

# SINEAX VK 626

## Programmable Temperature Transmitter for RTD and TC inputs, with HART protocol

for installation in the terminal head of a temperature sensor DIN 43 729, shape B



II 2 (1) G



### Application

**SINEAX VK 626** is a two-wire head-mounted transmitter. It is designed for **measuring temperature in combination with thermocouples or resistance thermometers**. Thermocouple non-linearities are automatically compensated. The output signal is a current in the range 4...20 mA.

Measured variable and measuring range are programmed using a PC with a suitable interface and running the programming software.

The sensor circuit is monitored for open and short-circuits and the output responds in a defined manner if one is detected.

The power supply of (12...30 V DC) is connected together with the signal by the two leads connected to the measurement output (loop powered).



Fig. 1. Measuring transmitter SINEAX VK 626 – 7A/7B, input/output electrically isolated.

### Features / Benefits

- Two-wire programming (HART protocol) of measured variable and measuring range

Measured variables	Measuring ranges		
	Limits	Min. span	Max. span
Temperatures with resistance thermometers for <b>two, three</b> or <b>four</b> -wire connection Pt 100, IEC 60 751 Ni 100, DIN 43 760	– 200 to 850 °C – 60 to 250 °C	50 K 50 K	850 K 250 K
Temperatures with thermocouples Type B, E, J, K, N, R, S, T acc. to IEC 60 584-1 Type L and U, DIN 43 710 Type W5 Re/W26 Re, Type W3 Re/W25 Re acc. to ASTM E 988-90	acc. to type	2 mV	80 mV

- Electrical isolation between input and output / Prevents measurement errors due to potential leakage
- Open and short-circuit sensor circuit supervision / Defined output response should the supervision pick up
- Terminals with captive screws
- Available in type of protection “Intrinsic safety” EEx ia IIC T6 (see “Table 3: Data on explosion protection”)

<b>Basic configuration:</b>	Measuring input	Pt 100 for three-wire connection
	Measuring range	0 ... 600 °C
	Measuring output:	4 ... 20 mA, linearised with temperature
	Open-circuit supervision:	Output 21.6 mA
	Response time:	Approx. 1.5/2 s (Table 2)
	Mains ripple suppression:	For frequency 50 Hz

### Standard versions

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

**Table 1:**

Version	Dimensions Ø 43 mm	Order Code	Order No.
Standard, electrically isolated	Height 30.8 mm	626-7A0	141 424
EEx ia IIC T6, electrically isolated	Height 30.8 mm	626-7B0	141 432

Please complete the Order Code 626-7.1. .... according to “Table 4: Specification and ordering information” for versions with user-specific input ranges.

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## Programmable Temperature Transmitter

### for RTD and TC inputs, with HART protocol

#### Programming

The SINEAX VK 626 is configured via a 4...20 mA two-wire lead using the HART protocol.

Programming is accomplished using a PC with a suitable interface (e.g. Smar HI 311, MACTeck Viator 010001, Siemens 7MF 4997-1DA) and running the programming software.

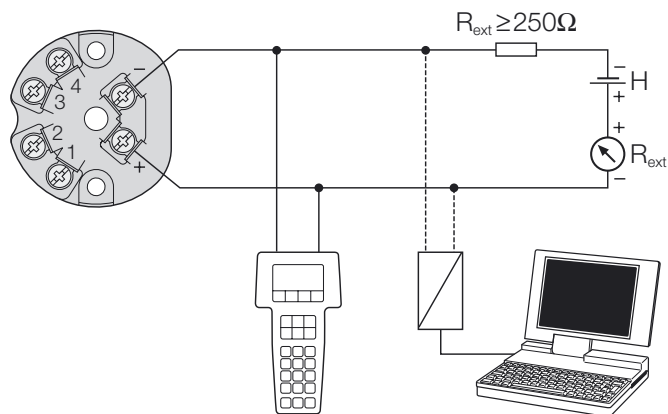


Fig. 2.

