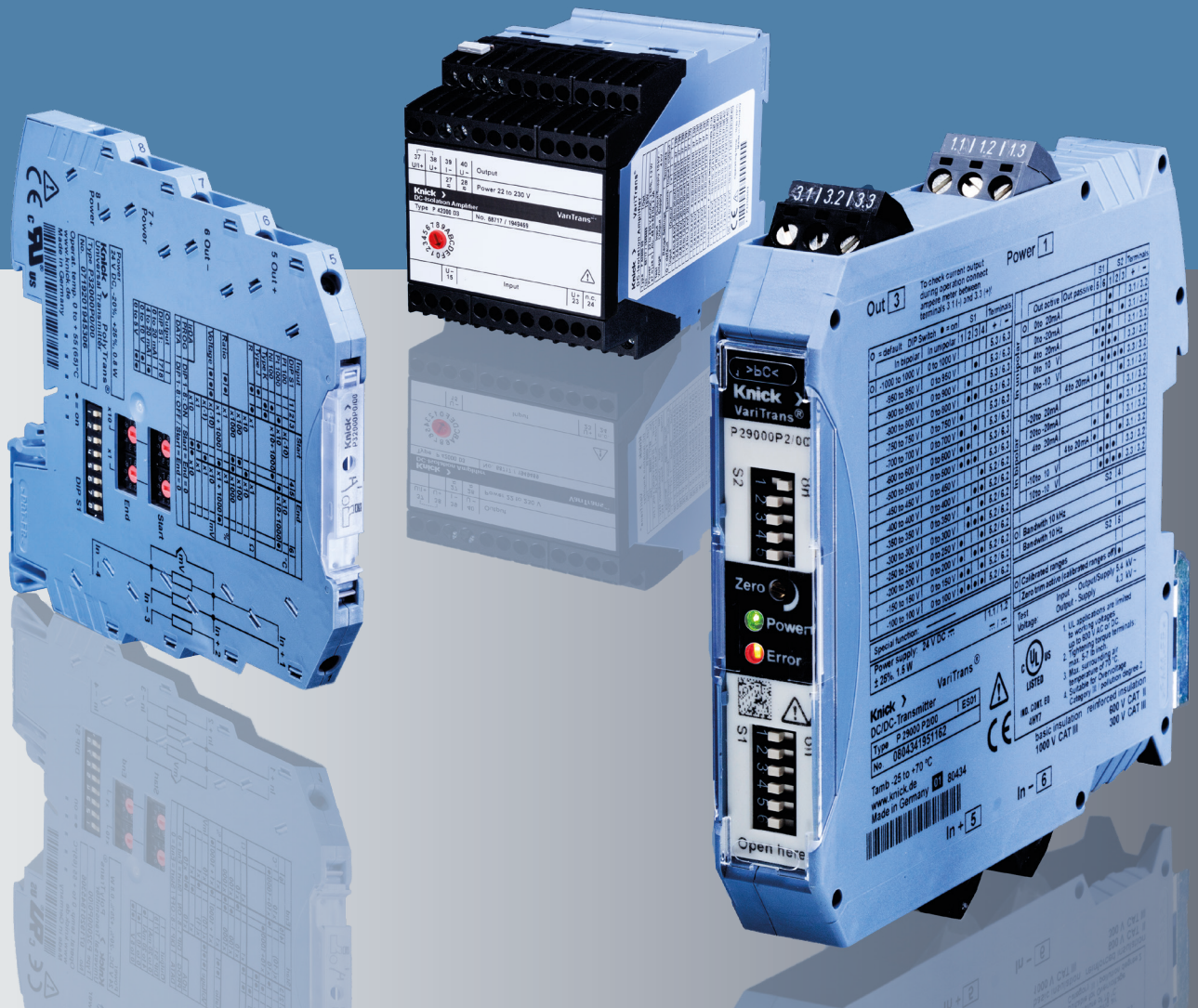
