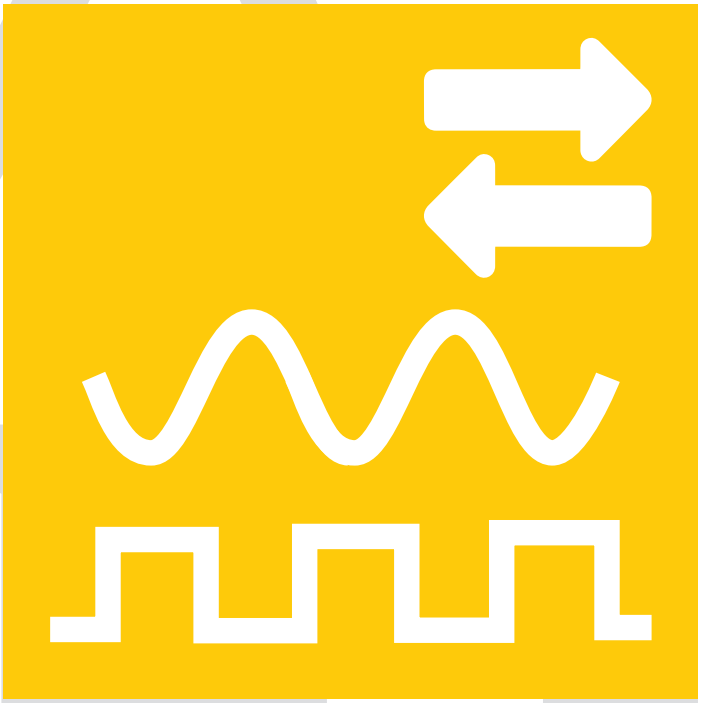
100% Made & Designed in Italy

K-LINE

COMPACT SIGNAL CONVERTERS AND ISOLATORS



SENECA

www.seneca.it

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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 swtitches.

