



## SIMEAS T (single channel)

Measuring Transducers for High-Tension Variables

**SIEMENS**



**Performance features**

- Extremely small dimensions
- Fast delivery times
- Standard models from stock
- CE mark
- EMC immunity
- Compliance with relevant national and international standards
- High quality, long service life
- Electrical isolation at high test voltage
- High measuring precision
- High-performance output signal circuits
- High plant safety and reliability

**SIMEAS T**  
Passive transducer

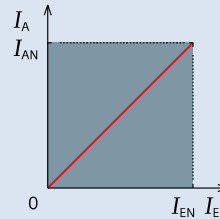
for alternating current/voltage

**Description**

The passive SIMEAS-T transducers convert the input alternating voltage or the input alternating current from the high-voltage power network (45 to 65 Hz) into a load-independent output direct current.

Up to the maximum permissible load, multiple devices – such as recorders, displays, remote control systems, computers and controllers – can be connected and operated directly or via long-distance lines at the output. The inputs and outputs are electrically isolated. Auxiliary power is not needed.

**Characteristics**

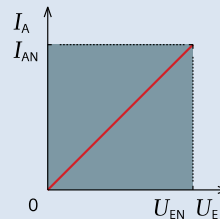


**Alternating current**

- $I_A$  = Output current DC
- $I_E$  = Input current AC
- $I_{AN}$  = Rated output current
- $I_{EN}$  = Rated input current

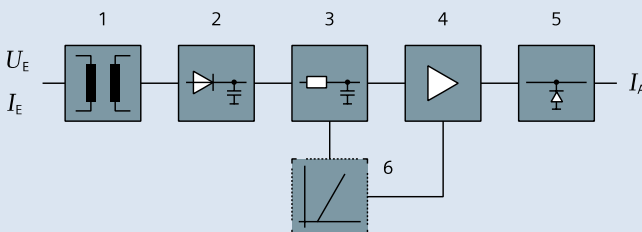
**Principle of operation** (see Overview circuit diagram)

The transformer (1) transfers the input signal via the rectification and smoothing (2) to the signal evaluation (3), which drives the output amplifier (4). Fed by filtering, the output amplifier provides load-independent current proportional to the input value. The protective circuit (5) protects the output against no-load, short-circuits and transient overvoltage. With an alternating voltage transducer with expanded end range, the expansion circuit (6) of the measuring range is adjusted

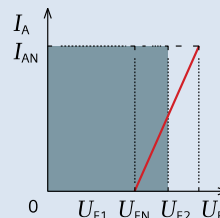


**Alternating voltage**

- $I_A$  = Output current DC
- $U_E$  = Input voltage AC
- $I_{AN}$  = Rated output current
- $U_{EN}$  = Rated input voltage



- 1. Transformer
- 2. Rectification, filtering
- 3. Signal evaluation
- 4. Output amplifier
- 5. Protective circuit
- 6. Expansion circuit (optional)



**Alternating voltage with expanded end range**

- $I_A$  = Output current DC
- $U_E$  = Input voltage AC
- $I_{AN}$  = Rated output current
- $U_{EN}$  = Rated input voltage
- $U_{E1}$  = Start of scale
- $U_{E2}$  = End of scale

**Input**

|  |  |
|--|--|
|  | Only for connecting to alternating voltage systems   |
| Maximum rated line voltage                         | Y 230 / Δ 400 V and Δ 500 V  |
| Power consumption (per channel with $I = I_{EN}$ ) | 0.3 VA with $I_{AN} = 2.5$ mA<br>0.4 VA with $I_{AN} = 5$ mA<br>0.6 VA with $I_{AN} = 10$ mA<br>0.9 VA with $I_{AN} = 20$ mA |
| Permissible modulation range                       | $1.2 I_{EN}$ or $1.2 U_{EN}$   |
| Rated frequency $f_{EN}$                           | 50 Hz; 60 Hz   |
| Frequency range $f_E$                              | 45 Hz to 65 Hz   |
| Waveform   | sine   |

**Input transducer alternating current  $I_E$**

|                                      |                    |
|--------------------------------------|--------------------|
| Standard rated currents $I_{EN}$     | see ordering table |
| Continuous overload capacity         |                    |
| for $I_{EN} = 1$ A, 1.2 A            | 2 A                |
| for $I_{EN} = 1.5$ A                 | 3 A                |
| for $I_{EN} = 2$ A, 2.4 A            | 4 A                |
| for $I_{EN} = 2.5$ A                 | 5 A                |
| for $I_{EN} = 5$ A, 6 A              | 10 A               |
| for $I_{EN} = 7.5$ A                 | 12 A               |
| for $I_{EN} = 10$ A                  | 15 A               |
| Surge overload capacity              |                    |
| for $I_{EN} = 1$ A, 1.2 A, 1.5 A     | 50 A for 1 s       |
| for $I_{EN} = 2$ A, 2.4 A, 2.5 A     | 100 A for 1 s      |
| for $I_{EN} = 5$ A, 6 A, 7.5 A, 10 A | 200 A for 1 s      |

**Input transducer alternating voltage  $U_E$**

|                                 |  |
|---------------------------------|--|
| Standard rated voltage $U_{EN}$ | see ordering table   |
| Special rated voltage $U_{EN}$  | in the range of 40 to 500 V                                |
| Continuous overload capacity    | $1.5 \times U_{EN}$ but max. 600 V                         |
| Surge overload capacity         | $\leq 2 \times U_{EN}$ (5 surges 1 s, at intervals of 5 s) |