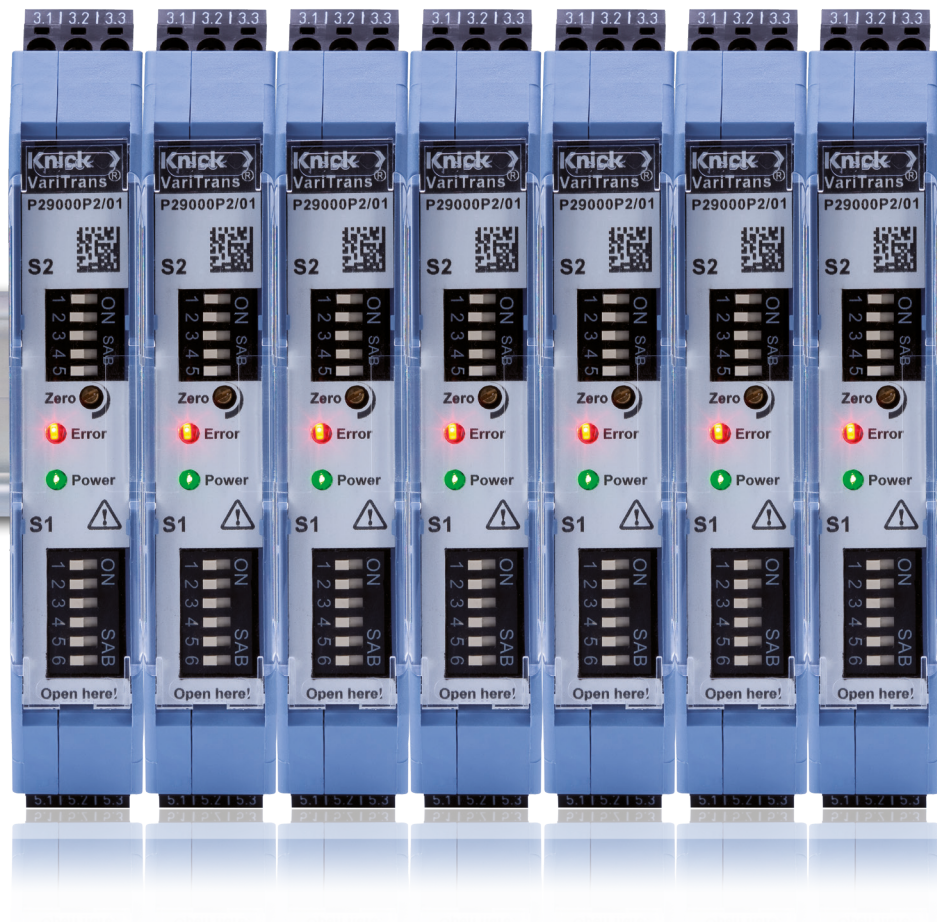


