

# SINEAX V 604s

## Programmable multifunctional transmitter

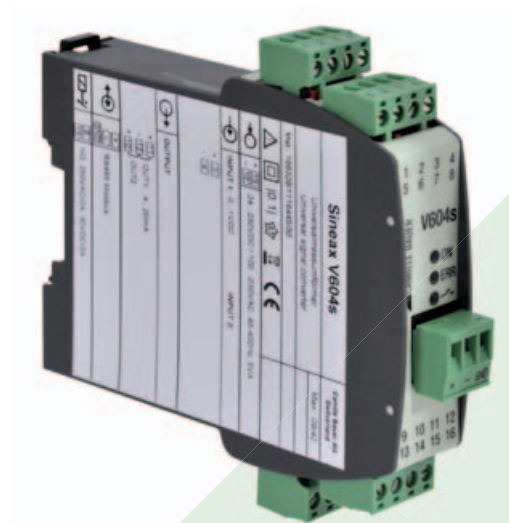
**for direct currents, direct voltages, temperature sensors, teletransmitters or potentiometers**



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 [ $\Omega$ ]	0 ... 5000 $\Omega$	8 $\Omega$
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

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### Technical data

#### Measuring input 1

##### Direct voltage

Measuring range mV	For limits see table 1 Ri > 10 MΩ
Measuring range V	For limits see table 1 Ri = 1.4 MΩ

##### Direct current

Measuring range mA	For limits see table 1 Ri = 11 Ω
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#### 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 °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 voltage

Measuring range mV	Same as measuring input 1
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##### Resistance thermometer RTD

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

##### Thermocouples TC

Same as measuring input 1	
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#### Resistance measurement, teletransmitter, potentiometer

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

#### Please note

The direct voltage measuring range V and direct current mA types of measurement can also be allocated to input 2 as input variable in the instrument configuration. However, as input wiring they are only available once.

The measuring inputs 1 and 2 are galvanically connected. In case of 2 sensors, please observe the wiring instruction in the operating manual!

#### 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	± 20 mA, range may be freely set
Burden voltage	max. 12 V
Open circuit voltage	< 20 V
Limit	Adjustable, max. ±22 mA

##### Direct voltage

Output range	± 10 V, range may be freely set
Load	max. 20 mA
Current limit	Approx. 30 mA
Limit	Adjustable, max. ±11 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

#### Transmission behaviour

Measured quantities for the outputs	<ul style="list-style-type: none"> <li>• Input 1</li> <li>• Input 2</li> <li>• Input 1 + input 2</li> <li>• Input 1 – input 2</li> <li>• Input 2 – input 1</li> <li>• Input 1 · input 2</li> <li>• Minimum value, maximum value or mean value of input 1 and input 2</li> <li>• Sensor redundancy Input 1 or input 2</li> </ul>
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Transmission function      Linear,  
user-specific via  
basic value table  
(24 basic values per measured  
variable)

Settling time:                Adjustable 1...30 s

### 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)

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

Time delay                    Adjustable 0...3600 s

Signalling                    Relay contact, alarm LED,  
status 1

### 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 sen-  
sors 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

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 cir-  
cuit, value adjustable -10...110%

### Power supply

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

### Displays at the instrument

LEDs in front plate      Power ON: Green LED  
Relay contact: Yellow LED  
Alarm: Red LED

### Configuration, programming

Operation with 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 or not active

#### 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 TypeR, S                ±0.1% ±2.4 K  
TC Type B                    ±0.1% ±2.4 K, meas. value > 300°C  
TC W5Re-W26Re,  
W3Re-W25Re                ±0.1% ±2.0 K  
DC voltage mV              ±0.1% ±0.015 mV  
DC voltage V                ±0.1% ±0.0045 V  
DC current mA              ±0.1% ±0.0015 mA

#### Additional error (additive)

High range minimum value  
(Minimum value >40%  
of maximum value):      ±0.05% of maximum value  
Small output range        ±0.05% \* (reference range / new  
range)  
Reference range in case of voltage  
output 0...10 V