**Output**

|                                  |   |
|----------------------------------|---|
|                                  | Load-independent direct current, short-circuit proof and resistant to no-load operation |
| Standard rated current $I_{AN}$  | 2.5 mA, 5 mA, 10 mA, 20 mA  |
| Special rated current $I_{AN}$   | in the range of 1 to 20 mA  |
| Rated modulation range           | 0 to $I_{AN}$   |
| Permissible modulation range     | 0 to $1.2 I_{AN}$   |
| No-load voltage $U_{AL}$         | $\leq 30$ V   |
| Rated load $R_{BIN}$             | $7.5 V / I_{AN}$  |
| Operating load $R_B$             | 0 to $15 V / I_{AN}$  |
| Residual ripple $I_{SS}$         | $\leq 0.5\%$ SS from $I_{AN}$   |
| Transducer setting time $t_{99}$ |   |
| Alternating current              | $\leq 1$ s  |
| Alternating voltage              | $\leq 0.4$ s  |

**Errors and influencing effects**

|                               |   |
|-------------------------------|---|
|                               | The relative error information with signs + and - |
| Error in reference conditions | 0.5% relative to $I_{AN}$                         |
| Reference conditions          |   |
| Input current $I_E$           | $0.05 I_{EN}$ to $I_{EN}$                         |
| Input voltage $U_E$           | $0.2 U_{EN}$ to $U_{EN}$                          |
| Frequency $f_E$               | $f_{EN} \pm 1\%$                                  |
| Waveform                      | sine, THD $\leq 0.2\%$                            |
| Load $R_B$                    | $R_{BIN} \pm 1\%$                                 |
| Ambient temperature $T_U$     | $23^\circ\text{C} \pm 1^\circ\text{C}$            |
| Warm-up period                | $\leq 15$ min                                     |
| Interfering fields            | none  |

|  |   |
|--|---|
| Influencing effects  |   |
| of the input voltage of $U_{EN}$ to $1.2 U_{EN}$           | $\leq 0.4\%$  |
| of the input current of 0 to $0.05 I_{EN}$ to $1.2 I_{EN}$ | $\leq 0.5\%$<br>$\leq 0.1\%$  |
| of the ambient temperature                                 | $\leq 0.3\% / 10$ K   |
| of the frequency (45 to 65 Hz)                             | $\leq 0.03\% / \text{Hz}$   |
| of the harmonics (only 3rd harmonic)                       | $\leq 0.33$ THD in %  |
| of the load  | $\leq 0.2\%$ with a change of the load from $0 \Omega$ to $15 V / I_{AN}$ |
| of the warm-up   | $\leq 0.3\%$  |

**Other technical specifications**

|   |  |
|---|--|
| Surge voltage VDE 0435 Part 303 with type test                      |  |
| Input relative to output at input and output As normal mode voltage | $U = 5$ kV, $1.2 / 50 \mu\text{s}$<br>$R = 500 \Omega$ each 3 surges in both polarity directions |

|                          |   |
|--------------------------|---|
| Dielectric strength      | (test voltage)                                    |
| Input relative to output | $U_{rms} = 5.5$ kV, 50 Hz, sine 1 min (type test) |

|   |  |
|---|--|
| Permissible ambient temperature according to IEC 68-2 / 1-3 |  |
| Working temperature range                                   | - $10^\circ\text{C}$ to + $60^\circ\text{C}$                     |
| Functional temperature range                                | - $15^\circ\text{C}$ to + $70^\circ\text{C}$                     |
| Storage temperature range                                   | - $40^\circ\text{C}$ to + $85^\circ\text{C}$                     |
| Climatic application class                                  | EN 60721-3-3 (rare slight condensation) environmental class IR 2 |

|                       |                                    |
|-----------------------|------------------------------------|
| Mechanical strength   |                                    |
| against falling       | according to DIN EN 61010 Part 1   |
| Vibration and shock   | Impact resistance class IK06 (1 J) |
| Fire resistance class | VO                                 |

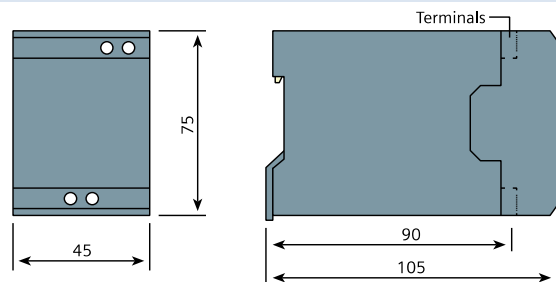
**Safety**

|                      |                                  |
|----------------------|----------------------------------|
|                      | according to DIN EN 61010 Part 1 |
| Overvoltage category | III                              |
| Pollution degree     | 2                                |

**Electromagnetic compatibility**

|  |              |
|--|--------------|
| Emitted interference according to DIN EN 50081-1                           |              |
| RFI field strength according to DIN EN 55022                               | Cl. B        |
| Interference immunity according to EN 50082-2                              |              |
| Immunity against electromagnetic fields (EN61000-4-3)                      | 10 V / m     |
| Discharge of static electricity  |              |
| ESD (EN61000-4-2)  | 8 kV         |
| Quick transients, asymmetrical burst with cap. coupling line (EN61000-4-4) | 2 kV<br>4 kV |