#### Technical Data

##### Measuring input $\rightarrow$

##### Temperature with resistance thermometers

Measuring range limits: See table 5  
 Resistance types: Type Pt 100 (IEC 60 751)  
 Type Ni 100 (DIN 43 760)  
 Other sensor types configurables  
 Measuring current:  $\leq 0.20$  mA  
 Standard circuit: 1 resistance thermometer for **two-, three- or four-**wire connection  
 Input resistance:  $R_i > 10$  M $\Omega$   
 Lead resistance:  $\leq 30$   $\Omega$  per lead

##### Temperature with thermocouple

Measuring range limits: See table 5  
 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 Re/W26 Re (ASTM)  
 Type W3 Re/W25 Re (E 988-90)  
 Standard circuit: 1 thermocouple, **internal** cold junction compensation with built-in Pt100 or  
 1 thermocouple, **external** cold junction compensation  
 Input resistance:  $R_i > 10$  M $\Omega$

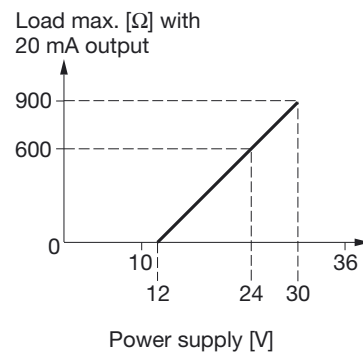
##### Cold junction compensation:

Internal: With built-in Pt 100 or with Pt 100 connected to the terminals  
 External: Via cold junction thermostat 0 ... 60 °C, configurable

##### Measuring output $\rightarrow$

Output signal  $I_A$ : (output/powering circuit)  
 Impressed DC current, **linear with temperature**  
 Standard range: 4...20 mA, 2-wire technique  
 External resistance (load)<sup>1)</sup>:

$$R_{\text{ext max.}} [\text{k}\Omega] = \frac{\text{Power supply [V]} - 12\text{V}}{\text{Max. output current [mA]}}$$



Residual ripple in output current:  $< 1\%$  p.p.

Table 2: Response time

Measuring mode	Open sensor circuit	Short-circuit	Possible response times approx. [s]							
			Option							
TC int. comp.	aktive	—	1.5	2.5	3.5	6.5	11	20.5	40	
TC int. comp.	off	—	1.5	2.5	3.5	6.5	13.5	24.5	49.5	
TC ext. comp.	aktive	—	1.5	2.5	3.5	6.5	11	20.5	40	
TC ext. comp.	off	—	1.5	2.5	4	6.5	13.5	24.5	48.5	
RTD 2L	aktive	—	2	2.5	3	5	9.5	17.5	33.5	
RTD 3L, 4L	aktive	aktive	2	2.5	4	6.5	11.5	21	40.5	
RTD 2L,3L,4L	off	off	1.5	2.5	3.5	7.5	14	26.5	50.5	

<sup>\*)</sup> Standard values, also valid for basic configuration

##### Accuracy data (acc. to EN/IEC 60 770-1)

Reference value: Measuring span  
 Basic accuracy: Error limits  $\leq \pm 0.2\%$  at reference conditions

##### Reference conditions

Ambient temperature: 23 °C  
 Power supply: 18 V DC

<sup>1)</sup> Note HART FSK Physical Layer Specifications!

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Output burden:	250 $\Omega$
Settings:	Pt100, 3-wire, 0...600 °C
<b>Additional errors (additive)</b>	
Low measuring ranges	
Voltage measurement:	$\pm 5 \mu\text{V}$ at measuring spans < 10 mV
Resistance thermometer:	$\pm 0.3 \text{ K}$ at measuring spans < 400 °C
Thermocouple:	
Type U, T, L, J, K, E	$\pm 0.1 \text{ K}$ at measuring spans < 200 °C
Type N	$\pm 0.13 \text{ K}$ at measuring spans < 320 °C
Type S, R	$\pm 0.42 \text{ K}$ at measuring spans < 1000 °C
Type B	$\pm 0.6 \text{ K}$ at measuring spans < 1400 °C
High initial value:	(Additional error = Factor · Initial value)
	Factor
Voltage measurement:	$\pm 0.1 \mu\text{V} / \text{mV}$
Resistance thermometer:	$\pm 0.00075 \text{ K} / \text{°C}$
Thermocouple:	
Type U, T, L, J, K, E	$\pm 0.0006 \text{ K} / \text{°C}$
Type N	$\pm 0.0008 \text{ K} / \text{°C}$
Type S, R	$\pm 0.0025 \text{ K} / \text{°C}$
Type B	$\pm 0.0036 \text{ K} / \text{°C}$
Influence of lead resistance at resistance thermometer:	$\pm 0.01\%$ per $\Omega$
Internal cold junction compensation:	$\pm 0.5 \text{ K}$
Linearisation:	$\pm 0.3\%$