HARSH INDUSTRIAL DESIGN

HIGH LEVEL RELIABILITY
>500.000 h

WIDE OPERATING TEMPERATURE RANGE
-20..+65°C

LOW POWER CONSUMPTION
<25mA

ISOLATION 3-WAYS
power
OUT
IN
1,5 kV

COMPACT SIZE
6,2 mm

BEST ACCURACY
0,1%



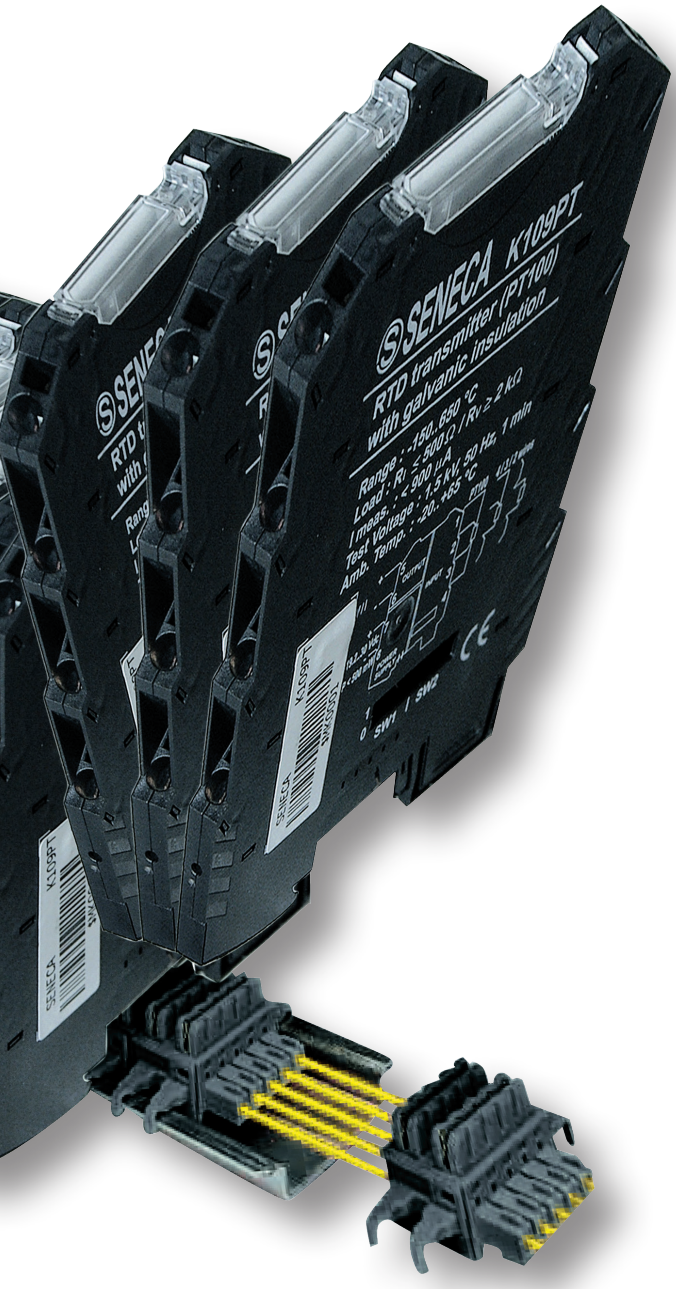
SPECIAL FUNCTIONS

READING STABILIZATION FILTER

I/O SCALES INVERSION

LINEARIZATION FOR HORIZONTAL CYLINDRICAL

SQRT FUNCTIONS



SETTINGS

FLEXIBLE CONFIGURATION VIA DIP-SWITCHES

ON
OFF

PC PROGRAMMING

EASY SETUP

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
				
	Universal converter (mA, V, Ohm, RTD, TC) isolated, loop powered	**DC current/voltage to current/voltage isolator converter**	**DC current/voltage to current/voltage isolator converter (2 wire power transducer)**	**DC low voltage to current/voltage isolator converter**
GENERAL DATA				
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 KVac (3-way)	1,5 KVac (3-way)	1,5 KVac (3-way)	1,5 KVac (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 Filter Reversed output	Root extraction Signal inversion Scale settable Linearization	Root extraction Signal inversion Scale settable Linearization	Fault configuration 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
INPUT DATA				
Channels	1	1	1	1
Type	THERMOCOUPLE J,K,R,S,T,E,B,N,L (EN 60584) RTD (Pt100, Pt500, Pt1000, Ni100, NI120, NI1000, Cu50, Cu100) 2, 3, 4 wires connection Voltage (V) ± 30V, impedance 200 kΩ Voltage (mV) ±150 mV, impedance 10 MΩ Current: ±24 mA, impedance 40 Ω Potentiometer: 500 Ω..100 KΩ Resistance: up to 1760 Ω	VOLTAGE Range: 0..10 / 10..0 / 0..5 / 1..5/ 0..15 / 0..30 V (inversion as well) Impedance: 110 kΩ - 325 kΩ CURRENT Range: 4..20 / 20..4 / 0..20 / 20..0 mA Impedance: 35 Ω	VOLTAGE Range: 0..10 / 10..0 / 0..5 / 1..5 V Impedance: 110 kΩ CURRENT Range: 4..20 / 20..4 / 0..20 / 20..0 mA Impedance: 35 Ω	SHUNT Range: ±25, 50, 60, 75, 80, 100, 120, 150, 200, 250, 300, 400, 500, 1000, 2000 mV (via Dip switches)
Absolute value		± 32 V (400 mW limitation)	± 30 V (limitation 400 mW)	± 50 V
OUTPUT DATA				
Channels	1	1	1	1
Type	CURRENT 4..20mA	VOLTAGE Range: 0..10 / 10..0 / 0..5 / 1..5 V Min load resistance: 2 kΩ CURRENT Range: 4..20 / 20..4 / 0..20 / 20..0 mA Max load resistance: 500 Ω Protection: 25 mA	VOLTAGE Range: 0..10 / 10..0 / 0..5 / 1..5 V Min load resistance: 2 kΩ CURRENT Range: 4..20 / 20..4 / 0..20 / 20..0 mA Max load resistance: 500 Ω Protection: 25 mA	VOLTAGE Range: 0..10 / 10..0 / 0..5 / 1..5 V Min load resistance: 2 kΩ CURRENT Range: 4..20 / 20..4 / 0..20 / 20..0 mA Max load resistance: 500 Ω Protection: 25 mA
Static relay				
Response time (10-90%)	140..620ms	< 40 ms (without filter) < 88 ms (with filter)	< 40 ms (without filtro) < 88 ms (with filter)	< 25 ms (without filter) < 55 ms (with filter)
A/D conversion, resolution				
ORDER CODES				
Code	K121	K109UI	K109S	K109LV

