

SINEAX V 604s

Programmable multifunctional transmitter

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



SINEAX V604s 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)
- 2 outputs (U and / 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
- Freely programmable relay, 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 voltage [V]	-300 ... 300 V	>1 V
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

Type of measurement	Measuring range	Minimum span
TC Type K	-270 ... 1372 °C	50 K
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 Typ W5Re-W26Re	0 ... 2315 °C	135 K
TC Type W3Re-W25Re	0 ... 2315 °C	161 K

SINEAX V 604s

Programmable multifunctional transmitter

Technical data

Measuring input 1

Direct voltage

Measuring range mV	For limits see table 1 $R_i > 10 \text{ M}\Omega$, continuous overload max. $\pm 1200 \text{ mV}$
Measuring range V (only in corresponding device type)	For limits see table 1 $R_i = 1.4 \text{ M}\Omega$, continuous overload max. $\pm 300 \text{ V}$

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, external with reference junction thermostat $-20...70 \text{ }^\circ\text{C}$

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 (only in corresponding device type)	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 following device types are available:

a) V604s with measuring input for 1x direct current [mA] and 1x high direct voltage [V]
The direct voltage [V] and direct current [mA] measuring methods can be allocated to Input 1 or Input 2 here.

b) V604s with measuring input for 2x direct current [mA]

The different device types are firm and cannot be reprogrammed!

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 outputs 1 and 2

The two outputs are galvanically connected and have a common earth. Voltage and current output software-configurable.

Direct current

Output range	$\pm 20 \text{ mA}$, range may be freely set
Burden voltage	max. 12 V
Open circuit voltage	< 20 V
Limit	Adjustable, max. $\pm 22 \text{ mA}$
Residual ripple	< 1% pp related to 20 mA

Direct voltage

Output range	$\pm 10 \text{ V}$, range may be freely set
Load	max. 20 mA
Current limit	Approx. 30 mA
Limit	Adjustable, max. $\pm 11 \text{ V}$
Residual ripple	< 1% pp related to 10 V

Output settings

Limit	
Gain/offset trimming	
Inversion	

Relay contact output

Contact	1 pole, normally open 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

SINEAX V 604s

Programmable multifunctional transmitter

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

sensor 2 is activated for bridging (see measuring quantities for outputs)

Alarm signalling

Relay contact

With closed contact, the yellow LED shines, invertible

Alarm LED

Time delay

Adjustable 0...60 s

Output value in case of a fault

For sensor breakage and short circuit, value adjustable –10...110%

Transmission function

Linear, user-specific via basic value table (24 basic values per measured variable)

Settling time:

Adjustable 1...30 s

Power supply

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

Limit values and monitoring

Limit values 1 and 2

Number

2

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)

Displays at the instrument

LEDs in front plate

Power ON:

Green LED, the LED flashes if the device is addressed via the interface.

Relay contact:

Yellow LED

Alarm:

Red LED

Configuration, programming

Operation with PC software «CB-Manager»

Functions

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

Time delay

Adjustable 0...3600 s

Signalling

Relay contact, alarm LED, status 1

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 or not active, for voltage output: range 0...10 V, burden resistance 2 kΩ

Sensor breakage and short circuit monitoring 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)

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, meas. value > –100 °C

TC Type R, S

±0.1% ±2.4 K

TC Type B

±0.1% ±2.4 K,

SINEAX V 604s

Programmable multifunctional transmitter

TC W5Re-W26Re, W3Re-W25Re	meas. value > 300°C
DC voltage mV	±0.1% ±2.0 K
DC voltage V	±0.1% ±0.015 mV
DC current mA	±0.1% ±0.0045 V
	±0.1% ±0.0015 mA

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/ series mode influence	±0.2%

Ambient conditions

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

Installation details

Design	Top-hat rail housing U4 Combustibility 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 50 022
Terminals	Pluggable, 2.5 mm ²
Weight	0.14 kg

Product safety, regulations

Electromagnetic compatibility	EN 61 000-6-2 / 61 000-6-4
Ingress protection (acc. IEC 529 or EN 60529)	Housing IP 40 terminal IP20
Electric design	Acc. IEC or EN 61 010
Degree of pollution	2
Between power supply and all circuits and be- tween 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 60 068-2-1/-2/-3 EN 60 068-2-27 Shock: 50g, 11ms, sawtooth, half-sine EN 60 068-2-6 Vibration: 0.15mm/2g, 10...150Hz, 10 cycles

