SINEAX VC 603
Programmable combined transmitter/alarm unit

for DC currents or voltages, temperature sensors, remote sensors or potentiometers

CE 0102 II (1) G

Application

The combined transmitter/alarm unit **SINEAX VC 603** (Figs. 1 and 2) converts the input variable – a DC current or voltage, or a signal from a thermo-couple, resistance thermometer, remote sensor or potentiometer – to a proportional analogue output signal. It is also equipped with 2 limit contacts for monitoring the input variable.

The analogue output signal is either an impressed current or superimposed voltage which is processed by other devices for purposes of displaying, recording and/or regulating a constant. The binary output signals of the two limit contact circuits are used for signalling out-of-limit conditions, control purposes and two-point regulation.

A considerable number of measuring ranges including bipolar or spread ranges are available.

Input variable and measuring range are programmed with the aid of a PC and the corresponding software. Other parameters relating to specific input variable data, the analogue output signal, the transmission mode, the operating sense, the binary output signals and the open-circuit sensor supervision can also be programmed.

The open-circuit sensor supervision is in operation when the SINEAX VC 603 is used in conjunction with a thermo-couple, resistance thermometer, remote sensor or potentiometer.

The transmitter/alarm unit 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/ EN 29 001.

Production QA is also certified according to guideline 94/9/EG.

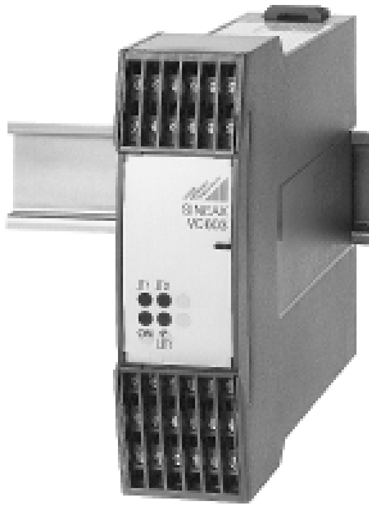


*Fig. 1. SINEAX VC 603 in housing **S35** clipped onto a top-hat rail.*

*Fig. 2. SINEAX VC 603 in housing **S35** screw hole mounting brackets pulled out.*

Features / Benefits

- **Input variable** (temperature, variation of resistance, DC signal) **and measuring range programmed using PC / Simplifies project planning and engineering** (the final measuring range can be determined during commissioning)**. Short delivery times and low stocking levels**
- **Analogue output signal and binary output signals also programmed on the PC** (analogue: impressed current or superimposed voltage for all ranges between – 20 and + 20 mA DC resp. – 12 and + 15 V DC; binary: various functions associated with the limit contact circuits) **/ Universally applicable. Short delivery times and low stocking levels**
- **Electrical insulation between measured variable, analogue output signal, binary output signals and power supply / Safe isolation acc. to EN 61 010**
- **Wide power supply tolerance / Only two operating voltage ranges between 20 and a maximum of 264 V DC/AC**
- **Available in type of protection "Intrinsic safety" [EEx ia] IIC** (see "Table 7: Data on explosion protection")
- **Ex devices also directly programmable on site / No supplementary Ex interface needed**
- **Standard version as per Germanischer Lloyd**
- **Provision for either snapping the transmitter/alarm unit onto top-hat rails or securing it with screws to a wall or panel**

SINEAX VC 603
Programmable combined transmitter/alarm unit

- **Other programmable parameters: specific measured variable data** (e.g. two, three or four-wire connection for resistance thermometers, “internal” or “external” cold junction compensation of thermo-couples etc.)**, transmission mode** (special linearised characteristic or characteristic determined by a mathematical relationship, e.g. output signal = f (measured variable)), **operating sense** (output signal directly or inversely proportional to the measured variable) **and open-circuit sensor supervision** (output signal assumes fixed preset value between – 10 and 110%, supplementary output contact signalling relay) **/ Highly flexible solutions for measurement problems**
- **All programming operations by IBM XT, AT or compatible PC running the self-explanatory, menu-controlled programming software, if necessary during operation / No ancillary hand-held terminals needed**
- **Digital measured variable data available at the programming interface / Simplifies commissioning, measured variable and signals can be viewed on PC in the field**
- **Standard software includes functional test program / No external simulator or signal injection necessary**
- **Self-monitoring function and continuously running test program / Automatic signalling of defects and device failure**

Programming (Figs. 3 and 4)

A PC with RS 232 C interface (Windows 3.1x, 95, 98, NT or 2000), the programming cable PRKAB 600 and the configuration software VC 600 are required to program the transmitter/alarm unit. (Details of the programming cable and the software are to be found in the separate Data sheet: PRKAB 600 Le.)

The connections between
“PC ↔ PRKAB 600 ↔ SINEAX VC 603” can be seen from Fig. 3. The power supply must be applied to SINEAX VC 603 before it can be programmed.

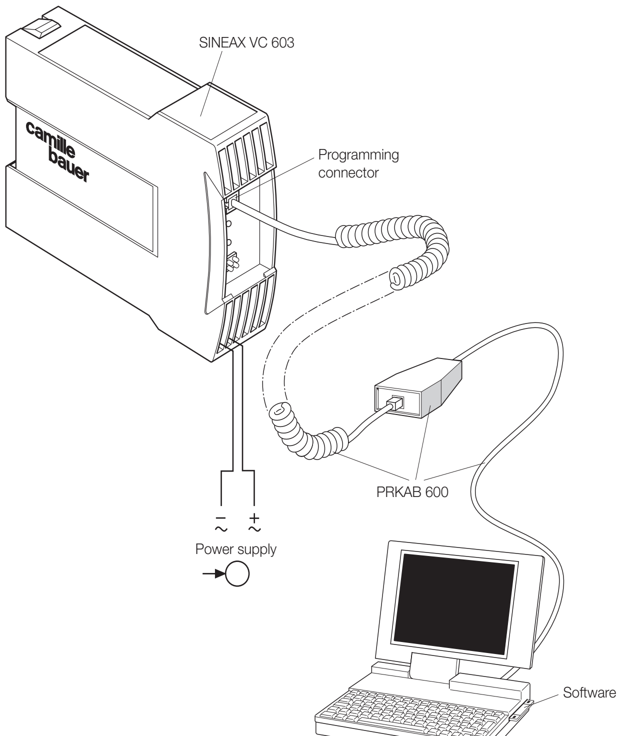


Fig. 3

A suitable PC is an IBM XT, AT or compatible.

The software VC 600 is supplied on a CD.

The programming cable PRKAB 600 adjusts the signal level and provides the electrical insulation between the PC and the transmitter/alarm unit SINEAX VC 603.

The programming cable PRKAB 600 is used for programming both standard and Ex versions.

Of the programmable details listed in section “Features/Benefits”, **one** parameter – the **output signal** – has to be determined by PC programming as well as mechanical setting on the transmitter/alarm unit …

… the output signal **range by PC**

… the **type** of output (current or voltage signal) has to be set **by DIP switch** (see Fig. 4).

The eight pole DIP switch is located on the PCB in the SINEAX VC 603.

