

ProLine

Product Overview: Interface Technology

Signal Conditioners and Transmitters





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



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 μA up to kA can be transmitted or converted with a high level of precision.

International

International certification including UL, CSA, CE, DNV-GL, 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).

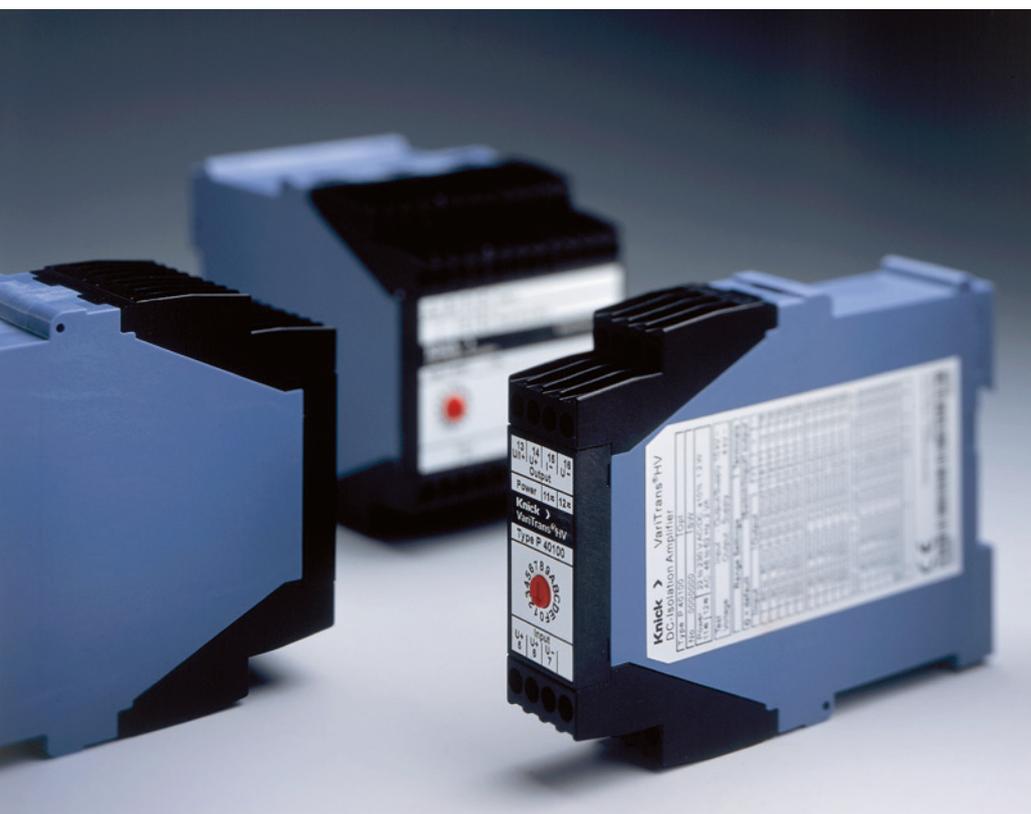
Signal conditioners and transmitters of the ProLine series provide crucial benefits for applications with high demands on isolation, signal transmission speed and long-term stability.

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



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
						
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,
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
Accuracy Class	0.1 %	0.3 %	0.3 %	0.1 % (0.5 R)	0.1 % (0.5 R)	5 %
Test Voltage	15 kV AC	15 kV AC	15 kV AC	18 kV AC	18 kV AC	18 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
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
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
Certification	CE, UL, EAC	CE, UL, EAC	CE, UL, EAC	CE, UL, EN 50155	CE, UL, EN 50155	CE, UL
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
Special Features	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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: IP54/51 • Diagnostics of input/output circuits and device function • Ambient temperature range: -40 °C to 85 °C 	<ul style="list-style-type: none"> • 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/IP51 • Safety via diagnostics for input circuit, output circuit, and device function • Ambient temperature range: -40 °C to 85 °C 	<ul style="list-style-type: none"> • 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
	VariTrans P 41000 TRMS	VariTrans P 42000 TRMS	VariTrans P 43000 TRMS	ProLine P51000-E	ProLine P52000-E	
						
	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	

Universal Isolated Signal Conditioners

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

High Voltage Transducers

VariTrans P29000



±30 mV to ±1000 V
unipolar/bipolar

0/4 ... 20 mA, ±20 mA
0 ... (±)10 V, 4 ... 20 mA,
passive

0.2 %

5.4 kV AC

1000 V AC/DC

600 V AC/DC

20 ... 253 V AC/DC
broad-range power supply

CE, cULus, EAC

17.5 mm

- Universal voltage measurement up to 1000 V and current measurement via shunt resistor (mV ranges)
- Calibrated range selection via DIP switches behind the front cover
- Precise signal conversion and high cutoff frequency of 10 kHz (-3 dB)
- Test jacks for measuring output current and voltage without disconnecting wires