Electric connections

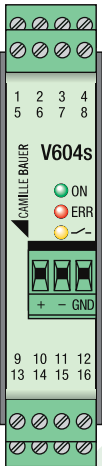
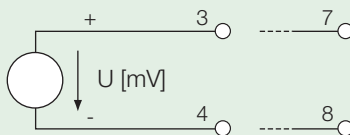
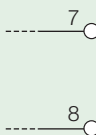
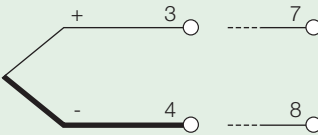
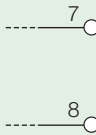
	Circuit	Terminal	Remarks
	Measuring input	1 to 8	See table 2
	Output 1 Output 2	11 (+), 12 (-) 10 (+), 12 (-)	
	Relay contacts	9, 13	
	Power supply	15 (+/~) 16 (-/~)	
	Bus/ programming connection	+, -, GND	Front plug

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		

Programmable multifunctional transmitter

Type of measurement	Wiring	
	Input 1	Input 2
Thermocouple with Pt100 at the terminals at the same input		
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		

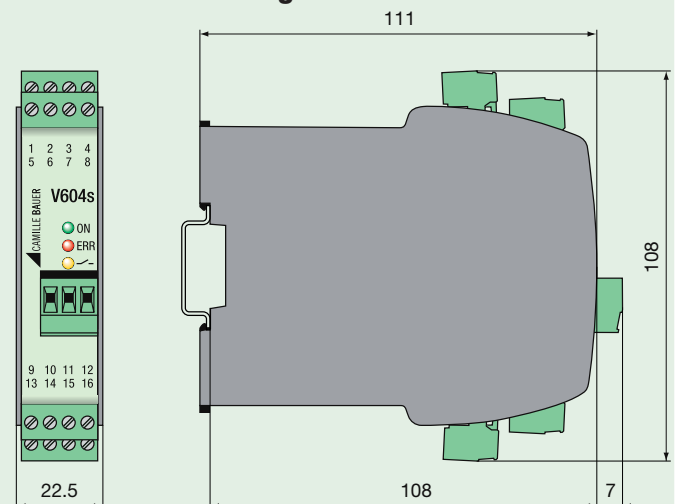
Type of measurement	Wiring	
	Input 1	Input 2
Direct voltage V (only in corresponding device type)		
Direct current mA (Input 2 only in corresponding device type)		

Table 3: Measuring method combination options

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

- 1 Selectable only in device type 1x direct current [mA] and 1x high voltage [V]
- 2 Selectable only in device type 2x direct current [mA]

Dimensional drawing



SINEAX V 604s

Programmable multifunctional transmitter

Scope of supply

1 SINEAX V604s
 1 Safety Instructions 168501
 1 Software and Docu-CD 156027

Accessories

USB-RS485 converter
 (for programming the V604s) Article No. 163189

Ordering details

Standard versions

The following transmitter types programmed in basic configuration are available as standard versions. An indication of the article number is sufficient:

Version	Configuration	Article No.
With measuring input for 1x direct current [mA] and 1x direct voltage [V]	Input 1: 0...1000mV Output 1: 4...20mA	168329
With measuring input for 2x direct current [mA]	Input 1 and 2: 4...20mA Output 1 and 2: 4...20mA	169624

Please note:

This are two hardware platforms.
 A SINEAX V604s with high DC Voltage cannot be configured to 2 x mA inputs afterwards, just as a SINEAX V604s with 2 x mA cannot measure a high DC Voltage.

V604s, Programmable	604s
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
Programmed to order	A
6. Mains ripple suppression 50Hz	1
60Hz	2

V604s, Programmable	604s
Features, Selection	
7. Input 1	
mV – Input (range –1000 ... 1000 mV) [mV]: _____	A
V – Input (range –300 ... 300 V) [V]: _____	B
mA – Input (range –50 ... 50 mA) [mA]: _____	C
Thermocouple (internal compensation)	D
Resistance thermometer 2-wire	E
Resistance thermometer 3-wire	F
Resistance thermometer 4-wire	G
Resistance sensor 2-wire	H
Resistance sensor 3-wire	J
Resistance sensor 4-wire	K
mV – Input: minimum span 2 mV	
V – Input: minimum span >1 V	
mA – Input: minimum span 0,2 mA	
8. Sensor Type Input 1	
Not used	0
Type B (Range 0 ... 1820 °C) [°C]: _____	A
Type E (Range –270 ... 1000 °C) [°C]: _____	B
Type J (Range –210 ... 1200 °C) [°C]: _____	C
Type K (Range –270 ... 1372 °C) [°C]: _____	D
Type L (Range –200 ... 900 °C) [°C]: _____	E
Type N (Range –270 ... 1300 °C) [°C]: _____	F
Type R (Range –50 ... 1768 °C) [°C]: _____	G
Type S (Range –50 ... 1768 °C) [°C]: _____	H
Type T (Range –270 ... 400 °C) [°C]: _____	J
Type U (Range –200 ... 600 °C) [°C]: _____	K
Type W5Re-W26Re (Range 0 ... 2315 °C) [°C]: _____	L
Type W3Re-W25Re (Range 0 ... 2315 °C) [°C]: _____	M
RTD Pt 100 (Range –200 ... 850 °C) [°C]: _____	N
RTD Pt 1000 (Range –200 ... 850 °C) [°C]: _____	O
RTD Ni 100 (Range –60 ... 250 °C) [°C]: _____	P

