# SINEAX VK 636
# Programmable Temperature Transmitter, for RTD and TC inputs, with PROFIBUS PA protocol

**for installation in the terminal head of a temperature sensor DIN 43 729, Shape B extra high**

CE 0102 Ex II 2 (1) G


*Fig. 1. Measuring transmitter SINEAX VK 636 with PROFIBUS PA protocol.*

## Application

**SINEAX VK 636** is a two-wire head-mounted transmitter head. It is designed for **measuring temperature in combination with thermocouples or resistance thermometers**. Thermocouple non-linearities are automatically compensated. The output signal is superimposed on the power supply current (Manchester code) according to specification IEC 1158-2.

The communication protocol used is Profibus PA Profil Version 3.0. The measured variables and ranges can be configured and set on a PC (Master Class 2) running the respective configuration software.

## Features / Benefits

- **Measured variables and ranges configured and set using Master Class 2 / Simplifies project planning and engineering, short delivery times, low stocking levels**

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

- **Profibus Profil Version 3.0**
- **Low current consumption (< 12 mA)**
- **Open and short-circuit sensor circuit supervision**
- **Terminals with captive screws**
- **Available in type of protection "Intrinsic safety" EEx ia-ib IIC T6** (see "Table 3: Data on explosion protection")

## Configurations and settings

A Master Class 2, the basic device file (GSD), the device description (DD) and the respective configuration software are needed to configure and set the transmitter. The hardware required includes an RS 485 cable (PC bus coupler), a bus coupler and an ancillary two-wire cable.

The connections between
"Master Class 2 ↔ bus coupler ↔ SINEAX VK 636" can be seen from Fig. 2.

The bus coupler compensates the level between RS 485 and IEC 1158-2 and also establishes the power supply connection between the Master Class 2 and the SINEAX VK 636 transmitter.

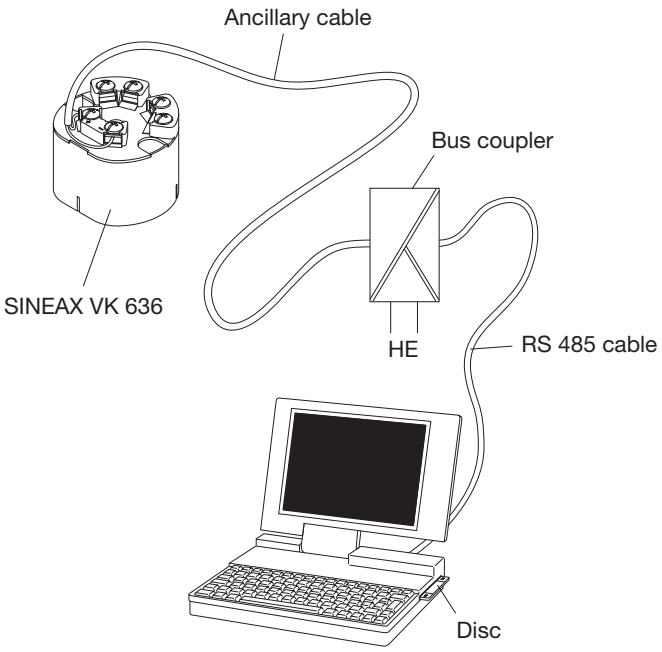



*Fig. 2*

# SINEAX VK 636
# Programmable Temperature Transmitter for RTD and TC inputs, with PROFIBUS PA protocol

## Technical data

### Measuring input

*Temperature with resistance thermometers*

| | |
|---|---|
| Measuring range limits: | See table 2 |
| Resistance types: | Type Pt 100 (IEC 60 751)<br>Type Ni 100 (DIN 43 760) |
| Measuring current: | ≤ 0.20 mA |
| Standard circuit: | 1 resistance thermometer for **two-, three-** or **four-**wire connection |
| Input resistance: | $R_i$ > 10 MΩ |
| Lead resistance: | ≤ 30 Ω per lead |

*Temperature with thermocouple*

| | |
|---|---|
| Measuring range limits: | See table 2 |
| Thermocouple pairs: | Type B: Pt30Rh-Pt6Rh (IEC 584)<br>Type E: NiCr-CuNi (IEC 584)<br>Type J: Fe-CuNi (IEC 584)<br>Type K: NiCr-Ni (IEC 584)<br>Type L: Fe-CuNi (DIN 43710)<br>Type N: NiCrSi-NiSi (IEC 584)<br>Type R: Pt13Rh-Pt (IEC 584)<br>Type S: Pt10Rh-Pt (IEC 584)<br>Type T: Cu-CuNi (IEC 584)<br>Type U: Cu-CuNi (DIN 43710)<br>Type W5 Re/W26 Re (ASTM<br>Type W3 Re/W25 Re E 988-90) |
| Standard circuit: | 1 thermocouple, internal cold junction compensation<br>or<br>1 thermocouple, external cold junction compensation |
| Input resistance: | Ri > 10 MΩ |

