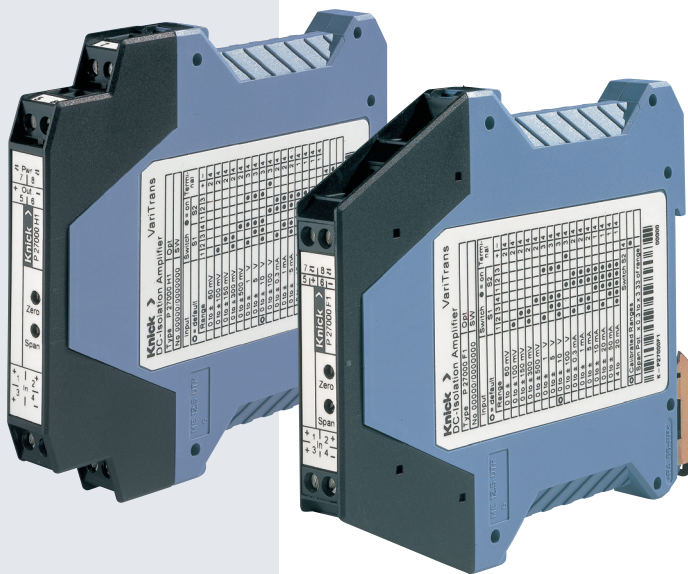


# Universal Isolation Amplifiers

## VariTrans P 27000

The “Multimeter” among the isolation amplifiers.

With 480 switchable calibrated ranges and broad-range power supply.



The broad-range power supply for all common supply voltages from 20 to 253 V AC/DC offers maximum flexibility.

To make setting the required input and output ranges simple and user friendly, we offer a free software tool called VariSoft to support the user. VariSoft shows you the correct DIP switch position when you enter the required input and output ranges and it has an integrated print option for easy documentation.

You can download VariSoft free of charge from our website.

### The Task

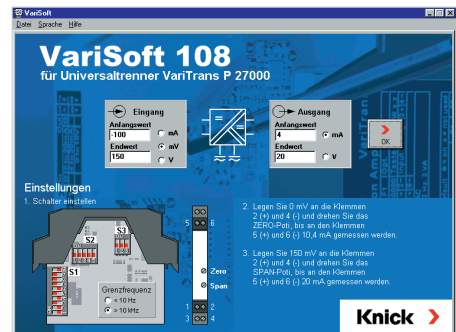
A wide variety of measurement signals must be reliably galvanically isolated and converted into standardized signals. This applies to any input signals from  $\pm 20$  mV to  $\pm 200$  V and from  $\pm 0.1$  mA to  $\pm 100$  mA.

### The Problem

The variety of tasks results in a large number of different devices.

### The Solution

The calibrated switching of the input and output ranges using DIP switches allows the Knick VariTrans P 27000 professional universal isolation amplifiers to be used without complicated readjustment. As switching occurs without expensive and unreliable equipment, the devices can also be easily configured on site.



### The Housing

At a width of just 12.5 mm, the modular housing with pluggable screw terminals allows for simple and fast assembly and pre-wiring of enclosures.

Housings with fixed screw terminals are also available for extremely high mechanical loads.

The easy-to-open housing allows for simple configuration of the input and output ranges and provides good protection against contact and unintentional adjustment.



### The Advantages

The analog transmission of the measurement signal with transformer-based isolation and the digitally controlled range selection guarantee almost perfect signal transmission:

- Gain error only 0.08 %
- Excellent pulse formation
- Extremely low residual ripple
- Maximum long-term stability and reliability

### The Technology

A microcontroller monitors the control element settings and controls the calibrated range selection. Interference with the signal transmission – due to contact resistance in the range switch, for example – is ruled out in this manner.

Thanks to the VariPower power supplies, the devices can be used internationally with virtually all supply voltages. The extremely low power consumption and the related minimal self-heating significantly increase reliability. The result: a 5-year warranty.

