EURAX VC 603
Programmable combined transmitter/alarm unit

CAMILLE BAUER

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

CE 0102 ⟨Ex⟩ II (1) GD

Fig. 1. Transmitter/alarm unit EURAX VC 603, front plate width 4 TE.

Application

The combined transmitter/alarm unit **EURAX VC 603** (Fig. 1) converts the input variable – a DC current or voltage, or a signal from a thermocouple, 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 EURAX VC 603 is used in conjunction with a thermocouple, resistance thermometer, remote sensor or potentiometer.

An explosion-proof "intrinsically safe" [EEx ia] IIC version rounds off this series of EURAX VC 603.

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
- Explosion-proof "Intrinsically safe" [EEx ia] IIC version also available (see "Table 7: Explosion protection data")
- Ex devices also directly programmable on site / No supplementary Ex interface needed
- Mechanical design of the transmitter/alarm unit: Plug-in module 4 TE (20.02 mm) for 19″ rack-mounted case
- 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 thermocouples 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

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Programming (Figs. 2 and 3)

A PC with an 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 ↔ EURAX VC 603” can be seen from Fig. 2. The power supply must be applied to EURAX VC 603 before it can be programmed.

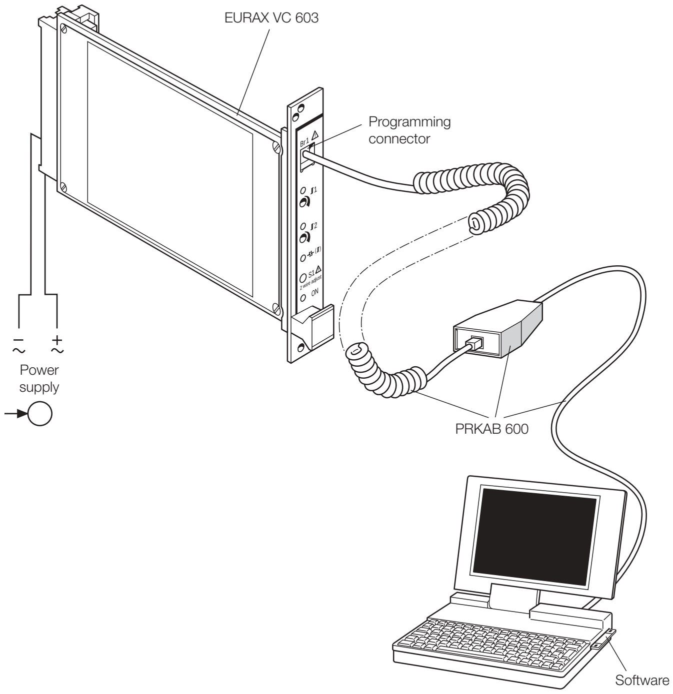


Fig. 2

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 EURAX 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. 3).

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

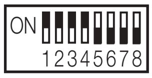
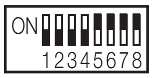
DIP switches	Type of output signal
 ON 12345678	impressed current
 ON 12345678	superimposed voltage

Fig. 3

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 thermocouples	– 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

[1] Note permissible value of the ratio “full-scale value/span ≤ 20”.
[2] Max. 30 V for Ex version with I.S. measuring input.

DC voltage

Measuring range:	See Table 1
Direct input:	Wiring diagram No. 1[1]
Input resistance:	Ri > 10 MΩ Continuous overload max. – 1.5 V, + 5 V
Input via potential divider:	Wiring diagram No. 2[1]
Input resistance:	Ri = 1 MΩ Continuous overload max. ± 100 V

DC current

Measuring range:	See Table 1
Low currents:	Wiring diagram No. 3[1]
Input resistance:	Ri = 24.7 Ω Continuous overload max. 150 mA
High currents:	Wiring diagram No. 3[1]
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 ranges 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[1] – three-wire connection, wiring diagram No. 5[1] – four-wire connection, wiring diagram No. 6[1]
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 No. 4 – 6[1]
Differential circuit:	2 identical three-wire resistance thermometers for deriving the mean temperature RT1–RT2 wiring diagram No. 7[1]
Input resistance:	R_i > 10 MΩ
Lead resistance:	≤ 30 Ω per lead