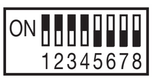
DIP switches	Type of output signal
	impressed current
	superimposed voltage

Fig. 4

Technical Data

Measuring input

Measured variable M

The measured variable M and the measuring range can be programmed

Table 1: Measured variables and measuring ranges

Measured variables	Measuring ranges Limits	Min. span	Max. span
DC voltages			
direct input	± 300 mV [1]	2 mV	300 mV
via potential divider[2]	± 40 V [1]	300 mV	40 V
DC currents			
low current range	± 12 mA[1]	0.08 mA	12 mA
high current range	– 50 to + 100 mA[1]	0.75 mA	100 mA
Temperature monitored by two, three or four-wire resistance thermometers	– 200 to 850 °C		
low resistance range	0...740 Ω[1]	8 Ω	740 Ω
high resistance range	0...5000 Ω[1]	40 Ω	5000 Ω
Temperature monitored by thermo-couples	– 270 to 1820 °C	2 mV	300 mV
Variation of resistance of remote sensors / potentiometers			
low resistance range	0...740 Ω[1]	8 Ω	740 Ω
high resistance range	0...5000 Ω[1]	40 Ω	5000 Ω

DC voltage

Measuring range: See Table 1

Direct input: Wiring diagram No. 1[3]

Input resistance: Ri > 10 MΩ
Continuous overload
max. – 1.5 V, + 5 V

Input via potential divider: Wiring diagram No. 2[3]

Input resistance: Ri = 1 MΩ
Continuous overload
max. ± 100 V

[1] *Note permissible value of the ratio "full-scale value/span ≤ 20"*
[2] *Max. **30 V** for **Ex** version with I.S. measuring input*
[3] *See "Table 9: Measuring input".*

DC current

Measuring range: See Table 1

Low currents: Wiring diagram No. 3[3]

Input resistance: Ri = 24.7 Ω
Continuous overload
max. 150 mA

High currents: Wiring diagram No. 3[3]

Input resistance: Ri = 24.7 Ω
Continuous overload
max. 150 mA

Resistance thermometer

Measuring range: See Tables 1 and 8

Resistance types: Type Pt 100 (DIN IEC 751)
Type Ni 100 (DIN 43 760)
Type Pt 20/20 °C
Type Cu 10/25 °C
Type Cu 20/25 °C
See "Table 6: Specification and ordering information", feature 6 for other Pt or Ni.

Measuring current: ≤ 0.38 mA for
measuring range 0...740 Ω
or
≤ 0.06 mA for
measuring range 0...5000 Ω

Standard circuit: 1 resistance thermometer:
- two-wire connection, wiring diagram No. 4[3]
- three-wire connection, wiring diagram No. 5[3]
- four-wire connection, wiring diagram No. 6[3]

Summation circuit: Series or parallel connection of 2 or more two, three or four-wire resistance thermometers for deriving the mean temperature or for matching other types of sensors,
wiring diagram Nos. 4 - 6[3]

Differential circuit: 2 identical three-wire resistance thermometers for deriving the mean temperature RT1–RT2,
wiring diagram No. 7[3]

Input resistance: R_i > 10 MΩ

Lead resistance: ≤ 30 Ω per lead

SINEAX VC 603
Programmable combined transmitter/alarm unit

Thermo-couples

Measuring range:	See Tables 1 and 8
Thermo-couple pairs:	Type B: Pt30Rh-Pt6Rh (IEC 584) Type E: NiCr-CuNi (IEC 584) Type J: Fe-CuNi (IEC 584) Type K: NiCr-Ni (IEC 584) Type L: Fe-CuNi (DIN 43710) Type N: NiCrSi-NiSi (IEC 584) Type R: Pt13Rh-Pt (IEC 584) Type S: Pt10Rh-Pt (IEC 584) Type T: Cu-CuNi (IEC 584) Type U: Cu-CuNi (DIN 43710) Type W5-W26 Re Other thermo-couple pairs on request
Standard circuit:	1 thermo-couple, internal cold junction compensation, wiring diagram No. 8[1] 1 thermo-couple, external cold junction compensation, wiring diagram No. 9[1]
Summation circuit:	2 or more thermo-couples in a summation circuit for deriving the mean temperature, external cold junction compensation, wiring diagram No. 10[1]
Differential circuit:	2 identical thermo-couples in a differential circuit for deriving the mean temperature TC1 – TC2, no provision for cold junction compensation, wiring diagram No. 11[1]
Input resistance:	R_i > 10 MΩ

Cold junction compensation:	Internal or external
Internal:	Incorporated Ni 100
Permissible variation of the internal cold junction compensation:	± 0.5 K at 23 °C, ± 0.25 K/10 K
External:	0...70 °C, programmable

Resistance sensor, potentiometer

Measuring range:	See Table 1
Resistance sensor types:	Type WF Type WF DIN Potentiometer see "Table 6: Specification and ordering information" feature 5.
Measuring current:	≤ 0.38 mA for measuring range 0...740 Ω or ≤ 0.06 mA for measuring range 0...5000 Ω
Kinds of input:	1 resistance sensor WF current measured at pick-up, wiring diagram No. 12[1] 1 resistance sensor WF DIN current measured at pick-up, wiring diagram No. 13[1] 1 resistance sensor for two, three or four-wire connection, wiring diagram Nos. 4-6[1] 2 identical three-wire resistance sensors for deriving a differential, wiring diagram No. 7[1]
Input resistance:	R_i > 10 MΩ
Lead resistance:	≤ 30 Ω per lead

[1] *See "Table 9: Measuring input".*

Measuring output

Output signals A1 and A2

The output signals available at A1 and A2 can be configured for either an impressed DC current I_A or a superimposed DC voltage U_A by appropriately setting DIP switches. The desired range is programmed using a PC. A1 and A2 are not DC isolated and exhibit the same value.

Standard ranges for I_A:	0...20 mA or 4...20 mA
Non-standard ranges:	Limits –22 to + 22 mA Min. span 5 mA Max. span 40 mA
Open-circuit voltage:	Neg. –13.2...–18 V, pos. 16.5...21 V
Burden voltage I_{A1}:	+ 15 V, resp. –12 V
External resistance I_{A1}:	R_{ext} max. [kΩ] = $\frac{15\ V}{I_{AN}\ [mA]}$ resp. = $\frac{-12\ V}{I_{AN}\ [mA]}$ I_{AN} = Full-scale output current
Burden voltage I_{A2}:	< 0.3 V
External resistance I_{A2}:	R_{ext} max. [kΩ] = $\frac{0,3\ V}{I_{AN}\ [mA]}$
Residual ripple:	< 1% p.p., DC ... 10 kHz < 1.5% p.p. for an output span < 10 mA
Standard ranges for U_A:	0...5, 1...5, 0...10 or 2...10 V
Non-standard ranges:	Limits –12 to + 15 V Min. span 4 V Max. span 27 V
Short-circuit current:	≤ 40 mA
Load-capacity U_{A1} / U_{A2}:	20 mA

External resistance
U_{A1} / U_{A2} : $R_{ext}\,[k\Omega] \geq \frac{U_A\,[V]}{20\,mA}$

Residual ripple: < 1% p.p., DC ... 10 kHz
< 1.5% p.p. for an output span < 8 V

Fixed settings for the output signals A1 and A2

After switching on: A1 and A2 are at a fixed value for 5 s after switching on (default).

Setting range between –10 and 110%[1] programmable, e.g. between 2.4 and 21.6 mA (for a scale of 4 to 20 mA).

The green LED ON flashes for 5 s

When input variable out of limits: A1 and A2 are at either a lower or an upper fixed value when the input variable …

… falls more than 10% below the minimum value of the permissible range

… exceeds the maximum value of the permissible range by more than 10%.

Lower fixed value = –10%[1], e.g. –2 mA (for a scale of 0 to 20 mA).

Upper fixed value = 110%[1], e.g. 22 mA (for a scale of 0 to 20 mA).