**Dimensions**



### Selection and ordering data

| Transducer for                           |        | Order number |  |   |   |  |
|--|--------|--------------|--|---|---|--|
| Alternating voltage                      |        | 7KG6101-     |  |   | 1 |  |
| <b>Rated frequency</b>                   |        |              |  |   |   |  |
| $f_{EN}$                                 |        |              |  |   |   |  |
| 50 Hz                                    |        |              |  | 2 |   |  |
| 60 Hz                                    |        |              |  | 3 |   |  |
| <b>Input voltage <math>U_{EN}</math></b> |        |              |  |   |   |  |
| 40 V                                     |        |              |  |   | K |  |
| 100 / $\sqrt{3}$ V                       |        |              |  |   | A |  |
| 60 V                                     |        |              |  |   | L |  |
| 110 / $\sqrt{3}$ V                       |        |              |  |   | B |  |
| 120 / $\sqrt{3}$ V                       |        |              |  |   | C |  |
| 132 / $\sqrt{3}$ V                       |        |              |  |   | D |  |
| 100 V                                    |        |              |  |   | E |  |
| 110 V                                    |        |              |  |   | F |  |
| 120 V                                    |        |              |  |   | J |  |
| 132 V                                    |        |              |  |   | N |  |
| 150 V                                    |        |              |  |   | P |  |
| 220 V                                    |        |              |  |   | G |  |
| 230 V                                    |        |              |  |   | W |  |
| 240 V                                    |        |              |  |   | V |  |
| 250 V                                    |        |              |  |   | Q |  |
| 300 V                                    |        |              |  |   | U |  |
| 380 V                                    |        |              |  |   | H |  |
| 400 V                                    |        |              |  |   | R |  |
| 500 V                                    |        |              |  |   | S |  |
| <b>Output signal <math>I_{AN}</math></b> |        |              |  |   |   |  |
| DC 0 to                                  | 2.5 mA |              |  |   | G |  |
| DC 0 to                                  | 5 mA   |              |  |   | H |  |
| DC 0 to                                  | 10 mA  |              |  |   | J |  |
| DC 0 to                                  | 20 mA  |              |  |   | K |  |
| <b>Measuring range</b>                   |        |              |  |   |   |  |
| 0 to $U_{EN}$                            |        |              |  |   | 0 |  |

| Transducer for                                 |        | Order number |  |   |   |   |
|--|--------|--------------|--|---|---|---|
| Alternating current                            |        | 7KG6111-     |  |   | 1 | 0 |
| <b>Rated frequency</b>                         |        |              |  |   |   |   |
| $f_{EN}$                                       |        |              |  |   |   |   |
| 50 Hz  |        |              |  | 2 |   |   |
| 60 Hz  |        |              |  | 3 |   |   |
| <b>Input rated current <math>I_{EN}</math></b> |        |              |  |   |   |   |
| 1.0 A  |        |              |  |   | A |   |
| 1.2 A  |        |              |  |   | B |   |
| 1.5 A  |        |              |  |   | K |   |
| 2.0 A  |        |              |  |   | C |   |
| 2.4 A  |        |              |  |   | D |   |
| 2.5 A  |        |              |  |   | L |   |
| 5.0 A  |        |              |  |   | E |   |
| 6.0 A  |        |              |  |   | F |   |
| 7.5 A  |        |              |  |   | G |   |
| 10 A   |        |              |  |   | J |   |
| <b>Output signal <math>I_{AN}</math></b>       |        |              |  |   |   |   |
| DC 0 to  | 2.5 mA |              |  |   | G |   |
| DC 0 to  | 5 mA   |              |  |   | H |   |
| DC 0 to  | 10 mA  |              |  |   | J |   |
| DC 0 to  | 20 mA  |              |  |   | K |   |

**Note:**  
Not all combination possibilities  
are available for order



### Performance features

- Extremely small dimensions
- Fast delivery times
- Standard models from stock
- CE mark
- EMC immunity
- Compliance with relevant national and international standards
- High quality, long service life
- Electrical isolation at high test voltage
- High measuring precision
- High-performance output signal circuits
- High plant safety and reliability

## SIMEAS T

### Active transducer

#### for alternating current/voltage (RMS value)

#### Area of application

The SIMEAS T transducers for alternating current and alternating voltage with auxiliary power convert the RMS value of the input alternating current or the input alternating voltage from the high-voltage network to a load-independent output direct current or voltage.

Up to the maximum permissible load, multiple devices – such as recorders, indicators, remote control systems, computers and controllers – can be connected and operated directly or via long-distance lines at the output. Input, output and auxiliary power are electrically dependent on each other.

#### Principle of operation (see Overview circuit diagram)

The transformer (1) transfers the input signal  $I_E$  or  $U_E$  via the rectification and smoothing (2) to the signal evaluation (3), which drives the output amplifier (4). Fed by smoothing, the output amplifier provides load-independent current  $I_A$  proportional to the input value  $I_E$ . The protective circuit (5) protects the output against no-load and transient overvoltage.

An expansion circuit (6) is used to adapt the measuring range for transducers with an expanded end range, expanded start range or non-linear characteristic curve.

The AC or DC auxiliary power is transformed by a direct or alternating voltage auxiliary power module (7) into the internal supply voltages.

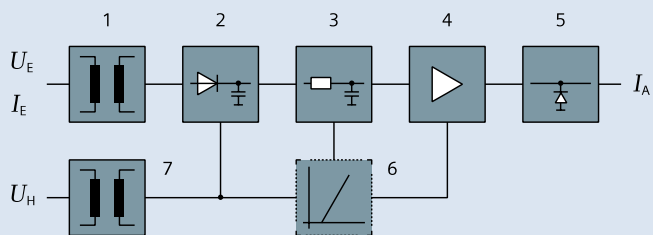
#### Design

The transducers are permanently wired and tested functional units. They have a snap-on fastening for a 35 mm standard mounting rail according to DIN EN 50022.

The inputs/outputs and auxiliary power can be safely connected with screw terminals.

The devices are silicone-free, halogen-free and flame-resistant.

The balancing potentiometers and test points can be accessed after removing the enclosure cover.