Universal Isolated Signal Conditioners

VariTrans P27000



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

0/4 ... 20 mA, ±20 mA
0 ... (±)10 V, 1 ... (±)5 V, 2 ... 10 V

0.08 %

5 kV AC

1000 V AC/DC

600 V AC/DC

20 ... 253 V AC/DC
broad-range power supply

CE, ATEX Zone II;
cULus Cl. I, Div 2; GL; EAC

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

Universal Isolated Signal Conditioners

VariTrans A26000



0 ... ±20 mA
0 ... ±10 V
bipolar

0 ... ±20 mA
0 ... ±10 V

0.1 %

4 kV AC

1000 V AC/DC

300 V AC/DC

20 ... 253 V AC/DC
broad-range power supply

CE, cULus, GL; EAC

12.5 mm

- 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



0 ... 20 mA
4 ... 20 mA
0 ... 10 V

4 ... 20 mA, 0 ... 20 mA,
0 ... 10 V

0.08 %

4 kV AC

1000 V AC/DC

300 V AC/DC

20 ... 253 V AC/DC
broad-range power supply

CE, cULus, GL, EAC, KTA

12.5 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

Isolated Standard Signal Conditioners

VariTrans A21000



0 ... 20 mA
4 ... 20 mA
0 ... 10 V

4 ... 20 mA, 0 ... 20 mA,

0.2 %

2.5 kV AC

300 V AC/DC

300 V AC/DC

24 ... 110 V DC /
110 ... 230 V AC

CE, EAC

6 mm

- 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 Doublers

VariTrans A20300



0 ... 20 mA
4 ... 20 mA
0 ... 10 V

4 ... 20 mA, 0 ... 20 mA

0.2 %

2.5 kV AC

300 V AC/DC

300 V AC/DC

24 V DC

CE, cULus; EAC; KTA

6 mm

- 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 Supplies

IsoAmp PWR A20100



4 ... 20 mA

4 ... 20 mA, 0 ... 20 mA,
0 ... 10 V

0.1 %

2.5 kV AC

600 V AC/DC

300 V AC/DC

24 V DC

CE, ATEX Zone II;
cULus Cl. I, Div 2; GL; EAC

6 mm

- Repeater power supply for 2-wire transmitters in a compact 6 mm housing — with calibrated range selection of output signals and HART transmission

Maconic shunt resistors



For measurement of currents up to 20 kA in conjunction with shunt isolators P41000, P51000, P29001, and P27000.

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 Loop-Powered Isolators for Standard Signals Loop-Powered Isolators for Standard Signals

IsoTrans 41 ProLine P22400 IsoTrans A20400



0 ... 20 mA
4 ... 20 mA
0 ... 50 mA 0 ... 20 mA
4 ... 20 mA 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 300 V AC/DC

Loop-powered Loop-powered Loop-powered

CE, EAC CE, ATEX Zone II;
cULus Cl. I, Div 2; GL; EAC CE, cULus; GL; 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)

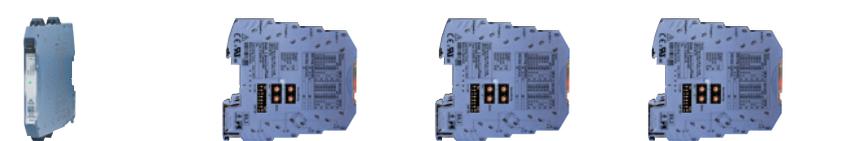
- Extremely reliable: MTBF (mean time between failures) 1031 years
- Extremely high component density of 320 channels per meter of mounting rail
- Excellent price-performance ratio

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 Universal Transmitters Temperature Transmitters Strain Gauge Transmitters

ProLine P16000 PolyTrans P32000 ThermoTrans P32100 SensoTrans DMS P32200



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

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

0.2 % 0.1 % 0.1 % 0.1 %

3 kV AC 2.5 kV AC 2.5 kV AC 2.5 kV AC

300 V AC/DC 300 V AC/DC 300 V AC/DC 300 V AC/DC

20 ... 110 DC ± 30 % broad-range power supply 24 V DC 24 V DC 24 V DC

CE, cULus, EN 50155 CE, cURus, EAC, KTA CE, cURus, EAC, KTA CE, cURus, EAC, KTA

12.5 mm 6 mm 6 mm 6 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 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 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

ThermoTrans A 20210 SensoTrans DMS A 20220



As ThermoTrans P 32100, without PC interface As ThermoTrans P 32200, 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.

Pt100 transmitter for high-voltage applications

Resistance Transmitters

Pt100 Transmitters

SensoTrans R P32300	ProLine P44000 D3	ProLine P44000 D1
		
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 ... (±)5 V, 0 ... 10 V	4 ... 20 mA	4 ... 20 mA
0.1 %	1 K (typically 0.5 K)	1 K (typically 0.5 K)
2.5 kV AC	15 kV AC	10 kV AC
300 V AC/DC	6.6 kV AC/DC	2 kV AC/DC
300 V AC/DC	2500 V AC/DC	1000 V AC/DC
24 V DC	20 ... 253 V AC/DC broad-range power supply	20 ... 253 V AC/DC broad-range power supply
CE, cURus, EAC, KTA	CE, cULus, EAC	CE, cULus, EAC
6 mm	67.5 mm	22.5 mm

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

SensoTrans R A 20230



As ThermoTrans P 32300, without PC interface

Loop-Powered Isolators for Standard Signals

Repeater Power Supplies

IsoTrans 36/37	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 [EEx ia] IIC; EAC	CE, ATEX: II (1) G [EEx ia] IIC; EAC
22.5 mm	22.5 mm

- Input and 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

WG 25



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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