



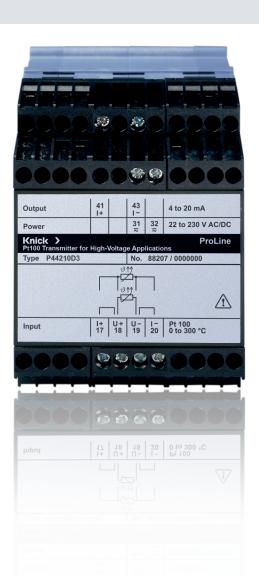
Precise Temperature Measurement at High Voltage Potentials up to 6.6 kV

When temperatures are to be measured using Pt100 resistance thermometers in high-voltage environments, standard temperature transmitters are often unsuitable due to their insufficient insulation.

Resistance thermometers can be insulated against high voltage. In practice, however, the available installation space is often too small. Moreover, the insulation is weakened by thermal and mechanical aging.

For temperature measurement on power electronics components, maximum safety is therefore provided by high-voltage resistant galvanic isolation.

A typical application is the monitoring of the winding temperature of electric motors, generators or transformers.



The Solution: Pt100 Transmitter with up to 6.6 kV AC/DC Basic Insulation

The new ProLine P 44000 transmitters for high-voltage applications convert the resistance of a 2-, 3- or 4-wire Pt100 resistance thermometer into a 4 to 20 mA signal with high accuracy and short delay times.

The output signal is galvanically isolated from the input signal and the voltage supply. The isolation is designed for working voltages of up to 6.6 kV AC/DC. During routine testing, the test voltage is 15 kV AC. Vacuum encapsulation protects the circuit against environmental influences and ensures that the extraordinary isolation properties are maintained.

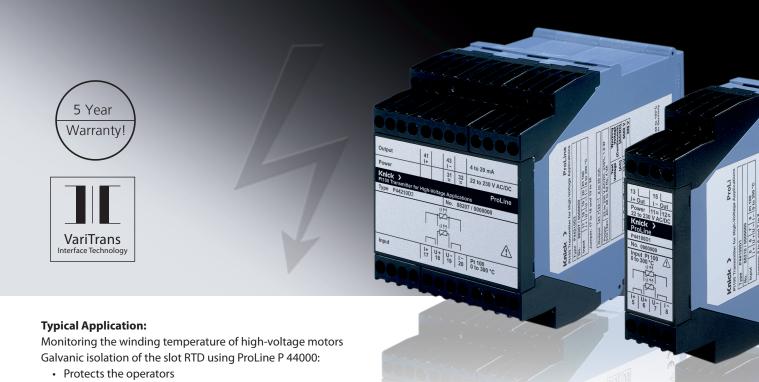
The product line covers the standard ranges of 0 to 150 °C, 0 to 200 °C and 0 to 300 °C. The transmitters are available in 67.5 and 22.5 mm modular housings to suit different requirements.

ProLine P 44000 - At One Glance

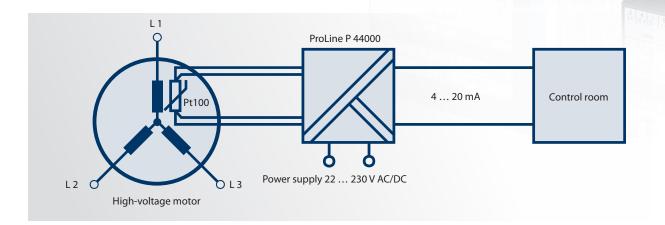
- Transmitters for Pt100 temperature sensors,
 2-, 3- or 4-wire connection
- Fixed range models for 0 to 150 °C, 0 to 200 °C and 0 to 300 °C input ranges
- Impressed output current of 4 to 20 mA
- Compact 67.5 and 22.5 mm modular housings based on proven VariTrans technology
- High isolation up to 6.6 kV AC/DC basic insulation and up to 2.5 kV AC/DC reinforced insulation with overvoltage category III and pollution degree 2 (input against output and power supply)
- 22.5 mm housing for less demanding isolation requirements up to 2 kV AC/DC (basic insulation)
- Mmeasurement error of just \pm 1 K (typically \pm 0.5 K) and short T90 delay time of 100 ms
- VariPower broad-range power supply for 22 ... 230 V AC/DC ensures safe operation even with unstable power grids
- Resistant to environmental influences through vacuum encapsulation
- Suitable for extreme environments: ambient temperature during operation –40 ... +85 °C