The green LED ON flashes

Open-circuit sensor: A1 and A2 are at a fixed value when an open-circuit sensor is detected (see Section “Sensor and open-circuit lead supervision ⌁”).

The fixed value of A1 and A2 is configured to either maintain the value at the instant the open-circuit occurs or adopt a preset value between –10 and 110%[1], e.g. between 1.2 and 10.8 V (for a scale of 2 to 10 V).

The green LED ON flashes and the red LED ⌁ lights continuously

[1] *In relation to analogue output span A1 resp. A2.*

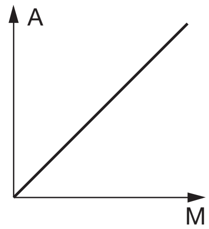
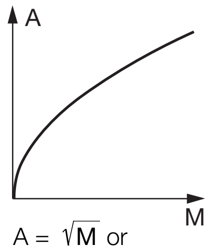
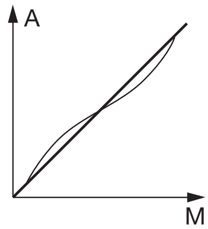
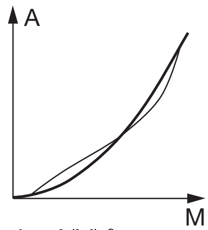
[2] *25 input points M given referred to a linear output scale from –10% to + 110% in steps of 5%.*

[3] *25 input points M given referred to a quadratic output scale from –10% to + 110%. Pre-define output points: 0, 0, 0, 0.25, 1, 2.25, 4.00, 6.25, 9.00, 12.25, 16.00, 20.25, 25.00, 30.25, 36.00, 42.25, 49.00, 56.25, 64.00, 72.25, 81.00, 90.25, 100.0, 110.0, 110.0%.*

Output characteristic

Characteristic: Programmable

Table 2: Available characteristics (acc. to measured variable)

<table>
<tr><th>Measured variables</th><th colspan="2">Characteristic</th></tr>
<tr><td>DC voltage</td><td rowspan="5" colspan="2">A = M</td></tr>
<tr><td>DC current</td></tr>
<tr><td>Resistance thermometer (linear variation of resistance)</td></tr>
<tr><td>Thermo-couple (linear variation of voltage)</td></tr>
<tr><td>Sensor or potentiometer</td></tr>
<tr><td>DC voltage</td><td rowspan="2" colspan="2">$A = \sqrt{M}$ or
$A = \sqrt{M^3}$</td></tr>
<tr><td>DC current</td></tr>
<tr><td>DC voltage</td><td rowspan="5">A = f (M) [2]
linearised</td><td rowspan="8">Special characteristics</td></tr>
<tr><td>DC current</td></tr>
<tr><td>Resistance thermometer (linear variation with temperature)</td></tr>
<tr><td>Thermo-couple signal (linear variation with temperature)</td></tr>
<tr><td>Sensor or potentiometer</td></tr>
<tr><td>DC voltage</td><td rowspan="3">A = f (M) [3]
quadratic</td></tr>
<tr><td>DC current</td></tr>
<tr><td>Sensor or potentiometer</td></tr>
</table>

Operating sense: Programmable
output signal directly
or
inversely proportional to measured variable

Setting time (IEC 770): Programmable
from 2 to 30 s

SINEAX VC 603
Programmable combined transmitter/alarm unit

Power supply H

DC, AC power pack (DC and 45...400 Hz)

Table 3: Nominal voltage and tolerance

Nominal voltage U_N	Tolerance	Instrument version
24... 60 V DC / AC	DC – 15...+ 33% AC ± 15%	Standard (Non-Ex)
85...230 V [1] DC / AC		
24... 60 V DC / AC	DC – 15...+ 33% AC ± 15%	Type of protection “Intrinsic safety” [EEx ia] IIC
85...230 V AC	± 10%	
85...110 V DC	– 15...+ 10%	

Power consumption: ≤ 2.2 W resp. ≤ 4.2 VA

Open-circuit sensor circuit supervision

Resistance thermometers, thermo-couples, remote sensors and potentiometer input circuits are supervised. The circuits of DC voltage and current inputs are not supervised.

Pick-up/reset level: 1 to 15 kΩ, acc. to kind of measurement and range

Signalling mode

Output signals A1 and A2: Programmable fixed values. The fixed value of A1 and A2 is configured to either maintain their values at the instant the open-circuit occurs or adopt a preset value between – 10 and 110%[2], e.g. between 1.2 and 10.8 V (for a scale of 2 to 10 V)

Frontplate signals: The green LED ON flashes and the red LED lights continuously

Output contact K3: **Relay 3**
1 potentially-free changeover contact (see Table 4)
Operating sense programmable
The relay can be either energised or de-energised in the case of a disturbance.
Set to “relay disabled” if not required!

[1] *An external supply fuse must be provided for DC supply voltages > 125 V.*

[2] *In relation to analogue output span A1 resp. A2.*

Output contacts for alarm unit 1, 2, (3)

Binary output signals K1, K2, K3

Output contact K1: **Relay 1**
2 potentially-free changeover contacts (see Table 4)

Output contact K2: **Relay 2**
1 potentially-free changeover contact (see Table 4)

Output contact K3: **Relay 3**
1 potentially-free changeover contact (see Table 4)

K3 is only available, providing it is **not** being used for open-circuit sensor supervision (see Section “Open-circuit sensor circuit supervision »). This applies …

… in all cases when the measured variable is a DC voltage or current

… when the measured variable is a resistance thermometer, a thermo-couple, a remote sensor or a potentiometer and the relay is set to **“Relay disabled”**

Limit type: Programmable

– Disabled

– Lower limit value of the measured variable (see Fig. 5, left)

– Upper limit value of the measured variable (see Fig. 5, left)

– Maximum rate-of-change of the measured variable

$$\text{Slope} = \frac{\Delta \text{ measured variable}}{\Delta t}$$

(see Fig. 5, right)

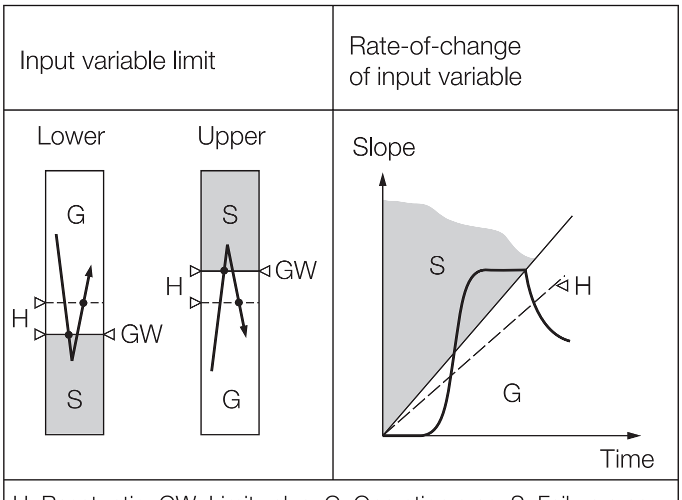


Fig. 5. Switching function according to limit monitored.

