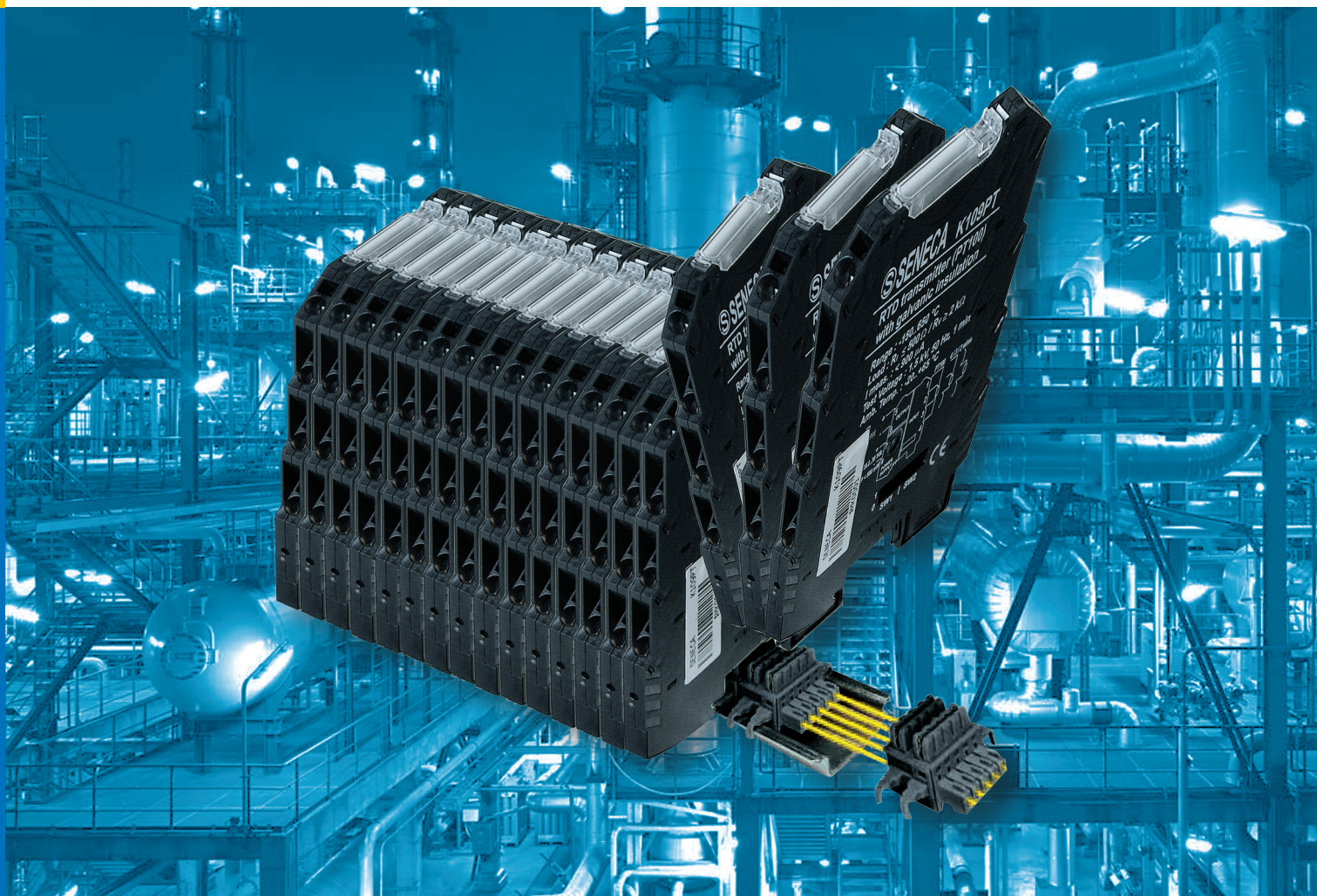


# K-Line

COMPACT SIGNAL CONVERTERS  
AND ISOLATORS



- UNIVERSAL CONVERTERS
- ANALOG CONVERTERS
- TEMPERATURE CONVERTERS
- FREQUENCY CONVERTERS
- SERIAL CONVERTERS

 **SENECA**  
www.seneca.it

# K-Line

## Compact Signal Converters and Isolators

SENECA **K-Line** compact signal converters have a 6,2 mm ultra slim case. These multi-point galvanic isolators convert temperature, analog, digital and serial signals.

The module's main features are its compact size, installation on 35 mm DIN rails, a bus-connector power supply option, top level accuracy class, quick connection possibility by using clamp terminals and an easy configuration in the field by means of a DIP switches.