Pt100 Transmitters for High Voltage Applications

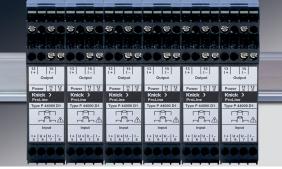


- · Prevents damage to the equipment
- Interference-free transmission of 4 to 20 mA signals to the control room even with long cables



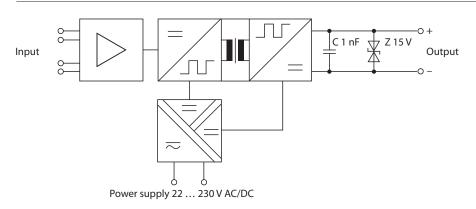
ProLine: You won't find anything better

ProLine stands for top-of-therange signal conditioners and transmitters. Each component will stand up to any competition: regarding conditioning, conversion or amplification of signals, as well as transmission characteristics, versatility, usability and energy efficiency. Due to their well-established reliability, ProLine products are used in industrial measurement and control systems around the world. Requiring few components, their intelligent circuits enable excellent reliability ratings. A five-year warranty is therefore a matter of course for all ProLine products.



ProLine P 44000

Block Diagram



Product Line

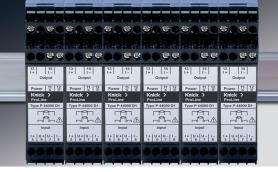
Device	Input	Output	Test voltage	Order No.
ProLine P 44000	0 150 °C	4 20 mA	15 kV	P44210D3-0007
	0 200 °C	4 20 mA	15 kV	P44210D3-0008
	0 300 °C	4 20 mA	15 kV	P44210D3-0009
	0 150 °C	4 20 mA	7.5 kV	P44100D1-0004
	0 200 °C	4 20 mA	7.5 kV	P44100D1-0005
	0 300 °C	4 20 mA	7.5 kV	P44100D1-0006



Pt100 Transmitters for High Voltage Applications

Specifications

Input				
Resistive sensor	Pt100 acc. to DIN 6	Pt100 acc. to DIN 60751		
Measuring ranges	P44210D3-0007	0 150 °C		
	P44210D3-0008	0 200 °C		
	P44210D3-0009	0 300 °C		
	P44100D1-0004	0 150 °C		
	P44100D1-0005	0 200 °C		
	P44100D1-0006	0 300 °C		
Connection	2-, 3- or 4-wire			
	Note: With 3-wire connection, the sensor cable resistance is not completely compensated for.			
Max. line resistance	100 ohms			
Supply current	Approx. 1 mA			
Output				
Output	4 20 mA (linear up to 21 mA)			
Maximum load	550 ohms			
Residual ripple	< 10 mV _{rms}			
Input unconnected or measuring range exceeded	> 21 mA (max. 38 mA)			
Transmission behavior				
Transmission error	\pm 1 K (typ. \pm 0.5 K) at 23 °C ambient temperature			
Temperature influence	< 150 ppm/K of full scale			
	(average TC in permitted operating temp range, reference temp 23 °C)			
Time response	T90 time max. 100 ms			
Power supply				
Power supply	22 230 V AC/DC ± 10 %; AC 48 62 Hz, < 1.8 W, < 4 VA			
Isolation				
Galvanic isolation	3-port isolation between input, output, and power supply			
Test voltage	P44210D3-xxxx	15 kV AC across input and output / power supply		
		4 kV AC across output and power supply		
	P44100D1-xxxx	7.5 kV AC across input and output / power supply		
		4 kV AC across output and power supply		