Trip point setting **using PC** for GW1, GW2 and GW3: Programmable

- – between –10 and 110%[1] (of the measured variable)
- – between ± 1 and ± 50%[1]/s (of the rate-of-change of the measured variable)

Trip point setting **using potentiometer** ☼ ⎍1 and ☼ ⎍2 for GW1 and GW2: Programmed to

- – Relative (± 10%) Setting range ± 10% referred to the set limit
- – Absolute (0...100%) Setting range 0...100%

Reset ratio: Programmable

- – between 0.5 and 100%[1] (of the measured variable)
- – between 1 and 100%[1]/s (of the rate-of-change of the measured variable)

Operating and resetting delays: Programmable

- – from 1 to 60 s

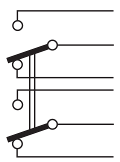
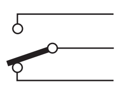
Operating sense: Programmable

- – Relay energised, LED on
- – Relay energised, LED off
- – Relay de-energised, LED on
- – Relay de-energised, LED off

(once limit reached)

Relay status signal: GW1 and GW2 by yellow LED's ⎍1 and ⎍2, GW3 by red LED (⎍3)

Table 4: Contact arrangement and data

Symbol		Material	Contact rating
Relay 1		Gold flashed silver alloy	AC: ≤ 2 A/250 V (500 VA) DC: ≤ 1 A/0.1...250 V (30 W)
Relay 2 and 3			

Relay approved by UL, CSA, TÜV, SEV

Programming connector

Interface:	RS 232 C
FCC-68 socket:	6/6 pin
Signal level:	TTL (0/5 V)
Power consumption:	Approx. 50 mW

Accuracy data (acc. to DIN/IEC 770)

Basic accuracy:	Max. error ≤ ± 0.2% Including linearity and repeatability errors for current, voltage and resistance measurement	
Additional error (additive):	< ± 0.3%	for linearised characteristic
	< ± 0.3%	for measuring ranges < 5 mV, 0.3…0.75 V, < 0.2 mA or < 20 Ω
	< ± 0.3%	for a high ratio between full-scale value and measuring range > factor 10, e.g. Pt 100 175.84 Ω…194.07 Ω ≙ 200 °C…250 °C
	< ± 0.3%	for current output < 10 mA span
	< ± 0.3%	for voltage output < 8 V span
	< 2 · (basic and additional error)	for two-wire resistance measurement

Reference conditions:

Ambient temperature	23 °C, ± 2 K
Power supply	24 V DC ± 10% and 230 V AC ± 10%
Output burden	Current: 0.5 · R_{ext} max. Voltage: 2 · R_{ext} min.

Influencing factors:

Temperature	< ± 0.1 … 0.15% per 10 K
Burden	< ± 0.1% for current output < 0.2% for voltage output, providing R_{ext} > 2 · R_{ext} min.
Long-time drift	< ± 0.3% / 12 months
Switch-on drift	< ± 0.5%
Common and transverse mode influence	< ± 0.2%
+ or – to ground:	< ± 0.2%

[1] *In relation to analogue output span A1 resp. A2.*

SINEAX VC 603
Programmable combined transmitter/alarm unit

Installation data

Housing:	Carrying rail housing type **S35** on plastic Polycarbonate UL 94-V0. Refer to Section "Dimensional drawings" for dimensions
Mounting:	For snapping onto top-hat rail (35 × 15 mm or 35 × 7.5 mm) acc. to EN 50 022 or directly onto a wall or panel using the pull-out screw hole brackets
Mounting position:	Any
Terminals:	DIN/VDE 0609 Screw terminals with wire guards for light PVC wiring and max. 2 × 0.75 mm^2 or 1 × 2.5 mm^2
Permissible vibrations:	2 g acc. to EN 60 068-2-6 10 … 150 … 10 Hz, 10 cycles
Choc:	3 × 50 g 3 shocks each in 6 directions acc. to EN 60 068-2-27
Weight:	Approx. 0.32 kg

Electrical insulation:	All circuits (measuring input/measuring output/power supply/output contacts) are electrically insulated. Programming connector and measuring input are connected. The PC is electrically insulated by the programming cable PRKAB 600.

Standards

Electromagnetic compatibility:	The standards DIN EN 50 081-2 and DIN EN 50 082-2 are observed
Intrinsically safe:	Acc. to DIN EN 50 020: 1996-04
Protection (acc. to IEC 529 resp. EN 60 529):	Housing IP 40 Terminals IP 20
Electrical design:	Acc. to IEC 1010 resp. EN 61 010
Operating voltages:	Measuring input < 40 V Programming connector, measuring outputs < 25 V Output contacts, power supply < 250 V
Rated insulation voltage:	Measuring input, programming connector, measuring outputs, output contacts, power supply < 250 V
Pollution degree:	2
Installation category II:	Measuring input, programming connector, measuring outputs, output contacts
Installation category III:	Power supply
Test voltage:	Measuring input and programming connector to: – output signal 2.3 kV, 50 Hz, 1 min. – power supply 3.7 kV, 50 Hz, 1 min. – output contacts 2.3 kV, 50 Hz, 1 min. Measuring outputs to: – power supply 3.7 kV, 50 Hz, 1 min. – output contacts 2.3 kV, 50 Hz, 1 min. Serial interface for the PC to: – everything else 4 kV, 50 Hz, 1 min. (PRKAB 600)

Ambient conditions

Commissioning temperature:	– 10 to + 55 °C
Operating temperature:	– 25 to + 55 °C, **Ex – 20** to + 55 °C
Storage temperature:	– 40 to + 70 °C
Relative humidity annual mean:	≤ 75% standard climatic rating ≤ 95% enhanced climatic rating

Basic configuration

The transmitter/alarm unit SINEAX VC 603 is also available already programmed with a **basic** configuration which is especially recommended in cases where the programming data is not known at the time of ordering (see “Table 6: Specification and ordering information”, feature 4.).

SINEAX VC 603 supplied as standard versions are programmed for **basic** configuration (see “Table 5: Standard versions”).

Basic configuration:

- Measuring input 0…5 V DC
- Measuring output 0…20 mA linear, fixed value 0%
  during 5 s after switching on
- Settling time 0.7 s
- Open-circuit supervision inactive
- Mains ripple suppression 50 Hz
- Limit functions inactive

Table 5: Standard versions

The following 8 transmitter/alarm unit versions are already programmed for **basic** configuration and are available ex stock. It is only necessary to quote the **Order No.**:

Cold junction compensation	Climatic rating	Instrument	Power supply	Order Code[1]	**Order No.**
included	standard	Standard version	24… 60 V DC / AC	603-112$\bar{0}$	987 670
			85…230 V DC / AC	603-122$\bar{0}$	987 852
		[EEx ia] IIC version, measuring circuit I.S.	24… 60 V DC / AC	603-132$\bar{0}$	987 894
			85…110 V DC / 85…230 V AC	603-142$\bar{0}$	987 935
	increased	Standard version	24… 60 V DC / AC	603-114$\bar{0}$	987 836
			85…230 V DC / AC	603-124$\bar{0}$	987 878
		[EEx ia] IIC version, measuring circuit I.S.	24… 60 V DC / AC	603-134$\bar{0}$	987 919
			85…110 V DC / 85…230 V AC	603-144$\bar{0}$	987 951

The complete Order Code[1] 603-…$\bar{0}$ and/or a description should be stated for other version with the basic works configuration.

[1] *See “Table 6: Specification and ordering information”.*

SINEAX VC 603
Programmable combined transmitter/alarm unit

Table 6: Specification and ordering information (See also “Table 5: Standard versions”)

Insert code in the 1st box on page 12!