ProLine

Product Overview: Interface Technology

Signal Conditioners and Transmitters





High-Precision Signal Conditioners and Transmitters for Sophisticated Applications

Flexible

Switchable calibrated input ranges and flexibly selectable standard signals on the output allow for a broad range of applications. Inventory costs are reduced and operation is simplified.

Depending on the model, the relevant measurement signals are amplified or converted to the standard values of 10 V or 20 mA. Voltages of a few mV up to 4800 V and currents of a few μ A up to kA can be transmitted or converted with a high level of precision.

International

International certification including UL, CSA, CE, DNV, SIL, KTA, ATEX, EAC allows the devices to be used worldwide. This applies particularly to the models with broad-range power supply (20 ... 253 V AC/DC).

Signal conditioners and transmitters of the ProLine series provide crucial benefits for applications with high demands on isolation, signal transmission speed and long-term stability.

Reliable

Intelligent circuit design and integrated safety margins between the normal load and the possible maximum load in the event of an error are basic design principles employed by Knick. They also include the use of high-quality parts and eliminating components with high failure rates. The result: MTBF (mean time between failure) is up to 1030 years.

www.knick.de/proline



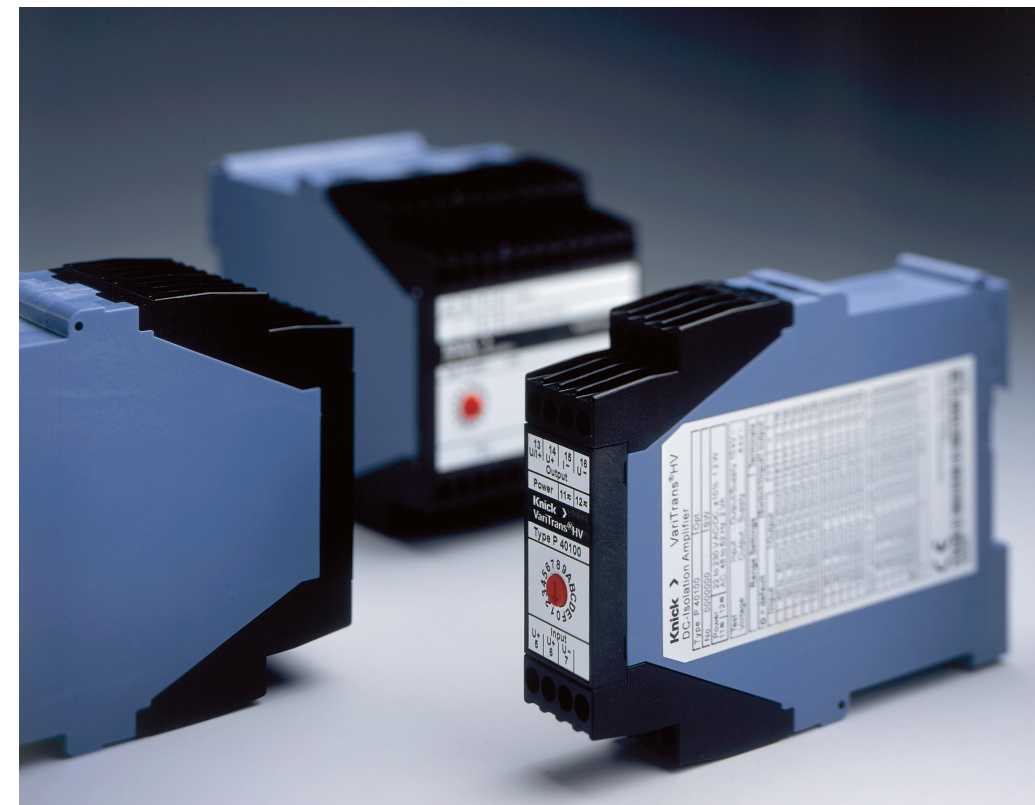
ProLine signal conditioners for precise measurements at high working voltages of up to 4800 V

In industrial applications, measuring and control signals must be isolated when being transmitted — for safety reasons and in order to achieve optimal signal quality. The products used must safely master dangerously high voltage levels, a variety of ground potentials and high common-mode voltages.

- Our ProLine products provide solutions for a range of industrial applications, including
- Protection and monitoring equipment in electric drives
 - Power current switchgear
 - Power plants
 - Trains and traction power supply
 - Photovoltaics
 - Measuring and testing technology

Product Lines

- Universal signal conditioners for voltage and current measurement with galvanic isolation
- Transducers for high DC and AC voltages and precise current measurement via shunt resistor
- Active and passive isolators for standard signals
- Repeater power supplies for 2-wire sensors
- Temperature transmitters, also with high isolation



If shipped to our factory, deficient products will be repaired free of charge there if the deficiency was not visible upon delivery and was reported to us within 5 years of receipt.

The original warranty period after first delivery applies to repaired products.

Further claims for direct damages or consequential damages are excluded from the warranty.

Transducers for High Voltage / Shunt Applications / DC and AC

For reliable current and voltage measurements with extremely high isolation requirements.