### The Facts

#### – Flexible and highly accurate

Calibrated range selection without time-consuming readjustment

#### – Broad-range power supply

VariPower 20 ... 253 V AC/DC

#### – Extremely compact design

12.5 mm modular housing;  
up to 80 active isolators per meter of mounting rail

#### – Fast and easy configuration

Easy-to-open housing

#### – Pluggable screw terminals

Simple, time-saving assembly and pre-wiring of enclosures

#### – 3-port isolation

Protection against incorrect measurements or damage

#### – Extremely high precision

#### – Specific test report

following EN 10204 2.3

#### – Protective separation according to EN 61140

Protection against unacceptably high voltages (for example, with shunt measurements at high potentials or in 3-phase systems)

#### – Maximum reliability

No repair or failure costs

#### – 5-year warranty

Warranty  
**5 years!**

Warranty  
*Defects occurring within 5 years from delivery date shall be remedied free of charge at our plant (carriage and insurance paid by sender).*



**KTA**

# Universal Isolation Amplifiers

## VariTrans P 27000

### Product Line

Device	Input	Output	Order No. with pluggable screw terminal	Order No. with fixed screw terminal
VariTrans P 27000 Input and output adjustable	0 ... ±20 mV/200 V 0 ... ±0,1 mA/100 mA	0 ... 20 mA 4 ... 20 mA 0 ... 10 V 0 ... ±10 V 0 ... ±20 mA	<b>P 27000 H1</b>	<b>P 27000 F1</b>
VariTrans P 27000 with fixed settings	0 ... ±20 mA 0 ... ±20 mA 0 ... ±60 mV 0 ... 60 mV 0 ... ±60 mV 0 ... ±150 mV 0 ... 150 mV 0 ... ±150 mV 0 ... ±300 mV 0 ... 300 mV 0 ... ±300 mV 0 ... ±500 mV 0 ... 500 mV 0 ... ±500 mV 0 ... ±1 V 0 ... 1 V 0 ... ±1 V 0 ... ±10 V 0 ... ±10 V	0 ... ±20 mA 0 ... ±10 V 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 0 ... ±20 mA 4 ... 20 mA 0 ... ±10 V 0 ... ±20 mA 4 ... 20 mA 0 ... ±10 V 0 ... ±20 mA 0 ... ±10 V	<b>P 27016 H1</b> <b>P 27018 H1</b> <b>P 27056 H1</b> <b>P 27057 H1</b> <b>P 27058 H1</b> <b>P 27066 H1</b> <b>P 27067 H1</b> <b>P 27068 H1</b> <b>P 27076 H1</b> <b>P 27077 H1</b> <b>P 27078 H1</b> <b>P 27086 H1</b> <b>P 27087 H1</b> <b>P 27088 H1</b> <b>P 27096 H1</b> <b>P 27097 H1</b> <b>P 27098 H1</b> <b>P 27036 H1</b> <b>P 27038 H1</b>	<b>P 27016 F1</b> <b>P 27018 F1</b> <b>P 27056 F1</b> <b>P 27057 F1</b> <b>P 27058 F1</b> <b>P 27066 F1</b> <b>P 27067 F1</b> <b>P 27068 F1</b> <b>P 27076 F1</b> <b>P 27077 F1</b> <b>P 27078 F1</b> <b>P 27086 F1</b> <b>P 27087 F1</b> <b>P 27088 F1</b> <b>P 27096 F1</b> <b>P 27097 F1</b> <b>P 27098 F1</b> <b>P 27036 F1</b> <b>P 27038 F1</b>
VariTrans P 27000 with fixed settings to customer requirements	–	–	<b>P 27000 H1-nnnn</b>	<b>P 27000 F1-nnnn</b>

### Accessories

		Order No.	Order No.
VariSoft SW 108	Adjustment tool for the adjustable VariTrans P 27000 universal isolation amplifiers	<b>SW 108</b>	<b>SW 108</b>