Order Code **603 –**			
Features, Selection	*SCODE	no-go	
1. Mechanical design			
1) Carrying rail housing S35			1 . . . .
2. Version / Power supply H (nominal voltage U_N)			
1) Standard / 24... 60 V DC/AC			. 1 . . . . . .
2) Standard / 85...230 V DC/AC			. 2 . . . . . .
3) [EEx ia] IIC / 24... 60 V DC/AC			. 3 . . . . . .
4) [EEx ia] IIC / 85...110 V DC 85...230 V AC			. 4 . . . . . .
Lines 3 and 4: Device [EEx ia] IIC, measuring circuit EEx ia IIC			
3. Climatic rating / Cold junction compensation			
2) Standard climatic rating; instrument with cold junction compensation			. . 2 . . . . .
4) Extra climatic rating; instrument with cold junction compensation			. . 4 . . . . .
4. Configuration			
0) **Basic** configuration, programmed	Z		. . . 0 . . . .
1) Programmed to order			. . . 1 . . . .
2) Programmed to order with test certificate			. . . 2 . . . .
Line 0: If you wish to order the **basic** configuration, the line “0”) must be selected for options 4. to 19., i.e. all the digits of the order code after the 4th. are zeros, see “Table 5: Standard versions” Lines 0 and 1: No test certificate			
5. Measured variable / Measuring input M			
DC voltage			
0) 0... 5 V linear	C		. . . . 0 . . .
1) 1... 5 V linear	C	Z	. . . . 1 . . .
2) 0...10 V linear	C	Z	. . . . 2 . . .
3) 2...10 V linear	C	Z	. . . . 3 . . .
4) Linear input, other ranges [V]	C	Z	. . . . 4 . . .
5) Square root input function [V]	C	Z	. . . . 5 . . .
6) Input x 3/2 [V]	C	Z	. . . . 6 . . .
Lines 4 to 6: DC [V] 0...0.002 to 0...≤ 40 V **(Ex max. 30 V)** or span 0.002 to 40 V between –40 and 40 V, ratio full-scale/span ≤ 20			

Feature “5. Measured variable / Measuring input M” continued on next page!

Order Code **603 -**		*SCODE	no-go	
Features, Selection				*Insert code in the 1st box of the next page!*
5. Measured variable / Measuring input M (continuation)				
DC current				
7) 0...20 mA linear		C	Z	7 . . . .
8) 4...20 mA linear		C	Z	8 . . . .
9) Linear input, other ranges [mA]		C	Z	9 . . . .
A) Square root input function [mA]		C	Z	A . . . .
B) Input x 3/2 [mA]		C	Z	B . . . .
Lines 9, A and B: DC [mA] 0...0.08 to 0...100 mA or span 0.08 to 100 mA between –50 and 100 mA, ratio full-scale/span ≤ 20				
Resistance thermometer, linearised				
C) Two-wire connection, R_L [Ω]		E	Z	C . . . .
D) Three-wire connection, R_L ≤ 30 Ω/wire		E	Z	D . . . .
E) Four-wire connection, R_L ≤ 30 Ω/wire		E	Z	E . . . .
Resistance thermometer, non-linearised				
F) Two-wire connection, R_L [Ω]		E	Z	F . . . .
G) Three-wire connection, R_L ≤ 30 Ω/wire		E	Z	G . . . .
H) Four-wire connection, R_L ≤ 30 Ω/wire		E	Z	H . . . .
J) Temperature difference [deg] 2 identical resistance thermometers in three-wire connection		E	Z	J . . . .
Lines C and F: Specify total lead resistance R_L [Ω], any value between 0 and 60 Ω. This may be omitted, because two leads can be compensated automatically on site Line J: Temperature difference; specify measuring range [deg], also for feature 6.: t_{min}; t_{max}; $t_{reference}$				
Thermo-couple linearised				
K) Internal cold junction compensation (not for type B)		DT	GZ	K . . . .
L) External cold junction compensation (specify 0°C for type B)* tK [°C]		D	Z	L . . . .
Thermo-couple not linearised				
M) Internal cold junction compensation (not for type B)		DT	GZ	M . . . .
N) External cold junction compensation (specify 0°C for type B)* tK [°C]		D	Z	N . . . .
P) Average temperature [n] tK [°C]		D	Z	P . . . .
Q) Temperature difference [deg] 2 identical thermo-couples		D	Z	Q . . . .
Lines L, N and P: Specify external cold junction temperature t_K [°C], any value between 0 and 70 °C Line P: State number of sensors [n] Line Q: Temperature difference; specify measuring range [deg], also for feature 6.: t_{min}; t_{max}; $t_{reference}$				

Feature "5. Measured variable / Measuring input M" continued on next page

** Because of its characteristic, thermocouple type B does not require compensating leads nor cold junction compensation.*

SINEAX VC 603
Programmable combined transmitter/alarm unit

Order Code **603 -**				Insert code in the 1st box on next page!
Features, Selection		*SCODE	no-go	
5. Measured variable / Measuring input M (continuation)				
Resistance sensor / Potentiometer				
R) WF $R_L \leq 30\ \Omega$/wire	Measuring range [Ω]	F	Z	R . . . .
S) WF DIN $R_L \leq 30\ \Omega$/wire	Measuring range [Ω]	F	Z	S . . . .
T) Potentiometer Two-wire connection	Measuring range [Ω] and R_L [Ω]	F	Z	T . . . .
U) Potentiometer Three-wire connection $R_L \leq 30\ \Omega$/wire	Measuring range [Ω]	F	Z	U . . . .
V) Potentiometer Four-wire connection $R_L \leq 30\ \Omega$/wire	Measuring range [Ω]	F	Z	V . . . .
Lines R to V: Specify initial resistance, span and residual resistance in Ω; example: 200...600...200; 0...500...0; 10...80...20 Minimum span at full-scale value ME: 8 Ω for ME ≤ 740 Ω 40 Ω for ME > 740 Ω. Max. resistance value (initial value + span + lead resistance) 5000 Ω. Note! Initial measuring range < 10¥span Line T: Specify total lead resistance R_L [Ω], any value between 0 and 60 Ω. This may be omitted, because two leads can be compensated automatically on site				
Special characteristic				
Z) For special characteristic Fill in Table W 2357 e for special characteristic for V, mA or Ω.	[V] [mA] [Ω]		Z	Z . . . .
6. Sensor type / Temperature range				
0) No temperature measurement				. 0 . . . . . .
1) Pt 100	[°C]		CDFZ	. 1 . . . . . .
2) Ni 100	[°C]		CDFZ	. 2 . . . . . .
3) Other Pt [Ω]	[°C]		CDFZ	. 3 . . . . . .
4) Other Ni [Ω]	[°C]		CDFZ	. 4 . . . . . .
5) Pt 20 / 20 °C	[°C]		CDFZ	. 5 . . . . . .
6) Cu 10 / 25 °C	[°C]		CDFZ	. 6 . . . . . .
Lines 1 to 6: Specify measuring range in [°C] or °F, refer to Table 8 for the operating limits for each type of sensors. For temperature difference measurement: specify measuring range and reference temperature for 2nd sensor (t_{min}; t_{max}; $t_{reference}$), e.g. 100; 250; 150 Lines 3 and 4: Specify resistance in Ω at 0°C; permissible values are 100 and 1000, multiplied or divided by a whole number, e.g.: 1000 : 4 = 250, 100 : 2 = 50 or 100 x 3 = 300				

