

SINEAX VC604s

Programmable Safety Value Converter

for direct currents, direct voltages, temperature sensors, teletransmitters or potentiometers



SINEAX VC604s is a multifunctional transmitter for top-hat rail assembly with the following main characteristics:

- Measurement of DC voltage, DC current, temperature (RTD, TC) and resistance
- Sensor connection without any external jumpers
- 2 inputs (e.g. for sensor redundancy or difference formation)
- 1 output (U or I)
- 2 inputs can be linked with each other and allocated to the 2 outputs which enables calculations and sensor monitoring (e.g. prognostic maintenance of sensors).
- System capability: Communication via Modbus interface
- 2 freely programmable relays with changeover contacts, e.g. for limit or alarm signalling
- AC/DC wide-range power supply unit
- Pluggable high-quality screw terminals

All settings of the instrument can be adapted to the measuring task by PC software. The software also serves visualising, commissioning and service.

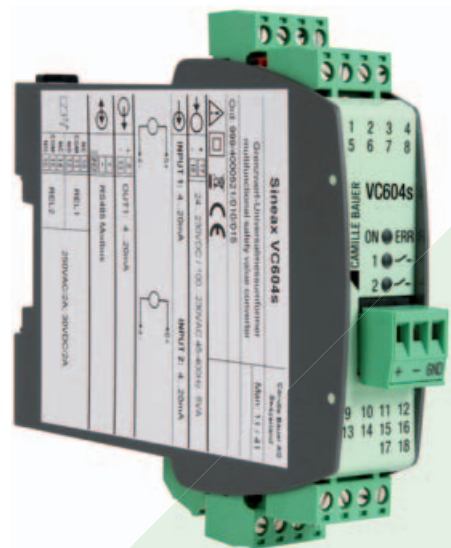


Table 1: Input variables, measuring ranges

Type of measurement	Measuring range	Minimum span
DC voltage [mV]	-1000 ... 1000 mV	2 mV
DC current [mA]	-50 ... 50 mA	0.2 mA
Resistance [Ω]	0 ... 5000 Ω	8 Ω
RTD Pt100	-200 ... 850 °C	20 K
RTD Ni100	-60 ... 250 °C	15 K
TC Type B	0 ... 1820 °C	635 K
TC Type E	-270 ... 1000 °C	34 K
TC Type J	-210 ... 1200 °C	39 K
TC Type K	-270 ... 1372 °C	50 K

Type of measurement	Measuring range	Minimum span
TC Type L	-200 ... 900 °C	38 K
TC Type N	-270 ... 1300 °C	74 K
TC Type R	-50 ... 1768 °C	259 K
TC Type S	-50 ... 1768 °C	265 K
TC Type T	-270 ... 400 °C	50 K
TC Type U	-200 ... 600 °C	49 K
TC Type W5Re-W26Re	0 ... 2315 °C	135 K
TC Type W3Re-W25Re	0 ... 2315 °C	161 K

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Technical data

Measuring input 1

Direct voltage

Measuring range mV For limits see table 1
 $R_i > 10 \text{ M}\Omega$,
 continuous overload max. $\pm 1200 \text{ mV}$

Direct current

Measuring range mA For limits see table 1
 $R_i = 11 \Omega$,
 continuous overload max. $\pm 50 \text{ mA}$

Resistance thermometer RTD

Resistance measurement types Pt100 (IEC 60751), adjustable Pt20...Pt1000
 Ni100 (DIN 43760), adjustable Ni50...Ni1000

Measuring range limits See table 1

Wiring 2, 3 or 4-wire connection

Measuring current 0.2 mA

Line resistance 30 Ω per line, in 2-wire connection adjustable or calibratable

Thermocouples TC

Thermocouples Type B, E, J, K, N, R, S, T (IEC 60584-1)
 Type L, U (DIN 43760)
 Type W5Re-W26Re, W3Re-W25Re (ASTM E988-90)

Measuring range limits See table 1

Cold junction compensation Internal (with installed Pt100), with Pt100 on terminals or with external reference junction $-20 \dots 70 \text{ }^\circ\text{C}$

Resistance measurement, teletransmitter, potentiometer

Measuring range limits See table 1

Wiring 2, 3 or 4-wire connection

Resistance teletransmitter Type WF and WF DIN

Measuring current 0.2 mA

Line resistance 30 Ω per line, in 2-wire connection adjustable or calibratable

Measuring input 2

Direct current

Measuring range mA Same as measuring input 1

Direct voltage

Measuring range mV Same as measuring input 1

Resistance thermometer RTD

Same as measuring input 1 except:
 Wiring 2 or 3 wire connection

Thermocouples TC

Same as measuring input 1

Resistance measurement, teletransmitter, potentiometer

Same as measuring input 1 except:
 Wiring 2 or 3 wire connection

Please note

The measuring inputs 1 and 2 are galvanically connected. If 2 input sensors or input variables are used, observe combination options in Table 3 and circuit instructions contained in the operating instructions!