Thermocouples

Measuring range:	See Tables 1 and 8
Thermocouple 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 thermocouple pairs on request
Standard circuit:	1 thermocouple, internal cold junction compensation, wiring diagram No. 8[1] 1 thermocouple, external cold junction compensation, wiring diagram No. 9[1]
Summation circuit:	2 or more thermocouples in a summation circuit for deriving the mean temperature, external cold junction compensation, wiring diagram No. 10[1]
Differential circuit:	2 identical thermocouples 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

[1] *See “Table 9: Measuring input”.*

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Resistance sensor, potentiometer

Measuring ranges:	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 No. 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

Output signal ⊖►

Output signal A

The output signal A 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.

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_A:	+ 15 V, resp. – 12 V
External resistance I_A:	R_{ext} max. [kΩ] = $\frac{15\text{ V}}{I_{AN}\text{ [mA]}}$ resp. = $\frac{-12\text{ V}}{I_{AN}\text{ [mA]}}$ I_{AN} = full-scale output current
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 range:	Limits – 12 to + 15 V Min. span 4 V Max. span 27 V
Short-circuit current:	≤ 40 mA
Load capacity U_A:	20 mA
External resistance U_A:	R_{ext} [kΩ] ≥ $\frac{U_A\text{ [V]}}{20\text{ mA}}$
Residual ripple:	< 1% p.p., DC ... 10 kHz < 1.5% p.p. for an output span < 8 V

Fixed setting for the output signal A

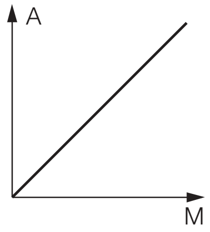
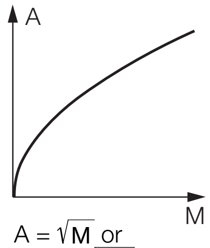
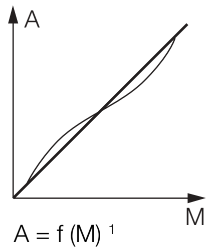
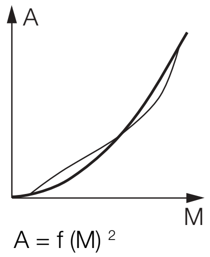
After switching on:	“A” is at a fixed value for 5 s after switching on (default). Setting range – 10 to 110%[2] programmable, e.g. between 2.4 and 21.6 mA (for a scale of 4 to 20 mA). The green LED ON flashes for 5 s
When input variable out of limits:	“A” is at either a lower or an upper fixed value 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%[2], e.g. – 2 mA (for a scale of 0 to 20 mA). Upper fixed value = 110%[2], e.g. 22 mA (for a scale of 0 to 20 mA). The green LED ON flashes
Open-circuit sensor:	“A” is at a fixed value when an open-circuit sensor is detected (see Section “Sensor and open-circuit lead supervision ⊀”). The fixed value of “A” is configured to either maintain the value at the instant the open-circuit occurs or adopt a preset value between – 10 and 110%[2] programmable, 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] *See “Table 9: Measuring input”.*
[2] *In relation to analogue output span A.*

Output characteristic

Characteristic: Programmable

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

Measured variable	Characteristic	
DC voltage	 A = M	
DC current		
Resistance thermometer (linear variation of resistance)		
Thermocouple (linear variation of voltage)		
Sensor or potentiometer		
DC voltage	 $A = \sqrt{M}$ or $A = \sqrt{M^3}$	
DC current		
DC voltage	 A = f (M) [1] linearised	Special characteristics
DC current		
Resistance thermometer (linear variation with temperature)		
Thermocouple signal (linear variation with temperature)		
Sensor or potentiometer		
DC voltage	 A = f (M) [2] quadratic	
DC current		
Sensor or potentiometer		