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TEMPERATURE

K109PT	K109PT-HPC	K109PT1000	K120RTD	K109TC
			 	
Pt100 to DC current/voltage isolator converter	**Pt100 to DC current/voltage isolator converter (high precision)**	**Pt1000 to DC current/voltage isolator converter**	**Pt100, Ni100 to DC current converter -Loop powered (non isolated)**	**TC to DC current/voltage isolator converter (with alarm)**
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	Fault Alarm	Fault Alarm	Fault Alarm	Fault Alarm
fault and cut-off configuration, filter	fault and cut-off configuration, filter	fault and cut-off configuration, filter	RTD type / connection, filter, measure range, error, output inversion, over-range	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 IEC 751 standard / EN 60751 – ITS90 Range: -150..+650 °C Min span: 50 °C Current on transmitter: 900 µA Connection: 2,3,4 wires Max cable resistance: 20 Ω	Pt100 IEC 751 standard / EN 60751 – ITS90 Range: -200..+160 °C Min span: 20 °C Current on transmitter: 900 µA Connection: 2,3,4 wires Max cable resistance: 20 Ω	Pt1000 EN 60751/A2 – ITS90 Range: -200..+210 °C Min span: 30 °C Current on transmitter: < 350 µA Connection: 2,3,4 wires Max cable resistance: 50 Ω	Pt100 EN 60751/A2 – ITS90 Range: -200..+650 °C Min span: 20 °C Connection: 2,3,4 wire Ni100 Range: -60..+250°C Min span: 20 °C Connection: 2,3,4 wires	Thermocouple Type: J,K,E,N,S,R,B,T (ITS90) Min span: 100 °C Impedance: 10 MΩ Semiconductor sold joint ADC 13 bit Precision: 0,15 °C Update: 10 s Max voltage: ±32 V
1	1	1	1	1
VOLTAGE Range: 0..10 / 10..0 / 0..5 / 1..5 V Min load resistance: 2 kΩ CURRENT Range: 4..20 / 20..4 / 0..20 / 20..0 mA Max load resistance: 500 Ω Protection: 25 mA	VOLTAGE Range: 0..10 / 10..0 / 0..5 / 1..5 V Min load resistance: 2 kΩ CURRENT Range: 4..20 / 20..4 / 0..20 / 20..0 mA Max load resistance: 500 Ω Protection: 25 mA	VOLTAGE Range: 0..10 / 10..0 / 0..5 / 1..5 V Min load resistance: 2 kΩ CURRENT Range: 4..20 / 20..4 / 0..20 / 20..0 mA Max load resistance: 500 Ω Protection: 25 mA	CURRENT Range: 4..20 / 20..4 mA (2 wire) Load resistance: 1 kΩ Resolution: 0,5 µA (15 bit+sign) Protection: 30 mA	VOLTAGE Range: 0..10 / 10..0 / 0..5 / 1..5 V Min load resistance: 2 kΩ CURRENT Range: 4..20 / 20..4 / 0..20 / 20..0 mA Max load resistance: 500 Ω
				Nominal voltage: 24 Vac/dc Current: 60 mA Overvoltage protection: 50 V Settable hysteresis / alarm trip
< 50 ms (without filter) < 200 ms (with filter)	< 50 ms (without filter) < 200 ms (with filter)	< 50 ms (without filter) < 200 ms (with filter)	< 220 ms (without filter) < 620 ms (with filter)	< 40 ms (without filter) < 88 ms (with filter)
1 mV, 2 µA	1 mV, 2 µA	1 mV, 2 µA	1 mV, 2 µA	1 mV, 2 µA
K109PT	K109PT-HPC	K109PT1000	K120RTD	K109TC