Analog output

Direct current

Output range $\pm 20 \text{ mA}$, range may be freely set
 max. 12 V

Burden voltage < 18 V

Open circuit voltage Adjustable, max. $\pm 22 \text{ mA}$

Limit < 50 μA pp (after low pass 10 kHz)

Residual ripple > 5 $\text{M}\Omega$

Source resistance

Direct voltage

Output range $\pm 10 \text{ V}$, range may be freely set
 max. 20 mA

Load Approx. 30 mA

Current limit Adjustable, max. $\pm 11 \text{ V}$

Limit < 20 mV pp (after low pass 10 kHz)

Residual ripple < 2 Ω

Source resistance

Output settings

Limitation
 Gain/offset trimming
 Inversion

Relay contact outputs

Contact 1 pole, changeover contact

Switching capacity AC: 2 A / 250 V AC
 DC: 2 A / 30 V

Bus/programming connection

Interface, protocol RS-485, Modbus RTU

Baudrate 9.6...115.2 kBaud, adjustable

Transmission behaviour

Measured quantities for the outputs

- Input 1
- Input 2
- Input 1 + input 2
- Input 1 – input 2
- Input 2 – input 1
- Input 1 · input 2
- Minimum value, maximum value or mean value of input 1 and input 2
- Sensor redundancy Input 1 or input 2

Transmission function Linear, user-specific via

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basic value table
(24 basic values per measured variable)

Settling time: Adjustable 1...30 s

Limit values and monitoring

Number of limit values 4

Measured variable for the limit values

- Input 1
- Input 2
- Measured variable for outputs
- Input 1 – input 2 (e.g. drift monitoring in case of 2 sensors)
- Input 2 – input 1 (e.g. drift monitoring in case of 2 sensors)

Functions Absolute value
Gradient dx/dt (e.g. temperature gradient monitoring)

Time delay Adjustable 0...3600 s

Signalling Relay contact, alarm LED, status 1, status 3

Sensor breakage and short circuit monitoring of measuring input

Signalling Relay contact, alarm LED, status 1
Output value in case of a fault

Other monitoring operations

Drift monitoring Monitoring of measured value difference between 2 input sensors for a certain period of time (e.g. due to different sensor response times).
If the limit value is exceeded for this time, an alarm is signalled. (See limit values 1 and 2)

Sensor redundancy Measurement with 2 temperature sensors; if sensor 1 fails (fault) sensor 2 is activated for bridging (see measuring quantities for outputs)

Alarm signalling

Time delay Adjustable 0...60 s

Alarm LED "ERR"

Relay contact With closed contact, the yellow LED shines, invertible



Output value in case of a fault For sensor breakage and short circuit, value adjustable -10...110%

Power supply

Rated voltage UN	Tolerance
24...230 V DC	±15%
100...230 V AC, 50...400 Hz	±15%

Consumption 2.0 W resp. 5.5 VA

Displays at the instrument

LED	Color	Function
ON/ERR	green	Power on
	red	Alarm
	flashing	Communication active
1 	yellow	Relay 1 on
2 	yellow	Relay 2 on

Configuration, programming

Operation via PC software «CB-Manager»

Accuracies (according to EN/IEC 60770-1)

Reference conditions

Ambient temperature 23 °C ± 2 K

Power supply 24 V DC

Reference value Span

Settings Input 1: Direct voltage mV, 0...1000 mV
Output 1: 4...20 mA, burden resistance 300 Ω
Mains frequency 50 Hz, Setting time 1 s
Input 2, output 2, relay, monitoring off resp. not active, for voltage output: range 0...10 V, burden resistance >1 MΩ

Installation position Vertically, detached

Basic accuracy

At reference conditions ±0.1%

Other types of measurement and input ranges:

RTD Pt100, Ni100 ±0.1% ±0.2 K

Resistance measurement ±0.1% ±0.1 Ω

TC Type K, E, J, T, N, L, U ±0.1% ±0.4 K, measuring value > -100 °C

TC Type R, S ±0.1% ±2.4 K

TC Type B ±0.1% ±2.4 K, measuring value > 300 °C

TC W5Re-W26Re, W3Re-W25Re ±0.1% ±2.0 K

DC voltage mV ±0.1% ±0.015 mV

DC current mA ±0.1% ±0.0015 mA

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Additional error (additive)

High range minimum value (Minimum value >40% of maximum value):	±0.1% of maximum value
Small output range	±0.1% * (reference range / new range)
Cold junction compensation internal	±3 K

Influencing factors

Ambient temperature	±0.1% per 10 K at reference con- ditions other settings: basic accuracy and additional errors per 10 K
Long-term drift	±0.1%
Common mode influence	±0.01%

Ambient conditions

Operating temperature	-25 ... +55 °C
Storage temperature	-40 ... +70 °C
Relative humidity	≤75%, no dew
Range of utilisation	Indoor up to 2000 m above sea level

Installation details

Design	Top-hat rail housing U4 Flammability class V-0 according to UL 94
Dimensions	See dimensional drawing
Assembly	For snap-on fastening on top-hat rail (35 x 15 mm or 35 x 7.5 mm) according to EN 50022
Terminals	Pluggable, 2.5 mm ²
Weight	150 g