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

Setting time (IEC 770): Programmable between 2 and 30 s

[1] *25 input points M given referred to a linear output scale from –10% to + 110% in steps of 5%.*

Power supply H

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

Table 3: Rated voltages and permissible variations

Nominal voltage U_N	Permissible variation	Instrument version
24... 60 V DC / AC	DC –15...+ 33% AC ± 15%	Standard (Non-Ex)
85...230 V [3] DC / AC		
24... 60 V DC / AC	DC – 15...+ 33% AC ± 15%	Type of protection intrinsically safe [EEx ia] IIC
85...230 V AC	± 10%	
85...110 V DC	–15...+ 10%	

Power consumption: ≤ 2.3 W resp. ≤ 3.6 VA

Open-circuit sensor circuit supervision

Resistance thermometers, thermocouples, 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 modes

Output signal A: Programmable fixed value. The fixed value of “A” is configured to either maintain the value at the instant the open-circuit occurs or adopt a preset value between – 10 and 110%[4], e.g. between 1.2 and 10.8 V (for a scale of 2 to 10 V)

Front plate 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 energized or de-energized in the case of a disturbance.
Set to “relay inactive” if not required!

[2] *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%.*

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

[4] *In relation to analogue output span A.*

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

Binary output signals K1, K2, K3

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

Output contact K2: **Relay 2** 2 potentially-free changeover contacts (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 thermocouple, 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. 4, left)
- Upper limit value of the measured variable (see Fig. 4, left)
- Maximum rate-of-change of the measured variable

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

(see Fig. 4, right)

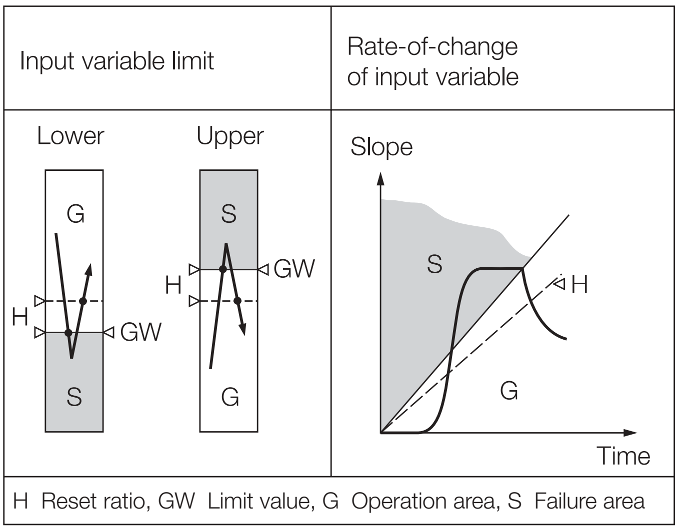


Fig. 4. Switching function according to limit monitored.

[1] *In relation to analogue output span A.*

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)

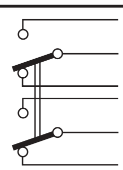
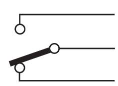
Operating and resetting delays: Programmable
- between 1 and 60 s

Operating sense: Programmable
- Relay energized, LED on
- Relay energized, LED off
- Relay de-energized, LED on
- Relay de-energized, LED off

(once limit reached)

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

Table 4: Contact arrangement and data

	Symbol	Material	Contact rating
Relay 1 and 2		Gold flashed silver alloy	≤ 0.5 A/125 V AC (62.5 VA) ≤ 1 A/30 V DC (30 W)
Relay 3			

Relay approved by UL, CSA

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.
Longtime drift	< ± 0.3% / 12 months
Switch-on drift	< ± 0.5%
Common and transverse mode influence	< ± 0.2%
+ or – output connected to ground:	< ± 0.2%