### Power supply

20 ... 253 V AC/DC

## Specifications

### Input data

Inputs	P 27000 H1/F1: Voltage	Default setting $\pm 10$ V configurable from 20 mV to 200 V and switchable in calibrated increments of 60 mV, 100 mV, 150 mV, 300 mV, 500 mV, 1 V, 5 V, 10 V, 100 V, uni-/bipolar	
	Current	configurable from 0.1 mA to 100 mA and switchable in calibrated increments of 1 mA, 5 mA, 10 mA, 20 mA, 50 mA, uni-/bipolar and 4 ... 20 mA <sup>1)</sup>	
Input resistance	Current input	Ranges $\leq 5$ mA Ranges $> 5$ mA	approx. 100 ohms approx. 5 ohms
	Voltage input		approx. 1 Mohm
Overload capacity	Current input	Ranges $\leq 5$ mA Ranges $> 5$ mA	$\leq 100$ mA $\leq 300$ mA
	Voltage input	Ranges $\leq 500$ mV	Limiting by 36 V suppressor diode, max. allowable continuous current $\leq 20$ mA
		Ranges $> 500$ mV	Limiting by 250 V suppressor diode, max. allowable continuous current $\leq 3$ mA

### Output data

Output	P 27000 H1/F1: Default setting $\pm 10$ V 20 mA, 5 V, 10 V uni-/bipolar and 4 ... 20 mA, 1 ... 5 V and 2 ... 10 V calibrated switching	
Offset	-100 %, -50 %, 0 %, 50 %, 100 % span of selected output range, calibrated switching	
Load	With output current	$\leq 12$ V (600 ohms at 20 mA)
	With output voltage	$\leq 10$ mA (1 kohm at 10 V) <sup>2)</sup>
Offset	20 $\mu$ A or 10 mV	
Residual ripple	$< 10$ mV <sub>rms</sub>	

### Transmission behavior

Adjustment range ZERO potentiometer	$\pm 25$ % span of selected output range
Adjustment range SPAN potentiometer	0.33 ... 3.30 x final value of selected input range (max. $V_{in} = 200$ V)
Gain error	$< 0.08$ % meas.val. (DC)
Cutoff frequency	P 27000 H1/F1: $> 10$ kHz, $< 10$ Hz, switchable -3 dB, fixed-range models $> 10$ kHz, -3 dB
Temperature coefficient <sup>3)</sup>	$< 0.005$ %/K full scale (reference temp. 23 °C)

### Power supply

Power supply	20 ... 253 V AC/DC; AC 48 ... 62 Hz, approx. 2 VA; DC approx. 0.9 W
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# Universal Isolation Amplifiers

## VariTrans P 27000

### Specifications (continued)

#### Isolation

Galvanic isolation

3-port isolation between input, output and power supply

Test voltage

5 kV AC input against output; 4 kV AC output against power supply

Working voltage  
(basic insulation)

1000 V AC/DC with overvoltage category II and pollution degree 2 according to EN 61010-1.  
For applications with high working voltages, ensure there is sufficient spacing or isolation from neighboring devices and protection against electric shocks.

Protection against electric  
shock

Protective separation according to EN 61140 by reinforced insulation according to EN 61010-1.  
Working voltages with overvoltage category II and pollution degree 2:  
up to 600 V AC/DC across input and output,  
up to 300 V AC/DC across output and power supply  
up to category II and degree 2

For applications with high working voltages, ensure there is sufficient spacing or isolation from neighboring devices and protection against electric shocks.

Explosion protection

Europe: II 3G Ex nA IIC T4 Gc X  
USA: Class I Div.2 GRP A,B,C,D T4 Class I Zone 2 AEx nA IIC T4  
Canada: Class I Zone 2 Ex nA IIC T4 XClass I Div.2 GRP A,B,C,D T4

#### Standards and approvals

Surge withstand

5 kV, 1.2/50  $\mu$ s, according to IEC 255-4

EMC<sup>4)</sup>

EN 61326

Approvals

CUL: cULus Listed, File No. E340287, E308146, E340288  
Standard: UL 61010-1 and CAN/CSA C22.2 No. 61010-1  
GL: No. 42843-02 HH  
KTA: 3507 not in combination with explosion protection

