CAMILLE BAUER

SINEAX U553
Transducer for AC Voltage

With power supply
RMS value measurement
Carrying rail housing P13/70

*Fig. 1. Transducer SINEAX U553 in housing **P13/70** clipped onto a top-hat rail.*

Application

The transducer **SINEAX U553** (Fig. 1) converts a sinusoidal or a distorted AC voltage into a **load independent** DC current or a **load independent** DC voltage proportional to the measured value.

The transducer fulfils all the important requirements and regulations concerning electromagnetic compatibility **EMC** and **Safety** (IEC 1010 resp. EN 61 010). It was developed and is manufactured and tested in strict accordance with the **quality assurance standard** ISO 9001.

Features / Benefits

- **Measuring input: AC voltage, sine or distorted wave forms, RMS value measurement**

Measured variable	Measuring range limits
AC voltage	0 … 20 to 0 … 690 V

- **Measuring output: Unipolar and live-zero output variables**
- **Measuring principle: Logarithmic method**
- **AC/DC power supply / Universal**
- **Standard version as per Germanischer Lloyd**

Mode of operation

Input signal U~ is galvanically separated from the mains network using a transformer.

The following mathematical expression is then formed using a root-mean-square value computer

$$U_{eff} = \left| \sqrt{\frac{1}{T} \int_{\varnothing}^{T} u^2 \, dt} \right|$$

Following filtration by means of an active filter, the transformation properties of the measuring transducer are determined in the succeeding characteristics circuit.

The output amplifier transforms the measuring signal into an impressed DC current output signal A.

The electronic components are supplied with voltage H from the mains supply unit H.

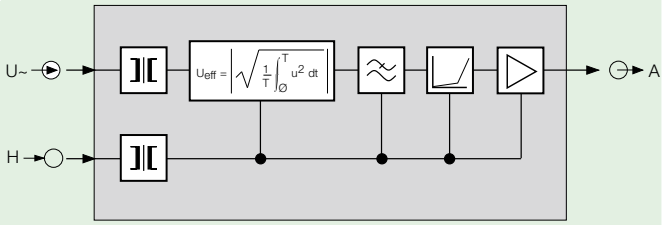

Fig. 2. Block diagram.

Technical data

General

Measured quantity:	AC voltage Sine or distorted wave forme RMS value measurement
Measuring principle:	Logarithmic method

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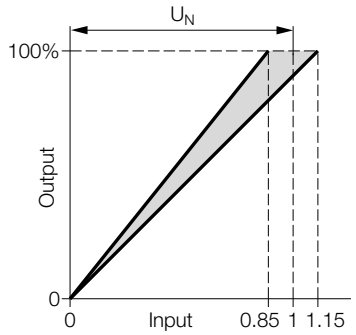
Measuring input E

Nominal frequency f_N: 50/60 or 400 Hz

Nominal input voltage U_N (measuring range end value): 0 … 20 to 0 … 690 V

Setting: Admissible alteration of full-scale output, variable sensitivity, adjustable with potentiometer

Setting range
0.85 … 1.15 · U_N (± 15%)



Own consumption: ≤ 1 VA with input end value

Overload capacity:

Measured quantity U_N	Number of applications	Duration of one application	Interval between two successive applications
1.2 · U_N[1]	—	continuously	—
2 · U_N[1]	10	1 s	10 s

[1] *But max. 264 V with power supply from measuring input*

Measuring output A

Load-independent DC current: 0 … 1 to 0 … 20 mA
resp. live-zero
0.2 … 1 to 4 … 20 mA

Burden voltage: 15 V

External resistance: R_{ext} max. [kΩ] = $\frac{15\ V}{I_{AN}\ [mA]}$

I_{AN} = Output current end value

Load-independent DC voltage: 0 … 1 to 0 … 10 V
resp. live-zero
0.2 … 1 to 2 … 10 V

External resistance: $R_{ext}\ [k\Omega] \geq \frac{U_A\ [V]}{2\ mA}$

Current limit under overload: ≤ 1.5 · I_{AN} at current output
Approx. 10 mA at voltage output

Voltage limit under $R_{ext} = \infty$: ≤ 25 V

Residual ripple in output current: ≤ 0.5% p.p. at setting time 300 ms
≤ 2% p.p. at setting time 50 ms