### Influencing factors

Temperature:	$\leq \pm (0.15\% + 0.15 \text{ K})$ per 10 K with temperature measurement $\leq \pm (0.15\% + 12 \mu\text{V})$ per 10 K with voltage measurement
Power supply influence (power supply on terminals):	$\leq \pm 0.005\%$ per V
Long-time drift:	$\leq \pm 0.1\%$
Common and transverse mode influence:	$\leq \pm 0.2\%$

### Open and short-circuit sensor circuit supervision

Signalling modes:	Output signal programmable to... ... the value the output had im- mediately prior to the open or short-circuit (hold value) ... a value between 4 and 21.6 mA
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### Power supply

DC voltage:	Supply 12...30 V DC max. residual ripple 1% p.p. <sup>1</sup> (supply must not fall below 12 V) Protected against wrong polarity
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### HART communication

HART protocol:	Revision 5.10
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### Installation data

Dimensions:	See section "Dimensional drawing"
Housing:	Lexan 940 (polycarbonate) Flammability class V-0 acc. to UL 94, self-extinguishing, non-dripping, free of halogen
Mounting position:	Any
Electrical connections:	Screw terminals with Phillips heads for max. $2 \times 1.5 \text{ mm}^2$
Weight:	Approx. 60 g
Mounting:	Shape B version of terminal head held by two M4 cheese-headed screws and two springs

### Standards

Electromagnetic compatibility:	The standards EN 50 081-2 und EN 50 082-2 are observed
Intrinsically safe:	Acc. to EN 50 020
Protection (acc. to IEC 529 resp. EN 60 529):	Housing IP 40 Terminals IP 00
Electrical standards:	Acc. to IEC 1010 resp. EN 61 010
Test voltage:	1500 V AC, applied between measu- ring input and output

### Ambient conditions

IEC 68-1-1/-2/-3/-6/-27 resp. EN 60 068-2-1/-2/-3/-6/-27	Ambient tests - 1 Cold, - 2 Dry heat, - 3 Damp heat, - 6 Vibration, - 27 Shock
Ambient temperature range:	-25 to + 80 °C at NEx and Ex (T4) at Ex (T6) dependent of Pi, see EC- type-examination Certificate
Storage temperature range:	-40 to + 80 °C
Annual mean relative humidity:	$\leq 75\%$ , no moisture condensation
Altitude:	2000 m max.
Indoor use statement	

<sup>1)</sup> Note HART FSK Physical Layer Specifications!

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## Programmable Temperature Transmitter

### for RTD and TC inputs, with HART protocol

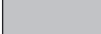
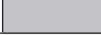
**Table 3: Data on explosion protection**  **II 2 (1) G**

Order Code	Type of protection Marking	Electrical data acc. to Certificate		Certificate	Mounting location
		Sensor input	Output of device		
626 - 7B	EEx ia IIC T6	$U_o = 6\text{ V}$ $I_o = 5\text{ mA}$ $P_o = 11\text{ mW}$ $C_o = 1864\text{ nF}$ $L_o = 5\text{ mH}$	$U_l = 30\text{ V}$ $I_l = 160\text{ mA}$ $P_l = \text{max. } 1\text{ W}^*$ $C_l = 0$ $L_l = 0$	EC-type-examination Certificate ZELM 01 ATEX 0067	<b>Within</b> the hazardous area, zone 1 and 2**

\* According to temperature class

\*\* It is permissible for the sensor circuit to enter zone 0, however, EN 50 284 and any applicable national standards must be observed.