#### Further data

MTBF<sup>5)</sup>

Approx. 76 years

Ambient temperature

Operation: -10 ... +70 °C  
Transport and storage: -40 ... +85 °C

Design

Modular housing, 12.5 mm wide, see dimension drawings for further measurements,  
pluggable screw terminals: Type H1  
fixed screw terminals: Type F1

Ingress protection

IP 20

Mounting

Metal interlock to attach to 35-mm mounting rail according to EN 50022.  
See dimension drawings for conductor cross-section

Weight

Approx. 150 g

<sup>1)</sup> Input 4 ... 20 mA: Offset switching not calibrated

<sup>2)</sup> Higher output load upon request

<sup>3)</sup> Average TC in the specified operating temperature range -10 °C ... +70 °C

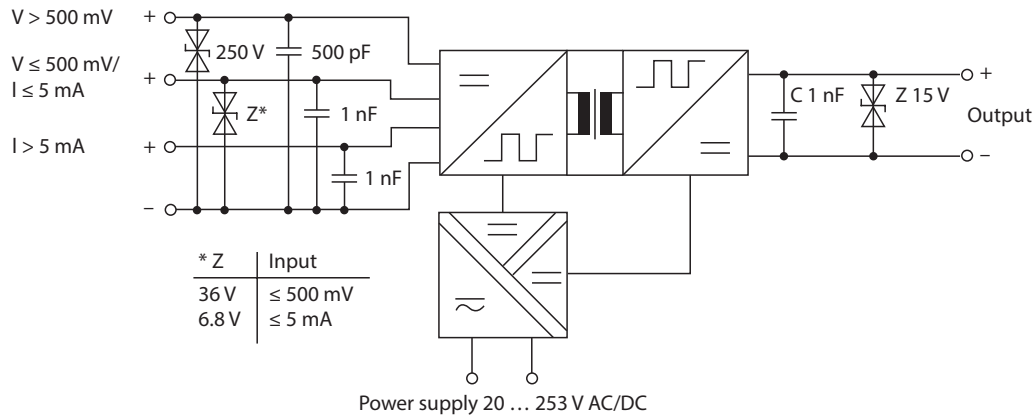
<sup>4)</sup> Slight deviations are possible while there is interference

<sup>5)</sup> Mean Time Between Failures – MTBF – according to EN 61709 (SN 29500). Conditions: Stationary operation in well-kept rooms, average ambient temperature 40 °C, no ventilation, continuous operation

For up-to-date information, please visit [www.knick.de](http://www.knick.de)