- |                             |                                 |
|-----------------------------|---------------------------------|
| 1. Transformer              | 5. Protective circuit           |
| 2. Rectification, smoothing | 6. Expansion circuit (optional) |
| 3. Signal evaluation        | 7. Auxiliary power              |
| 4. Output amplifier         |                                 |

## Input

|                              |  |
|------------------------------|--|
|                              | Only for connecting to alternating voltage systems |
| Maximum rated line voltage   | Y 230 / Δ 400 V and Δ 500 V                        |
| Permissible modulation range | 0 - 1.2 $I_{EN}$ or 1.2 $U_{EN}$                   |
| Rated frequency $f_{EN}$     | 50 Hz; 60 Hz                                       |
| Frequency range $f_E$        | 45 Hz to 65 Hz                                     |
| Waveform                     | sine, square, triangle, phase control              |
| Crest factor                 | $iI_{rms}$ or $\hat{u}/U_{rms} \leq 2$             |

## Input transducer alternating current $I_{EN}$

|   |                    |
|---|--------------------|
| Standard rated currents $I_{EN}$        | see ordering table |
| Measuring range in rated value $I_{EN}$ | 0 to $I_{EN}$      |
| Continuous overload capacity            | 2 $I_{EN}$         |
| Surge overload capacity                 |                    |
| for $I_{EN} = 1$ A                      | 100 A for 1 s      |
| for $I_{EN} = 5$ A                      | 200 A for 1 s      |

## Input transducer alternating voltage $U_E$

|   |  |
|---|--|
| Standard rated voltage $U_{EN}$         | see ordering table   |
| Special rated voltage $U_{EN}$          | in the range of 40 to 500 V                                |
| Measuring range in rated value $U_{EN}$ | 0 to $U_{EN}$  |
| Continuous overload capacity            | 1.5 x $U_{EN}$ but max. 600 V                              |
| Surge overload capacity                 | $\leq 2 \times U_{EN}$ (5 surges 1 s, at intervals of 5 s) |

## Output

|                                 |  |
|---------------------------------|--|
|                                 | Load-independent direct current or load-independent direct voltage, short-circuit proof and resistant to no-load operation |
| Standard rated current $I_{AN}$ | 2.5 mA, 5 mA, 10 mA, 20 mA   |
| Special rated current $I_{AN}$  | in the range of 1 to 20 mA   |
| Rated modulation range          | 0 to $I_{AN}$ or 4 – 20 mA   |
| Permissible modulation range    | 0 to 1.2 $I_{AN}$  |
| Zero adjustment                 | in the range of 0 to $I_{AN}$  |
| No-load voltage $U_{AL}$        | $\leq 30$ V  |
| Rated load $R_{BIN}$            | 7.5 V / $I_{AN}$   |
| Operating load $R_B$            | 0 to 15 V / $I_{AN}$   |
| Standard rated voltage $U_{AN}$ | 1 V; 10 V  |
| Rated modulation range          | 0 to $U_{AN}$  |
| Permissible modulation range    | 0 to 1.2 $U_{AN}$  |
| Zero adjustment                 | in the range of 0 to $U_{AN}$  |
| Short-circuit current           | $\leq 25$ mA   |
| Rated load $R_{BUN}$            | $U_{AN} / 1$ mA  |
| Load current $I_B$              | $\leq 5$ mA  |
| Residual ripple $I_{SS}$        | $\leq 0.5\%$ SS from $I_{AN}$ or $U_{AN}$  |
| Setting time $t_{99}$           | $\leq 350$ ms transducer   |

## Auxiliary power $U_H$

|                         |                                     |
|-------------------------|-------------------------------------|
| Input voltage $U_{HIN}$ |                                     |
| Direct voltage          | 24 – 60 V; 110 – 200 V DC           |
| Alternating voltage     | 100/115/230 V AC; 45 – 65 Hz        |
| Input range             | $\pm 20\%$                          |
| Power consumption       | with $U_H = U_{AN}$ , typical value |
| Direct voltage          | 2.5 W                               |
| Alternating voltage     | 2.5 W / 4 VA                        |

## Errors and influencing effects

The relative error information with signs + and -

Error in ref. conditions 0.3% relative to  $I_{AN}$

## Reference conditions

|                           |                        |
|---------------------------|------------------------|
| Input current $I_E$       | 0 to $I_{EN}$          |
| Input voltage $U_E$       | 0 to $U_{EN}$          |
| Frequency $f_E$           | $f_{EN} \pm 1\%$       |
| Waveform                  | sine, THD $\leq 0.2\%$ |
| Load $R_B$                | $R_{BIN} \pm 1\%$      |
| Ambient temperature $T_U$ | 23 °C $\pm 1$ °C       |
| Warm-up period            | $\leq 15$ min          |
| Interfering fields        | none                   |

## Influencing effects

|                                 |  |
|---------------------------------|--|
| of the ambient temperature      | $\leq 0.2\% / 10$ K                                |
| of the frequency (45 bis 65 Hz) | $\leq 0.04\% / \text{Hz}$                          |
| of the waveform                 | $\leq 0.02\%$ per 10% THD (crest factor $\leq 2$ ) |
| of the load for current output  |  |
| for $R_B = 15$ V / $I_{AN}$     | $\leq 0.1\%$                                       |
| of the load with voltage output |  |
| for $R_B =$ to $I_{AN} / 20$ mA | $\leq 10$ mV                                       |
| of the auxiliary power          |  |
| $U_H = 0.8$ to $1.2 U_{HIN}$    | $\leq 0.1\%$                                       |
| of the warm-up                  | $\leq 0.3\%$                                       |