Cold junction  
compensation internal      ±3 K  
Ambient temperature      ±0.1% per 10 K  
Long-term drift              ±0.1%  
Common mode/  
series mode influence      ±0.2%

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### 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 <sup>2</sup>
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 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/-6/-27

### Electric connections

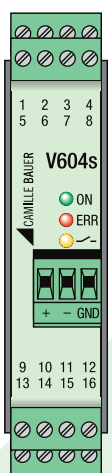
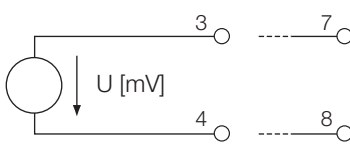
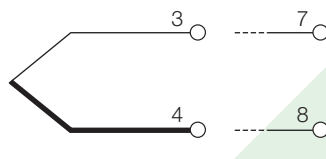
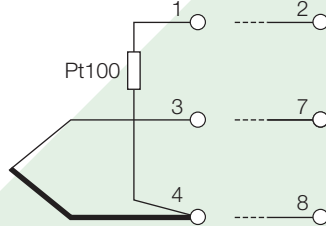
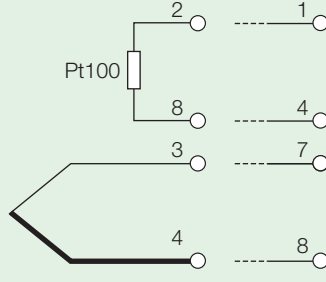
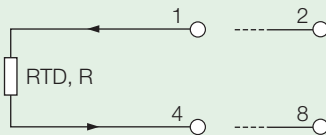
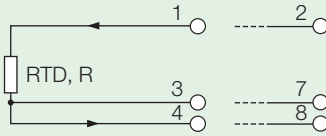
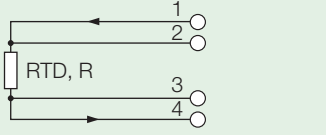
	<b>Circuit</b>	<b>Terminal</b>	<b>Remarks</b>
	Measuring input	1 to 8	See table 2
	Output 1 Output 2	11 (+), 12 (-) 10 (+), 12 (-)	
	Relay contacts	9, 13	
	Power supply	15 (+/-) 16 (-/-)	
	Bus/ programming connection	+, -, GND	Front plug

Table 2: Connection of inputs

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		
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		

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Type of measurement	Wiring	
	Input 1	Input 2
Resistance-teletransmitter WF		
Resistance-teletransmitter WF-DIN		
Direct voltage V		
Direct current mA		

### Scope of supply

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

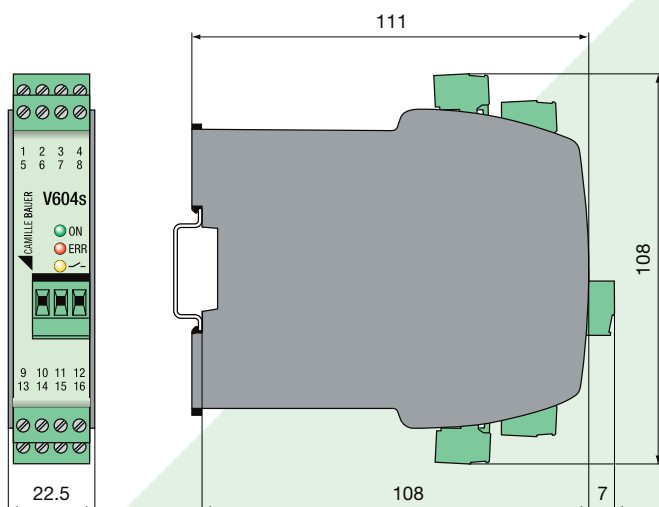
### Accessories

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

### Ordering details

Version	Order code	Article No.
Standard	604s-1110 G	168329
With test certificate in German	604s-111D G	—
With test certificate in English	604s-111E G	—

### Dimensional drawing



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