### Cold junction compensation:

| | |
|---|---|
| | Internal or external |
| Internal: | Incorporated Pt 100 |
| Permissible variation of the internal cold junction compensation: | ± 0.5 K to 23 °C, ± 0.25 K/10 K |
| External: | 0 … 60 °C, programmable |

### Measuring output

| | |
|---|---|
| Communication protocol: | Profibus PA (Profil for Process Control, Version 3.0) |
| Data transfer: | Acc. to IEC 1158-2 |
| Bus termination: | External |
| Transmission speed: | 31.25 kbit/s |

### Configuration and setting connector

| | |
|---|---|
| Interface: | Output terminals |

### Accuracy data

| | |
|---|---|
| Reference value: | Measuring range end value |
| Basic accuracy: | Max. error ≤ ± 0.2% |
| Linearity: | < 0.1% |

#### Reference conditions

| | |
|---|---|
| Ambient temperature | 23 °C, ± 1 K |
| Input variable: | Rated useful range |

### Open and short-circuit sensor circuit supervision

| | |
|---|---|
| Signalling modes: | Acc. to Profil 3.0 |

### Power supply

| | |
|---|---|
| Power supply: | Via standard bus coupler conforming to IEC 1158-2 |

### Installation data

| | |
|---|---|
| Dimensions: | See section “Dimensional drawings” |
| Housing: | Lexan 940 (polycarbonate)<br>Flammability class V-0 acc. to UL 94, self-extinguishing, non-dripping, free of halogen |
| Mounting position: | Any |
| Electrical connections: | Screw terminals with Philips heads for max. 2 × 1.5 mm² |
| Weight: | Approx. 80 g |
| Mounting: | In terminal head by two M4 cheese-headed screws and two springs |

### 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<br>Terminals IP 00 |
| Electrical standards: | Acc. to IEC 1010 resp. EN 61 010 |
| Test voltage: | 1500 V<br>applied between measuring input and output |

### Ambient conditions

| | |
|---|---|
| Climatic rating: | Climate class 3Z acc. to VDI/VDE 3540 |

| | | | |
|---|---|---|---|
| Commissioning temperature: | – 10 to + 80 °C | Storage temperature: | – 40 to + 80 °C |
| Operating temperature: | NEx – 25 to + 80 °C<br>Ex – 25 to + 60 °C/T6<br>– 25 to + 80 °C/T4 | Annual mean relative humidity: | ≤ 75% |

## Table 1: Specification and ordering information

| Order Code **636 -** | | | |
|---|---|---|---|
| Features, Selection | *SCODE | no-go | |
| **1. Housing** | | | |
| 7) For installation in a terminal head DIN 43 729, shape B (with extra high body) | | | 7 . . . . . |
| **2. Version** | | | |
| C) Not intrinsically safe | | | . C . . . . . |
| D) EEx ia-ib IIC T6, intrinsically safe electrical circuits | | | . D . . . . . |
| **3. Configuration** | | | |
| 0) **Basic** configuration programmed | G | | . . 0 . . . . . |
| 1) Programmed to order | | | . . 1 . . . . . |
| **4. Measuring unit** | | | |
| 0) Basic configuration | | | . . . 0 . . . . |
| 1) Temperatures in °C | | G | . . . 1 . . . . |
| 2) Temperatures in °F | | G | . . . 2 . . . . |
| 3) Temperatures in K | | G | . . . 3 . . . . |
| **5. Measuring mode, input connection** | | | |
| 0) Basic configuration | | | . . . . 0 . . . |
| **Thermocouple** | | | |
| 1) Internal cold junction compensation | | G | . . . . 1 . . . |
| 2) External cold junction compensation $t_K$ | | G | . . . . 2 . . . |
| **Resistance thermometer** | | | |
| 3) Two-wire connection, $R_L$ [Ω] | | G | . . . . 3 . . . |
| 4) Three-wire connection, $R_L \leq 30$ Ω/wire | | G | . . . . 4 . . . |
| 5) Four-wire connection, $R_L \leq 30$ Ω/wire | | G | . . . . 5 . . . |
| Line 2: Specify external cold junction temperature $t_K$ (in °C, °F or K, acc. to specification in Feature 4), any value between 0 and 60 °C or equivalent<br>Line 3: Specify total lead resistance $R_L$ [Ω], any value between 0 and 60 Ω | | | |

Table 1: “Specification and ordering information” continued on next page!