Setting time: 50 ms or 300 ms

Power supply H

AC/DC power pack (DC or 50/60 Hz)

Table 1: Rated voltages and permissible variations

Rated voltage	Tolerancd
85 … 230 V DC / AC	DC – 15 … + 33% AC ± 15%
24 … 60 V DC / AC	

Option: Connected to the low tension terminal side 12 and 13
24 V AC or 24 … 60 V DC

Power consumption: 3 VA

Accuracy (acc. to EN 60 688)

Reference value: Output end value

Basic accuracy: Class 0.5

Reference conditions:

Ambient temperature: 15 … 30 °C

Input variable: Rated operating range

Frequency: f_N ± 2 Hz

Curve shape: Sine-wave

Crest factor: $\sqrt{2}$

Power supply: In rated range

Output burden: Current: 0.5 · R_{ext} max.
Voltage: 2 · R_{ext} min.

Warm-up time: ≤ 5 min.

Influence effects (maxima):
included in basic error

Frequency	40 … 400 Hz,	± 0.3%
	30 … 1000 Hz,	± 0.5%
Crest factor	1 … 2.5	± 0.2%
	> 2.5 … 6	± 0.5%

Safety

Protection class: II (protection isolated, EN 61 010)

Housing protection: IP 40, housing
(test wire, EN 60 529)
IP 20, terminals
(test finger, EN 60 529)

Contamination level: 2

Overvoltage category: III

Rated insulation voltage (versus earth):	400 V, input 230 V, power supply 40 V, output
Test voltage:	50 Hz, 1 min. acc. to EN 61 010-1
	3700 resp. 5550 V, input versus all other circuits as well as outer surface
	3700 V, power supply versus output as well as outer surface
	490 V, output versus outer surface

Installation data

Mechanical design:	Housing **P13/70**
Material of housing:	Lexan 940 (polycarbonate), flammability Class V-0 acc. to UL 94, self-extinguishing, non-dripping, free of halogen
Mounting:	For rail mounting
Mounting position:	Any
Weight:	Approx. 0.3 kg

Connecting terminals

Connection element:	Screw-type terminals with indirect wire pressure
Permissible cross section of the connection leads:	≤ 4.0 mm^2 single wire or 2 × 2.5 mm^2 fine wire

Environmental conditions

Operating temperature:	– 10 to + 55 °C
Storage temperature:	– 40 to + 70 °C
Relative humidity of:	≤ 75%, no dew
Altitude:	2000 m max.
Indoor use statement!	

Ambient tests

EN 60 068-2-6:	Vibration
Acceleration:	± 2 g
Frequency range:	10 … 150 … 10 Hz, rate of frequency sweep: 1 octave/minute
Number of cycles:	10, in each of the three axes
EN 60 068-2-27:	Shock
Acceleration:	3 × 50 g 3 shocks each in 6 directions
EN 60 068-2-1/-2/-3:	Cold, dry heat, damp heat
IEC 1000-4-2/-3/-4/-5/-6 EN 55 011:	Electromagnetic compatibility

Germanischer Lloyd

Type approval certificate:	No. 12 259-98 HH
Ambient category:	C
Vibrations:	0.7 g

Table 2: Specification and ordering information

Designation	*Blocking code	No-go with blocking code	Article No./ Feature
SINEAX U553 **Order Code 553 - xxxx xx**			553 –
Features, Selection			
1. Mechanical design			
Housing P13/70 for rail mounting			4
2. Nominal input frequency			
50/60 Hz			1
400 Hz			3

Continuation see on next page!