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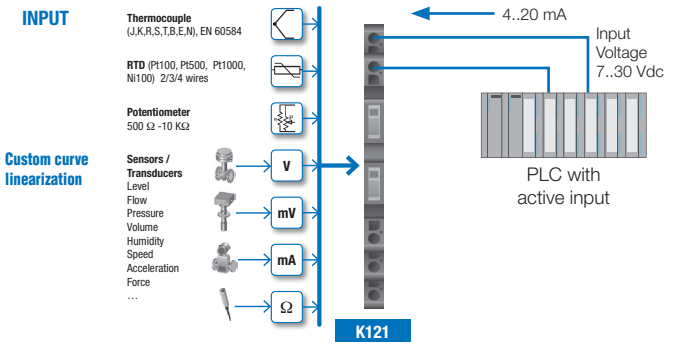
COMPACT SIGNAL CONVERTERS AND ISOLATORS

	FREQUENCY			SERIAL		
	K111	**K111D**	**K112**	**K107A**	**K107B**	**K107USB**
						
	Frequency threshold with 2 outputs	**Frequency splitter / repeater with 2 isolated outputs**	**Digital sensor amplifier with 2 outputs**	**RS485↔RS485 serial isolator/repeater**	**RS232↔RS485 serial isolator/converter**	**USB↔RS485 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	With programmable cutoff frequency		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 Threshold Error	Power ON Output status	Power ON Output status	Power ON Data Inverted connection	Power ON Data Inverted connection	Power ON Data Inverted connection
Special functions	Signal Splitter/Repeater Dual programmable Limit Alarm trip	Signal Splitter/Repeater Frequency divider (max f/2566)	-	-	-	Compliance to USB 1.1 and 2.0 Plug&play for Windows O.S. Multiple connection on the same PC
Communication	-	-	-	Automatic handshake Baud rate: 1.200..115.200 bps	Automatic handshake Baud rate: 1.200..115.200 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	1	1	1	1	1
Type	Contact IEC 1131.2 (type 1) Namur (DIN 19234, EN 60947-5-6) NPN / PNP (12 o 22 V) 2/3 wires Reed Photocell Max voltage: ±28 Vdc Max frequency 20 kHz min 1 pulse every 116 minutes	IEC 1131.2 free contact (type 1) Namur (DIN 19234, EN 60947-5-6) NPN / PNP (12 or 22 V) 2/3 wires Reed Photocell Voltage: max ±28 Vdc Frequency: Max 20 kHz, min 1 pulse each 116 minutes	Contact IEC 1131.2 (type1) Namur (DIN 19234, EN 60947-5-6) NPN / PNP (12 o 22 V) 2/3 wires Reed Photocell Max frequency: 400 Hz	SERIAL RS485 Half duplex, 31 nodes, line termination, protection up to 30 Vdc	SERIAL RS232, protection up to 30 Vdc	SERIAL 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; Max load: 60 mA / 24 Vdc	2-CH trip amplifier, PNP, BJT, Mosfet; max rating > 60 mA / 24 Vdc	PNP e NPN simultaneous channels Max current 200 mA Max voltage 30 V (continuous), 50V (pulse)	SERIAL RS485 half duplex, 31 nodes, terminal, protection up to 30 Vdc	SERIAL RS485 half duplex, 31 nodes, terminal, protection up to 30 Vdc	SERIAL RS485, max 31 nodes, spring cage terminal block
ORDER CODES						
Code	K111	K111D	K112	K107A	K107B	K107USB

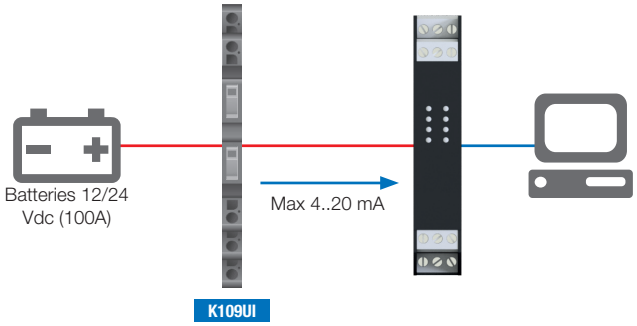
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APPLICATION EXAMPLES