SINEAX V 604s

Programmable multifunctional transmitter

V604s, Programmable	604s
Features, Selection	
RTD Ni 1000 (Range -60 ... 250 °C) [°C]: _____	Q
Resistor (Range 0 ... 5000 Ω) [W]: _____	R
Type B: minimum Span 635 K	
Type E: minimum Span 34 K	
Type J: minimum Span 39 K	
Type K: minimum Span 50 K	
Type L: minimum Span 38 K	
Type N: minimum Span 74 K	
Type R: minimum Span 259 K	
Type S: minimum Span 265 K	
Type T: minimum Span 50 K	
Type U: minimum Span 49 K	
Type W5Re-W26Re: minimum Span 135 K	
Type W3Re-W25Re: minimum Span 161 K	
RTD Pt 100: minimum Span 20 K	
RTD Pt 1000: minimum Span 20 K	
RTD Ni 100: minimum Span 15 K	
RTD Ni 1000: minimum Span 15 K	
Resistor: minimum Span 8	
9. Input 2	
Not used	0
mV – Input (Range -1000 ... 1000 mV) [mV]: _____	A
mA – Input (Range -50 ... 50 mA) [mA]: _____	C
Thermocouple (internal compensation)	D
Resistance thermometer 2-wire	E
Resistance thermometer 3-wire	F
Resistance sensor 2-wire	H
Resistance sensor 3-wire	J
mV – Input: minimum Span 2 mV	
mA – Input: minimum Span 0,2 mA	
10. Sensor Type Input 2	
Not used	0
Type B (Range 0 ... 1820 °C) [°C]: _____	A
Type E (Range -270 ... 1000 °C) [°C]: _____	B
Type J (Range -210 ... 1200 °C) [°C]: _____	C
Type K (Range -270 ... 1372 °C) [°C]: _____	D
Type L (Range -200 ... 900 °C) [°C]: _____	E
Type N (Range -270 ... 1300 °C) [°C]: _____	F

V604s, Programmable	604s
Features, Selection	
Type R (Range -50 ... 1768 °C) [°C]: _____	G
Type S (Range -50 ... 1768 °C) [°C]: _____	H
Type T (Range -270 ... 400 °C) [°C]: _____	J
Type U (Range -200 ... 600 °C) [°C]: _____	K
Type W5Re-W26Re (Range 0 ... 2315 °C) [°C]: _____	L
Type W3Re-W25Re (Range 0 ... 2315 °C) [°C]: _____	M
RTD Pt 100 (Range -200 ... 850 °C) [°C]: _____	N
RTD Pt 1000 (Range -200 ... 850 °C) [°C]: _____	O
RTD Ni 100 (Range -60 ... 250 °C) [°C]: _____	P
RTD Ni 1000 (Range -60 ... 250 °C) [°C]: _____	Q
Resistor (Range 0 ... 5000 Ω) [W]: _____	R
minimum Span ditto Sensor Type Input 1	
11. Output signal / Measuring output 1	
current (Range -20 ... 20 mA) [mA]: _____	1
voltage (Range -10 ... 10 V) [V]: _____	2
12. Output signal / Measuring output 2	
Not used	0
current (Range -20 ... 20 mA) [mA]: _____	1
voltage (Range -10 ... 10 V) [V]: _____	2

Basic configurations

Type	Basic configuration
Standard, with measuring for 2x direct current [mA]	Input 1 and 2: 4...20mA Output 1 and 2: 4...20mA

SINEAX V 604s

Programmable multifunctional transmitter



Rely on us.

Camille Bauer AG
Aargauerstrasse 7
CH-5610 Wohlen / Switzerland

Phone: +41 56 618 21 11

Fax: +41 56 618 35 35

info@camillebauer.com

www.camillebauer.com