### HARSH INDUSTRIAL DESIGN

#### HIGH LEVEL RELIABILITY



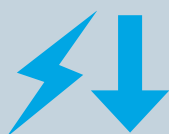
>500.000 h

#### WIDE OPERATING TEMPERATURE RANGE



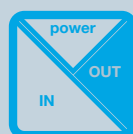
-20..+65°C

#### LOW POWER CONSUMPTION



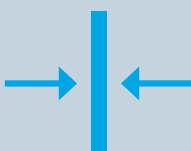
<25mA

#### ISOLATION 3-WAYS



1,5 kV

#### COMPACT SIZE



6,2 mm

#### BEST ACCURACY



0,1%





## SPECIAL FUNCTIONS

**READING  
STABILIZATION  
FILTER**



**I/O SCALES  
INVERSION**



**LINEARIZATION FOR  
HORIZONTAL  
CYLINDRICAL**



**SQRT  
FUNCTIONS**



## SETTINGS

**FLEXIBLE  
CONFIGURATION VIA  
DIP-SWITCHES**



**PC PROGRAMMING**



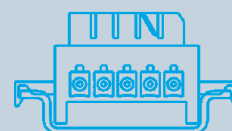
## POWER SUPPLY

**DISTRIBUTED / ON  
TERMINAL  
POWER SUPPLY**



**19.2..30 Vdc**

**EXPANDABLE POWER  
SUPPLY CONNECTOR**



## APPROVALS

**INTERNATIONAL  
STANDARD**



**CE, UL, CSA**

**ATEX COMPLIANT  
(K121)**



**II 3G Ex nA IIC T4 Gc X (gas)  
II 3D Ex tc IIIC T135°C Dc X (dust)  
EN 60079-0:2012  
EN 60079-15:2010**

## COMPACT SIGNAL CONVERTERS AND ISOLATORS

## UNIVERSAL

## ANALOG

|                            | K121                                                                                                                                                                                                                                                                                                                                                 | K109UI                                                                                                                                                                                                                                  | K109S                                                                                                                                                                                                                                                                     | K109LV                                                                                                                                                                                               |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                            |    <p>Universal converter<br/>(mA, V, Ohm, RTD, TC) isolated,<br/>loop powered</p>                |   <p>DC current/voltage to current/voltage<br/>isolator converter</p> |   <p>DC current/voltage to current/voltage<br/>isolator converter<br/>(2 wire power transducer)</p> |  <p>DC low voltage to current/voltage<br/>isolator converter</p>                                                  |
| <b>GENERAL DATA</b>        |                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                      |
| Power supply               | 7..30 Vdc (from loop 4..20mA)                                                                                                                                                                                                                                                                                                                        | 19,2.. 30 Vdc                                                                                                                                                                                                                           | 19,2.. 30 Vdc                                                                                                                                                                                                                                                             | 19,2.. 30 Vdc                                                                                                                                                                                        |
| Side Power                 |                                                                                                                                                                                                                                                                                                                                                      | Yes                                                                                                                                                                                                                                     | Yes                                                                                                                                                                                                                                                                       | Yes                                                                                                                                                                                                  |
| Hot swapping               | Yes                                                                                                                                                                                                                                                                                                                                                  | Yes                                                                                                                                                                                                                                     | Yes                                                                                                                                                                                                                                                                       | Yes                                                                                                                                                                                                  |
| Current consumption        | 24 mA                                                                                                                                                                                                                                                                                                                                                | 22 mA (24 Vdc)                                                                                                                                                                                                                          | 23 mA (24 Vdc); 45 mA (with aux power)                                                                                                                                                                                                                                    | 22 mA (24 Vdc)                                                                                                                                                                                       |
| Power consumption          | <660 mW                                                                                                                                                                                                                                                                                                                                              | 500 mW                                                                                                                                                                                                                                  | 500 mW                                                                                                                                                                                                                                                                    | 500 mW                                                                                                                                                                                               |
| A/D Conversion             | 16 bit                                                                                                                                                                                                                                                                                                                                               | 14 bit                                                                                                                                                                                                                                  | 14 bit                                                                                                                                                                                                                                                                    | 14 bit                                                                                                                                                                                               |
| Transmission               |                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                      |
| Rejection                  | 50 / 60 Hz                                                                                                                                                                                                                                                                                                                                           | 50 / 60 Hz                                                                                                                                                                                                                              | 50 / 60 Hz                                                                                                                                                                                                                                                                | 50 / 60 Hz                                                                                                                                                                                           |
| Settings                   | Software (EASY SETUP)                                                                                                                                                                                                                                                                                                                                | DIP Switches                                                                                                                                                                                                                            | DIP Switches                                                                                                                                                                                                                                                              | DIP Switches                                                                                                                                                                                         |
| Filter                     | Yes, stable reading                                                                                                                                                                                                                                                                                                                                  | Yes, stable reading                                                                                                                                                                                                                     | Yes, stable reading                                                                                                                                                                                                                                                       | Yes, stable reading                                                                                                                                                                                  |
| Dimensions (w x h x d)     | 6,2 x 93,1 x 102,5 mm                                                                                                                                                                                                                                                                                                                                | 6,2 x 93,1 x 102,5 mm                                                                                                                                                                                                                   | 6,2 x 93,1 x 102,5 mm                                                                                                                                                                                                                                                     | 6,2 x 93,1 x 102,5 mm                                                                                                                                                                                |
| Isolation                  | 1,5 kVdc (3-way)                                                                                                                                                                                                                                                                                                                                     | 1,5 kVdc (3-way)                                                                                                                                                                                                                        | 1,5 kVdc (3-way)                                                                                                                                                                                                                                                          | 1,5 kVdc (3-way)                                                                                                                                                                                     |
| Isolation technique        | Digital (optocoupler)                                                                                                                                                                                                                                                                                                                                | Digital (optocoupler)                                                                                                                                                                                                                   | Digital (optocoupler)                                                                                                                                                                                                                                                     | Digital (optocoupler)                                                                                                                                                                                |
| Data processing            | 32 bit floating point                                                                                                                                                                                                                                                                                                                                | 32 bit floating point                                                                                                                                                                                                                   | 32 bit floating point                                                                                                                                                                                                                                                     | 32 bit floating point                                                                                                                                                                                |
| Colour                     | Black                                                                                                                                                                                                                                                                                                                                                | Black                                                                                                                                                                                                                                   | Black                                                                                                                                                                                                                                                                     | Black                                                                                                                                                                                                |
| Enclosure                  | PBT                                                                                                                                                                                                                                                                                                                                                  | PBT                                                                                                                                                                                                                                     | PBT                                                                                                                                                                                                                                                                       | PBT                                                                                                                                                                                                  |