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Designation	*Blocking code	No-go with blocking code	Article No./ Feature
SINEAX U553 **Order Code 553 - xxxx xx**			553 –
Features, Selection			
3. Measuring range			
0 … 100 V	B		C
0 … 110 V	B		D
0 … 120 V	B		F
0 … 150 V	B		J
0 … 250 V	C		K
0 … 500 V*	C		L
Non-standard [V]			Z
0 … 20 to 0 … 690 V With power supply from measuring input min. 24 V / max. 230 V, see feature 5, lines 3 and 4. * Max. 400 V nominal value of the network against earth (operating voltage acc. to EN 61 010)			
4. Output signal			
0 … 20 mA, R_{ext} ≤ 750 Ω			1
4 … 20 mA, R_{ext} ≤ 750 Ω			2
Non-standard [mA]			9
0 … 1.00 to 0 … < 20 0.2 … 1 to < (4 … 20)			
0 … 10 V, R_{ext} ≥ 5 kΩ			A
Non-standard [V]			Z
0 … 1.00 to 0 … < 10 0.2 … 1 to 2 … 10			
5. Power supply			
85 … 230 V AC/DC			1
24 … 60 V AC/DC			2
From measuring input ≥ 24 … 60 V AC		BC	3
From measuring input ≥ 85 … 230 V AC		AC	4
Connected to the low tension terminal side 12 and 13 24 V AC / 24 … 60 V DC			5
6. Setting time			
0.3 s			1
50 ms			2
7. Test certificate			
Without test certificate			0
Test certificate in German			D
Test certificate in English			E

**Lines with letter(s) under "no-go" cannot be combined with preceding lines having the same letter under "Blocking code".*

Electrical connections

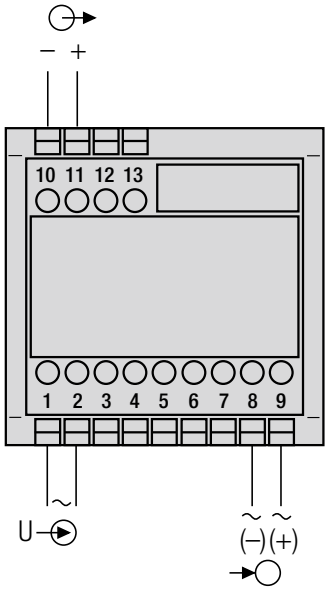

Fig. 3. Power supply connected to terminals 8 and 9.

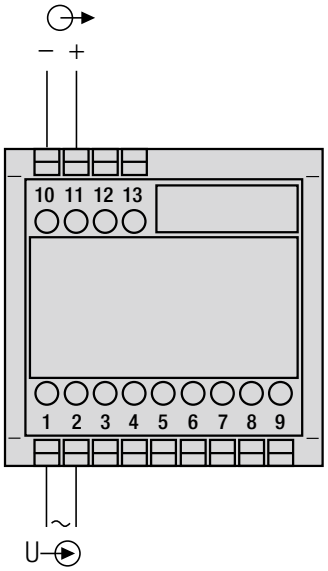

Fig. 4. Power supply internal from measuring input, without separated power supply connected.

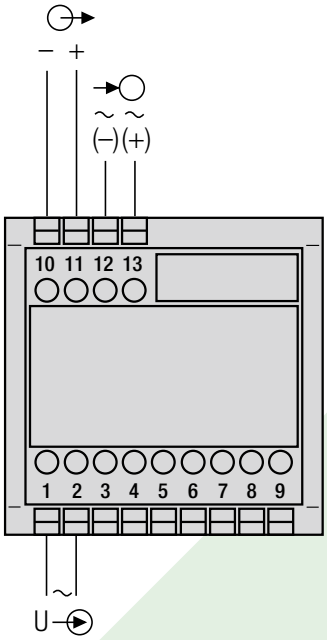

Fig. 5. Power supply connected to the low tension terminal side 12 and 13.

= Measuring input
= Measuring output
= Power supply

Dimensional drawing

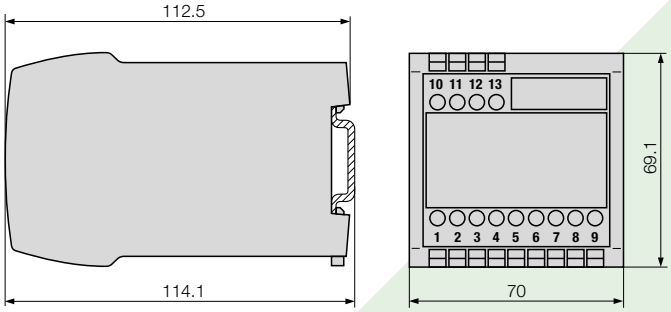

*Fig. 6. SINEAX U553 in housing **P13/70** clipped onto a top-hat rail (35 ×15 mm or 35×7.5 mm, acc. to EN 50 022).*

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Standard accessories

1 Operating Instructions in three languages: German, French, English