VariTrans P 43000

VariTrans P 43000

Universal high voltage transducer.
Input currents up to I_{in} = 5 A.

The Task

In high-voltage systems, unipolar or bipolar currents ranging from 100 mA to 5 A must be galvanically isolated and converted to standard ±20 mA, ±10 V or 4 ... 20 mA output signals.

The Problems

In the case of insufficient insulation, high voltages and harsh ambient conditions may overload the galvanic isolation. This can result in false measurement values or even personal injury or damage to the equipment. These risks have to be eliminated safely and over the long term by suitably designed high voltage transducers.

The Solution

The VariTrans P 43000 high voltage transducers have been specially conceived for direct measurement of currents up to 5 A AC/DC. They reliably isolate high potentials at the input circuit.

The separation distances are designed to withstand permanent voltages up to 3600 V AC/DC and fast transients up to 20 kV. Protection against electric shock is achieved through protective separation according to EN 61140 between input and output and power supply.

The Housing

A new 45 mm wide modular housing is used for the VariTrans P 43000 high voltage transducers. It is snapped onto a standard DIN rail.
The front panels of the adjustable models provide a rotary switch for selecting the ranges.

The Advantages

The VariTrans P 43000 are available for any input currents from ±100 mA to ±5 A. Unipolar and bipolar (standard) signals are available at the output: ±20 mA, ±10 V and 4 … 20 mA.
16 input/output signal combinations can easily be selected with a rotary switch on the front of the device. There is no need for a complicated on-site adjustment with screwdriver, calibrator and multimeter. Drift problems due to unstable trimming components – e.g., potentiometers – are avoided. Thanks to the easy scalability of the range selection, the devices can easily be customized to individual customer solutions. Up to 16 customized signal combinations can be implemented in one device and configured optimally for the respective application.

The integrated 20 to 253 V AC/DC VariPower broad-range power supply offers maximum flexibility. This ensures trouble-free operation with alternating or direct voltages everywhere in the world and provides for maximum safety even in unstable power supply networks. Installation is also safe and easy. Incorrect connection of the supply voltage is practically impossible. Expensive standstill times and repair work during commissioning are avoided.

Vacuum encapsulation provides maximum protection against aggressive environmental influences, shock and vibrations and ensures that the high disruptive strength required for working voltages up to 3600 V AC/DC is maintained over the long term.
The isolation system meets the safety requirements of EN 61010-1 and EN 50124-1 (Railway applications: Insulation coordination).

High Voltage Transducers

The Technology
In this series, Knick relies on the newly developed TransShield technology, which compared to conventional designs enables very compact high-voltage transformers with low leakage. Thanks to the resulting space savings, a just 45 mm wide modular housing is sufficient for input currents up to 5 A AC/DC. Another major advantage offered by this technology: High transient overvoltages (common-mode interference) are reliably isolated and cause hardly any measurement errors at the output.

To guarantee the specified isolation capabilities, 100 % of the devices are subjected to routine testing with 15 kV AC (fixed-range models) or 10 kV AC (switchable models).

Circuit design and device construction ensure excellent transmission characteristics, which are reflected in zero point stability, linearity, long-term stability, frequency response, and immunity to interference. The high cutoff frequency ensures distortion-free signal conversion. The output signal follows fast changes in the input signal almost without delay.

5 Year Warranty!

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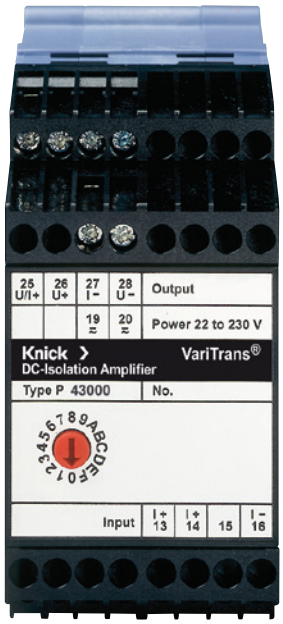
Facts and Features

- **Universal high voltage transducers**
  for converting input currents up to 5 A to impressed ±20 mA, ±10 V, or 4 ... 20 mA output signals
- **New TransShield technology**
  enables extremely compact modular housings
- **Working voltages up to 3600 V AC/DC**
- **Protection against electric shock**
  with protective separation up to 1800 V AC/DC according to EN 61140
- **Test voltages up to 15 kV AC**
- **Excellent transmission properties:**
  – Gain error < 0.3 %
  – Cutoff frequency 5 kHz (low-pass filter / lower cutoff frequency on request)
  – Rise time T90 approx. 110 µs
- **Tremendous flexibility provided by**
  – calibrated switching of up to 16 input/output ranges (working voltage up to 2200 V)
  – up to 16 customer-specific measuring ranges
  – 20 V to 253 V AC/DC broad-range power supply
- **Reliable function**
  even with unstable power supply
- **No damage**
  in the case of erroneous power connection
- **Switchable models**
  minimize required device variants and save stockkeeping costs
- **Robust**
  thanks to vacuum encapsulation
- **Mechanically stable**
  for operation on ships, rail vehicles and land crafts
- **5-year warranty**