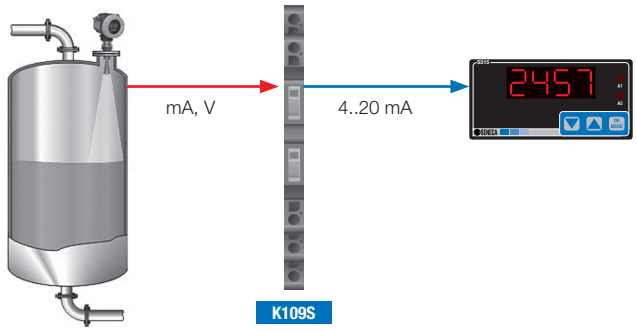
UNIVERSAL ANALOG SIGNAL CONVERTION



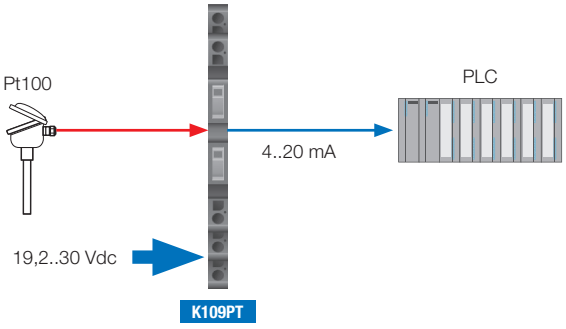
BATTERY VOLTAGE MONITORING



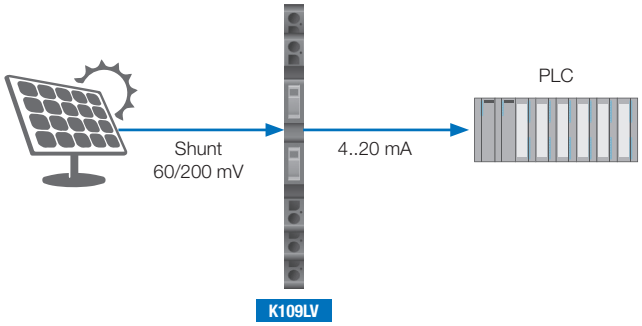
ANALOG SIGNAL ISOLATION, RETRANSMISSION, VISUALIZATION FROM 2-WIRE SENSOR



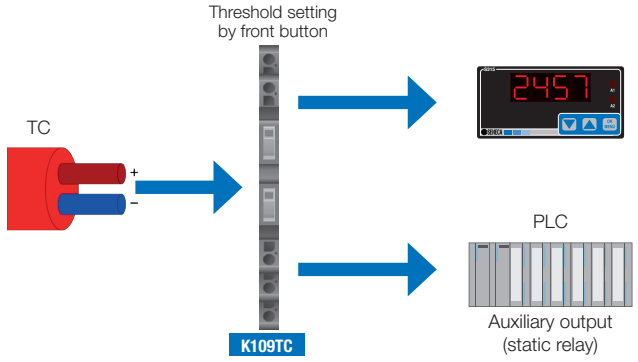
PT100 TEMPERATURE TO ANALOG SIGNAL CONVERSION