## Other technical specifications

|  |   |
|--|---|
| Basic standard                           | IEC 60688   |
| Surge voltage VDE 0435                   | Input relative to output                                  |
| Part 303 with type test                  | Input relative to auxiliary power                         |
|  | Output relative to auxiliary power                        |
|  | As normal mode voltage                                    |
| To input                                 | $\hat{U} = 5$ kV, 1.2 / 50 $\mu$ s, $R_i = 500 \Omega$    |
| To output                                | $\hat{U} = 5$ kV, 1.2 / 50 $\mu$ s, $R_i = 500 \Omega$    |
|  | In each case, 3 surges in both directions of polarity     |
| Dielectric strength                      | (test voltage)  |
| Input relative to output                 | $U_{off} = 5.5$ kV, 50 Hz, sine 1 min                     |
| Input relative to auxiliary power        | $U_{off} = 5.5$ kV, 50 Hz, sine 1 min                     |
| Output relative to auxiliary power       | $U_{off} = 3.7$ kV, 50 Hz, sine 1 min                     |
| Permissible ambient temperature          | according to IEC 68-2 / 1-3 (type test)                   |
| Working temperature range                | - 10 °C to + 60 °C  |
| Functional temperature range             | - 15 °C to + 70 °C  |
| Storage temperature range                | - 40 °C to + 85 °C  |
| Climatic application class               | EN 60721-3-3  |
|  | Temperature 3K8H, humidity 3K5 (rare slight condensation) |
| Mechanical strength                      | according to DIN EN 61010 Part 1                          |
| against falling and vibration and impact | Impact resistance class IK06 (1J)                         |
| Fire resistance class                    | V0  |

## Safety

|                      |                                  |
|----------------------|----------------------------------|
|                      | according to DIN EN 61010 Part 1 |
| Overvoltage category | III                              |
| Pollution degree     | 2                                |

## Electromagnetic compatibility

|  |          |
|--|----------|
| Emitted interference according to EN 50081-1       |          |
| RFI field strength EN 55022                        | Cl. B    |
| RFI voltage EN 55022                               | Cl. B    |
| Interference immunity according to EN 50082-2      |          |
| Immunity to electromagnetic fields (EN61000-4-3)   | 10 V / m |
| Discharge of static electricity                    |          |
| ESD (EN61000-4-2)                                  | 8 kV     |
| Quick transients, asymmetrical burst (EN61000-4-4) |          |
| Inputs and outputs                                 | 2 kV     |
| Power supply                                       | 4 kV     |
| Surge (IEC 801-5)                                  |          |
| HF current (IEC 801-6)                             | 10 V rms |

### Selection and ordering data

#### Transducer for alternating voltage

Order number: 7KG6106- [ ] [ ] [ ] [ ] [ ] - [ ] B

#### Rated frequency

|          |   |
|----------|---|
| $f_{EN}$ |   |
| 50 Hz    | 2 |
| 60 Hz    | 3 |

#### Input voltage $U_{EN}$ (AC)

|                    |   |
|--------------------|---|
| 40 V               | K |
| 100 / $\sqrt{3}$ V | A |
| 60 V               | L |
| 110 / $\sqrt{3}$ V | B |
| 120 / $\sqrt{3}$ V | C |
| 132 / $\sqrt{3}$ V | D |
| 100 V              | E |
| 110 V              | F |
| 120 V              | J |
| 132 V              | N |
| 150 V              | P |
| 220 V              | G |
| 230 V              | W |
| 240 V              | V |
| 250 V              | Q |
| 300 V              | U |
| 380 V              | H |
| 400 V              | R |
| 500 V              | S |

#### Output signal $I_{AN} / U_{AN}$

|                           |   |   |
|---------------------------|---|---|
| DC 0 to 2.5 mA            | G |   |
| DC 0 to 5 mA              | H |   |
| DC 0 to 10 mA             | J |   |
| DC 0 to 20 mA             | K |   |
| (Live zero) 4 to 20 mA DC | N | 2 |
| DC 0 to 1 V               | L |   |
| DC 0 to 10 V              | M |   |

#### Zero point position

|  |   |
|--|---|
| Measuring range zero = Signal range zero point | 1 |
|--|---|

#### Auxiliary power

|                       |   |
|-----------------------|---|
| 19.2 - 72 V DC        | 1 |
| 88 - 234 V DC         | 4 |
| 45 to 65 Hz, 100 V AC | 5 |
| 45 to 65 Hz, 115 V AC | 6 |
| 45 to 65 Hz, 230 V AC | 7 |

Continued

#### Transducer for alternating voltage

Order number: 7KG6106- [ ] [ ] [ ] [ ] [ ] - [ ] B

#### Measuring range

|                      |   |
|----------------------|---|
| Linear 0 to $U_{EN}$ | 0 |
|----------------------|---|

#### Expanded start range

|  |   |
|--|---|
| 0 to 0.05 to $U_{EN}$ $\triangleq$ 0 to 0.8 to $I_{AN} / U_{AN}$ | 1 |
| 0 to 0.1 to $U_{EN}$ $\triangleq$ 0 to 0.8 to $I_{AN} / U_{AN}$  | 2 |

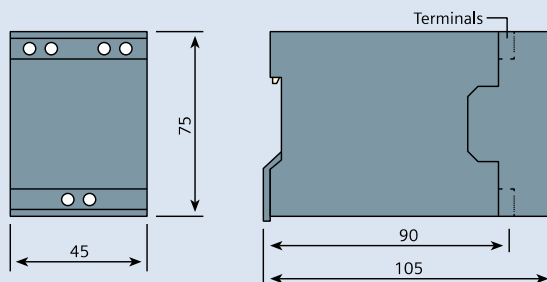
#### Expanded end range

|   |   |
|---|---|
| 0 to 0.9 to 1.1 $U_{EN}$ $\triangleq$ 0 to 0.2 to $I_{AN} / U_{AN}$   | 3 |
| 0 to 0.85 to 1.15 $U_{EN}$ $\triangleq$ 0 to 0.2 to $I_{AN} / U_{AN}$ | 4 |
| 0 to 0.8 to 1.2 $U_{EN}$ $\triangleq$ 0 to 0.2 to $I_{AN} / U_{AN}$   | 5 |

#### Suppressed start range

|   |   |
|---|---|
| 0 to 0.9 to 1.1 $U_{EN}$ $\triangleq$ 0 to 0 to $I_{AN} / U_{AN}$   | 6 |
| 0 to 0.85 to 1.15 $U_{EN}$ $\triangleq$ 0 to 0 to $I_{AN} / U_{AN}$ | 7 |
| 0 to 0.8 to 1.2 $U_{EN}$ $\triangleq$ 0 to 0 to $I_{AN} / U_{AN}$   | 8 |