VariTrans P 43000

Product Line

Devices	Input	Output	Working voltage	Test voltage	Order No.
VariTrans P 43000 Input and output adjustable	±1 / ±1,5 / ±2 / ±3 / ±5 A, calibrated switching	±10 V, ±20 mA and 4 ... 20 mA, calibrated switching	≤ 2.2 kV AC/DC	10 kV AC	**P 43000 D2**
VariTrans P 43000 adjusted to customer requirements	±0.1 A ... ±5 A 1 to 16 switchable calibrated ranges to customer requirements[1)]	±10 V, ±20 mA, 4 ... 20 mA, one or more ranges to customer requirements[1)]	≤ 2.2 kV AC/DC	10 kV AC	**P 43000 D2-nnnn**
	±0.1 A ... ±5 A, fixed setting, to customer requirements[1)]	±10 V, ±20 mA, 4 ... 20 mA, fixed setting, to customer requirements[1)]	≤ 3.6 kV AC/DC	15 kV AC	**P 43100 D2-nnnn**

Power supply

20 ... 253 V AC/DC

1) Please specify the desired setting on the order

Specifications

Input		
Inputs	P 43000 D2	±1 A, ±1,5 A, ±2 A, ±3 A, ±5 A, calibrated switching, factory setting: ±5 A
	P 43000 D2-nnnn	±0.1 A ... ±5 A, 1 to 16 ranges to customer requirements, calibrated switching
	P 43100 D2-nnnn	0,1 A … 5 A, unipolar/bipolar; fixed setting, to customer requirements
Input resistance	< 0.6 Ω	
Input capacitance	Approx. 1 nF	
Overload capacity	20 % full scale	
Output		
Output	P 43000 D2	20 mA, 10 V unipolar/bipolar and 4 ... 20 mA; calibrated switching, factory setting: ±10 V
	P 43000 D2-nnnn	20 mA, 10 V unipolar/bipolar and/or 4 ... 20 mA, calibrated switching, to customer requirements
	P 43100 D2-nnnn	20 mA, 10 V unipolar/bipolar or 4 ... 20 mA; fixed setting, to customer requirements
Displacement	Up to ±150 % by default	
Load	With output current With output voltage	≤ 12 V (600 Ω at 20 mA) ≤ 10 mA (1000 Ω at 10 V)
Offset	20 µA or 10 mV	
Residual ripple	< 10 mV_{rms}	
Transmission Behavior		
Gain error	< 0.3 % meas. value	
Cutoff frequency (–3 dB)	Approx. 5 kHz; optional factory setting: 10 Hz	
Common-mode rejection ratio	CMRR[1)]	DC: approx. 160 dB AC 50 Hz: approx. 120 dB
Temperature coefficient[2)]	< 0.005 %/K full scale	

High Voltage Transducers

Specifications

Power Supply		
Power supply	20 … 253 V AC/DC	AC 48 … 62 Hz, approx. 2 VA; max. approx. 1.2 W
Isolation		
Galvanic isolation	3-port isolation between input, output, and power supply	
Test voltage	Calibrated switching	10 kV AC input against output and power supply
	Fixed setting (model P43100D2-nnnn)	15 kV AC input against output and power supply
	All models	4 kV AC output against power supply
Working voltage (basic insulation) according to EN 61010-1	Calibrated switching	Up to 2200 V AC/DC with overvoltage category III and pollution degree 2. Input against output / power supply (transient overvoltage: 13.5 kV)
	Fixed setting (model P43100D2-nnnn)	Up to 3600 V AC/DC with overvoltage category III and pollution degree 2. Input against output / power supply (transient overvoltage: 20 kV)
Rated insulation voltage according to EN 50124-1	Calibrated switching	Up to 2200 V AC/DC with overvoltage category III and pollution degree 2. Input against output / power supply
	Fixed setting (model P43100D2-nnnn)	Up to 3000 V AC/DC with overvoltage category III and pollution degree 2. Input against output / power supply
Protection against electric shock	Calibrated switching	Protective separation according to EN 61140 by reinforced insulation according to EN 61010-1. Working voltages with overvoltage category III and pollution degree 2: – up to 1100 V AC/DC input against output / power supply – up to 300 V AC/DC across output and power supply
	Fixed setting (model P43100D2-nnnn)	Protective separation according to EN 61140 by reinforced insulation according to EN 61010-1. Working voltages with overvoltage category III and pollution degree 2: – up to 1800 V AC/DC input against output / power supply – up to 300 V AC/DC across output and power supply
For applications with high working voltages, take measures to prevent accidental contact and make sure that there is sufficient distance or insulation between adjacent devices.		
Standards and Approvals		
EMC[3]	Product family standard:	EN 61326
	Emitted interference:	Class B
	Immunity to interference:	Industrial applications
Further Data		
MTBF[4]	Approx. 96 years	
Ambient temperature[5]	Operation:	-10 ... +70 °C
	Transport and storage:	-40 ... +85 °C
Design	Modular housing with screw terminals	D2 housing width: 45.0 mm
See dimension drawings for other measurements.		
Ingress protection	Housing: IP 40	Terminals: IP 20
Mounting	With snap-on mounting for 35 mm DIN rail according to EN 60715	
Weight	Approx. 350 g	