| Weght                      | 45 g                                                                                                                                                                                                                                                                                                                                                 | 45 g                                                                                                                                                                                                                                    | 45 g                                                                                                                                                                                                                                                                      | 45 g                                                                                                                                                                                                 |
| Operating temperature      | -20..+65 °C                                                                                                                                                                                                                                                                                                                                          | -20..+65 °C                                                                                                                                                                                                                             | -20..+65 °C                                                                                                                                                                                                                                                               | -20..+65 °C                                                                                                                                                                                          |
| Connections                | 8 Clamp terminals                                                                                                                                                                                                                                                                                                                                    | Clamp terminals / bus                                                                                                                                                                                                                   | Clamp terminals / bus                                                                                                                                                                                                                                                     | Clamp terminals / bus                                                                                                                                                                                |
| Protection degree          | IP 20                                                                                                                                                                                                                                                                                                                                                | IP 20                                                                                                                                                                                                                                   | IP 20                                                                                                                                                                                                                                                                     | IP 20                                                                                                                                                                                                |
| Precision class            | 0,1%                                                                                                                                                                                                                                                                                                                                                 | 0,1%                                                                                                                                                                                                                                    | 0,1%                                                                                                                                                                                                                                                                      | 0,1%                                                                                                                                                                                                 |
| Thermal drift              | < 120 ppm/K                                                                                                                                                                                                                                                                                                                                          | < 120 ppm/K                                                                                                                                                                                                                             | < 120 ppm/K                                                                                                                                                                                                                                                               | < 120 ppm/K                                                                                                                                                                                          |
| Status indicators          | Fault, alarm                                                                                                                                                                                                                                                                                                                                         | Fault, alarm                                                                                                                                                                                                                            | Fault, alarm                                                                                                                                                                                                                                                              | Fault, alarm                                                                                                                                                                                         |
| Special functions          | Cold junction compensation<br>Filter<br>Reversed output                                                                                                                                                                                                                                                                                              | Root extraction<br>Signal inversion<br>Scale settable<br>Linearization                                                                                                                                                                  | Root extraction<br>Signal inversion<br>Scale settable<br>Linearization                                                                                                                                                                                                    | Fault configuration<br>Filter                                                                                                                                                                        |
| Approvals                  | CE, II 3G Ex nA IIC T4 Gc X, II 3D Ex tc IIIC T135°C Dc X                                                                                                                                                                                                                                                                                            | CE, UL-UR CSA                                                                                                                                                                                                                           | CE, UL-UR CSA                                                                                                                                                                                                                                                             | CE                                                                                                                                                                                                   |
| Norms                      | Safety (EN 61010-1), EMC (EN 61000-6-2, EN 61000-6-4, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-11), Atex (EN 60079-0, EN 60079-15)                                                                                                                                                                           | EN 61000-6-4, EN 61010-6-2, EN 61010-1                                                                                                                                                                                                  | EN 61000-6-4, EN 61010-6-2, EN 61010-1                                                                                                                                                                                                                                    | EN 61000-6-4, EN 61010-6-2, EN 61010-1                                                                                                                                                               |
| <b>INPUT DATA</b>          |                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                      |
| Channels                   | 1                                                                                                                                                                                                                                                                                                                                                    | 1                                                                                                                                                                                                                                       | 1                                                                                                                                                                                                                                                                         | 1                                                                                                                                                                                                    |
| Type                       | THERMOCOUPLE J, K, R, S, T, E, B, N (EN 60584)<br>RTD (PT100, PT500, PT1000, NI100) connection 2,3,4 wires<br>Voltage (V) $\pm$ 30V, impedance 200 k $\Omega$<br>Voltage (mV) $\pm$ 150 mV, impedance 10 M $\Omega$<br>Current: $\pm$ 24 mA, impedance 40 $\Omega$<br>Potentiometer: 500 $\Omega$ ..10 K $\Omega$<br>Resistance: up to 1760 $\Omega$ | VOLTAGE<br>Range: 0..10 / 10..0 / 0..5 / 1..5 / 0..15 / 0..30 V (inversion as well)<br>Impedance: 110 k $\Omega$ - 325 k $\Omega$<br>CURRENT<br>Range: 4..20 / 20..4 / 0..20 / 20..0 mA<br>Impedance: 35 $\Omega$                       | VOLTAGE<br>Range: 0..10 / 10..0 / 0..5 / 1..5 V<br>Impedance: 110 k $\Omega$<br>CURRENT<br>Range: 4..20 / 20..4 / 0..20 / 20..0 mA<br>Impedance: 35 $\Omega$                                                                                                              | SHUNT<br>Range: $\pm$ 25, 50, 60, 75, 80, 100, 120, 150, 200, 250, 300, 400, 500, 1000, 2000 mV (via Dip switches)                                                                                   |
| Absolute value             |                                                                                                                                                                                                                                                                                                                                                      | $\pm$ 32 V (400 mW limitation)                                                                                                                                                                                                          | $\pm$ 30 V (limitation 400 mW)                                                                                                                                                                                                                                            | $\pm$ 50 V                                                                                                                                                                                           |
| <b>OUTPUT DATA</b>         |                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                      |
| Channels                   | 1                                                                                                                                                                                                                                                                                                                                                    | 1                                                                                                                                                                                                                                       | 1                                                                                                                                                                                                                                                                         | 1                                                                                                                                                                                                    |
| Type                       | CURRENT 4..20mA                                                                                                                                                                                                                                                                                                                                      | VOLTAGE<br>Range: 0..10 / 10..0 / 0..5 / 1..5 V<br>Min load resistance: 2 k $\Omega$<br>CURRENT<br>Range: 4..20 / 20..4 / 0..20 / 20..0 mA<br>Max load resistance: 500 $\Omega$<br>Protection: 25 mA                                    | VOLTAGE<br>Range: 0..10 / 10..0 / 0..5 / 1..5 V<br>Min load resistance: 2 k $\Omega$<br>CURRENT<br>Range: 4..20 / 20..4 / 0..20 / 20..0 mA<br>Max load resistance: 500 $\Omega$<br>Protection: 25 mA                                                                      | VOLTAGE<br>Range: 0..10 / 10..0 / 0..5 / 1..5 V<br>Min load resistance: 2 k $\Omega$<br>CURRENT<br>Range: 4..20 / 20..4 / 0..20 / 20..0 mA<br>Max load resistance: 500 $\Omega$<br>Protection: 25 mA |
| Static relay               |                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                      |
| Response time (10-90%)     | 140..620ms                                                                                                                                                                                                                                                                                                                                           | < 40 ms (without filter)<br>< 88 ms (with filter)                                                                                                                                                                                       | < 40 ms (without filter)<br>< 88 ms (with filter)                                                                                                                                                                                                                         | < 25 ms (without filter)<br>< 55 ms (with filter)                                                                                                                                                    |
| A/D conversion, resolution |                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                      |
| <b>ORDER CODES</b>         |                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                      |
| Code                       | K121                                                                                                                                                                                                                                                                                                                                                 | K109UI                                                                                                                                                                                                                                  | K109S                                                                                                                                                                                                                                                                     | K109LV                                                                                                                                                                                               |