**Table 4: Specification and ordering information** (see also Table 1: Standard versions)

Features, Selection	Blocking code	no-go with blocking code	Article No./ Feature
<b>Order Code 626 – xxxx xxxx xxx</b>			<b>626 –</b>
<b>1. Housing</b> (power supply via output leads) 7) For installation in a terminal head DIN 43 729, shape B			7
<b>2. Version</b> A) Not intrinsically safe B) EEx ia IIC T6, intrinsically safe electrical circuits			1 2
<b>3. Configuration</b> 0) <b>Basic</b> configuration, programmed, (Pt100, 3-wire, 0 ... 600 °C) 1) Configured to order Line 0: All types with basic configuration are available as standard versions, see table 1, specification complete! Line 1: The following features 4 to 11 must be fully specified!	G		0 1
<b>4. Measuring unit</b> 1) Temperatures in °C 2) Temperatures in °F 3) Temperatures in K		G G	1 2 3
<b>5. Measuring mode, input connection</b> <b>Thermocouple</b> 1) Internal cold junction compensation, with built-in Pt100 2) External cold junction compensation $t_k$  <b>Resistance thermometer</b> 3) Two-wire connection $R_L$ $[\Omega]$  4) Three-wire connection, $R_L \leq 30\ \Omega$ / wire 5) Four-wire connection, $R_L \leq 30\ \Omega$ / wire Line 2: Specify external cold junction temperature in tK (in °C, °F or K, acc. to specification in Feature 4), any value between 0 and 60 °C or equivalent. Line 3: Specify total lead resistance $R_L$ $[\Omega]$ , any value between 0 and 60 $\Omega$	T T R R R	G G G G	1 2 3 4 5

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Features, Selection	Blocking code	no-go with blocking code	Article No./ Feature
<b>Order Code 626 – xxxx xxxx xxx</b>			<b>626 –</b>
<b>6. Sensor type / measuring range</b>			
Sensor type / beginning ... end value of measuring range			
1) RTD Pt 100	Range	T	1
2) RTD Ni 100	Range	GT	2
3) RTD Pt ... [ $\Omega$ ]	Range	GT	3
4) RTD Ni ... [ $\Omega$ ]	Range	GT	4
B) TC Type B	Range	GR	B
E) TC Type E	Range	GR	E
J) TC Type J	Range	GR	J
K) TC Type K	Range	GR	K
L) TC Type L	Range	GR	L
N) TC Type N	Range	GR	N
R) TC Type R	Range	GR	R
S) TC Type S	Range	GR	S
T) TC Type T	Range	GR	T
U) TC Type U	Range	GR	U
W) TC W5-W26Re	Range	GR	W
X) TC W3-W25Re	Range	GR	X
Specify measuring range in [°C], [°F] or [K]; refer to table 5 for the operating limits for each type of sensor. Lines 3 and 4: Specify resistance in $\Omega$ at 0 °C, any value between 50 and 4000 $\Omega$			
<b>7. Output characteristic</b>			
0) Standard 4 ... 20 mA			0
1) Inversely 20 ... 4 mA		G	1
<b>8. Open and short-circuit sensor signalling</b>			
Output response for an open or short-circuit* sensor			
0) Output 21.6 mA			0
1) Output [mA]		G	1
2) Hold output at last value		G	2
A) No signal		G	A
Line 1: Any value between 4 and < 21.6 mA *) The short-circuit signal is only active for the RTD measuring mode $\geq 100 \Omega$ at 0 °C and three or four-wire connection.			
<b>9. Output time response</b>			
0) Standard setting time approx. 2 s			0
9) Setting time [s]		G	9
Line 9: Admissible values see Table 3			
<b>10. Mains ripple suppression</b>			
0) Frequency 50 Hz			0
1) Frequency 60 Hz		G	1
<b>11. Test certificate</b>			
0) Without test certificate			0
D) Test certificate in German		G	D
E) Test certificate in English		G	E

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

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**Table 5: Temperature measuring ranges**