	High Voltage Transducers VariTrans P41000	High Voltage Transducers VariTrans P42000	High Voltage Transducers VariTrans P43000	High Voltage Transducers ProLine P51000	High Voltage Transducers ProLine P52000	Voltage and Current Detectors ProLine P51/52000 VPD	High Voltage Transducers VariTrans P29000
Input	±60 mV to ±100 V unipolar/bipolar	D3: ±100 to ±3600 V D2: ±100 to ±2200 V unipolar/bipolar	±0.1 to ±5 A unipolar/bipolar	±30 mV to ±125 V unipolar/bipolar	±100 to ±4200 V (max. 4200 V) unipolar/bipolar	Switching threshold: 50 to 4200 V, 10 to 300 mV, 5 to 125 V,	±30 mV to ±1000 V unipolar/bipolar
Output	0/4 ... 20 mA, ±20 mA 0 ... (±)10 V	0/4 ... 20 mA, ±20 mA 0 ... (±)10 V	0/4 ... 20 mA, ±20 mA 0 ... (±)10 V	0/4 ... 20 mA, ±20 mA, ±40 mA 0 ... (±)10 V, 0 ... (±)5 V	0/4 ... 20 mA, ±20 mA, ±40 mA 0 ... (±)10 V, 0 ... (±)5 V	Solid state relays, power good signal	0/4 ... 20 mA, ±20 mA 0 ... (±)10 V, 4 ... 20 mA, passive
Accuracy Class	0.1 %	0.3 %	0.3 %	0.1 % (0.5 R)	0.1 % (0.5 R)	5 %	0.2 %
Test Voltage	15 kV AC	15 kV AC	15 kV AC	18 kV AC	18 kV AC	18 kV AC	5.4 kV AC
Basic Insulation	3600 V AC/DC	3600 V AC/DC	3600 V AC/DC	4800 V AC/DC	4800 V AC/DC	4800 V AC/DC	1000 V AC/DC
Reinforced Insulation	1800 V AC/DC	1800 V AC/DC	1800 V AC/DC	3600 V AC/DC	3600 V AC/DC	3600 V AC/DC	600 V AC/DC
Power Supply	20 ... 253 V AC/DC broad-range power supply	20 ... 253 V AC/DC broad-range power supply	20 ... 253 V AC/DC broad-range power supply	24 ... 230 V AC/DC ± 30 % broad-range power supply	24 ... 230 V AC/DC ± 30 % broad-range power supply	24 ... 230 V AC/DC ± 30 % broad-range power supply	20 ... 253 V AC/DC broad-range power supply
Certification	CE, UL, EAC	CE, UL, EAC	CE, UL, EAC	CE, UL, EN 50155	CE, UL, EN 50155	CE, UL	CE, cULus, EAC
Width	22.5 mm	45 / 67.5 mm	45 mm	72.5 x 182 x 116 mm	72.5 x 182 x 116 mm	72.5 x 182 x 116 mm	17.5 mm

- Special Features**
- For high current measurement via high-potential shunt resistor
 - Precise signal conversion and high cutoff frequency of 5 kHz (-3 dB)
 - Calibrated, switchable, and custom-adjustable versions
 - High immunity to transient common-mode interference: T-CMR > 115 dB
 - Extended ambient temperature range from -40 °C to 80 °C on request
 - For direct measurement of high voltages
 - Up to 3600 V AC/DC working voltage
 - Calibrated, switchable, and custom-adjustable versions
 - High measurement accuracy without long-term drift
 - Precise signal conversion and high cutoff frequency of 5 kHz (-3 dB)
 - Extended ambient temperature range from -40 °C to 80 °C on request
 - For direct measurement of currents up to 5 A
 - Up to 3600 V AC/DC working voltage
 - Calibrated, switchable, and custom-adjustable versions
 - High measurement accuracy without long-term drift
 - Precise signal conversion and high cutoff frequency of 5 kHz (-3 dB)
 - Extended ambient temperature range from -40 °C to 80 °C on request
 - Measurement of high currents via shunt resistor up to 20 kA or universal measurement of high-potential currents and voltages
 - Use on rolling stock (EN 50155)
 - Fire protection HL3 according to EN 45545-2
 - Contact protection according to EN 50153, housing: IP54/IP51
 - Safety via diagnostics for input circuit, output circuit, and device function
 - Ambient temperature range: -40 °C to 85 °C
 - For direct measurement of high voltages
 - Use on rolling stock (EN 50155)
 - Fire protection HL3 according to EN 45545-2
 - Contact protection according to EN 50153, housing: IP54/51
 - Diagnostics of input/output circuits and device function
 - Ambient temperature range: -40 °C to 85 °C
 - Monitoring of voltages up to 4800 V or of currents via shunt resistor up to approx. 20 kA
 - Continuous monitoring of the device function
 - For industrial plants, traction power systems, and rail vehicles
 - Monitoring the switching threshold
 - 10 switching thresholds, freely adjustable via rotary switches on the device
 - Universal voltage measurement up to 1000 V and current measurement via shunt resistor (mV ranges)
 - Customized measuring ranges on request
 - For measuring DC currents via shunt resistor, battery voltages, and many other currents and voltages
 - Specifically for precise conversion and galvanic isolation of bipolar signals
 - Convenient configuration via DIP switches
 - Even after range switching, the transmission ranges remain calibrated and there is no need for re-adjustment
 - Precise signal conversion and high cutoff frequency of 5 kHz (-3 dB)



As P 41000, but with true root-mean-square value conversion (true RMS) | As P 42000, but with true root-mean-square value conversion (true RMS) | As P 43000, but with true root-mean-square value conversion (true RMS) | Current sensor for energy measurement on rail vehicles acc. to EN 50463 | Voltage sensor for energy measurement on rail vehicles acc. to EN 50463 | For measurement of currents up to 20 kA in conjunction with shunt isolators P41000, P51000, P29001, and P27000.