#### Dimensions



#### Note:

Not all combination possibilities are available for order

### Selection and ordering data

**Transducer for alternating current**

Order number: **7KG6113-**

|  |  |  |  |  |
|--|--|--|--|--|
|  |  |  |  |  |
|--|--|--|--|--|

 - 

|  |   |
|--|---|
|  | B |
|--|---|

| Rated frequency $f_{EN}$                       |   |   |
|--|---|---|
| 50 Hz  | 2 |   |
| 60 Hz  | 3 |   |
| Input current $I_{EN}$ (AC)                    |   |   |
| 1 A  | A |   |
| 1.2 A  | B |   |
| 1.5 A  | K |   |
| 2 A  | C |   |
| 2.4 A  | D |   |
| 2.5 A  | L |   |
| 5 A  | E |   |
| 6 A  | F |   |
| 7.5 A  | G |   |
| 10 A   | J |   |
| Output signal $I_{AN} / U_{AN}$                |   |   |
| DC 0 to 2.5 mA                                 | G |   |
| DC 0 to 5 mA                                   | H |   |
| DC 0 to 10 mA                                  | J |   |
| DC 0 to 20 mA                                  | K |   |
| (Live zero) 4 to 20 mA DC                      | N | 2 |
| DC 0 to 1 V                                    | L |   |
| DC 0 to 10 V                                   | M |   |
| Zero point position                            |   |   |
| Measuring range zero = Signal range zero point | 1 |   |
| Auxiliary power                                |   |   |
| 19.2 - 72 V DC                                 | 1 |   |
| 88 - 234 V DC                                  | 4 |   |
| 45 to 65 Hz, 100 V AC                          | 5 |   |
| 45 to 65 Hz, 115 V AC                          | 6 |   |
| 45 to 65 Hz, 230 V AC                          | 7 |   |
| Measuring range                                |   |   |
| Linear 0 to $I_{EN}$                           | 0 |   |

**Note:**  
Not all combination possibilities are available for order





### Performance features

- Extremely small dimensions
- Fast delivery times
- Standard models from stock
- CE mark
- EMC immunity
- Compliance with relevant national and international standards
- High quality, long service life
- Electrical isolation at high test voltage
- High measuring precision
- High-performance output signal circuits
- High plant safety and reliability

## SIMEAS T DC transducer isolation amplifier

for direct current and direct voltage or as an isolation amplifier

### Description

The SIMEAS T transducers for direct current or direct voltage with auxiliary power convert the input current or input voltage into a load-independent direct output current or a load-independent direct output voltage.

Up to the maximum permissible load, multiple devices – such as recorders, indicators, remote control systems, computers and controllers – can be connected and operated directly or via long-distance lines at the output. Input, output and auxiliary power supply are electrically isolated from each other.

### Principle of operation

The input variable  $E$  is adapted to the voltage duty cycle transformer (2) by resistors (1). The square wave signal it generates is transferred to the output side by the transformer (3), filtered, and processed with the amplifier (4). Corresponding to the characteristic curve, the output amplifier (5) supplies a load-independent direct current  $I_A$  or a load-independent direct voltage  $U_A$  proportional to the input value. Zero adjustment of the characteristic curve can be performed with the reference current.

The auxiliary power isolator (6) generates the electrically isolated power supply for the input circuit.

The auxiliary power is transformed by an alternating or direct voltage module (8) into the internal supply voltages.

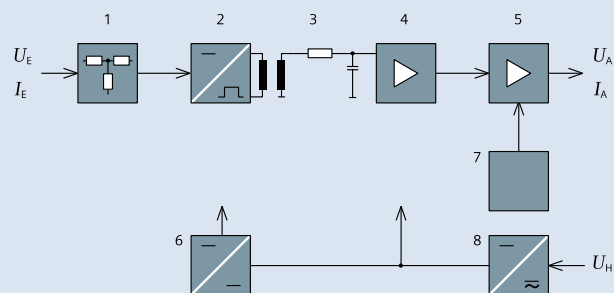
### Design

The transducers are permanently wired and tested functional units. They have a snap-on fastening for a 35 mm standard mounting rail according to DIN EN 50022.

The inputs/outputs and auxiliary power can be safely connected with screw terminals.

The devices are silicone-free, halogen-free and flame-resistant.

The balancing potentiometers and test points can be accessed after removing the enclosure cover.



- |                                       |                             |
|---------------------------------------|-----------------------------|
| 1. Input compensation using resistors | 4. Amplifier                |
| 2. Voltage duty cycle transformer     | 5. Output amplifier         |
| 3. Transformer                        | 6. Auxiliary power isolator |
|                                       | 7. Constant voltage source  |
|                                       | 8. Auxiliary power module   |

## Input

Only for connection to direct voltage systems with a maximum rated voltage of 500 / 1000 V (see Safety)