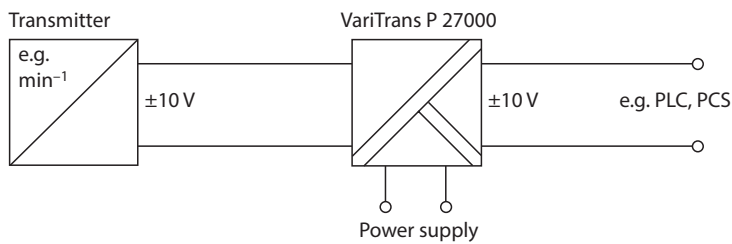
### Block Diagram



### Typical Applications

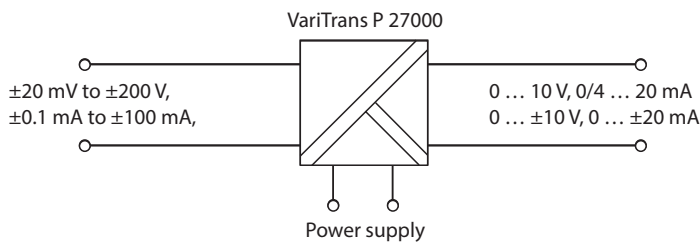
#### Potential isolation

for safe coupling of the measurement signals to the processing electronics



#### Signal conversion or range adjustment

for converting arbitrary measurement signals into standard 10 V or 20 mA signals



# Universal Isolation Amplifiers

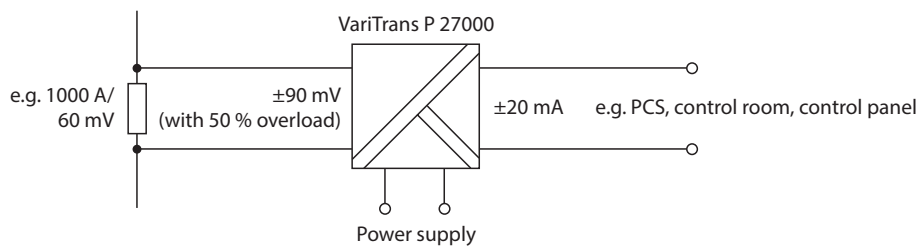
## VariTrans P 27000

### Typical Applications *(continued)*

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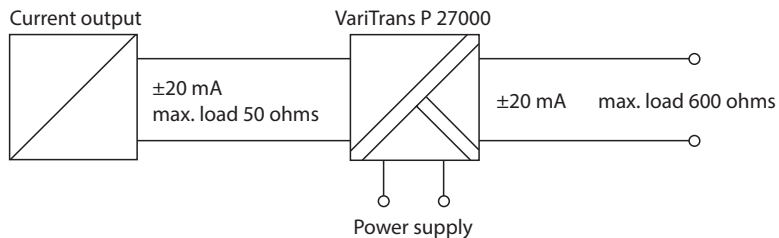
#### Simple shunt measurement

e.g. also with free adjustment of overload ranges



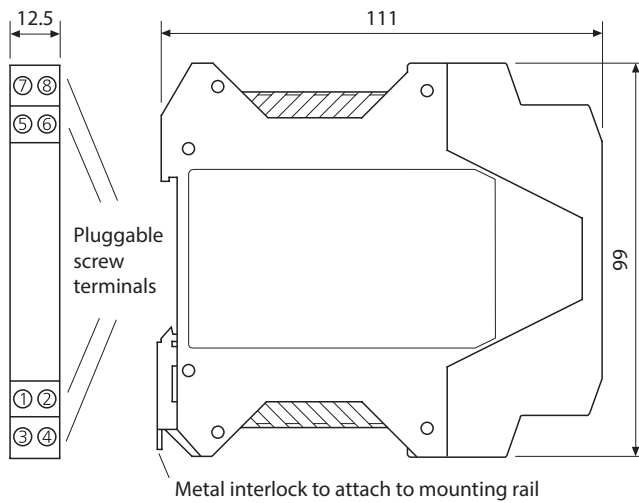
#### Potential isolation

for safe coupling of the measurement signals to the processing electronics



## Dimension Drawings and Terminal Assignments

### Housing with pluggable screw terminals



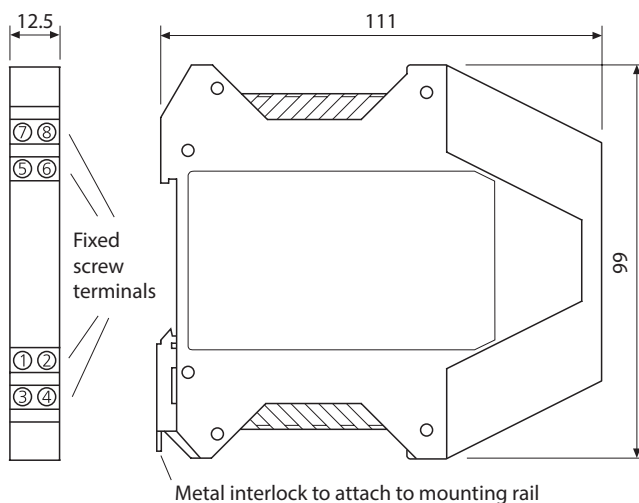
#### Terminal assignments

- 1 Input + Current > 5 mA
- 2 Input + Current ≤ 5 mA, voltage ≤ 500 mV
- 3 Input + Voltage > 500 mV
- 4 Input -
- 5 Output +
- 6 Output -
- 7 Power supply AC/DC
- 8 Power supply AC/DC

Conductor cross-section max. 2.5 mm<sup>2</sup>

Multi-wire connection max. 1 mm<sup>2</sup>  
(two wires with equal diameters)

### Housing with fixed screw terminals



All dimensions in mm