Feature “6. Sensor type / Temperature range” continued on next page

Order Code **603 -**				
Features, Selection		*SCODE	no-go	
6. Sensor type / Temperature range (continuation)				
B) Type B: Pt30Rh-Pt6Rh	[°C]		CEFTZ	B . . . .
E) Type E: NiCr-CuNi	[°C]		CEFZ	E . . . .
J) Type J: Fe-CuNi	[°C]		CEFZ	J . . . .
K) Type K: NiCr-Ni	[°C]		CEFZ	K . . . .
L) Type L: Fe-CuNi	[°C]		CEFZ	L . . . .
N) Type N: NiCrSi-NiSi	[°C]		CEFZ	N . . . .
R) Type R: Pt13Rh-Pt	[°C]		CEFZ	R . . . .
S) Type S: Pt10Rh-Pt	[°C]		CEFZ	S . . . .
T) Type T: Cu-CuNi	[°C]		CEFZ	T . . . .
U) Type U: Cu-CuNi	[°C]		CEFZ	U . . . .
W) Type W5-W26Re	[°C]		CEFZ	W . . . .
Lines B to W: Specify measuring range [°C] or °F, refer to Table 8 for the operating limits for each type of sensor. For temperature difference measurement: specify measuring range and reference temperature for 2nd sensor (t_{min}; t_{max}; $t_{reference}$), e.g. 100; 250; 150				
7. Output signal / Measuring output A1*				
0) 0...20 mA, R_{ext} ≤ 750 Ω				. 0 . . . . . .
1) 4...20 mA, R_{ext} ≤ 750 Ω			Z	. 1 . . . . . .
2) Non-standard	[mA]		Z	. 2 . . . . . .
3) 0... 5 V, R_{ext} ≥ 250 Ω			Z	. 3 . . . . . .
4) 1... 5 V, R_{ext} ≥ 250 Ω			Z	. 4 . . . . . .
5) 0...10 V, R_{ext} ≥ 500 Ω			Z	. 5 . . . . . .
6) 2...10 V, R_{ext} ≥ 500 Ω			Z	. 6 . . . . . .
7) Non-standard	[V]		Z	. 7 . . . . . .
Line 2: –22 to + 22, span 5 to 40 mA Line 7: –12 to + 15, span 4 to 27 V				
8. Output characteristic				
0) Directly proportional, initial start-up value 0%				. . 0 . . . . .
1) Inversely proportional, initial start-up value 100%			Z	. . 1 . . . . .
2) Directly proportional, initial start-up value	[%]		Z	. . 2 . . . . .
3) Inversely proportional, initial start-up value	[%]		Z	. . 3 . . . . .
9. Output time response				
0) Rated settling time approx. 1 s				. . . 0 . . . .
1) Others	[s]		Z	. . . 1 . . . .
Line 1: Any whole number from 2 to 30 s				

** 2nd output signal A2 for field indicator only*

SINEAX VC 603
Programmable combined transmitter/alarm unit

Order Code **603 -**

Features, Selection	*SCODE	no-go	
10. Open-circuit sensor signalling Without / open-circuit sensor signal / relay / output signal A corresponding to input variable [%]			
0) No sensor signal for current or voltage measurement		DEF	0 . . . .
1) With sensor signal / relay disabled / output signal A %		CZ	1 . . . .
2) With sensor signal / relay energized / output signal A %	K	CZ	2 . . . .
3) With sensor signal / relay de-energized / output signal A %	K	CZ	3 . . . .
4) With sensor signal / relay energized / hold A at last value	K	CZ	4 . . . .
5) With sensor signal / relay de-energized / hold A at last value	K	CZ	5 . . . .
Lines 1, 2 and 3: Specify value of output signal span in %, any value from –10% to 110%; e.g. with output 4...20 mA corresponding 2.4 mA –10% and 21.6 mA 110% Lines 2 to 5: Cannot be combined with active trip point GW3, Feature 18. lines 1 to 3 and Feature 19. lines 1 and 2			
11. Mains ripple suppression			
0) Frequency 50 Hz			. 0 . . . . . .
1) Frequency 60 Hz		Z	. 1 . . . . . .
12. Local setting of trip point GW1 (for output contact K1)			
0) Alarm function inactive	N		. . 0 . . . . .
1) Trip point adjustable, potentiometer ⎍1 –10…+10%	OP	Z	. . 1 . . . . .
2) Trip point variable, potentiometer ⎍1 0…100%	OP	Z	. . 2 . . . . .
3) Potentiometer ⎍1 ineffective	O	Z	. . 3 . . . . .
13. Type and value of trip point GW1 and reset ratio, energizing delay and de-energizing delay of relay 1 (for K1)			
0) Alarm function inactive		O	. . . 0 . . . .
1) Low alarm [%;%;s;s]		NZ	. . . 1 . . . .
2) High alarm [%;%;s;s]		NZ	. . . 2 . . . .
3) Rate-of-change alarm δx/δt [%/s;%;s;s]		NPZ	. . . 3 . . . .
Lines 1 and 2: Trip point –10 to 110%; reset ratio 0.5 to 100% Line 3: Trip point ± 1 to ± 50%/s; reset ratio 1 to 100%/s Lines 1 to 3: Energizing / de-energizing delay 1 to 60 s			
14. Sense of action of relay 1 (for GW1 resp. K1)			
0) Alarm function inactive		O	. . . . 0 . . .
1) Relay energized in alarm condition / LED lit in alarm condition		NZ	. . . . 1 . . .
2) Relay energized in alarm condition / LED lit in safe condition		NZ	. . . . 2 . . .
3) Relay energized in safe condition / LED lit in alarm condition		NZ	. . . . 3 . . .
4) Relay energized in safe condition / LED lit in safe condition		NZ	. . . . 4 . . .

Order Code **603 -**			
Features, Selection	*SCODE	no-go	
15. Local setting of trip point GW2 (for output contact K2)			
0) Alarm function inactive	Q		0 . . . .
1) Trip point adjustable, potentiometer ⎍2 –10… +10%	RS	Z	1 . . . .
2) Trip point variable, potentiometer ⎍2 0… 100%	RS	Z	2 . . . .
3) Potentiometer ⎍2 ineffective	R	Z	3 . . . .
16. Type and value of trip point GW2 and reset ratio, energizing delay and de-energizing delay of relay 2 (for K2)			
0) Alarm function inactive		R	. 0 . . . . . .
1) Low alarm [%;%;s;s]		QZ	. 1 . . . . . .
2) High alarm [%;%;s;s]		QZ	. 2 . . . . . .
3) Rate-of-change alarm δx/δt [%/s;%;s;s]		QPZ	. 3 . . . . . .
17. Sense of action of relay 2 (for GW2 resp. K2)			
0) Alarm function inactive		R	. . 0 . . . . .
1) Relay energized in alarm condition / LED lit in alarm condition		QZ	. . 1 . . . . .
2) Relay energized in alarm condition / LED lit in safe condition		QZ	. . 2 . . . . .
3) Relay energized in safe condition / LED lit in alarm condition		QZ	. . 3 . . . . .
4) Relay energized in safe condition / LED lit in safe condition		QZ	. . 4 . . . . .
18. Type and value of trip point GW3 and reset ratio, energizing delay and de-energizing delay of relay 3 (for K3)			
0) Alarm function inactive	L		. . . 0 . . . .
1) Low alarm [%;%;s;s]	M	KZ	. . . 1 . . . .
2) High alarm [%;%;s;s]	M	KZ	. . . 2 . . . .
3) Rate-of-change alarm δx/δt [%/s;%;s;s]	M	KZ	. . . 3 . . . .
19. Sense of action of relay 3 (for GW3 resp. K3)			
0) Alarm function inactive		M	. . . . 0 . . .
1) Relay energized in alarm condition		KLZ	. . . . 1 . . .
2) Relay energized in safe condition		KLZ	. . . . 2 . . .