Measuring ranges [°C]	Resistance thermometers		Thermocouples											
	Pt100	Ni100	B	E	J	K	L	N	R	S	T	U	C <sup>1)</sup>	D <sup>2)</sup>
0... 40	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	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	X	
0... 200	X	X		X	X	X	X	X			X	X	X	X
0... 250	X	X		X	X	X	X	X			X	X	X	X
0... 300	X			X	X	X	X	X	X	X	X	X	X	X
0... 400	X			X	X	X	X	X	X	X	X	X	X	X
0... 500	X			X	X	X	X	X	X	X		X	X	X
0... 600	X			X	X	X	X	X	X	X		X	X	X
0... 800	X		X	X	X	X	X	X	X	X			X	X
0... 900			X	X	X	X	X	X	X	X			X	X
0...1000			X	X	X	X		X	X	X			X	X
0...1200			X		X	X		X	X	X			X	X
0...1500			X						X	X			X	X
0...1600			X						X	X			X	X
0...1800			X										X	X
0...2000													X	X
50... 150	X	X		X	X	X	X	X			X	X		
100... 300	X			X	X	X	X	X			X	X	X	X
200... 500	X			X	X	X	X	X	X	X		X	X	X
300... 600	X			X	X	X	X	X	X	X		X	X	X
600... 900			X	X	X	X	X	X	X	X			X	X
600...1000			X	X	X	X		X	X	X			X	X
900...1200			X		X	X		X	X	X			X	X
600...1600			X						X	X			X	X
600...1800			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	0 to 2315	0 to 2315
	$\Delta R$ min. 15 $\Omega$ at final value <sup>3)</sup> $\leq 400 \Omega$ $\Delta R$ min. 150 $\Omega$ at final value $> 400 \Omega$ max. final value 4000 $\Omega$ Initial value $\frac{\text{Initial value}}{\Delta R} \leq 10$		$\Delta U$ min. 2 mV, max. 80 V $\frac{\text{Initial value}}{\Delta U} \leq 10$											

<sup>1)</sup> W5 Re W26 Re (ASTM E 988-90)

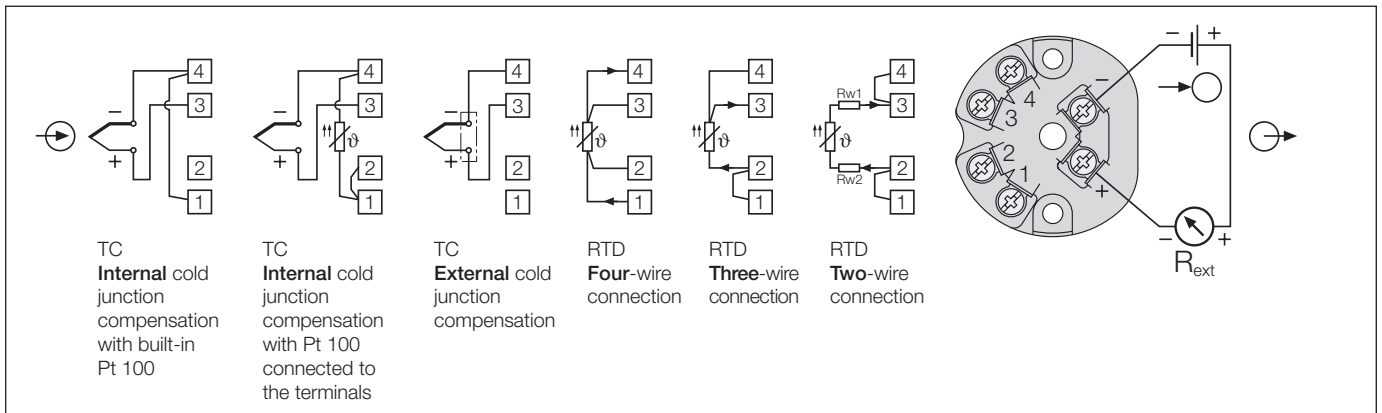
<sup>2)</sup> W3 Re W25 Re (ASTM E 988-90)

<sup>3)</sup> For two-wire connection, the final value is made up of the measured final value [ $\Omega$ ] plus the total resistance of the leads.

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## Programmable Temperature Transmitter for RTD and TC inputs, with HART protocol

### Electrical connections



= Measuring input

= Two-wire measuring output (measuring circuit)  
(4 ... 20 mA signal)

= Power supply H 12 ... 30 V DC

### Table 6: Accessories

Description	Order No.
<b>Configuration software V 600 plus</b> for SINEAX VK 616, VK 626, V 608 and V 624 Windows 3.1x, 95, 98, NT and 2000 on CD in German, English, French, Spanish, Italian and Dutch. <b>(Download free of charge under <a href="http://www.camillebauer.com">http://www.camillebauer.com</a>)</b> In addition, the CD contains all configuration programmes presently available for Camille Bauer products.	146 557
Operating Instructions VK 626 Bd in German	141 961
Operating Instructions VK 626 Bf in French	142 084
Operating Instructions VK 626 Be in English	142 133

### Standard accessories

- 1 Operating Instructions in German, French and English
- 1 Type examination certificate (only for "intrinsically safe" explosion-proof devices)

### Dimensional drawings