Universal Isolated Signal Conditioners

Easy isolation and conversion of any input voltages and currents into selectable, standardized output signals.

Universal Isolated Signal Conditioners VariTrans P27000	Universal Isolated Signal Conditioners VariTrans A26000
0 ... ±0.1 to 0 ... ±100 mA 0 ... ±20 mV to 0 ... ±200 V 0/4 ... 20 mA, ±20 mA 0 ... 10 V, ± 10 V unipolar/bipolar	0 ... ±20 mA 0 ... ±10 V bipolar
0/4 ... 20 mA, ±20 mA 0 ... (±)10 V, 1 ... (±)5 V, 2 ... 10 V	0 ... ±20 mA 0 ... ±10 V
5 kV AC	4 kV AC
1000 V AC/DC	1000 V AC/DC
600 V AC/DC	300 V AC/DC
20 ... 253 V AC/DC broad-range power supply	20 ... 253 V AC/DC broad-range power supply
CE, cULus, Cl. I, Div 2; DNV; EAC	CE, cULus, DNV; EAC
12.5 mm	12.5 mm

- Flexible and precise: 480 calibrated ranges
- Rapid response for rapid control: 10 kHz cutoff frequency
- Customized measuring ranges on request
- For measuring DC currents via shunt resistor, battery voltages, and many other currents and voltages
- Specifically for precise conversion and galvanic isolation of bipolar signals
- Convenient configuration via DIP switches
- Even after range switching, the transmission ranges remain calibrated and there is no need for re-adjustment
- Precise signal conversion and high cutoff frequency of 5 kHz (-3 dB)

Isolated Standard Signal Conditioners/ Repeater Power Supplies

Robust galvanic isolation and conversion of standard signals, even with high voltages and strict requirements for the quality of signal conversion.

Isolated Standard Signal Conditioners VariTrans P15000	Isolated Standard Signal Conditioners VariTrans A21000	Signal Doublers VariTrans A20300	Repeater Power Supplies IsoAmp PWR A20100
0 ... 20 mA 4 ... 20 mA 0 ... 10 V	0 ... 20 mA 4 ... 20 mA 0 ... 10 V	0 ... 20 mA 4 ... 20 mA 0 ... 10 V	4 ... 20 mA
4 ... 20 mA, 0 ... 20 mA, 0 ... 10 V	4 ... 20 mA, 0 ... 20 mA, 0 ... 10 V	4 ... 20 mA, 0 ... 20 mA, 0 ... 10 V	4 ... 20 mA, 0 ... 20 mA, 0 ... 10 V
0.08 %	0.2 %	0.2 %	0.1 %
4 kV AC	2.5 kV AC	2.5 kV AC	2.5 kV AC
1000 V AC/DC	300 V AC/DC	300 V AC/DC	600 V AC/DC
300 V AC/DC	300 V AC/DC	300 V AC/DC	300 V AC/DC
20 ... 253 V AC/DC broad-range power supply	24 ... 110 V DC / 110 ... 230 V AC	24 V DC	24 V DC
CE, cULus, DNV, EAC	CE, EAC	CE, cULus; EAC; KTA	CE, ATEX Zone II; cULus Cl. I, Div 2; DNV; EAC
12.5 mm	6 mm	6 mm	6 mm

- The standard-signal pro with high isolation
- Almost perfect signal conversion with analog signal processing and transmission
- Calibrated, digitally controlled range selection without adjustment after switching
- With broad-range power supply for universal, global use
- The first standard-signal conditioner with protective separation and broad-range power supply in the 6 mm class.
- Extraordinary operating time and reliability with specially adapted design. MTBF (mean time between failures): 280 years
- Signal doubler with calibrated, switchable inputs and outputs
- 2 electrically isolated outputs, each with full load of 500 ohms
- All channels galvanically decoupled (4-port isolation)
- Repeater power supply for 2-wire transmitters in a compact 6 mm housing — with calibrated range selection of output signals and HART transmission

Loop-Powered Isolators for Standard Signals

Galvanic isolation of current signals to prevent measurement errors. Product design for extreme reliability.