Installation data

Housing:	Plug-in Europe format module, 100 × 160 mm (see Section “Dimensional diagram”)
Space:	Front plate width 4 TE (20.02 mm)
Front plate colour:	Grey RAL 7032
Designation:	EURAX VC 603
Mounting position:	Any
Electrical connections:	48-pin connector, DIN 41 612, pattern F Contact layout see Section “Electrical connections”
Coding:	By coding pins, removed/not removed, see Section “Electrical connections”
Weight:	Approx. 0.2 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

Electrical design:	Acc. to IEC 1010 resp. EN 61 010
Electromagnetic compatibility:	The standards DIN 50 081-2 and DIN EN 50 082-2 are observed
Intrinsically safe:	Acc. to DIN EN 50 020: 1996-04
Protection class:	IP 00 acc. to EN 60 529
Operating voltages:	Measuring input < 40 V Programming connector, measuring output < 25 V Output contacts, power supply < 250 V
Rated insulation voltage:	Measuring input, programming connector, measuring output, output contacts, power supply < 250 V
Pollution degree:	2
Installation category II:	Measuring input, programming connector, measuring output, output contacts
Installation category III:	Power supply
Protection against electric shock:	Acc. to IEC 1010 and DIN/VDE 106 Part 101

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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 output to:
- power supply 3.7 kV, 50 Hz, 1 min.
- output contacts 1 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 EURAX 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.).

Basic configuration: Measuring input 0…5 V DC
Output 0…20 mA linear, fixed value 0% during 5 s after switching on
Setting time 0.7 s
Open-circuit supervision inactive
Mains ripple suppression 50 Hz
Limit functions inactive
Position of jumpers

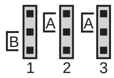

Tableau 5: Standard versions

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.**:

Instruments in standard (non-Ex) version (measuring circuit non intrinsically safe)

Cold junction compensation	Climatic rating	Power supply	Order Code	**Order No.**
without	standard	24… 60 V DC / AC	603-2110	997 455
		85…230 V DC / AC	603-2210	997 471

Instruments in [EEx ia] IIC version (measuring circuit intrinsically safe)

Cold junction compensation	Climatic rating	Power supply	Order Code	**Order No.**
without	standard	24…60 V DC / AC	603-2310	997 497
		85…110 V DC / 85…230 V AC	603-2410	997 512

The complete Order Code 603-..., according to “Table 6: Specification and ordering information” must be stated for versions other than the basic version and for special configurations.

The same applies to orders for the preferred series of devices that Camille Bauer are required to supply in 19″ equipment racks, i.e. the complete Order Code 603-..., according to “Table 6: Specification and ordering information” must be stated in the order. (This is necessary because the stores numbers are needed for special instruments).

Where one is required, order the reference point compensation resistor Ni 100 as a separate item (see Section “Accessories and spare parts”).

Basic configuration see Section “Technical data”.

Table 6: Specification and ordering information

Order Code 603 -			
Features, Selection	*SCODE	no-go	
1. Mechanical design			
2) Plug-in module for 19″ case			2 . . . .
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 . . . . . .
3. Climatic rating / Cold junction compensation			
1) Standard climatic rating; instrument without cold junction compensation	G		. . 1 . . . . .
3) Extra climatic rating; instrument without cold junction compensation	G		. . 3 . . . . .
5) Standard climatic rating; instrument with cold junction compensation, provision for fitting compensating resistor supplied on assembly BT 901, BT 901 is not supplied			. . 5 . . . . .
6) Extra climatic rating; instrument with cold junction compensation, provision for fitting compensating resistor supplied on assembly BT 901, BT 901 is not supplied			. . 6 . . . . .
7) Standard climatic rating; instrument with cold junction compensation, provision for fitting compensating resistor supplied on assembly BT 901-.. (G84), BT 901-.. (G84) is not supplied			. . 7 . . . . .
8) Extra climatic rating; instrument with cold junction compensation, provision for fitting compensating resistor supplied on assembly BT 901-.. (G84), BT 901-.. (G84) is not supplied			. . 8 . . . . .
A) Standard climatic rating; instrument with cold junction compensation, compensating resistor fitted on assembly BT 901, BT 901 also supplied already wired			. . A . . . . .
B) Extra climatic rating; instrument with cold junction compensation, compensating resistor fitted on assembly BT 901, BT 901 also supplied already wired			. . B . . . . .
C) Standard climatic rating; instrument with cold junction compensation, compensating resistor fitted on assembly BT 901-.. (G84), BT 901-.. (G84) also supplied already wired			. . C . . . . .
D) Extra climatic rating; instrument with cold junction compensation, compensating resistor fitted on assembly BT 901-.. (G84), BT 901-.. (G84) also supplied already wired			. . D . . . . .
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 Lines 0 and 1: No test certificate			

