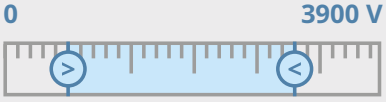
# P45000

## Signal Conditioner with a High Level of Isolation for Measuring Direct and Alternating Voltages of up to 3900 V DC and 4500 V $AC_{peak}$


**Certified according to SIL 2/3, the P45000 is the world's first functionally safe high voltage transducer and it's ready to order with any input voltage range from 500 V DC.**

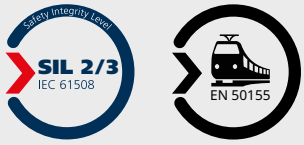
One of the most space-saving high voltage transducers, it impresses thanks to its numerous installation options. This means not only can it be mounted on 35 mm DIN rails, but also screwed onto mounting surfaces—vertically, horizontally, or stacked as needed.

The P45000 can be flexibly customized to meet specific customer requirements, and many implemented versions are available for special uses.



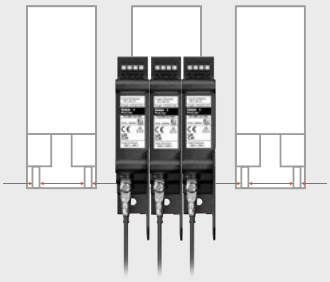

### Can be Ordered with any Input Voltage Range

- Rapid availability for the input voltage ranges from 0 … 500 V DC to 0 … 3000 V DC.
- Additional input voltages are available on request.




### Certified in Accordance with Standards

- World's first functionally safe high voltage transducer.
- Optimized for use on rolling stock.



### Space Saving and Flexibly Mountable

- Mounting on a 35 mm DIN rail or horizontally or vertically on a mounting surface.
- Multiple devices can be installed in series or stacked.

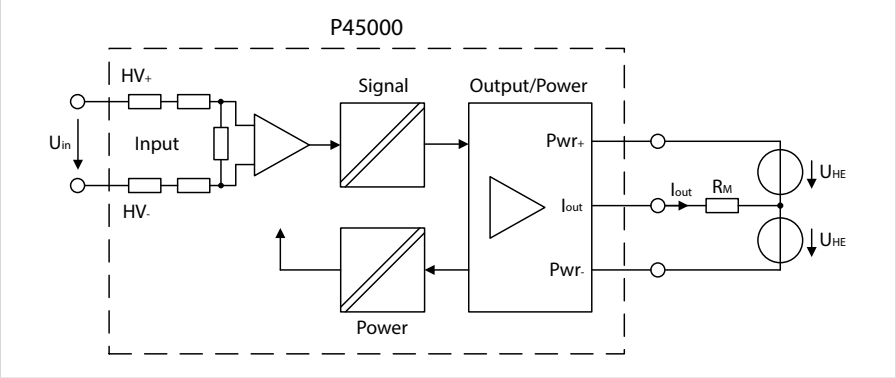
## Product Code

| **High Voltage Transducer** | **P45** | **_** | **_** | **_** | **K** | **2** | **_** | **_** | **_** | **/** | **_** | **_** | **_** | **_** | **_** | **_** | **_** | **_** | **_** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type test voltage 10 kV AC, nominal voltage $U_{in,n}$ [V]: 500…1500 | | **0** | | | | | | | | **/** | | | | | | | | | |
| Type test voltage 20 kV AC, nominal voltage $U_{in,n}$ [V]: 500…3000 | | **1** | | | | | | | | **/** | | | | | | | | | |
| $I_{out}$ = ±50 mA; bipolar | | | **0** | **0** | | | | | | **/** | | | | | | | | | |
| $I_{out}$ = ±50 mA; bipolar | | | **0** | **2** | | | | | | **/** | | | | | | | | | |
| $I_{out}$ = 10…50 mA; unipolar | | | **1** | **1** | | | | | | **/** | | | | | | | | | |
| $I_{out}$ = 4…20 mA; unipolar | | | **2** | **1** | | | | | | **/** | | | | | | | | | |
| Out special type | | | **9** | **0** | | | | | | **/** | | | | | **-** | **S** | **x** | **x** | **x** |
| Out special type | | | **9** | **2** | | | | | | **/** | | | | | **-** | **S** | **x** | **x** | **x** |
| Without SIL capability, gain error 0.2 % | | | | **0** | | | | | | **/** | | | | | | | | | |
| With SIL capability, gain error 0.2 %[1)] | | | | **1** | | | | | | **/** | | | | | | | | | |
| Without SIL capability, gain error 0.1 % | | | | **2** | | | | | | **/** | | | | | | | | | |
| Type of enclosure | | | | | **K** | **2** | | | | **/** | | | | | | | | | |
| Wall mounting only | | | | | | | **0** | | | **/** | | | | | | | | | |
| Wall mounting/35 mm DIN rail | | | | | | | **1** | | | **/** | | | | | | | | | |
| High-voltage connection: Screwed contact/ring cable lug | | | | | | | | **0** | | **/** | | | | | | | | | |
| High-voltage connection: Fixed cable | | | | | | | | **1** | | **/** | | | | | | | | | |
| Output/auxiliary power: Push-in terminals | | | | | | | | | **1** | **/** | | | | | | | | | |
| Output/auxiliary power: Screw terminals | | | | | | | | | **2** | **/** | | | | | | | | | |
| Input nominal voltage: $U_{in,n}$ = xxxx V | | | | | | | | | | **/** | **x** | **x** | **x** | **x** | | | | | |
| Special types | | | | | | | | | | | | | | | **-** | **S** | **x** | **x** | **x** |