ProLine P 44000

Specifications

Rated isolation voltage	acc. to EN 50178				
	P44210D3-xxxx	Up to 6000 V AC/DC across input and output / power supply with overvoltage category III and pollution degree 2 Impulse withstand voltage: max. 33 kV			
	P44100D1-xxxx	Up to 2000 V AC/DC across input and output / power supply with overvoltage category III and pollution degree 2 Impulse withstand voltage: max. 13 kV			
	acc. to UL 347				
	P44210D3-xxxx	Up to 6600 V AC/DC with overvoltage category III and pollution degree 2, rated impulse lightning voltage: max. 33 k\			
	acc. to EN 50124-1	Railway applications (stationary operation)			
	P44210D3-xxxx	Up to 5500 V AC/DC across input and output / power supply with overvoltage category II and pollution degree 2 Impulse withstand voltage: 25 kV			
		Up to 4800 V AC/DC across input and output / power supply with overvoltage category III and pollution degree 2 Impulse withstand voltage: 30 kV			
	P44100D1-xxxx	Up to 2000 V AC/DC across input and output / power supply with overvoltage category III and pollution degree 2 Impulse withstand voltage: 12 kV			
Protection against electric shock	Protective separation according to EN 50178 by reinforced insulation: Working voltages with overvoltage category III and pollution degree 2:				
	P44210D3-xxxx	Up to 2500 V AC AC/DC across input and output / power supply			
		Up to 300 V AC across output and power supply			
	P44100D1-xxxx Up to 1000 V AC AC/DC across input and output / power supply				
		Up to 300 V AC across output and power supply			
Standards and approvals					
EMC ¹⁾	Product family stand	dard: EN 61326-1 EN 61326-2-3: 2013			
	Emitted interference	e: Class A ²⁾			
	Immunity to interference: Industry				
Further data					
Ambient temperature	Operation, storage and transport	-40 + 85 °C			
Relative humidity	Operation, storage and transport	5 95 % (no condensation during operation)			
Air pressure	70 106 kPa	Altitude up to 2000 m			
Operating conditions	Stationary operation	peration			
MTBF ³⁾	Approx. 160 years				
Design	Modular housing with screw terminals				
	Housing width	Type D1: 22.5 mm Type D3: 67.5 mm			
	See dimension draw	rings for further dimensions			
Protection class	Housing: IP 40	Terminals: IP 20			
Mounting	For 35-mm DIN rail acc. to EN 60715				
Weight	D1: approx. 250 g	D3: approx. 500 g			

¹⁾ Slight deviations are possible while there is interference (typ. < 2 K).

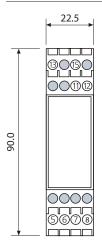
²⁾ CAUTION! – This is a Class A device for industrial use. When used in residential areas, the device can cause radio interference.

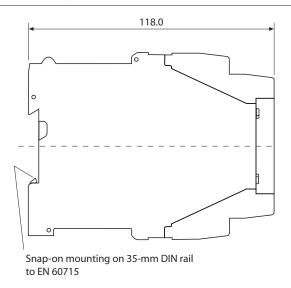
³⁾ acc. to EN 61709 (SN29500), stationary operation in well-kept rooms, average ambient temperature 40 °C, no ventilation, continuous operation



Pt100 Transmitters for High Voltage Applications

Dimension Drawing and Terminal Assignments, Type D1





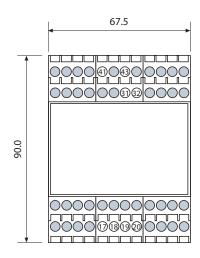
Terminal assignments

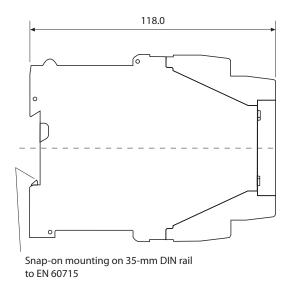
- 5 Input + Current 6 Input + Voltage 7 Input - Voltage 8 Input - Current
- 11 Power supply AC/DC
- 12 Power supply AC/DC
- 13 Output + Current 15 Output - Current

For 2-wire-connection to Pt100, place jumpers from 5 to 6 and from 7 to 8, for 3-wire connection from 7 to 8 only.

M 3.5 connecting screws with self-releasing terminal housing.
Conductor cross-section max. 1 x 4 mm² solid or 1 x 2.5 mm² stranded with sleeve, min. 1 x 0.5 mm² solid or stranded with sleeve

Dimension Drawing and Terminal Assignments, Type D3





Terminal assignments

- 17 Input + Current 18 Input + Voltage 19 Input - Voltage 20 Input - Current
- 31 Power supply AC/DC
- 32 Power supply AC/DC
- 41 Output + Current
- 43 Output Current

For 2-wire-connection to Pt100, place jumpers from 17 to 18 and from 19 to 20, for 3-wire connection from 19 to 20 only.

M 3.5 connecting screws with self-releasing terminal housing.
Conductor cross-section max. 1 x 4 mm² solid or 1 x 2.5 mm² stranded with sleeve, min. 1 x 0.5 mm² solid or stranded with sleeve