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Order Code **603 -**				
Features, Selection		*SCODE	no-go	Insert code in the 1st box of the next page!
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				
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 2 identical resistance thermometers in three-wire connection	[deg]	E	Z	J . . . .
Lines C and F: Specify total lead resistance R_L [Ω] any value between 0 and 70 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}; $t_{reference}$				

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

Order Code 603 -			
Features, Selection	***SCODE**	**no-go**	
5. **Measured variable / Measuring input M** (continuation)			
Thermocouple 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 . . . .
Thermocouple 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 2 identical thermocouples — [deg]	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}; $t_{reference}$			
Resistance sensor / Potentiometer			
R) WF R_L ≤ 30 Ω/wire — Measuring range [Ω]	F	Z	R . . . .
S) WF DIN R_L ≤ 30 Ω/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 ≤ 30 Ω/wire — Measuring range [Ω]	F	Z	U . . . .
V) Potentiometer Four-wire connection R_L ≤ 30 Ω/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 . . . .

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

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Order Code 603 -			*SCODE	no-go	
Features, Selection			*SCODE	no-go	
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 . . . .
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 1 to W: Specify measuring range in [°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 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 100×3 = 300					
7. Output signal / Measuring output A					
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 . . . . .

Order Code 603 -	*SCODE	no-go	
Features, Selection			
9. Output time response			
0) Rated setting time approx. 1 s			0 . . . .
1) Others [s]		Z	1 . . . .
Line 1: Any whole number from 2 to 30 s			
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 . .

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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]		QSZ	. 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: Explosion protection data

Order Code	Type of protection "Intrinsically safe" Marking: Instrument	Type of protection "Intrinsically safe" Marking: Measuring input	Type Examination Certificate	Mounting location of device
603 - 23/24	[EEx ia] IIC	EEx ia IIC	ZELM 02 ATEX 0099 X	**Not in** hazardous area

Table 8: Temperature measuring range

Measuring range [°C]	Resistance thermometer		Thermocouple									
	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									

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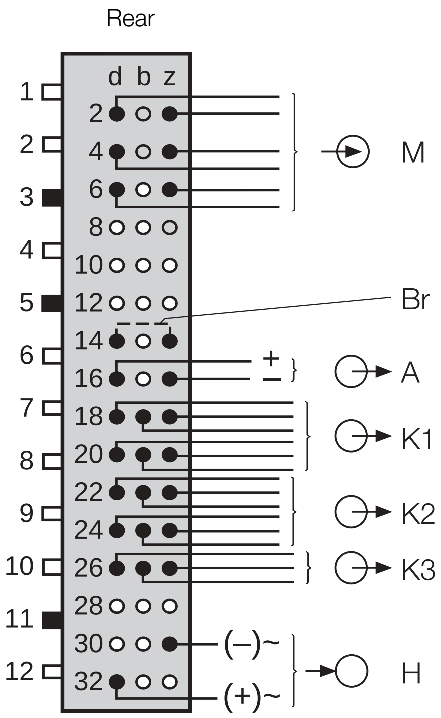
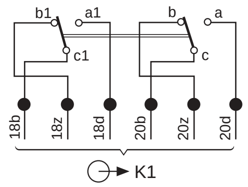
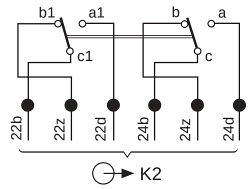
Electrical connections