## TEMPERATURE

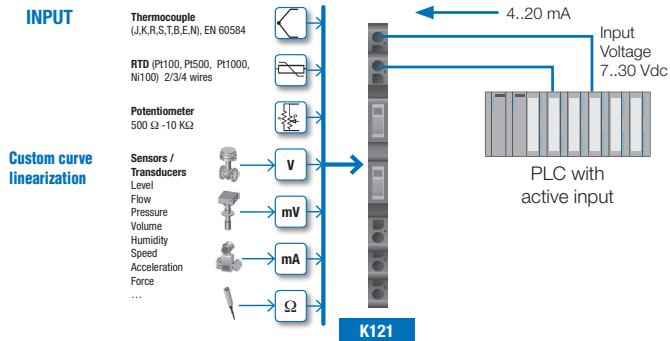
| K109PT                                                                                                                                                                                        | K109PT-HPC                                                                                                                                                                                    | K109PT1000                                                                                                                                                                                    | K120RTD                                                                                                                                                                           | K109TC                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                             |                                                                                                              |                                                                                                              |               |                                                                                                                                                                                         |
| <b>Pt100 to DC current/voltage isolator converter</b>                                                                                                                                         | <b>Pt100 to DC current/voltage isolator converter (high precision)</b>                                                                                                                        | <b>Pt1000 to DC current/voltage isolator converter</b>                                                                                                                                        | <b>Pt100, Ni100 to DC current converter -Loop powered (non isolated)</b>                                                                                                          | <b>TC to DC current/voltage isolator converter (with alarm)</b>                                                                                                                                                                                                                                                                                               |
| 19,2...30 Vdc                                                                                                                                                                                 | 19,2...30 Vdc                                                                                                                                                                                 | 19,2...30 Vdc                                                                                                                                                                                 | Loop powered (5...30 Vdc)                                                                                                                                                         | 19,2...30 Vdc                                                                                                                                                                                                                                                                                                                                                 |
| Yes                                                                                                                                                                                           | Yes                                                                                                                                                                                           | Yes                                                                                                                                                                                           | -                                                                                                                                                                                 | Yes                                                                                                                                                                                                                                                                                                                                                           |
| Yes                                                                                                                                                                                           | Yes                                                                                                                                                                                           | Yes                                                                                                                                                                                           | -                                                                                                                                                                                 | Yes                                                                                                                                                                                                                                                                                                                                                           |
| 21...25 mA (24 Vdc)                                                                                                                                                                           | 21...25 mA (24 Vdc)                                                                                                                                                                           | 21...25 mA (24 Vdc)                                                                                                                                                                           | 21...25 mA (24 Vdc)                                                                                                                                                               | 21...25 mA (24 Vdc)                                                                                                                                                                                                                                                                                                                                           |
| 500 mW                                                                                                                                                                                        | 500 mW                                                                                                                                                                                        | 500 mW                                                                                                                                                                                        | 500 mW                                                                                                                                                                            | 500 mW                                                                                                                                                                                                                                                                                                                                                        |
| 14 bit                                                                                                                                                                                        | 14 bit                                                                                                                                                                                        | 14 bit                                                                                                                                                                                        | 14 bit                                                                                                                                                                            | 14 bit                                                                                                                                                                                                                                                                                                                                                        |
| Optical - digital                                                                                                                                                                             | Optical - digital                                                                                                                                                                             | Optical - digital                                                                                                                                                                             | Optical - digital                                                                                                                                                                 | Optical - digital                                                                                                                                                                                                                                                                                                                                             |
| 50 – 60 Hz (configurable)                                                                                                                                                                     | 50 – 60 Hz (configurable)                                                                                                                                                                     | 50 – 60 Hz (configurable)                                                                                                                                                                     | 50 – 60 Hz (configurable)                                                                                                                                                         | 50 – 60 Hz (configurable)                                                                                                                                                                                                                                                                                                                                     |
| DIP switches                                                                                                                                                                                  | DIP switches                                                                                                                                                                                  | DIP switches                                                                                                                                                                                  | DIP switches, Software (EASY Setup)                                                                                                                                               | DIP switches                                                                                                                                                                                                                                                                                                                                                  |
| Yes, stable reading                                                                                                                                                                           | Yes, stable reading                                                                                                                                                                           | Yes, stable reading                                                                                                                                                                           | Yes, stable reading                                                                                                                                                               | Yes, stable reading                                                                                                                                                                                                                                                                                                                                           |
| 6,2 x 93,1 x 102,5 mm                                                                                                                                                                         | 6,2 x 93,1 x 102,5 mm                                                                                                                                                                         | 6,2 x 93,1 x 102,5 mm                                                                                                                                                                         | 6,2 x 93,1 x 102,5 mm                                                                                                                                                             | 6,2 x 93,1 x 102,5 mm                                                                                                                                                                                                                                                                                                                                         |
| 1,5 kVac (3-way)                                                                                                                                                                              | 1,5 kVac (3-way)                                                                                                                                                                              | 1,5 kVac (3-way)                                                                                                                                                                              | -                                                                                                                                                                                 | 1,5 kVac (3-way)                                                                                                                                                                                                                                                                                                                                              |
| Digital (optocoupler)                                                                                                                                                                         | Digital (optocoupler)                                                                                                                                                                         | Digital (optocoupler)                                                                                                                                                                         | -                                                                                                                                                                                 | Digital (optocoupler)                                                                                                                                                                                                                                                                                                                                         |
| 32 bit floating point                                                                                                                                                                         | 32 bit floating point                                                                                                                                                                         | 32 bit floating point                                                                                                                                                                         | 32 bit floating point                                                                                                                                                             | 32 bit floating point                                                                                                                                                                                                                                                                                                                                         |