Loop-Powered Isolators for Standard Signals IsoTrans 41	Loop-Powered Isolators for Standard Signals ProLine P22400	Loop-Powered Isolators for Standard Signals IsoTrans A20400
0 ... 20 mA 4 ... 20 mA 0 ... 50 mA	0 ... 20 mA 4 ... 20 mA 0 ... 10 V	0 ... 20 mA 4 ... 20 mA
Like input 1:1 transmission	Like input 1:1 transmission	Like input 1:1 transmission
0.02 %	0.08 %	0.1 %
2.5 kV AC	5.4 kV AC	2.5 kV AC
500 V AC/DC	600 V AC/DC	600 V AC/DC
600 V AC/DC	300 V AC/DC	300 V AC/DC
Loop-powered	Loop-powered	Loop-powered
CE, EAC	CE, cULus, Cl. I, Div 2; DNV; EAC	CE, cULus; DNV; EAC
17.5/22.5 mm	12.5 mm	6 mm

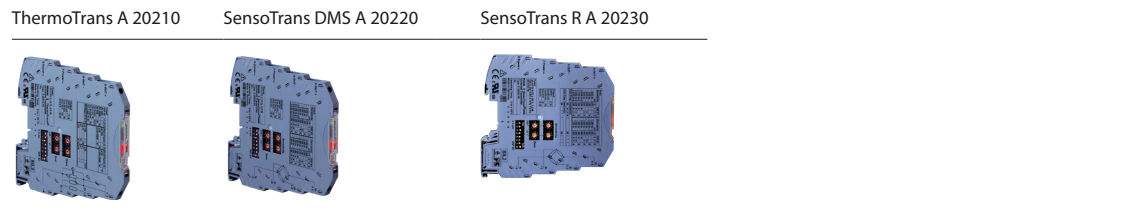
- Transformer-based isolation of 0(4) ... 20 mA standard current signals on up to 3 channels
- Extreme precision: 0.02 % meas. val. transmission error
- Extreme efficiency: Low voltage drop of 1.2 V
- Transformer-based isolation of 0(4) ... 20 mA standard current signals
- One or two channels per device
- Up to SIL 3 / EN 61508 and PL c / e / EN 13849-1 for isolation of safety-related circuits
- High reliability: MTBF of 1106 years
- Also available as a signal splitter with 2 electrically isolated outputs
- The first decoupled passive isolator with load stop function (option)
- Extremely reliable: MTBF (mean time between failures) 1031 years
- Extremely high component density of 320 channels per meter of mounting rail
- Excellent price-performance ratio

Transmitters for Frequency, Temperature, Strain Gauges, and Resistance

Reliable detection of sensor signals for physical parameters such as temperature, path, angle, pressure or force, flexible and easy to adjust, for safety-related circuits up to SIL 3, and for general measuring tasks.

Pulse Frequency Conditioners ProLine P16000	Universal Transmitters PolyTrans P32000	Temperature Transmitters ThermoTrans P32100	Strain Gauge Transmitters SensoTrans DMS P32200	Resistance Transmitters SensoTrans R P32300	Pt100 Transmitters ProLine P44000 D3	Pt100 Transmitters ProLine P44000 D1
0 ... 0.5 kHz, 0 ... 1 kHz 0 ... 2 kHz, 0 ... 5 kHz 0 ... 10 kHz, 0 ... 20 kHz	Resistance thermometers, strain gauges, thermocouples, potentiometers, resistors, shunt voltages up to ±1000 mV	Resistance thermometers, thermocouples, resistors, shunt voltages up to ±1000 mV	Strain gauges, load cells	Potentiometers and resistors	Pt100 resistance thermometers 0 ... 100 °C 0 ... 200 °C 0 ... 300 °C	Pt100 resistance thermometers 0 ... 100 °C 0 ... 200 °C 0 ... 300 °C
4 ... 20 mA, 0 ... 20 mA, 0 ... 10 V	4 ... 20 mA, 0 ... 20 mA, 0 ... (±)5 V, 0 ... 10 V	4 ... 20 mA, 0 ... 20 mA, 0 ... (±)5 V, 0 ... 10 V	4 ... 20 mA, 0 ... 20 mA, 0 ... (±)5 V, 0 ... 10 V	4 ... 20 mA, 0 ... 20 mA, 0 ... (±)5 V, 0 ... 10 V	4 ... 20 mA	4 ... 20 mA
0.2 %	0.1 %	0.1 %	0.1 %	0.1 %	1 K (typically 0.5 K)	1 K (typically 0.5 K)
3 kV AC	2.5 kV AC	2.5 kV AC	2.5 kV AC	2.5 kV AC	15 kV AC	10 kV AC
300 V AC/DC	300 V AC/DC	300 V AC/DC	300 V AC/DC	300 V AC/DC	6.6 kV AC/DC	2 kV AC/DC
300 V AC/DC	300 V AC/DC	300 V AC/DC	300 V AC/DC	300 V AC/DC	2500 V AC/DC	1000 V AC/DC
20 ... 110 DC ± 30 % broad-range power supply	24 V DC	24 V DC	24 V DC	24 V DC	20 ... 253 V AC/DC broad-range power supply	20 ... 253 V AC/DC broad-range power supply
CE, cULus, EN 50155	CE, cURus, EAC, KTA	CE, cURus, EAC, KTA	CE, cURus, EAC, KTA	CE, cURus, EAC, KTA	CE, cULus, EAC	CE, cULus, EAC
12.5 mm	6 mm	6 mm	6 mm	6 mm	67.5 mm	22.5 mm