## Specifications (Excerpt)

Excerpt from the user manual. Detailed information → *knick-international.com*

### 1 Block Diagram




1) Only for nominal voltage $U_{in,n}$ [V]: 500, 750, 1000, 1500, 2000, 2800, 3000

## 2 Input

| Measuring ranges/output ranges | | | | |
|---|---|---|---|---|
| Product variant | Nominal voltage | Nominal measuring range | Nominal output range | Type test voltage |
| Products without SIL capability | | | | |
| P4500* | 500 V<br>...<br>1500 V | ±500 V<br>...<br>±1500 V | ±50 mA<br><br>±50 mA | 10 kV |
| P4510* | 500 V<br>...<br>3000 V | ±500 V<br>...<br>±3000 V | ±50 mA<br><br>±50 mA | 20 kV |
| Products with SIL capability/EN 61508 | | | | |
| P45011 | 500 V<br>...<br>1500 V | 0...500 V<br>...<br>0...1500 V | 10...50 mA<br><br>10...50 mA | 10 kV |
| P45111 | 500 V<br>...<br>3000 V | 0...500 V<br>...<br>0...3000 V | 10...50 mA<br><br>10...50 mA | 20 kV |
| P45021 | 500 V<br>...<br>1500 V | 0...500 V<br>...<br>0...1500 V | 4...20 mA<br><br>4...20 mA | 10 kV |
| P45121 | 500 V<br>...<br>3000 V | 0...500 V<br>...<br>0...3000 V | 4...20 mA<br><br>4...20 mA | 20 kV |

## 3 Output

| Output current in nominal measuring range | |
|---|---|
| P45*0*K2***: | $I_{out}$ = ±50 mA |
| P45*1*K2***: | $I_{out}$ = 10...50 mA |
| P45*2*K2***: | $I_{out}$ = 4...20 mA |

## 4 Isolation

| | |
|---|---|
| Galvanic isolation | Input to output/auxiliary power<br>2-port isolation |

## 5 Auxiliary Power

| Power supply unit | |
|---|---|
| Nominal voltage range | ±15 V DC, ± 10% ... ±24 V DC, ± 10% |

## 6 Device Error Detection and Signaling

| Output current (in the event of a fault) | |
|---|---|
| P45*0*K2***: | No error signal |
| P45*1*K2***: | $I_{out,failure}$: < 9 mA |
| P45*2*K2***: | $I_{out,failure}$: < 3.6 mA |

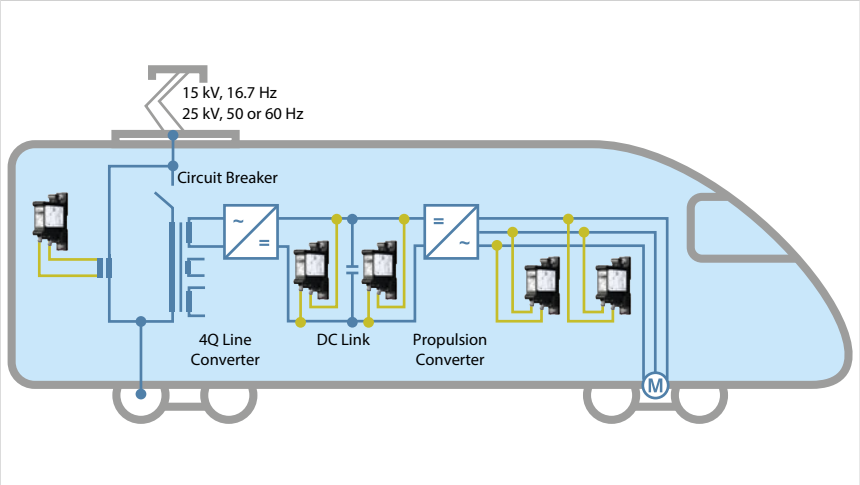
## 7 Transmission Behavior

| | |
|---|---|
| Gain error | ≤ 0.2 % of the measured value at 23 °C (73.4 °F) |
| Gain error (option) | ≤ 0.1 % of the measured value at 23 °C (73.4 °F) |
| Offset error | < 100 µA at 23 °C (73.4 °F) |
| Temperature coefficient | < 100 ppm/K of full scale value |
| Total error in the entire temperature range | < 1 % of full scale value |
| Cutoff frequency (-3 dB) | ≥ 10 kHz |
| Settling time $T_{90resp}$ | < 70 µs |

## 8 Further Data

| | |
|---|---|
| EMC | |
| Railway applications | EN 50121-1, EN 50121-3-2, EN 50121-5 |
| Industrial applications | EN 61326-1, EN 61326-3-1 |
| Emitted interference | Class B (up to 110 V DC/up to 230 V AC) |
| Immunity to interference | Industrial applications |
| Mechanical stress<br>Vibration and shock<br>in accordance with EN 61373, IEC 61373 | Category 1, class B<br>Tested by an independent accredited test laboratory |
| Fire protection in accordance with<br>EN 45545-1, EN 45545-2, EN 45545-5 | For outdoor applications (combustible weight < 400 g) up to HL3 |
| | For interior applications: Mount only in closed control cabinets with sufficient fire protection |
| | Certified by independent test laboratory |

## Application Example

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