| Black                                                                                                                                                                                         | Black                                                                                                                                                                                         | Black                                                                                                                                                                                         | Black                                                                                                                                                                             | Black                                                                                                                                                                                                                                                                                                                                                         |
| PBT                                                                                                                                                                                           | PBT                                                                                                                                                                                           | PBT                                                                                                                                                                                           | PBT                                                                                                                                                                               | PBT                                                                                                                                                                                                                                                                                                                                                           |
| 45 g                                                                                                                                                                                          | 45 g                                                                                                                                                                                          | 45 g                                                                                                                                                                                          | 45 g                                                                                                                                                                              | 45 g                                                                                                                                                                                                                                                                                                                                                          |
| -20...+65 °C                                                                                                                                                                                  | -20...+65 °C                                                                                                                                                                                  | -20...+65 °C                                                                                                                                                                                  | -20...+65 °C                                                                                                                                                                      | -20...+65 °C                                                                                                                                                                                                                                                                                                                                                  |
| Clamp terminals / bus                                                                                                                                                                         | Clamp terminals / bus                                                                                                                                                                         | Clamp terminals / bus                                                                                                                                                                         | Clamp terminals / bus                                                                                                                                                             | Clamp terminals / bus                                                                                                                                                                                                                                                                                                                                         |
| IP20                                                                                                                                                                                          | IP20                                                                                                                                                                                          | IP20                                                                                                                                                                                          | IP20                                                                                                                                                                              | IP20                                                                                                                                                                                                                                                                                                                                                          |
| 0,1% (max range)                                                                                                                                                                              | 0,1% (max range)                                                                                                                                                                              | 0,1%                                                                                                                                                                                          | 0,1%                                                                                                                                                                              | 0,1%                                                                                                                                                                                                                                                                                                                                                          |
| < 100 ppm/K                                                                                                                                                                                   | < 100 ppm/K                                                                                                                                                                                   | < 100 ppm/K                                                                                                                                                                                   | < 100 ppm/K                                                                                                                                                                       | < 100 ppm/K                                                                                                                                                                                                                                                                                                                                                   |
| Fault Alarm<br>fault and cut-off configuration, filter                                                                                                                                        | Fault Alarm<br>fault and cut-off configuration, filter                                                                                                                                        | Fault Alarm<br>fault and cut-off configuration, filter                                                                                                                                        | Fault Alarm<br>RTD type / connection, filter, measure range, error, output inversion, over-range                                                                                  | Fault Alarm<br>fault and cut-off configuration, filter                                                                                                                                                                                                                                                                                                        |
| CE, UL-UR CSA                                                                                                                                                                                 | CE                                                                                                                                                                                            | CE                                                                                                                                                                                            | CE                                                                                                                                                                                | CE, UL-UR CSA                                                                                                                                                                                                                                                                                                                                                 |
| EN 61000-6-4, EN 61000-6-2, EN 61010-1                                                                                                                                                        | EN 61000-6-4, EN 61000-6-2, EN 61010-1                                                                                                                                                        | EN 61000-6-4, EN 61000-6-2, EN 61010-1                                                                                                                                                        | EN 61000-6-4, EN 61000-6-2, EN 61010-1                                                                                                                                            | EN 61000-6-4, EN 61000-6-2, EN 61010-1                                                                                                                                                                                                                                                                                                                        |
| 1                                                                                                                                                                                             | 1                                                                                                                                                                                             | 1                                                                                                                                                                                             | 1                                                                                                                                                                                 | 1                                                                                                                                                                                                                                                                                                                                                             |
| Pt100<br>IEC 751 standard / EN 60751 – ITS90<br>Range: -150...+650 °C<br>Min span: 50 °C<br>Current on transmitter: 900 µA<br>Connection: 2,3,4 wires<br>Max cable resistance: 20 Ω           | Pt100<br>IEC 751 standard / EN 60751 – ITS90<br>Range: -200...+160 °C<br>Min span: 20 °C<br>Current on transmitter: 900 µA<br>Connection: 2,3,4 wires<br>Max cable resistance: 20 Ω           | Pt1000<br>EN 60751/A2 – ITS90<br>Range: -200...+210 °C<br>Min span: 30 °C<br>Current on transmitter: < 350 µA<br>Connection: 2,3,4 wires<br>Max cable resistance: 50 Ω                        | Pt100<br>EN 60751/A2 – ITS90<br>Range: -200...+650 °C<br>Min span: 20 °C<br>Connection: 2,3,4 wire<br>Ni100<br>Range: -60...+250 °C<br>Min span: 20 °C<br>Connection: 2,3,4 wires | Thermocouple<br>Type: J,K,E,N,S,R,B,T (ITS90)<br>Min span: 100 °C<br>Impedance: 10 MΩ<br>Semiconductor sold joint<br>ADC 13 bit<br>Precision: 0,15 °C<br>Update: 10 s<br>Max voltage: ±32 V                                                                                                                                                                   |
| 1                                                                                                                                                                                             | 1                                                                                                                                                                                             | 1                                                                                                                                                                                             | 1                                                                                                                                                                                 | 1                                                                                                                                                                                                                                                                                                                                                             |
| VOLTAGE<br>Range: 0...10 / 10...0 / 0...5 / 1...5 V<br>Min load resistance: 2 kΩ<br>CURRENT<br>Range: 4...20 / 20...4 / 0...20 / 20...0 mA<br>Max load resistance: 500 Ω<br>Protection: 25 mA | VOLTAGE<br>Range: 0...10 / 10...0 / 0...5 / 1...5 V<br>Min load resistance: 2 kΩ<br>CURRENT<br>Range: 4...20 / 20...4 / 0...20 / 20...0 mA<br>Max load resistance: 500 Ω<br>Protection: 25 mA | VOLTAGE<br>Range: 0...10 / 10...0 / 0...5 / 1...5 V<br>Min load resistance: 2 kΩ<br>CURRENT<br>Range: 4...20 / 20...4 / 0...20 / 20...0 mA<br>Max load resistance: 500 Ω<br>Protection: 25 mA | CURRENT<br>Range: 4...20 / 20...4 mA (2 wire)<br>Load resistance: 1 kΩ<br>Resolution: 0,5 µA (15 bit+sign)<br>Protection: 30 mA                                                   | VOLTAGE Range: 0...10 / 10...0 / 0...5 / 1...5 V<br>Min load resistance: 2 kΩ<br>CURRENT Range: 4...20 / 20...4 / 0...20 / 20...0 mA<br>Max load resistance: 500 Ω<br><br>Nominal voltage: 24 Vac/dc<br>Current: 60 mA<br>Overvoltage protection: 50 V<br>Settable hysteresis / alarm trip<br>< 40 ms (without filter)<br>< 88 ms (with filter)<br>1 mV, 2 µA |
| < 50 ms (without filter)<br>< 200 ms (with filter)<br>1 mV, 2 µA                                                                                                                              | < 50 ms (without filter)<br>< 200 ms (with filter)<br>1 mV, 2 µA                                                                                                                              | < 50 ms (without filter)<br>< 200 ms (with filter)<br>1 mV, 2 µA                                                                                                                              | < 220 ms (without filter)<br>< 620 ms (with filter)<br>1 mV, 2 µA                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                               |
| K109PT                                                                                                                                                                                        | K109PT-HPC                                                                                                                                                                                    | K109PT1000                                                                                                                                                                                    | K120RTD                                                                                                                                                                           | K109TC                                                                                                                                                                                                                                                                                                                                                        |