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

Table 7: Data on explosion protection ⟨Ex⟩ II (1) G

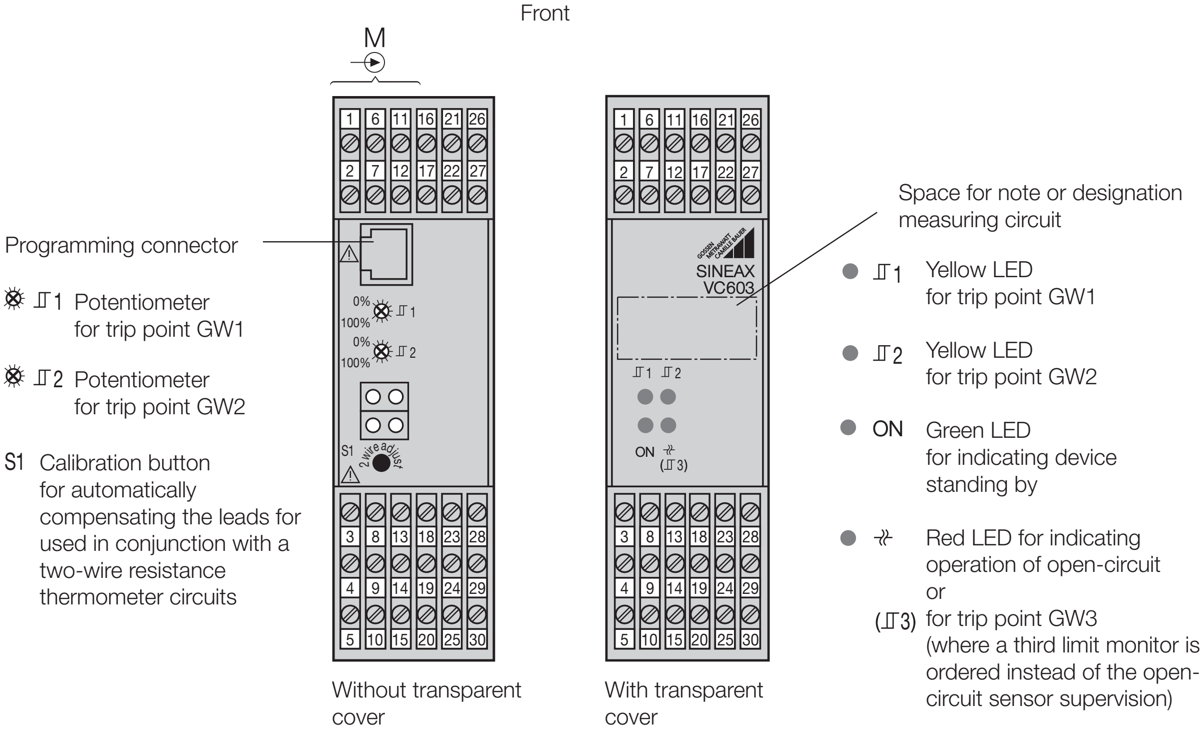
Order Code	Type of protection "Intrinsic safety" Marking: Instrument	Measuring input	Type examination certificate	Mounting location of the instrument
603-13/14	**[EEx ia] IIC**	**EEx ia IIC**	**PTB 97 ATEX 2074 X**	**Outside** the hazardous area

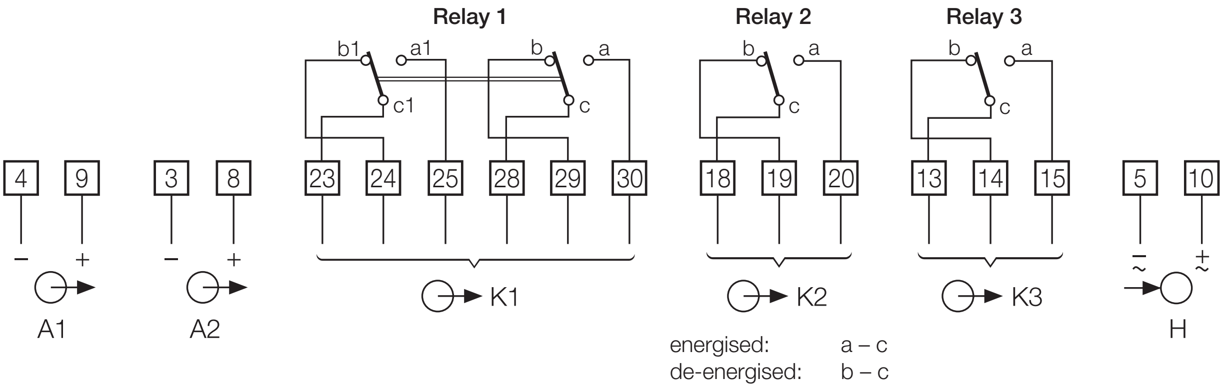
Important condition: The SINEAX VC 603 may only be programmed using a PRKAB 600 with the component certificate PTB 97 ATEX 2082 U.

Table 8: Temperature measuring ranges

Measuring range [°C]	Resistance thermometer		Thermo-couple									
	Pt100	Ni100	B	E	J	K	L	N	R	S	T	U
0... 20												
0... 25	X	X										
0... 40	X	X		X	X		X					
0... 50	X	X		X	X	X	X				X	X
0... 60	X	X		X	X	X	X				X	X
0... 80	X	X		X	X	X	X				X	X
0... 100	X	X		X	X	X	X	X			X	X
0... 120	X	X		X	X	X	X	X			X	X
0... 150	X	X		X	X	X	X	X			X	X
0... 200	X	X		X	X	X	X	X			X	X
0... 250	X	X		X	X	X	X	X			X	X
0... 300	X			X	X	X	X	X	X	X	X	X
0... 400	X			X	X	X	X	X	X	X	X	X
0... 500	X			X	X	X	X	X	X	X		X
0... 600	X			X	X	X	X	X	X	X		X
0... 800			X									
0... 900			X	X	X	X	X	X	X	X		
0...1000			X	X	X	X		X	X	X		
0...1200			X		X	X		X	X	X		
0...1500			X						X	X		
0...1600			X						X	X		
50... 150	X	X		X	X	X	X	X			X	X
100... 300	X			X	X	X	X	X			X	X
300... 600	X			X	X	X	X	X	X	X		X
600... 900			X	X	X	X	X	X	X	X		
600...1000			X	X	X	X		X	X	X		
900...1200			X		X	X		X	X	X		
600...1600			X						X	X		
600...1800			X									
−20... 20	X	X		X	X		X					
−10... 40	X	X		X	X	X	X					X
−30... 60	X	X		X	X	X	X	X			X	X
Measuring range limits [°C]	−200 to 850	−60 to 250	0 to 1820	−270 to 1000	−210 to 1200	−270 to 1372	−200 to 900	−270 to 1300	−50 to 1769	−50 to 1769	−270 to 400	−200 to 600
	ΔR min 8Ω at full-scale ≤ 740 Ω ΔR min 40 Ω at full-scale > 740 Ω to 5000 Ω		ΔU min 2 mV									