- Decoupling of safety-related encoder signals for detecting the train's speed from existing circuits
- Non-interacting input circuit SIL 3
- Signal doubling omits the need to retrofit sensors
- Universal transmitter for temperature, strain gauges, and potentiometers
- Interface for configuration via PC
- Rotary and DIP switches for easy, intuitive configuration
- SIL approval for safety circuits up to SIL 3
- Transmitter for platinum temperature sensors and thermocouples or for measuring mV shunt voltages, in a 6 mm housing
- Interface for configuration via PC
- Rotary and DIP switches for easy, intuitive configuration
- SIL approval for safety circuits up to SIL 3
- Transmitter for load cells and strain gauges (full bridges) in a 6 mm housing
- Interface for configuration via PC
- Rotary and DIP switches for easy, intuitive configuration
- SIL approval for safety circuits up to SIL 3
- Transmitter for resistors and potentiometers in a 6 mm housing
- Interface for configuration via PC
- Rotary and DIP switches for easy, intuitive configuration
- SIL approval for safety circuits up to SIL 3
- Transmitter for monitoring the winding temperature of high-voltage motors
- 6.6 kV basic insulation for slot thermometers in high-voltage motors up to 11 kV.
- 2-, 3-, or 4-wire connection
- Transmitter for monitoring the winding temperature of high-voltage motors
- 2 kV basic insulation for slot thermometers in high-voltage motors up to 3 kV.
- 2-, 3-, or 4-wire connection



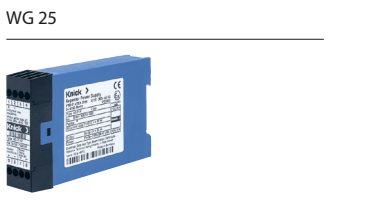
As ThermoTrans P 32100, without PC interface | As ThermoTrans P 32200, without PC interface | As ThermoTrans P 32300, without PC interface

Isolators for Standard Signals / Repeater Power Supplies

Hazardous/safe area isolation of process signals and supply to 2-wire sensors in ATEX zone 1.

Loop-Powered Isolators for Standard Signals IsoTrans	Repeater Power Supplies WG 21
0 ... 20 mA 4 ... 20 mA	4 ... 20 mA
Like input 1:1 transmission	4 ... 20 mA
0.2 %	0.1 %
10 kV AC	4 kV AC
3600 V AC/DC	1000 V AC/DC
600 V AC/DC	600 V AC/DC
Loop-powered	24 V AC, 110/115 V AC, 220/230 V AC
CE, ATEX: II (1) G [EEEx ia] IIC; EAC	CE, ATEX: II (1) G [EEEx ia] IIC; EAC
22.5 mm	22.5 mm

- Output isolators for hazardous/safe area isolation of 20 mA signals in process applications
- Precise signal transmission with outstanding pulse formation
- Extremely high isolation, test voltage up to 10 kV
- Transmission of HART signals
- Maximum reliability: no repair and failure costs
- Repeater power supply for 2-wire sensors in hazardous areas via the 4 ... 20 mA signal
- High-quality galvanic isolation between current loop and output signal to controller
- Transmission of HART signals
- Maximum reliability: no repair and failure costs



As WG 21, but as loop-powered repeater power supply

Interface Technology

- Universal Isolated Signal Conditioners
- Isolated Standard Signal Conditioners
- High Voltage Transducers
- Repeater Power Supplies
- Temperature Transmitters
- Resistance Transmitters
- Strain Gauge Transmitters
- AC/DC Transducers

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