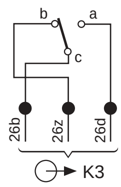




Relay 1



Relay 2



Relay 3

Energized:	a - c and a1 - c1
De-energized:	b - c and b1 - c1

□ = Coding pin

■ = Coding pin broken off
(For **version Ex** additional coding pin 1)

● = Contact fitted

◉ = Contact fitted
(only for test purposes at the works)

○ = No contact

M = Measured variable / measuring input
The contact pin connections and the position of jumpers A and B depends on the kind of measurement and application (see "Table 9: Measuring input"). Jumpers A and B are located on the PCB of EURAX VC 603.

A = Output variable / measuring output

K1, K2 = Output contacts for monitoring limits GW1, GW2, see Figures "Relay 1" and "Relay 2"

K3 = Output contact for open-circuit sensor or for monitoring limit GW3, see Figure "Relay 3"

H = Power supply

Br = Jumper for safety circuit. A safety circuit may be looped via the jumper, for signalling "module unplugged" or "module not plugged in properly". This jumper **must not** be inserted on the **Ex version.**

Front

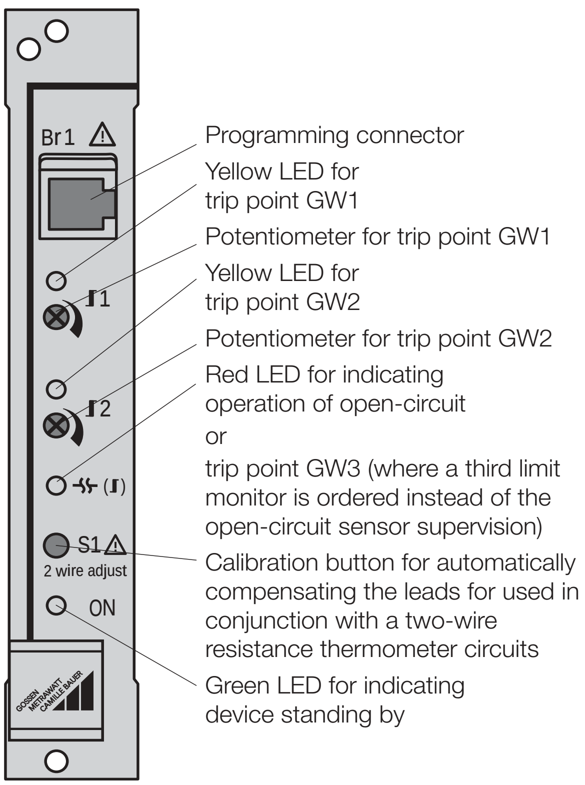


Table 9: Measuring input

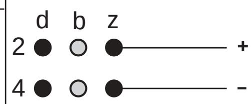
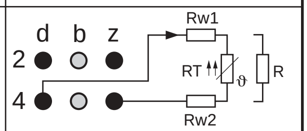
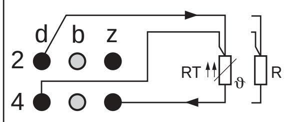
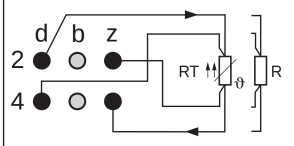
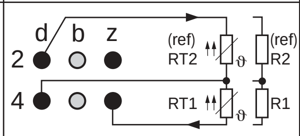
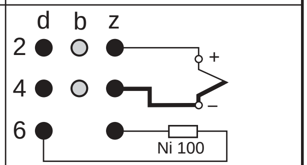
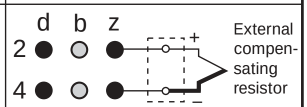
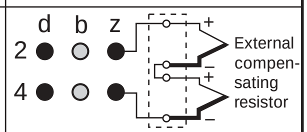
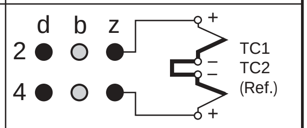
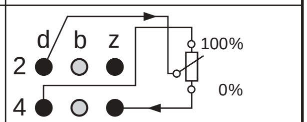
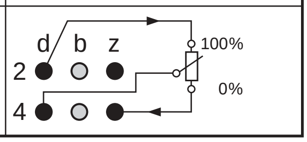
Measurement	Measuring range	Measuring span	Position of jumpers (1 2 3)	No	Wiring diagram Plug arrangement
DC voltage (direct input)	– 300...0...300 mV	2...300 mV	A B A	1	
DC voltage (input via potential divider)	– 40...0...40 V	0.3...40 V	B A A	2	
DC current	– 12...0... 12 mA/ – 50...0...100 mA	0.08... 12 mA / 0.75...100 mA	A A A	3	
Resistance thermometer RT or resistance measurement R, two-wire connection	0... 740 Ω / 0...5000 Ω	8... 740 Ω / 40...5000 Ω	A A A	4	
