

**Input:** V, mA, RTD, Potentiometer, Thermocouple  
**Output:** 4-20 mA

- Only 6.2 mm Wide
- Universal Input to 4-20 mA Output
- 4-20 mA Loop Powered
- PC Configuration
- Full 2-Way Isolation

### Applications

- Convert Common Signals to a PLC Input for Control and/or Validation
- Interface Sensors with Panel Meters, PLCs, Recorders, Data Acq., DCS, & SCADA Systems

### Description

The K121 is a universal converter able to manage all analog signals (mA, mV, V, Pt100, Pt1000, Pt500, Ni100, T/Cs, Ohm) and convert/isolate it to a 4-20mA loop-powered signal.

Input and output are completely configurable via the free PC program. The output mode (normal/inverted), scale over-range, output fault, sensor fault action are selectable. 2-way galvanic input-output isolation ensures the integrity of your signals.

The compact 0.25" wide size saves considerable panel space.

### Specifications

#### Input

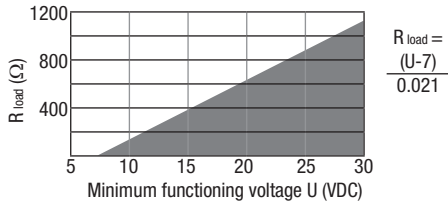
**Voltage:** -150 mV to +150 mV, Input imp.: 10 MΩ  
 -30 V to +30V, Input imp.: 200 KΩ  
**Current:** -24 mA to 24 mA, Input imp.: 40 Ω  
**RTD:** Pt100, Pt500, Pt1000, Ni100  
 2, 3, 4 or wire  
 Excitation current: 375 μA  
 Maximum cable resistance: 25 Ω  
 Cable resistance influence: 0.003 Ω/Ω

**Thermocouple:** Type J, K, T, E, R, S, B, N  
 10 MΩ input impedance  
 CJC: -40 to 65°C, ±1.5°C, settable  
 Settable upscale/downscale burnout

**Potentiometer:** 500 Ω to 10 KΩ  
 Resistance: 1750 Ω

2, 3, 4 or wire  
 10 MΩ input impedance

**Custom:** User-defined input curve using Easy Setup software. Insert data points or upload from file.



#### Output

4-20 mA, sinking (passive) output powered by 7-30 VDC loop  
 1 kΩ @ 28 VDC, 21 mA  
 Over-range output: + 2.5% of end scale, -2.5% of start scale  
 Fault output: + 5% of end scale, -5% of start scale  
 Current output protection: ~30 mA

#### Accuracy

±0.1% of span  
 Thermal drift: <100 ppm/K, 30 ppm typical  
 Output resolution error 2 μA (>13 bit)

#### Response Time

140 ms typ. for voltage and current, <620 ms for other inputs

#### Sensor Test Current

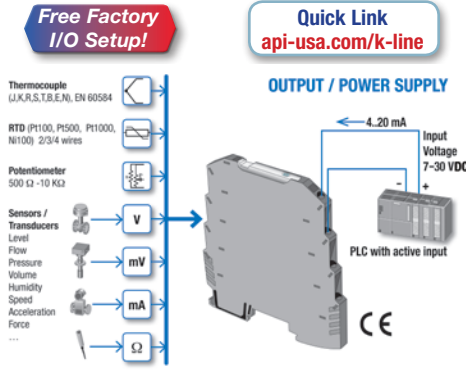
<50 nA

#### Configuration

EASY Setup LP PC software

#### Isolation

Two-way galvanic isolation: input, output  
 1500 V<sub>RMS</sub> 1 minute isolation



Narrow 0.25" Width



Best Accuracy



Long MTBF



Easy PC Setup

#### Ambient Conditions

-20°C to +65°C operating  
 -20°C to +85°C storage  
 30 to 90% RH at 40°C non-condensing

#### Connections

24 to 14 AWG wire size stripped 5/16"  
 Spring clamp terminals

#### Housing

IP 20, requires installation in panel or enclosure  
 Mount vertically to a standard 35 mm DIN rail  
 1.7 ounces (50 grams)

#### Power

7 to 30 VDC via output loop  
 <660 mW

#### Dimensions

2.5" H x 0.25" W x 4" D (93.1 x 6.2 x 102.5 mm)

#### CE Standards

EN61000-6-4/2002 (Electromagnetic emission, industrial environment)  
 EN61000-6-2/2006 (Electromagnetic immunity, industrial environment)

EN61010-1/2001 (safety). All circuits must be isolated from the other circuits under dangerous voltage with double isolation. The power supply transformer must comply with EN60742 "Isolated transformers and safety transformers".

