

## VariTrans P 27000

The "Multimeter" among the signal conditioners.

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

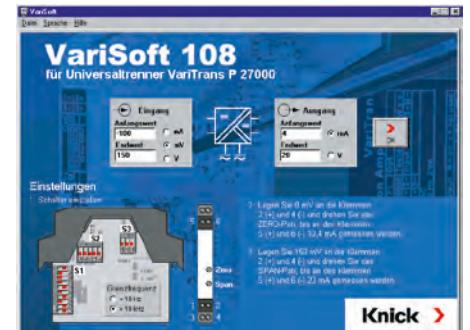
A wide variety of measurement signals must be reliably galvanically isolated and converted into standardized signals. This applies to any input signals from  $\pm 20$  mV to  $\pm 200$  V and from  $\pm 0.1$  mA to  $\pm 100$  mA.

### The Problem

The range of tasks results in too many different devices.

### The Solution

The calibrated switching of the input and output ranges using DIP switches allows VariTrans P 27000 universal signal conditioners 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.

# VariTrans P 27000

## 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.

## Facts and Features

- **Flexible and extremely precise**  
Calibrated range selection without complicated readjustments
- **Broad-range power supply**  
VariPower 20 ... 253 V AC/DC
- **Compact design**  
12.5 mm modular housing;  
up to 80 active isolators per meter of mounting rail
- **Quick and easy configuration**  
Housing can be easily opened
- **Pluggable screw terminals**  
Simple, time-saving assembly and prewiring of enclosures
- **3-port separation**  
Protection against incorrect measurements or damage

- **Maximum accuracy**
- **Specific test report**  
Following EN 10204 2.2
- **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 and failure costs
- **5-year warranty**



**Product Line**

Device	Input	Output	Order no.	Order no.
			with pluggable screw terminal	with fixed screw terminal
VariTrans P 27000 Input and output adjustable	0 ... ±20 mV/200 V	0 ... 20 mA	<b>P 27000 H1</b>	<b>P 27000 F1</b>
	0 ... ±0.1 mA/100 mA	4 ... 20 mA		
		0 ... 10 V		
		0 ... ±10 V		
		0 ... ±20 mA		
VariTrans P 27000 with fixed settings	0 ... ±20 mA	0 ... ±20 mA	<b>P 27016 H1</b>	<b>P 27016 F1</b>
	0 ... ±20 mA	0 ... ±10 V	<b>P 27018 H1</b>	<b>P 27018 F1</b>
	0 ... ±60 mV	0 ... ±20 mA	<b>P 27056 H1</b>	<b>P 27056 F1</b>
	0 ... 60 mV	4 ... 20 mA	<b>P 27057 H1</b>	<b>P 27057 F1</b>
	0 ... ±60 mV	0 ... ±10 V	<b>P 27058 H1</b>	<b>P 27058 F1</b>
	0 ... ±150 mV	0 ... ±20 mA	<b>P 27066 H1</b>	<b>P 27066 F1</b>
	0 ... 150 mV	4 ... 20 mA	<b>P 27067 H1</b>	<b>P 27067 F1</b>
	0 ... ±150 mV	0 ... ±10 V	<b>P 27068 H1</b>	<b>P 27068 F1</b>
	0 ... ±300 mV	0 ... ±20 mA	<b>P 27076 H1</b>	<b>P 27076 F1</b>
	0 ... 300 mV	4 ... 20 mA	<b>P 27077 H1</b>	<b>P 27077 F1</b>
	0 ... ±300 mV	0 ... ±10 V	<b>P 27078 H1</b>	<b>P 27078 F1</b>
	0 ... ±500 mV	0 ... ±20 mA	<b>P 27086 H1</b>	<b>P 27086 F1</b>
	0 ... 500 mV	4 ... 20 mA	<b>P 27087 H1</b>	<b>P 27087 F1</b>
	0 ... ±500 mV	0 ... ±10 V	<b>P 27088 H1</b>	<b>P 27088 F1</b>
	0 ... ±1 V	0 ... ±20 mA	<b>P 27096 H1</b>	<b>P 27096 F1</b>
	0 ... 1 V	4 ... 20 mA	<b>P 27097 H1</b>	<b>P 27097 F1</b>
	0 ... ±1 V	0 ... ±10 V	<b>P 27098 H1</b>	<b>P 27098 F1</b>
	0 ... ±10 V	0 ... ±20 mA	<b>P 27036 H1</b>	<b>P 27036 F1</b>
0 ... ±10 V	0 ... ±10 V	<b>P 27038 H1</b>	<b>P 27038 F1</b>	
VariTrans P 27000 with fixed settings to customer requirements	0 ... ±1 V	0 ... ±10 V	<b>P 27000 H1-nnnn</b>	<b>P 27000 F1-nnnn</b>
<b>Accessories</b>			<b>Order no.</b>	<b>Order no.</b>
VariSoft SW 108	Adjustment tool for the adjustable VariTrans P 27000 universal signal conditioners		<b>SW 108</b>	<b>SW 108</b>
<b>Power supply</b>				
20 ... 253 V AC/DC				