## COMPACT SIGNAL CONVERTERS AND ISOLATORS

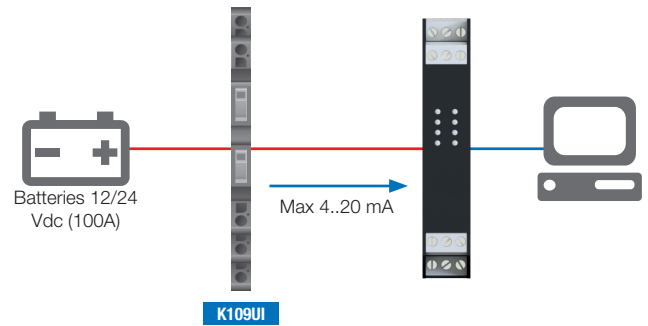
|                        | FREQUENCY                                                                                                                                                                                            |                                                                                                                                                                                                             |                                                                                                                                                | SERIAL                                                                              |                                                                                     |                                                                                                         |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
|                        | K111                                                                                                                                                                                                 | K111D                                                                                                                                                                                                       | K112                                                                                                                                           | K107A                                                                               | K107B                                                                               | K107USB                                                                                                 |
|                        |                                                                                                                     |                                                                                                                            |                                                               |   |  |                      |
|                        |                                                                                                                     |                                                                                                                            |                                                                                                                                                |  |  |                      |
|                        | Frequency threshold<br>with 2 outputs                                                                                                                                                                | 2-CH frequency<br>divider-repeater with 2<br>isolated outputs                                                                                                                                               | Digital sensor amplifier<br>with 2 outputs                                                                                                     | RS485↔RS485<br>serial isolator/repeater                                             | RS232↔RS485<br>serial isolator/converter                                            | USB↔RS485<br>serial isolator/converter                                                                  |
| GENERAL DATA           |                                                                                                                                                                                                      |                                                                                                                                                                                                             |                                                                                                                                                |                                                                                     |                                                                                     |                                                                                                         |
| Power supply           | 19,2...30 Vdc                                                                                                                                                                                        | 19,2...30 Vdc                                                                                                                                                                                               | 19,2...30 Vdc                                                                                                                                  | 19,2...30 Vdc                                                                       | 19,2...30 Vdc                                                                       | By USB port                                                                                             |
| Side Power             | Yes                                                                                                                                                                                                  | Yes                                                                                                                                                                                                         | Yes                                                                                                                                            | Yes                                                                                 | Yes                                                                                 | -                                                                                                       |
| Hot swapping           | Yes                                                                                                                                                                                                  | Yes                                                                                                                                                                                                         | Yes                                                                                                                                            | Yes                                                                                 | Yes                                                                                 | Yes                                                                                                     |
| Current consumption    | < 25 mA                                                                                                                                                                                              | < 25 mA                                                                                                                                                                                                     | < 25 mA                                                                                                                                        | 22 mA (24 Vdc)                                                                      | 22 mA (24 Vdc)                                                                      | 60 mA                                                                                                   |
| Power consumption      | 500 mW                                                                                                                                                                                               | < 500 mW                                                                                                                                                                                                    | 500 mW                                                                                                                                         | 500 mW                                                                              | 500 mW                                                                              | -                                                                                                       |
| A/D Conversion         | 14 bit                                                                                                                                                                                               | 14 bit                                                                                                                                                                                                      | 14 bit                                                                                                                                         |                                                                                     |                                                                                     |                                                                                                         |
| Rejection              | 50 / 60 Hz                                                                                                                                                                                           | 50 / 60 Hz                                                                                                                                                                                                  | 50 / 60 Hz                                                                                                                                     | 50 / 60 Hz                                                                          | 50 / 60 Hz                                                                          | 50 / 60 Hz                                                                                              |
| Settings               | DIP switches, Software (EASY Setup)                                                                                                                                                                  | DIP switches, Software (EASY SETUP)                                                                                                                                                                         | DIP Switches                                                                                                                                   | DIP switches                                                                        | DIP switches                                                                        | DIP switches                                                                                            |
| Filter                 | Configurable                                                                                                                                                                                         | Configurable                                                                                                                                                                                                |                                                                                                                                                | Yes, stable reading                                                                 | Yes, stable reading                                                                 | Yes, stable reading                                                                                     |
| Dimensions (w x h x d) | 6,2 x 93,1 x 102,5 mm                                                                                                                                                                                | 6,2x93,1x102,5 mm                                                                                                                                                                                           | 6,2 x 93,1 x 102,5 mm                                                                                                                          | 6,2 x 93,1 x 102,5 mm                                                               | 6,2 x 93,1 x 102,5 mm                                                               | 6,2 x 93,1 x 102,5 mm                                                                                   |
| Isolation              | 1,5 kVac (3 ways)                                                                                                                                                                                    | 1,5 kVac (3 ways)                                                                                                                                                                                           | 1,5 kVac (3-way)                                                                                                                               | 1,5 kVac (3-way)                                                                    | 1,5 kVac (3-way)                                                                    | 1,5 kVac (USB // RS485)                                                                                 |
| Isolation technique    | Digital / Optocoupler                                                                                                                                                                                | Digital / Optocoupler                                                                                                                                                                                       | Digital (optocoupler)                                                                                                                          | Digital (optocoupler)                                                               | Digital (optocoupler)                                                               | Digital (optocoupler)                                                                                   |
| Data processing        | 32 bit floating point                                                                                                                                                                                | 32 bit floating point                                                                                                                                                                                       | 32 bit floating point                                                                                                                          | 32 bit floating point                                                               | 32 bit floating point                                                               | 32 bit floating point                                                                                   |