1) Common-mode rejection ratio = Differential voltage gain / Common-mode voltage gain

2) Reference temperature for TC specifications = 23 °C, the average TC is specified

3) Slight deviations are possible while there is interference.

4) Mean Time Between Failures – MTBF – according to EN 61709 (SN 29500)
Preconditions: stationary operation in well-kept rooms, average ambient temperature 40 °C, no ventilation, continuous operation

5) Extended temperature range –25 ... +85 °C on request

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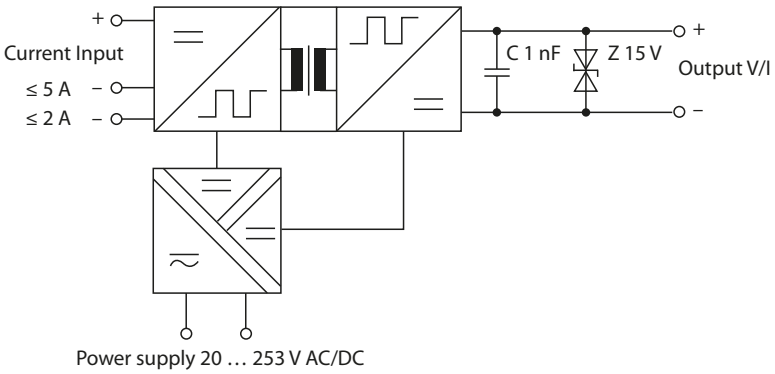
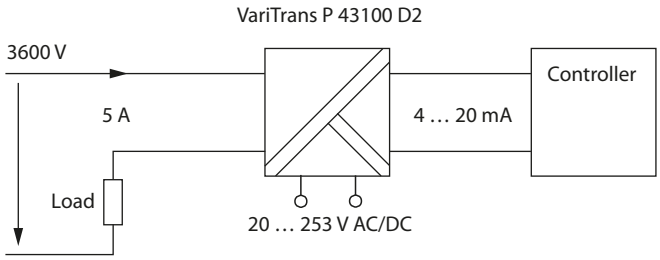
Block Diagram



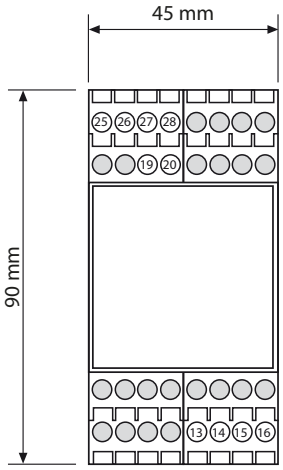
Typical Application

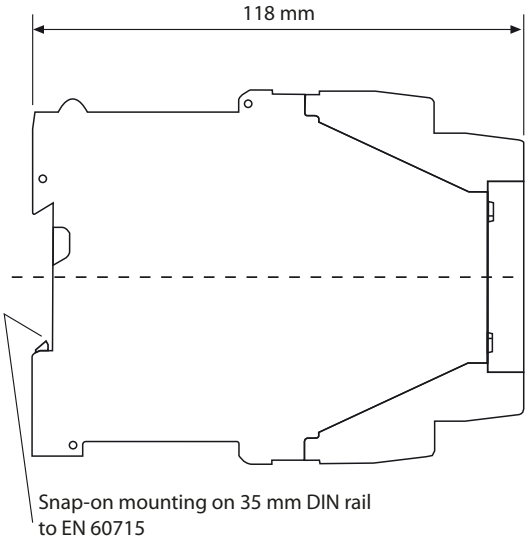
Direct measurement with a high input potential



High Voltage Transducers

Dimension Drawing and Terminal Assignments





Snap-on mounting on 35 mm DIN rail
to EN 60715

Terminal assignments

13	n/c		
14	Input	+	Current
15	Input	–	Current (≤5 A)
16	Input	–	Current (≤2 A)
19	Power supply		AC/DC
20	Power supply		AC/DC
25	Output	+	Current
26	Output	+	Voltage
27	Output	–	Current
28	Output	–	Voltage

M 3.5 screw terminals with self-lifting clamps
Conductor cross-section max. 1 x 4 mm²
solid or 1 x 2.5 mm² stranded with ferrule,
min. 1 x 0.5 mm² solid or stranded with ferrule

For voltage output, place jumper
across terminals 25 and 26.
Do not use a jumper for current output
(remove pre-installed jumper).