# VariTrans P 27000

## Specifications

### Input data

Inputs	P 27000 H1/F1:	Default setting $\pm 10$ V	
	Voltage	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, unipolar/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, unipolar/bipolar and 4 ... 20 mA <sup>1)</sup>	
Input resistance	Current input	Ranges $\leq 5$ mA	approx. 100 ohms
		Ranges $> 5$ mA	approx. 5 ohms
	Voltage input	approx. 1 Mohm	
Overload capacity	Current input	Ranges $\leq 5$ mA	$\leq 100$ mA
		Ranges $> 5$ 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 unipolar/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		
Response time $T_{90}$	Approx. 70 $\mu$ s with cutoff frequency 10 kHz adjusted		
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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**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, take measures to prevent accidental contact and make sure that there is sufficient distance or insulation between adjacent devices.
Protection against electric shock	Protective separation 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, take measures to prevent accidental contact and make sure that there is sufficient distance or insulation between adjacent devices.
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 µs, according to IEC 255-4
EMC <sup>4)</sup>	EN 61326-1
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
RoHS conformity	According to directive 2011/65/EU

**Further data**

MTBF <sup>5)</sup>	Approx. 76 years
Ambient temperature	Operation: -10 ... +70 °C Transport and storage: -40 ... +85 °C
Ambient conditions	Indoor use <sup>6)</sup> ; relative humidity 5 ... 95 %, no condensation; max. altitude 2000 m (air pressure: 790 ... 1060 hPa) <sup>7)</sup>
Design	Modular housing, 12.5 mm wide, see dimension drawings for further measurements, pluggable screw terminals: Type H1; fixed screw terminals: Type F1 Connection: pluggable screw terminals H1; fixed screw terminals F1 Conductor cross section max. 2.5 mm <sup>2</sup> ; Multi-wire connection max. 1 mm <sup>2</sup> (two wires with equal diameters)
Tightening torque	0.7 Nm
Mounting	Metal interlock to attach to 35 mm DIN rail according to EN 60715
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

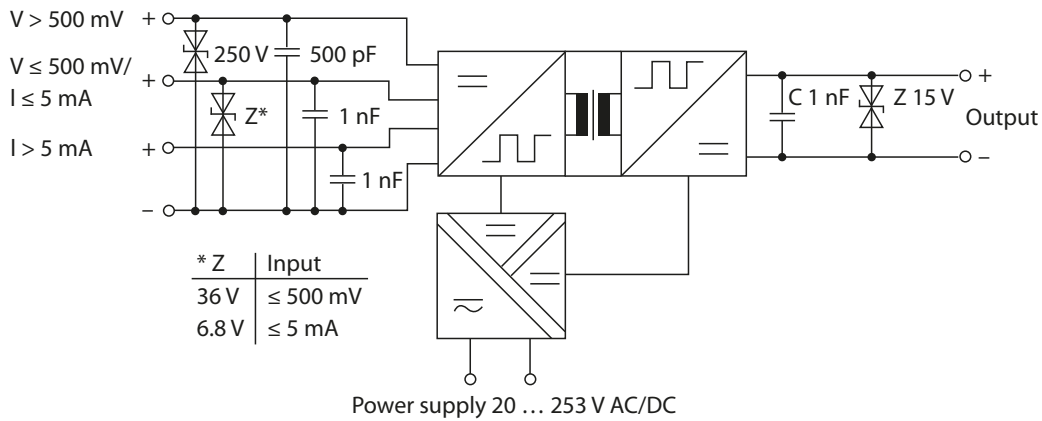
<sup>5)</sup> Mean Time Between Failures – MTBF – according to EN 61709 (SN 29500). Conditions: Stationary operation in well-kept rooms, average ambient temperature 40°C, no ventilation, continuous operation

<sup>6)</sup> Closed, weather-protected operating areas (stationary operation), water or wind-driven precipitation (rain, snow, hail, etc.) excluded

<sup>7)</sup> Lower air pressure reduces the allowable working voltages.