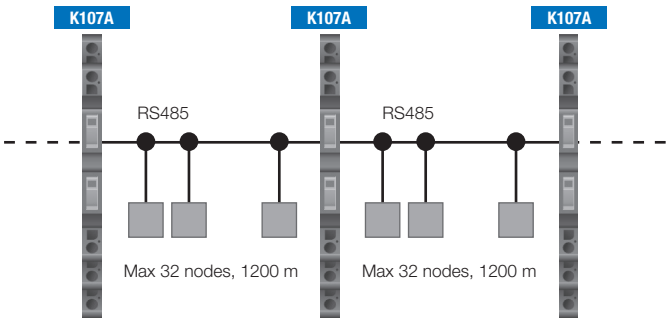
STRING CURRENT MEASUREMENT AND TRANSMISSION IN PHOTOVOLTAIC PLANT



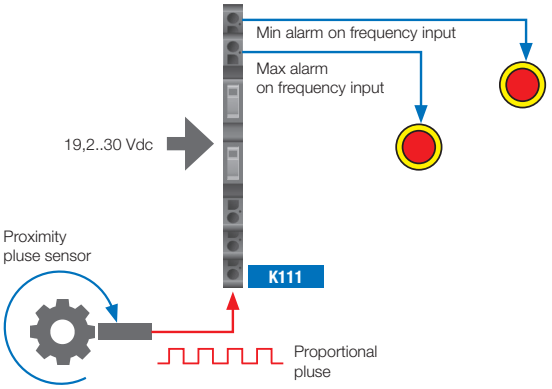
CONVERTION AND RETRANSMISSION OF A TEMPERATURE VALUE FROM THERMOCOUPLE



SERIAL RS485 REPETITION WITH GALVANIC ISOLATION



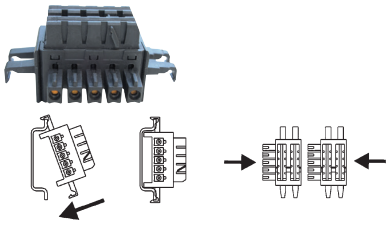
FREQUENCY CONVERSION WITH ALARM



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&Plug software configuration

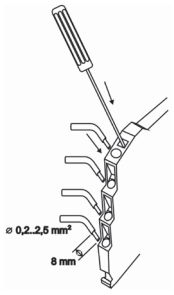


K111
K121
K120RTD

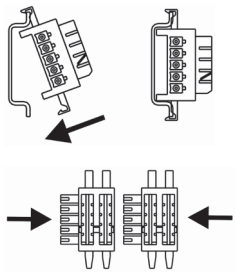
- Free download on www.seneca.it

CONNECTION AND INSTALLATION

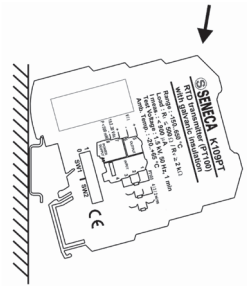
CAGE CLAMP CONNECTION



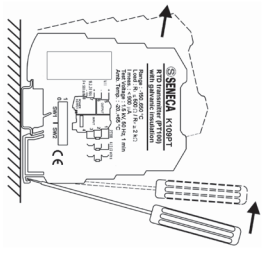
K-BUS CONNECTOR



INSERTING MODULE ON DIN GUIDE



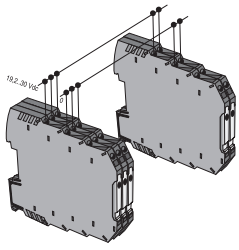
EXTRACTING MODULE FROM DIN GUIDE



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.

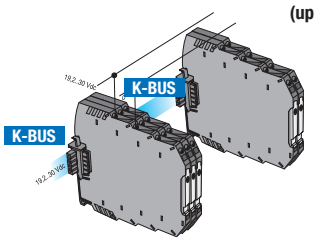
POWER SUPPLY ON CLAMP TERMINAL



1

SMART SUPPLY SYSTEM

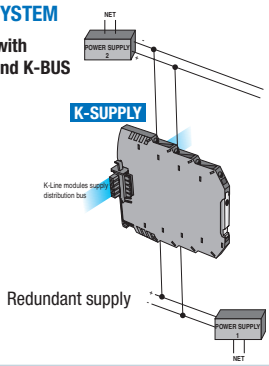
Distributed supply with 2 slot connector K-BUS (up to 16 modules)



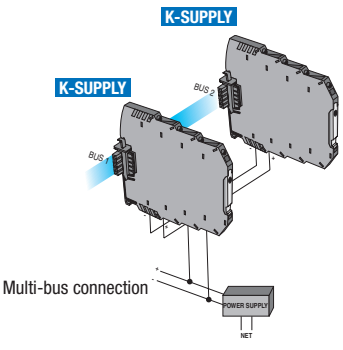
2

SMART SUPPLY SYSTEM

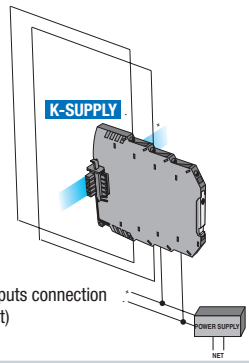
Distributed supply with K-SUPPLY module and K-BUS (up to 75 modules)



Redundant supply



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)

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