|   |  |
|---|--|
| Input signal                                | direct voltage $U_E$ or direct current $I_E$   |
| Standard rated current $I_{EN}$             | 1 mA, 2.5 mA, 5 mA, 10 mA, 20 mA   |
| Special rated current $I_{EN}$              | A value in the range of 1 mA to 100 mA   |
| Rated modulation range                      | $-I_{EN}$ to 0 to $+I_{EN}$  |
| Permissible modulation range                | $-1.2 I_{EN}$ to $+1.2 I_{EN}$   |
| Voltage drop at input with $I_{EN}$         | 500 mV $\pm 5\%$   |
| Standard rated voltage $U_{EN}$             | 60 mV, 150 mV, 300 mV, 1 V, 10 V, 15 V, 25 V, 30 V, 60 V, 100 V, 150 V, 250 V, 300 V, 400 V, 500 V, 600 V, 800 V, 1000 V |
| Special rated voltage $U_{EN}$              | A value in the range of 60 mV to 1000 V  |
| Rated modulation range                      | $-U_{EN}$ to 0 to $+U_{EN}$  |
| Permissible modulation range                | $-1.2 U_{EN}$ to 0 to $+1.2 U_{EN}$ but max. 1000 V  |
| Input resistance $R_E$                      |  |
| $U_{EN} = 60 \text{ mV to } 1 \text{ V}$    | $R_E = 30 \text{ k}\Omega / V$   |
| $U_{EN} = 1 \text{ V to } 100 \text{ V}$    | $R_E = 10 \text{ k}\Omega / V$   |
| $U_{EN} = 100 \text{ V to } 1000 \text{ V}$ | $R_E = 2 \text{ k}\Omega / V$  |

## Output signal A

Bipolar load-independent direct current or load-independent direct voltage, short-circuit proof and resistant to no-load operation

|                                      |  |
|--------------------------------------|--|
| Standard rated current $I_{AN}$      | 1 mA, 2.5 mA, 5 mA, 10 mA, 20 mA                               |
| Special rated current $I_{AN}$       | in the range of $\pm 1$ to $\pm 20$ mA                         |
| Rated modulation range               | $-I_{AN}$ to 0 to $+I_{AN}$ or 4 – 20 mA                       |
| Permissible modulation range         | $-1.2 I_{AN}$ to 0 to $+1.2 I_{AN}$                            |
| Zero adjustment                      | in the range of $-I_{AN}$ to $+I_{AN}$                         |
| No-load voltage $U_{AL}$             | $\leq 30 \text{ V}$  |
| Rated load $R_{BIN}$                 | $7.5 \text{ V} / I_{AN}$                                       |
| Operating load $R_B$                 | 0 to $15 \text{ V} / I_{AN}$                                   |
| Standard rated voltage $U_{AN}$      | 1 V; 10 V  |
| Rated modulation range               | 0 to $U_{AN}$  |
| Permissible modulation range         | $-1.2 U_{AN}$ to $+1.2 U_{AN}$                                 |
| Zero adjustment                      | in the range of 0 to $U_{AN}$                                  |
| Short-circuit current                | $\leq 25 \text{ mA}$   |
| Residual ripple $I_{SS}$ or $U_{SS}$ | $\leq 0.5\%$ SS from $I_{AN}$ or $U_{AN}$                      |
| Setting time $t_{99}$                | $\leq 50 \text{ ms}$ (residual error 1% of steady-state value) |

## Auxiliary power $U_H$

|                              |                                     |
|------------------------------|-------------------------------------|
| Rated input voltage $U_{HN}$ |                                     |
| Direct voltage               | 24 – 60 V; 110 – 200 V DC           |
| Alternating voltage          | 100/115/230 V AC; 45 – 65 Hz        |
| Input range                  | $\pm 20\%$                          |
| Power consumption            | with $U_H = U_{HN}$ , typical value |
| Direct voltage               | 2.0 W                               |
| Alternating voltage          | 1.6 W / 2.5 VA                      |

## Errors and influencing effects

The relative error information with signs + and -

Error in ref. conditions 0.2% relative to  $I_{AN}$

Reference conditions

|                                |  |
|--------------------------------|--|
| Input current $I_E$            | 0 to $I_{EN}$  |
| Input voltage $U_E$            | 0 to $U_{EN}$  |
| Aux. alternating voltage $U_H$ | $U_{HN} \pm 1\%$ , THD $\leq 5\%$                        |
| Auxiliary direct voltage $U_H$ | $U_{HN} \pm 1\%$ , AC component $\leq 5\%$               |
| Load $R_B$                     | $R_{BIN} \pm 1\%$ ; $R_{BUN} \pm 1\%$                    |
| Ambient temperature $T_U$      | $23 \text{ }^\circ\text{C} \pm 1 \text{ }^\circ\text{C}$ |
| Warm-up period                 | $\leq 15 \text{ min}$                                    |
| Interfering fields             | none   |

Influencing effects

|   |                             |
|---|-----------------------------|
| of the ambient temperature                    | $\leq 0.2\% / 10 \text{ K}$ |
| of the load for current output                |                             |
| for $R_B = 15 \text{ V} / I_{AN}$             | $\leq 0.1\%$                |
| of the load with voltage output               |                             |
| for $R_B = \text{to } I_{AN} / 20 \text{ mA}$ | $\leq 10 \text{ mV}$        |
| of the auxiliary power                        |                             |
| $U_H = 0.8 \text{ to } 1.2 U_{HN}$            | $\leq 0.1\%$                |
| of the warm-up                                | $\leq 0.3\%$                |