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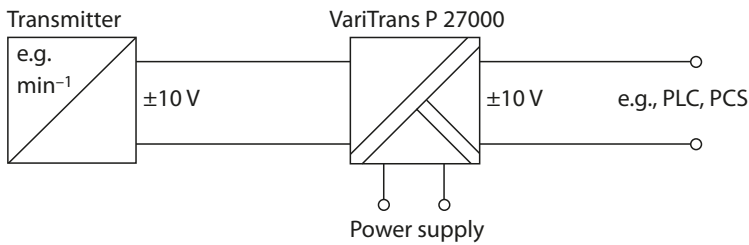
## Block Diagram



## Typical Applications

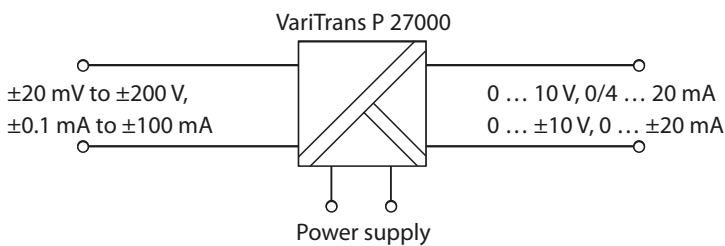
### Potential isolation

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

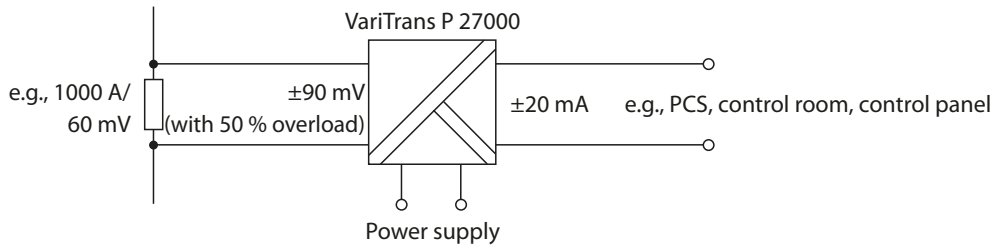


**Typical Applications** *(continued)*

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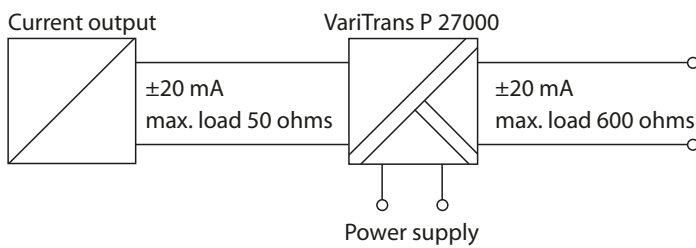
**Simple shunt measurement**

e.g., including any settings for overload ranges



**Potential isolation**

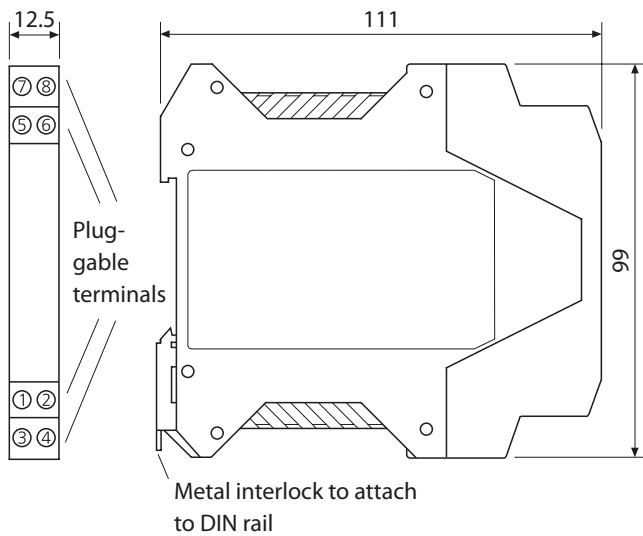
for safe connection of the measurement signals to the processing electronics



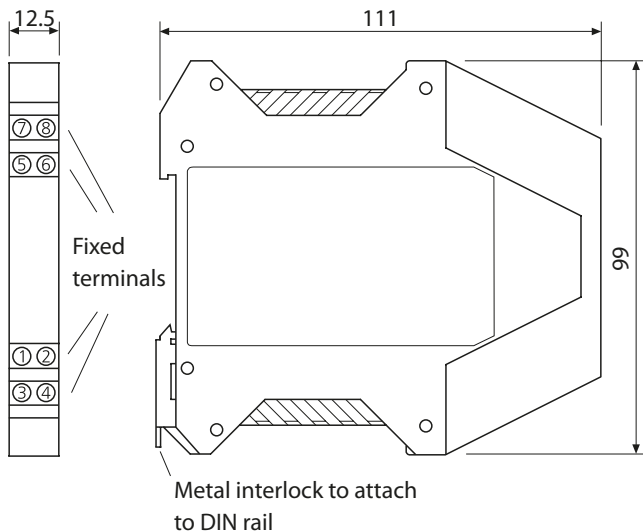
# VariTrans P 27000

## Dimension Drawings and Terminal Assignments

### Housing with pluggable screw terminals



### Housing with fixed 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)