# SINEAX VK 636
# Programmable Temperature Transmitter for RTD and TC inputs, with PROFIBUS PA protocol

| Order Code **636 -** | | | | | |
|---|---|---|---|---|---|
| Features, Selection | | | *SCODE | no-go | |
| **6. Sensor type / measuring range**<br>Sensor type / beginning … end value of measuring range | | | | | |
| 0) Basic configuration | | | | | 0 . . . . . |
| 1) RTD Pt 100 | Range | | | G | 1 . . . . . |
| 2) RTD Ni 100 | Range | | | G | 2 . . . . . |
| 3) RTD Pt 100 … [Ω] | Range | | | G | 3 . . . . . |
| 4) RTD Ni 100 … [Ω] | Range | | | G | 4 . . . . . |
| B) TC Type B | Range | | | G | B . . . . . |
| E) TC Type E | Range | | | G | E . . . . . |
| J) TC Type J | Range | | | G | J . . . . . |
| K) TC Type K | Range | | | G | K . . . . . |
| L) TC Type L | Range | | | G | L . . . . . |
| N) TC Type N | Range | | | G | N . . . . . |
| R) TC Type R | Range | | | G | R . . . . . |
| S) TC Type S | Range | | | G | S . . . . . |
| T) TC Type T | Range | | | G | T . . . . . |
| U) TC Type U | Range | | | G | U . . . . . |
| W) TC W5-W26Re | Range | | | G | W . . . . . |
| X) TC W3-W25Re | Range | | | G | X . . . . . |
| Specify measuring range in [°C], [°F] or [K]; refer to table 2 for the operating limits for each type of sensor<br>Lines 3 and 4: Specify resistance in Ω at 0 °C | | | | | |
| **7. Test certificate** | | | | | |
| 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 "SCODE".*

## Table 2: Temperature measuring ranges

| Measuring ranges [°C] | Resistance thermometer | | Thermocouples | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pt100 | Ni100 | B | E | J | K | L | N | R | S | T | U |
| 0... 20 | | | | | | | | | | | | |
| 0... 25 | | | | | | | | | | | | |
| 0... 40 | | | | 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 |
| | Span min. 50 K max. 850 K | Span min. 50 K max. 250 K | ΔU min 2 mV, max. 80 mV | | | | | | | | | |

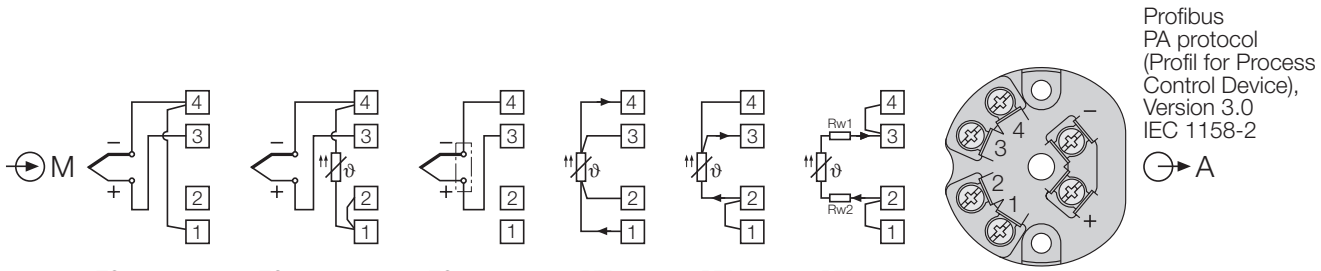
# SINEAX VK 636
# Programmable Temperature Transmitter for RTD and TC inputs, with PROFIBUS PA protocol

### Table 3: Data on explosion protection ⟨Ex⟩ II 2 (1) G

| Order Code | Type of protection Marking | Electrical data acc. to Certificate Sensor input | Output | Certificate | Mounting location of instrument |
|---|---|---|---|---|---|
| 636 - 7D | EEx ia-ib IIC T6 | in preparation | | EC-type-examination Certificate Zelm 99 ATEX | **Within** the hazardous area, zone 1 and 2** |

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

### Electrical connections




M = Measuring input
A = Measuring output

### Table 4: Accessories

| Description | Order No. |
|---|---|
| Operating Instructions VK 636 Bd in German | 141 979 |
| Operating instructions VK 636 Bf in French | 142 092 |
| Operating instructions VK 636 Be in English | 142 141 |

## Dimensional drawing

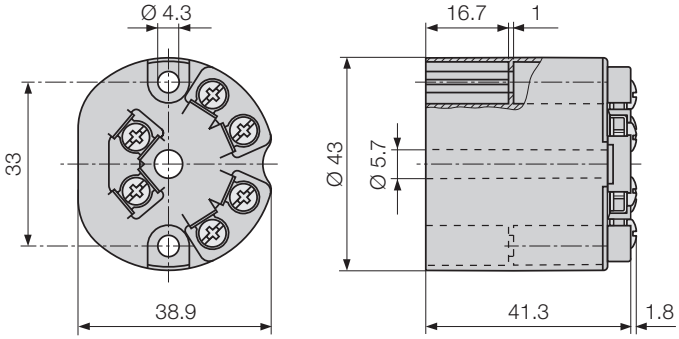



*Fig. 3. SINEAX VK 636.*

## Standard accessories

1 Operating Instructions in German, French and English
1 Type examination certificate (only for “intrinsically safe” explosion-proof devices)
1 Basic device file (GSD)
1 Device Description (DD)

# SINEAX VK 636
# Programmable Temperature Transmitter for RTD and TC inputs, with PROFIBUS PA protocol

Printed in Switzerland • Subject to change without notice • Edition 04.00 • Data sheet No. VK 636 Le

Camille Bauer Ltd

Aargauerstrasse 7
CH-5610 Wohlen/Switzerland
Phone +41 56 618 21 11
Fax +41 56 618 24 58
Telex 827 901 cbm ch