## Other technical specifications

|  |  |
|--|--|
| Basic standard                           | IEC 60688  |
| Surge voltage VDE 0435                   | Part 303 with type test  |
| Input relative to output                 | $\hat{U} = 5 \text{ kV}$ , 1.2 / 50 $\mu\text{s}$ , $R_i = 500 \Omega$ |
| Input relative to auxiliary power        | $\hat{U} = 5 \text{ kV}$ , 1.2 / 50 $\mu\text{s}$ , $R_i = 500 \Omega$ |
| Output relative to auxiliary power       | $\hat{U} = 5 \text{ kV}$ , 1.2 / 50 $\mu\text{s}$ , $R_i = 500 \Omega$ |
| at input and auxiliary power             | $\hat{U} = 5 \text{ kV}$ , 1.2 / 50 $\mu\text{s}$ , $R_i = 500 \Omega$ |
| from output as normal mode voltage       | $\hat{U} = 500 \text{ V}$ , 1.2/50 $\mu\text{s}$ , $R_i = 500 \Omega$  |
|  | 3 surges each in '+' and '-' direction                                 |
| Voltage strength                         | (test voltage) for type test   |
| Input relative to output                 | $U_{\text{off}} = 5.5 \text{ kV}$ , 50 Hz, sine 1 min                  |
| Input relative to auxiliary power        | $U_{\text{off}} = 5.5 \text{ kV}$ , 50 Hz, sine 1 min                  |
| Output relative to auxiliary power       | $U_{\text{off}} = 3.7 \text{ kV}$ , 50 Hz, sine 1 min                  |
| Permissible ambient temperature          | acc. to IEC 68-2 / 1-3 (type test)                                     |
| Working temperature range                | $-10 \text{ }^\circ\text{C}$ to $+60 \text{ }^\circ\text{C}$           |
| Functional temperature range             | $-15 \text{ }^\circ\text{C}$ to $+70 \text{ }^\circ\text{C}$           |
| Storage temperature range                | $-40 \text{ }^\circ\text{C}$ to $+85 \text{ }^\circ\text{C}$           |
| Climatic application class               | EN 60721-3-3   |
|  | Temperature 3K8H, humidity 3K5 (rare slight condensation)              |
|  | acc. to DIN EN 61010 Part 1  |
| Mechanical strength                      |  |
| against falling and vibration and impact | Impact resistance class IK06 (1J)                                      |

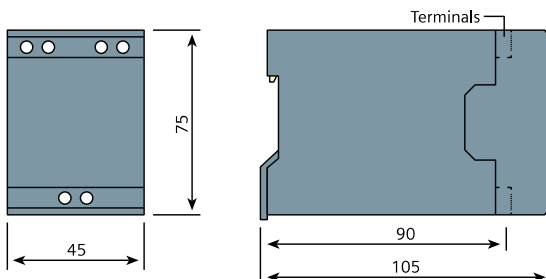
## Safety

|                                      |                                  |
|--------------------------------------|----------------------------------|
| Protective measures                  | according to DIN EN 61010 Part 1 |
| Overvoltage category                 | according to DIN EN 61010 Part 1 |
| with $U_{EN} = 0 - 500 \text{ V}$    | III                              |
| with $U_{EN} = 500 - 1000 \text{ V}$ | II                               |
| Fire resistance class                | V0                               |
| Pollution degree                     | 2                                |

## Electromagnetic compatibility

|  |                         |
|--|-------------------------|
| Emitted interference                               | according to EN 50081-1 |
| RFI field strength                                 | EN 55022, Cl. B         |
| RFI voltage  | EN 55022, Cl. B         |
| Interference immunity                              | according to EN 50082-2 |
| Immunity to electromagnetic fields (EN61000-4-3)   | 10 V / m                |
| Discharge of static electricity                    |                         |
| ESD (EN61000-4-2)                                  | 8 kV                    |
| Quick transients, asymmetrical burst (EN61000-4-4) |                         |
| Inputs and outputs                                 | 2 kV                    |
| Power supply                                       | 4 kV                    |
| Surge (IEC 801-5)                                  |                         |
| HF current (IEC 801-6)                             | 10 V rms                |

## Dimensions



## Selection and ordering data

**Direct voltage,  
direct current  
isolation amplifier**

Order number 7KG6131- 1

**DC input voltage  $U_{EN}$** 

|          |           |   |
|----------|-----------|---|
| - 60 mV  | to 60 mV  | A |
| - 150 mV | to 150 mV | B |
| - 300 mV | to 300 mV | C |
| - 1 V    | to 1 V    | L |
| - 10 V   | to 10 V   | M |
| - 15 V   | to 15 V   | D |
| - 25 V   | to 25 V   | F |
| - 30 V   | to 30 V   | X |
| - 150 V  | to 150 V  | P |
| - 250 V  | to 250 V  | Q |
| - 300 V  | to 300 V  | U |
| - 400 V  | to 400 V  | R |
| - 500 V  | to 500 V  | S |
| - 600 V  | to 600 V  | T |
| - 800 V  | to 800 V  | V |
| - 1000 V | to 1000 V | W |

**DC input current  $I_{EN}$** 

|          |           |   |
|----------|-----------|---|
| - 1 mA   | to 1 mA   | E |
| - 2.5 mA | to 2.5 mA | G |
| - 5 mA   | to 5 mA   | H |
| - 10 mA  | to 10 mA  | L |
| - 20 mA  | to 20 mA  | K |
| 4 mA     | to 20 mA  | N |

**DC output signal  $I_{AN}$  or  $U_{AN}$** 

|          |           |   |
|----------|-----------|---|
| - 1 mA   | to 1 mA   | E |
| - 2.5 mA | to 2.5 mA | G |
| - 5 mA   | to 5 mA   | H |
| - 10 mA  | to 10 mA  | J |
| - 20 mA  | to 20 mA  | K |
| - 1V     | to 1 V    | L |
| - 10 V   | to 10 V   | M |
| 4 mA     | to 20 mA  | N |

**Zero point  
position**

| Input   | Output    |   |
|---------|-----------|---|
| 0 mA, V | = 0 mA, V | 1 |
| 0 mA, V | = 4 mA    | 2 |
| 0 mA, V | = 12 mA   | 3 |
| 4 mA    | = 0 mA, V | 4 |
| 12 mA   | = 0 mA, V | 5 |

Continued:

**Direct voltage,  
direct current  
isolation amplifier**

Order number 7KG6131- 1

**Auxiliary power**

|           |             |   |
|-----------|-------------|---|
| 24 V DC   | to 60 V     | 1 |
| 110 V DC  | to 220 V    | 4 |
| 100 V AC, | 45 to 65 Hz | 5 |
| 115 V AC, | 45 to 65 Hz | 6 |
| 220 V AC, | 45 to 65 Hz | 7 |

**Note:**Not all combination possibilities  
are available for order

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