| Colour                 | Black                                                                                                                                                                                                | Black                                                                                                                                                                                                       | Black                                                                                                                                          | Black                                                                               | Black                                                                               | Black                                                                                                   |
| Enclosure              | PBT                                                                                                                                                                                                  | PBT                                                                                                                                                                                                         | PBT                                                                                                                                            | PBT                                                                                 | PBT                                                                                 | PBT                                                                                                     |
| Weght                  | 45 g                                                                                                                                                                                                 | 45 g                                                                                                                                                                                                        | 45 g                                                                                                                                           | 45 g                                                                                | 45 g                                                                                | 45 g                                                                                                    |
| Operating temperature  | -20...+65 °C                                                                                                                                                                                         | -20...+65 °C                                                                                                                                                                                                | -20...+65 °C                                                                                                                                   | -20...+65 °C                                                                        | -20...+65 °C                                                                        | -20...+65 °C                                                                                            |
| Connections            | Clamp terminals / bus                                                                                                                                                                                | Clamp terminals / bus                                                                                                                                                                                       | Clamp terminals / bus                                                                                                                          | Clamp terminals / bus                                                               | Clamp terminals / bus                                                               | Clamp terminals / bus                                                                                   |
| Protection degree      | IP 20                                                                                                                                                                                                | IP20                                                                                                                                                                                                        | IP 20                                                                                                                                          | IP20                                                                                | IP20                                                                                | IP20                                                                                                    |
| Status indicators      | Power ON<br>Threshold<br>Error                                                                                                                                                                       | Output status                                                                                                                                                                                               | Power ON<br>Output status                                                                                                                      | Power ON<br>Data<br>Inverted connection                                             | Power ON<br>Data<br>Inverted connection                                             | Power ON<br>Data<br>Inverted connection                                                                 |
| Special functions      | Frequency divider<br>Medium value of N pulses (N<br>≤ 256)                                                                                                                                           | Frequency Divider<br>Average measurement up<br>to N = 256 pulse<br>Direct functioning                                                                                                                       | -                                                                                                                                              | -                                                                                   | -                                                                                   | Compliance to USB 1.1<br>and 2.0<br>Plug&play for Windows O.S.<br>Multiple connection on the<br>same PC |
| Communication          | -                                                                                                                                                                                                    | -                                                                                                                                                                                                           | -                                                                                                                                              | Automatic handshake<br>Baud rate: 1.200..115.200<br>bps                             | Automatic handshake<br>Baud rate: 1.200..115.200<br>bps                             |                                                                                                         |
| Approvals              | CE                                                                                                                                                                                                   | CE                                                                                                                                                                                                          | CE                                                                                                                                             | CE, UL-UR CSA                                                                       | CE, UL-UR CSA                                                                       | CE, UL-UR CSA                                                                                           |
| Norms                  | EN 61000-6-4, EN 61010-6-2, EN 61010-1                                                                                                                                                               | EN 61000-6-4, EN 61010-6-2, EN 61010-1                                                                                                                                                                      | EN 61000-6-4, EN 61010-6-2, EN 61010-1                                                                                                         | EN 61000-6-4, EN 61000-6-2, EN 61010-1                                              | EN 61000-6-4, EN 61000-6-2, EN 61010-1                                              | EN 61000-6-4, EN 61000-6-2, EN 61010-1                                                                  |
| INPUT DATA             |                                                                                                                                                                                                      |                                                                                                                                                                                                             |                                                                                                                                                |                                                                                     |                                                                                     |                                                                                                         |
| Channels               | 1                                                                                                                                                                                                    | 2                                                                                                                                                                                                           | 1                                                                                                                                              | 1                                                                                   | 1                                                                                   | 1                                                                                                       |
| Type                   | Contact IEC 1131.2 (type 1)<br>Namur (DIN 19234, EN 60947-5-6)<br>NPN / PNP (12 o 22 V) 2/3 wires<br>Reed<br>Photocell<br>Max voltage: ±28 Vdc<br>Max frequency 20 kHz min 1 pulse every 116 minutes | IEC 1131.2 free contact (type 1)<br>Namur (DIN 19234, EN 60947-5-6)<br>NPN / PNP (12 or 22 V) 2/3 wires<br>Reed<br>Photocell<br>Voltage: max ±28 Vdc<br>Frequency: Max 20 kHz, min 1 pulse each 116 minutes | Contact IEC 1131.2 (type1)<br>Namur (DIN 19234, EN 60947-5-6)<br>NPN / PNP (12 o 22 V) 2/3 wires<br>Reed<br>Photocell<br>Max frequency: 400 Hz | SERIAL<br>RS485 Half duplex, 31 nodes, line termination, protection up to 30 Vdc    | SERIAL<br>RS232, protection up to 30 Vdc                                            | SERIAL<br>USB interface, standard USB 1.0/ 2.0 compliance, USB A and MINI USB B connection              |
| OUTPUT DATA            |                                                                                                                                                                                                      |                                                                                                                                                                                                             |                                                                                                                                                |                                                                                     |                                                                                     |                                                                                                         |
| Channels               | 2                                                                                                                                                                                                    | 2                                                                                                                                                                                                           | 2                                                                                                                                              | 1                                                                                   | 1                                                                                   | 1                                                                                                       |
| Type                   | N.2 threshold channels, PNP, BJT, Mosfet;<br>Max load: 60 mA / 24 Vdc                                                                                                                                | 2-CH trip amplifier, PNP, BJT, Mosfet; max rating > 60 mA / 24 Vdc                                                                                                                                          | PNP e NPN simultaneous channels<br>Max current 200 mA<br>Max voltage 30 V (continuous), 50V (pulse)                                            | SERIAL<br>RS485 half duplex, 31 nodes, terminal, protection up to 30 Vdc            | SERIAL<br>RS485 half duplex, 31 nodes, terminal, protection up to 30 Vdc            | SERIAL<br>RS485, max 31 nodes, spring cage terminal block                                               |
| ORDER CODES            |                                                                                                                                                                                                      |                                                                                                                                                                                                             |                                                                                                                                                |                                                                                     |                                                                                     |                                                                                                         |
| Code                   | K111                                                                                                                                                                                                 | K111D                                                                                                                                                                                                       | K112                                                                                                                                           | K107A                                                                               | K107B                                                                               | K107USB (programming cable and CD rom included)                                                         |