Resistance thermometer RT or resistance measurement R, three-wire connection	0... 740 Ω / 0...5000 Ω	8... 740 Ω / 40...5000 Ω	A A B	5	
Resistance thermometer RT or resistance measurement R, four-wire connection	0... 740 Ω / 0...5000 Ω	8... 740 Ω / 40...5000 Ω	A B B	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	A A B	7	
Thermo-couple TC Cold junction compensation internal (Ni 100)	– 300...0...300 mV	2...300 mV	A B A	8	
Thermo-couple TC Cold junction compensation external	– 300...0...300 mV	2...300 mV	A B A	9	
Thermo-couple TC in a summation circuit for deriving the mean temperature	– 300...0...300 mV	2...300 mV	A B A	10	
Thermo-couple TC in a differential circuit for deriving the mean temperature (Ni 100 not necessary)	TC1 – TC2 – 300...0...300 mV	2...300 mV	A B A	11	
Resistance sensor WF	0... 740 Ω / 0...5000 Ω	8... 740 Ω / 40...5000 Ω	A A B	12	
Resistance sensor WF DIN	0... 740 Ω / 0...5000 Ω	8... 740 Ω / 40...5000 Ω	A A B	13	

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Tableau 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.camillebauer.com) In addition, the CD contains all configuration programmes presently available for Camille Bauer products.	146 557
Cold junction compensating resistor Ni 100, Length of leads approx. 350 mm	
for fitting in the terminal block of BT 901	987 232
fitted in the grey CB terminal block for mounting on a top-hat rail 15 DIN 46 277 for rack BT 901-… (replacement for G84)	990 300
Type labels (without inscription) operating data	989 270
Operating Instructions VC 603-2 B d-f-e	993 370

Dimensional drawing

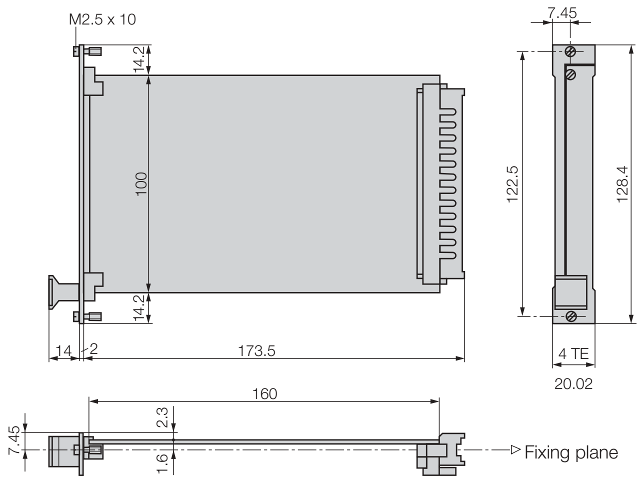

Fig. 5. EURAX VC 603, front plate width 4 TE.

Standard accessories

1 Operating Instructions in three languages: German, French, English
1 Ex approval (only for “intrinsically safe” explosion-proof [EEx ia] IIC devices)

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