#### ATEX Standards

ATEX 2014/34/UE according to European standards:  
 EN 60079-0:2012/A11:2013  
 EN 60079-15:2010  
 EN 60079-31:2014

#### Accessories and Software



**EASY USB**  
 USB to UART TTL converter

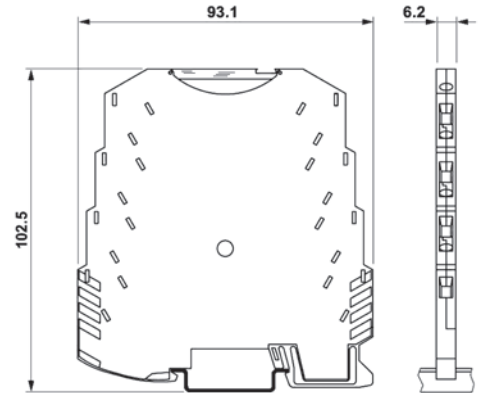


**EASY LP**  
 Free programming software  
 see www.seneca.it/en

**K LINE**



Actual Size



Call 1-800-942-0315 to place your order!

Model	Description
<b>K121</b>	Universal input transmitter. User configurable V, mA, RTD, potentiometer, T/C. 4-20 mA output. 7-30 VDC loop powered.
<b>K121-420</b>	Universal input transmitter pre-set for 4-20 mA input and 4-20 mA output. 7-30 VDC loop powered.
<b>EASY USB</b>	USB to UART TTL converter required to set up the K121 and other programmable models*

\*Include your sensor specifications with your order and API can set up your K121 for free.

#### Other 6 mm Transmitters

<b>K109TC</b>	Thermocouple to DC transmitter
<b>K109PT</b>	100 Ohm RTD to DC
<b>K109UI</b>	DC to DC isolator/converter
<b>K107A</b>	RS485 - RS485 serial amplifier/isolator
<b>K107B</b>	RS232 - RS485 serial isolator/converter
<b>K107USB</b>	USB - RS485 isolator/converter

**Precautions**

**WARNING!** All wiring must be performed by a qualified electrician or instrumentation engineer. See diagram for terminal designations and wiring examples. Consult factory for assistance.

**WARNING!** Avoid shock hazards! Turn signal input, output, and power off before connecting or disconnecting wiring, or removing or installing module.

**Précautions**

**ATTENTION!** Tout le câblage doit être effectué par un électricien ou ingénieur en instrumentation qualifié. Voir le diagramme pour désignations des bornes et des exemples de câblage. Consulter l'usine pour assistance.

**ATTENTION!** Éviter les risques de choc! Fermez le signal d'entrée, le signal de sortie et l'alimentation électrique avant de connecter ou de déconnecter le câblage, ou de retirer ou d'installer le module.

**Software Configuration**

The Easy USB or the S117P1 kit is required for programming the K121. Install the included setup CD or go to [seneca.it/en/](http://seneca.it/en/) and search for "Easy Setup" to download the latest version of the Easy LP program. Follow the interface kit instructions and the software installation prompts.

The software allows configuration and saving of all K121 parameters. Parameters can be saved to your PC allowing multiple modules to be identically programmed. The software also allows custom linearization of inputs.

The K121 can be programmed before installation and does not need external power during programming. Connect the K121 to your PC using the Easy USB or S117P1 kit, start the software, and select K121.

The following parameters can be programmed. Not all are available, depending on sensor type chosen.

- User defined tag number
- Sensor type: T/C, RTD, pot., mV, V, mA, resistance, custom
- Number of RTD or potentiometer wires: 2, 3, 4
- Unit of measure
- Offset
- Start of scale
- End of scale
- T/C internal temperature compensation: CJC on or off
- Detect broken sensor
- Normal or inverted output
- Out-of-range: 2.5% over-range accepted, 5% over is fault
- RTD/TC upscale or downscale burnout
- Output filtering seconds: Off, 1, 2, 5, 10, 30, 60
- Save configuration to file
- Send configuration to device
- Show configuration report

Output Signal Limit / Fault or Over-Range		
Output limit	Over-range $\pm 2.5\%$	Malfunction $\pm 5\%$
20 mA	20.4 mA	21 mA
4 mA	3.6 mA	<3.4 mA

Input Type	Range	Min. Span	Resolution
J	-210 to 1200°C	50 °C	5 $\mu$ V
K	-200 to 1372°C	50 °C	5 $\mu$ V
R	-50 to 1768°C	100 °C	5 $\mu$ V
S	-50 to 1768°C	100 °C	5 $\mu$ V
T	-200 to 400°C	50 °C	5 $\mu$ V
B	0 to 1820°C	100 °C	5 $\mu$ V
E	-200 to 1000°C	50 °C	5 $\mu$ V
N	-200 to 1300°C	50 °C	5 $\mu$ V
Ni100	-60 to 250°C	20 °C	6 m $\Omega$
Pt100	-200 to 650°C	20 °C	6 m $\Omega$
Pt500	-200 to 650°C	20 °C	28 m $\Omega$
Pt1000	-200 to 200°C	20 °C	28 m $\Omega$
mV	-150 to 150 mV	2.5 mV	5 $\mu$ V
V	-30 to 30 VDC	0.5 V	~1 mV
mA	-24 to 24 mA	0.5 mA	~1 $\mu$ A
Potent. $\Omega$	500 to 10,000 $\Omega$	10 %	28 m $\Omega$
Resist. $\Omega$	0 to 400 $\Omega$	10 $\Omega$	6 m $\Omega$
Resist. $\Omega$	0 to 1760 $\Omega$	10 $\Omega$	6 m $\Omega$