## APPLICATION EXAMPLES

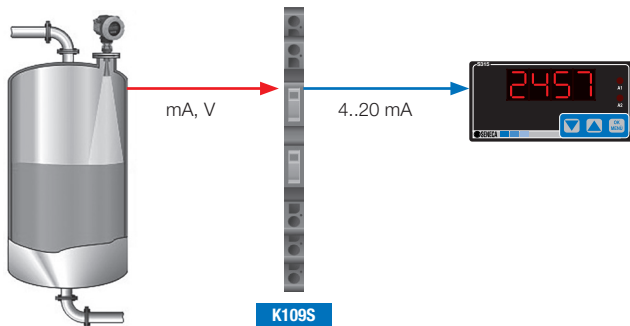
### UNIVERSAL ANALOG SIGNAL CONVERSION



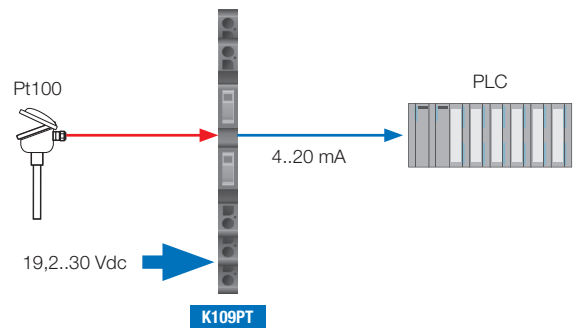
### BATTERY VOLTAGE MONITORING



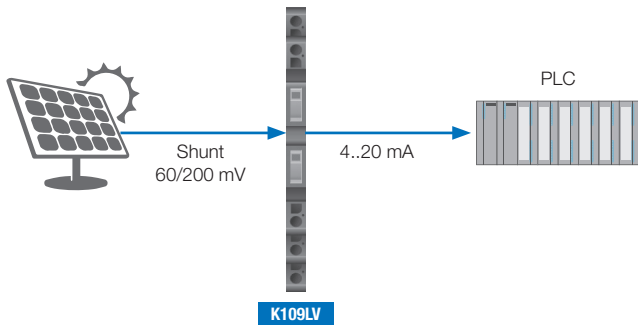
### ANALOG SIGNAL ISOLATION, RETRANSMISSION, VISUALIZATION FROM 2-WIRE SENSOR



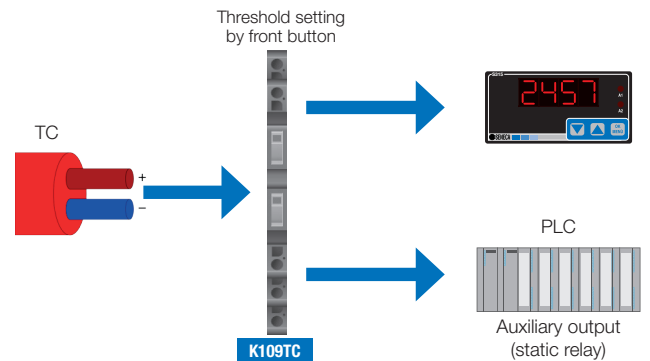
### PT100 TEMPERATURE TO ANALOG SIGNAL CONVERSION



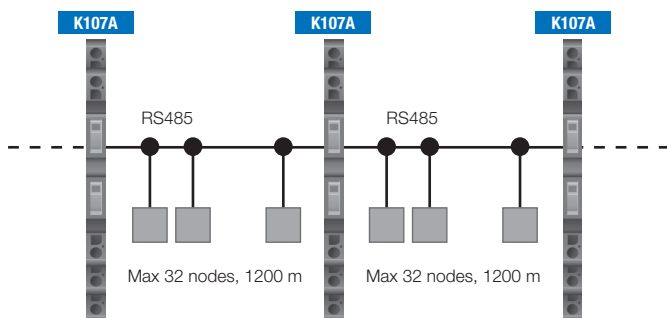
### STRING CURRENT MEASUREMENT AND TRANSMISSION IN PHOTOVOLTAIC PLANT



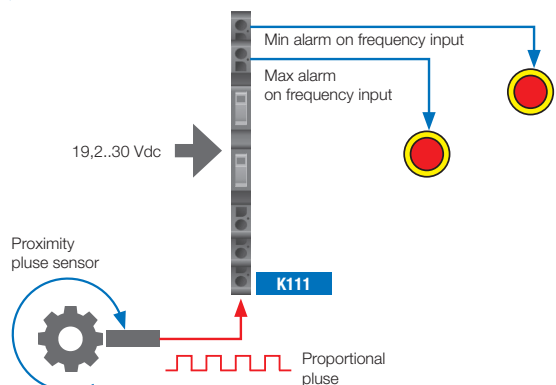
### CONVERSION AND RETRANSMISSION OF A TEMPERATURE VALUE FROM THERMOCOUPLE



### SERIAL RS485 REPETITION WITH GALVANIC ISOLATION



### FREQUENCY CONVERSION WITH ALARM

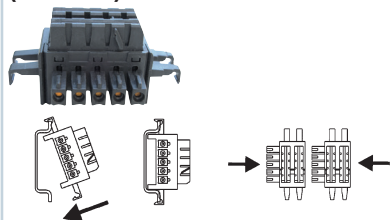




## SOFTWARE & ACCESSORIES

### K-BUS

**Expandable power supply connector  
(EN 60175)**



#### ORDER CODES

**K-BUS** 2 slot expandable power supply connector

### K-SUPPLY

**Redundant power supply module**



- Power supply 19,2..30 Vdc
- Nr 2 inputs with shared negative terminal
- Max voltage drop 300 mV
- Max current per terminal 4 A
- Differential mode filter
- Built-in protection against overvoltages

#### ORDER CODES

**K-SUPPLY** Power supply module with electronic protections

### EASY SETUP / EASY LP

**Plug&Play software configuration**

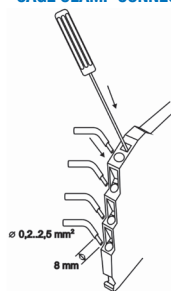


**K111  
K121  
K120RTD**

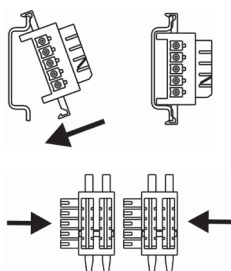
- Free download on [www.seneca.it](http://www.seneca.it)

## CONNECTION AND INSTALLATION

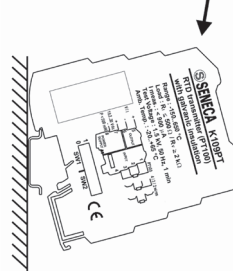
### CAGE CLAMP CONNECTION



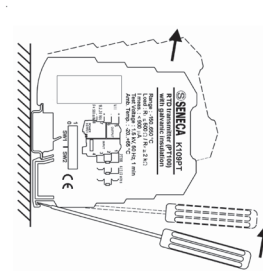
### K-BUS CONNECTOR



### INSERTING MODULE ON DIN GUIDE



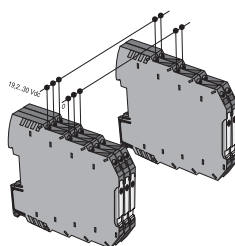
### EXTRACTING MODULE FROM DIN GUIDE



## POWER SUPPLY TECHNIQUE

**SUPPLY SYSTEM.** Except from loop powered instruments which aren't bus powered, K Line signal conditioners can be powered in 3 different ways: by the clamp terminal block (24 Vdc direct from power supply) or by SMART SUPPLY system. SMART SUPPLY system is based on expandable K-BUS connector. Up to 16 devices, the distribution of power supply is possible connecting a single device at voltage source, as whole consumption doesn't exceed 400 mA. Over 16 and up to 75 devices, with maximum current consumption of 1,6 A (approx 21 mA per module), it's necessary K-SUPPLY module that gets overvoltages protections on-board.

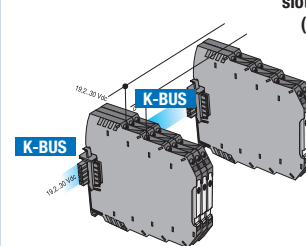
### POWER SUPPLY ON CLAMP TERMINAL



**1**

### SMART SUPPLY SYSTEM

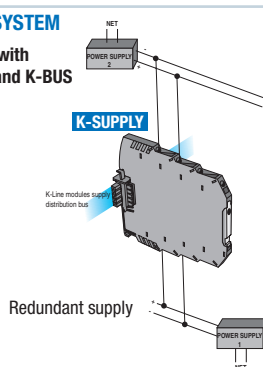
**Distributed supply with 2 slot connector K-BUS (up to 16 modules)**



**2**

### SMART SUPPLY SYSTEM

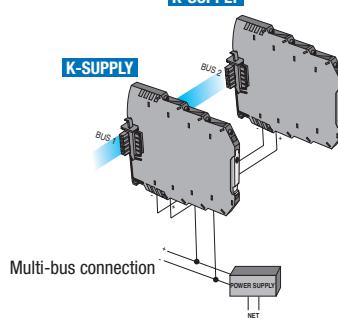
**Distributed supply with K-SUPPLY module and K-BUS (up to 75 modules)**



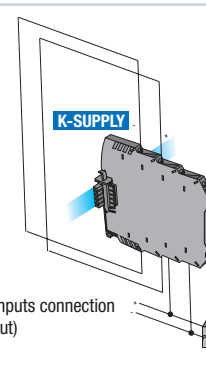
Redundant supply

### K-SUPPLY

### K-SUPPLY



Multi-bus connection



Parallel inputs connection  
(2 A output)

**3**

## EASY USB USB - UART TTL Converter



**Power supply** 5V @100mA (by PC)  
**Protection degree** IP20  
**Serial UART TTL** RJ11 connector, baud rate from 300 bps up to 250 Kbps  
**Serial USB** USB type A standard 1.0, 1.1 and 2.0  
**Dimension** 84x21x17 mm  
**O.S.** Windows, Mac OS, OS-X, Linux

#### ORDER CODES

**EASY-USB** USB - UART TTL Converter

## S117P1

**Serial converter RS232-USB, TTL-USB, RS485-USB**



- Asynchronous serial RS232, RS485 and TTL conversion
- Multiply connections of more S117P1 on the same computer
- Standard compatibility USB 1.0, 1.1, 2.0
- RS485 communication, max 32 nodes
- Power for external modules (100mA, 12 Vdc)
- Accessories included: USB cable, TTL cable, CD driver + EASYLP (configuration software for K120RTD, K121, T120 and T121)

#### ORDER CODES

**S117P1**

Asynchronous serial converter RS232<-> USB, RS485<->USB and TTL<->USB complete of USB cable, TTL cable, Cd driver + EASYLP (configuration software)