Electrical connections

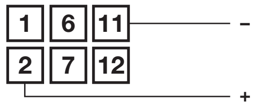
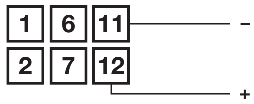
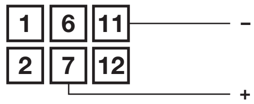
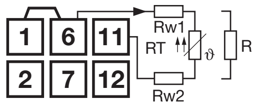
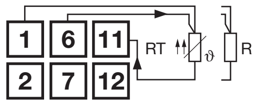
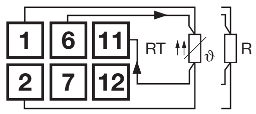
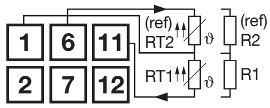
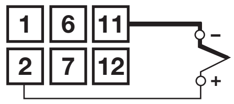
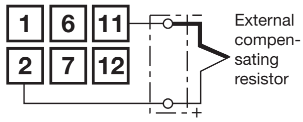
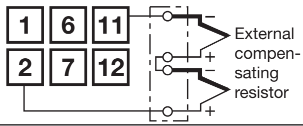
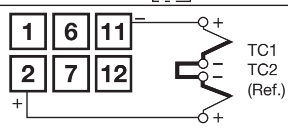
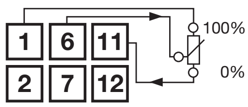
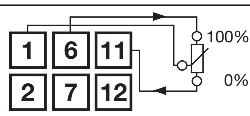




M	=	Measured variable / measuring input, Terminal allocation acc. to the measuring mode and application see “Table 9: Measuring input”
A1	=	Output signal / measuring output
A2	=	2nd output (field indicator) (only brief use permitted in the case of the Ex version)
K1, K2	=	Output contacts for monitoring limits GW1, GW2
K3	=	Output contact for open-circuit sensor supervision or for monitoring limit GW3
H	=	Power supply

SINEAX VC 603
Programmable combined transmitter/alarm unit

Table 9: Measuring input

Measurement	Measuring range limits	Measuring span	Wiring diagram No.	Wiring diagram Terminal arrangement
DC voltage (direct input)	– 300...0...300 mV	2...300 mV	1	
DC voltage (input via potential divider)	– 40...0...40 V	0.3...40 V	2	
DC current	– 12...0... 12 mA/ – 50...0...100 mA	0.08... 12 mA/ 0.75...100 mA	3	
Resistance thermometer RT or resistance measurement R, **two-wire connection**	0... 740 Ω / 0...5000 Ω	8... 740 Ω / 40...5000 Ω	4	
Resistance thermometer RT or resistance measurement R, **three-wire connection**	0... 740 Ω / 0...5000 Ω	8... 740 Ω / 40...5000 Ω	5	
Resistance thermometer RT or resistance measurement R, **four-wire connection**	0... 740 Ω / 0...5000 Ω	8... 740 Ω / 40...5000 Ω	6	
2 identical three-wire resistance transmitters RT for deriving the difference	RT1 - RT2 0... 740 Ω / 0...5000 Ω	8... 740 Ω / 40...5000 Ω	7	
Thermo-couple TC Cold junction compensation internal	– 300...0...300 mV	2...300 mV	8	
Thermo-couple TC Cold junction compensation external	– 300...0...300 mV	2...300 mV	9	
Thermo-couple TC in a summation circuit for deriving the mean temperature	– 300...0...300 mV	2...300 mV	10	
Thermo-couple TC in a differential circuit for deriving the mean temperature	TC1 - TC2 – 300...0...300 mV	2...300 mV	11	
Resistance sensor WF	0... 740 Ω / 0...5000 Ω	8... 740 Ω / 40...5000 Ω	12	
Resistance sensor WF DIN	0... 740 Ω / 0...5000 Ω	8... 740 Ω / 40...5000 Ω	13	

Dimensional drawings

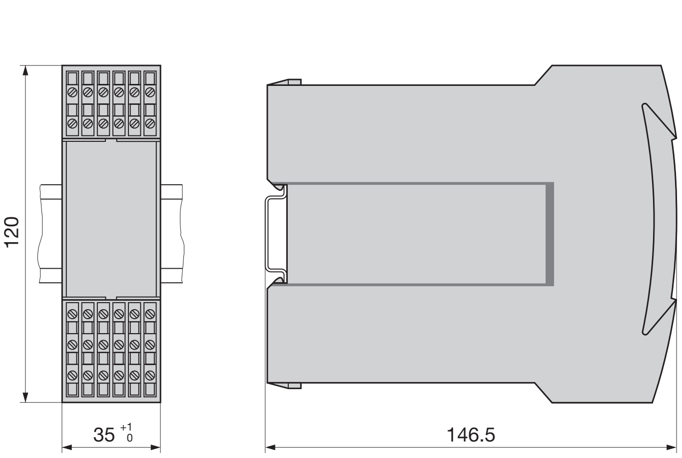


Fig. 6. SINEAX VC 603 in housing **S35** clipped onto a top-hat rail (35 × 15 mm or 35 × 7.5 mm, acc. to EN 50 022).

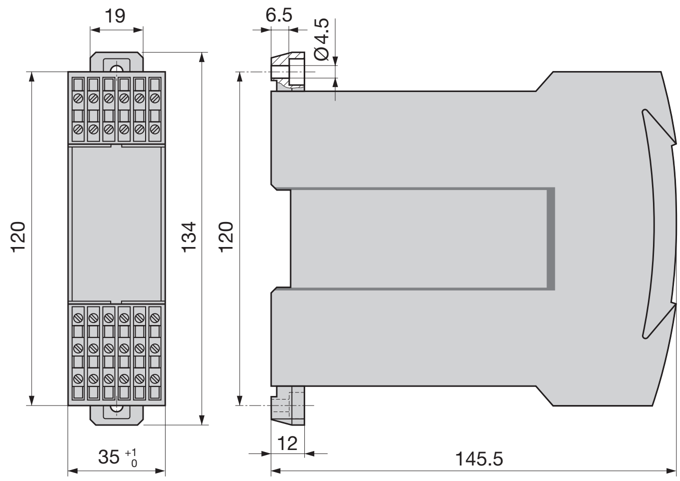


Fig. 7. SINEAX VC 603 in housing **S35,** with the screw hole brackets pulled out for wall mounting.

Table 10: Accessories and spare parts

Description	Order No.
Programming cable PRKAB 600 for SINEAX/EURAX VC 603/V 604, SIRAX V 644 and SINEAX TV 809	147 787
Ancillary cable for SINEAX/EURAX VC 603/V 604 and SIRAX V 644	988 058
Configuration Software VC 600 for SINEAX/EURAX VC 603 / V 604 and SIRAX V 644 Windows 3.1x, 95, 98, NT and 2000 incl. V 600 (Version 1.6, DOS) on CD in German, English, French and Dutch **(Download free of charge under http://www.gmc-instruments.com)** In addition, the CD contains all configuration programmes presently available for Camille Bauer products.	146 557
Pull-out handle (for removing device from its housing)	988 149
Front label (behind transparent cover)	973 489
Inscription label (green, for recording programmed settings)	120 626
Operating Instructions VC 603-1 B d-f-e	988 074

Standard accessories

1 Operating Instructions in three languages: German, French, English
2 Pull-out handle (for removing device from its housing)
2 Front labels (behind transparent cover)
2 Inscription labels (green, for recording programmed settings)
1 Type examination certificate (only for “intrinsically safe” explosion-proof devices)

SINEAX VC 603
Programmable combined transmitter/alarm unit

Printed in Switzerland • Subject to change without notice • Edition 03.01 • Data sheet No. VC 603-1 Le

Camille Bauer Ltd

Aargauerstrasse 7
CH-5610 Wohlen/Switzerland
Phone +41 56 618 21 11
Fax +41 56 618 24 58
e-mail: cbag@gmc-instruments.com
http://www.gmc-instruments.com

GOSSEN METRAWATT CAMILLE BAUER