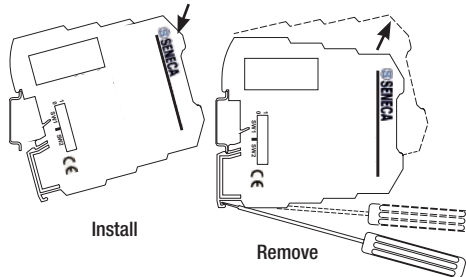
**Installation and Removal**

The housing clips to a standard 35 mm DIN rail and requires installation in a protective enclosure. Install module in a vertical orientation and position in the lower part of the panel away from heat sources or objects that may block air flow.

1. Tilt the front of module upward and clip the upper mount to the top edge of the DIN rail.
2. Push front of module downward until lower mount snaps in place.

To Remove: Avoid shock hazards! Turn input, output, and power off before removing module.

1. Use small screwdriver to pry to lower clip away from the DIN rail.
2. Tilt the front of module upward to remove.



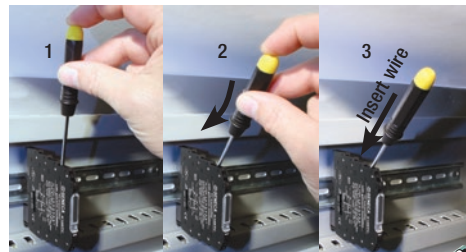
**Electrical Connections**

See the wiring diagrams at right. Polarity must be observed for wiring connections. If the output does not function, check wiring and polarity. The use of shielded wire is recommended for signal connections.

**Inserting Wires**

Use a flat blade screwdriver with a blade about 1/8" W to depress wiring spring clip for each connection.

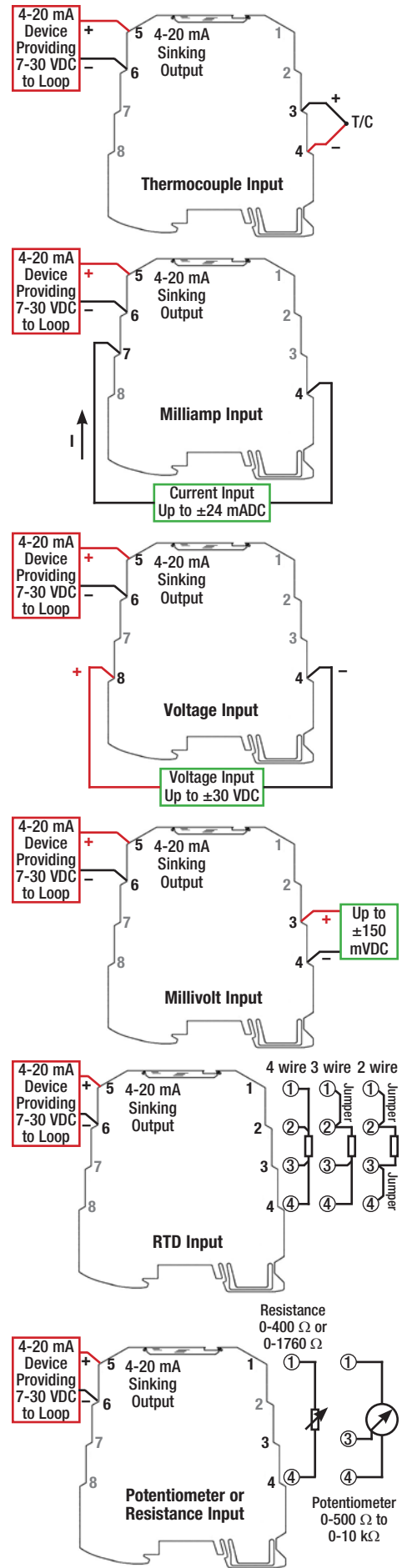
1. Insert screwdriver at a nearly vertical angle into the square opening next to desired round terminal. Make sure the screwdriver goes under the spring clip and not into the clip opening.
2. Push the screwdriver down and in, (or up and in for lower terminals). The wire clip moves up exposing the opening in the round terminal opening.
3. Insert wire into round terminal hole, then remove the screwdriver and make sure wire is secure.



**Output and power from the 4-20 mA loop**

The 4-20 mA output must be connected to a device that provides power to the 4-20 mA loop. This provides power to operate the K121. Acceptable voltage is 7 to 30 VDC.

Note: in order to reduce the module's heat dissipation, we recommend using a load of more than 250  $\Omega$ .



API maintains a constant effort to upgrade and improve its products. Specifications are subject to change without notice. Consult factory for your specific requirements.