Product safety, regulations

Electromagnetic compatibility	EN 61000-6-2 / 61000-6-4
Ingress protection (acc. EN 60529)	Housing IP 40 terminal IP20
Electric design	Acc. EN 61010
Degree of pollution	2
Between power supply and all circuits and between the measuring input (1 + 2) and all circuits	Reinforced insulation overvoltage category III Working voltage 300 V Test voltage 3.7 kV AC rms
Between output (1 + 2) and relay contact	Reinforced insulation overvoltage category II Working voltage 300 V Test voltage 2.3 kV AC rms
Between output (1 + 2) and the bus connection	Functional insulation Working voltage <50 V Test voltage 0.5 kV AC rms

Environmental tests	EN 60068-2-1/-2/-3 EN 60068-2-27 Shock: 50g, 11ms, sawtooth, half-sine EN 60068-2-6 Vibration: 0.15mm/2g, 10...150Hz, 10 cycles
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Electric connections

Circuit	Terminal	Remarks
Measuring input	1 to 8	See table 2
Output	9 (+), 13 (-)	
Relay contacts	nc com no	In dead voltage condition nc and com are connected
relay 1	10 11 12	
relay 2	14 15 16	
Power supply	17 (+/-) 18 (-/-)	Note polarity at DC
Bus/ programming con- nection	+, -, GND	Front plug

Table 2: Connection of inputs

Please note: If 2 input sensors or input variables are used, observe combination options in Table 3 and circuit instructions contained in the operating instructions!

Type of measurement	Wiring	
	Input 1	Input 2
Direct voltage mV		
Thermocouple with external cold junction thermostat or internally compensated		
Thermocouple with Pt100 at the terminals at the same input		

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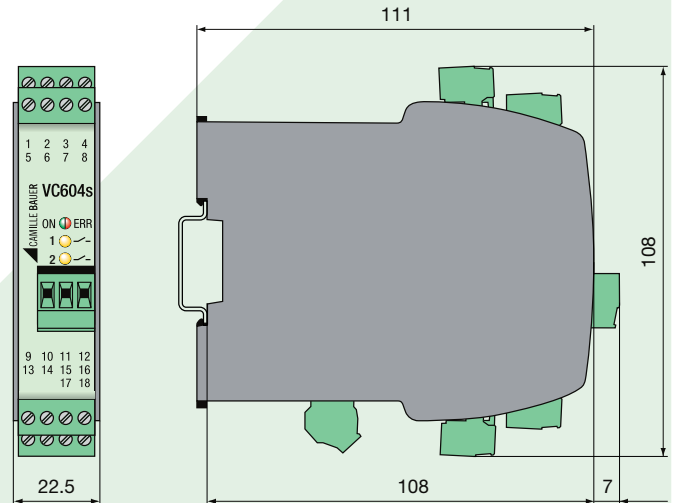
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Type of measurement	Wiring	
	Input 1	Input 2
Thermocouple with Pt100 at the terminals at the other input		
Resistance thermometer or resistance measurement 2-wire		
Resistance thermometer or resistance measurement 3-wire		
Resistance thermometer or resistance measurement 4-wire		
Resistance-teletransmitter WF		
Resistance-teletransmitter WF-DIN		
Direct current mA		

Table 3: Measuring method combination options

Input 1 measuring method	Input 2 measuring method	U [mV]	TC ext.	TC int.	R 2L	R 3L	RTD 2L	RTD 3L	I [mA]	
		earthed	earthed	earthed						
Terminals		7,8	7,8	7,8	2,7,8	2,8	2,7,8	2,8	2,7,8	6,4
U [mV] earthed	3,4	✓	✓	✓	✓	✓	✓	✓	✓	✓
I [mA]	5,4	✓	✓	✓	✓	✓	✓	✓	✓	✓
TC ext. earthed	3,4	✓	✓	✓	✓	✓	✓	✓	✓	✓
TC int. earthed	3,4	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1,3,4	✓	✓		✓	✓	✓	✓		
R 2L	1,4	✓	✓		✓	✓	✓	✓		
R 3L	1,3,4	✓	✓		✓	✓	✓	✓		
R 4L	1,2,3,4	✓	✓							
RTD 2L	1,4	✓	✓		✓	✓	✓	✓		
RTD 3L	1,3,4	✓	✓		✓	✓	✓	✓		
WF	1,3,4	✓	✓		✓	✓	✓	✓		
WF_DIN	1,3,4	✓	✓		✓	✓	✓	✓		
RTD 4L	1,2,3,4	✓	✓							

Dimensional drawing



Scope of supply

- 1 SINEAX VC604s
- 1 Safety Instructions 170 217
- 1 Software and Docu-CD 156027

Accessories

USB-RS485 converter
(for programming the VC604s) Article No. 163 189

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Ordering details

VC604s, Programmable	C604s
Features, Selection	
1. Mechanical design Top-hat rail housing	1
2. Version Standard	1
3. Climatic rating Standard climatic rating	1
4. Test certificate without test certificate	0
with test certificate German	D
with test certificate English	E
5. Configuration Basic configuration	G

Basic configurations

Type	Basic configuration
Standard	Input 1 and 2: 4...20mA Output: 4...20mA



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