**DC to DC Isolated Transmitter**

**K109UI**

**Input:**
- 0-20 mA, 4-20 mA, 0-5 VDC, 1-5 VDC, 0-10 VDC, 2-10 VDC, 0-15 VDC, 0-30 VDC

**Output:**
- 0-5 V, 1-5 V, 0-10 V, 10-0 V, 20-0 mA, 0-20 mA, 20-4 mA, 4-20 mA

- Only 6.2 mm Wide
- Convert and Isolate DC Signals
- DIP Switch Configuration
- Full 3-Way Isolation
- Bus Power Options

**Applications**
- Convert and Isolate DC V or mA to a Standard PLC Input for Control and/or Validation
- Includes Functions for Square Root Conversion and Horizontal Cylindrical Tank Linearization

**Description**
The K109UI accepts a mA/V signal and isolates/converts it to a standard mA/V signal. Input and output are completely configurable via DIP switches. Inputs up to 30 V allow use for battery voltage monitoring. All parameters are configurable through dip-switches. 3-way (power/input/output) optical and galvanic isolation ensures the integrity of your signals.

The compact 0.25” wide size saves considerable panel space.

**Specifications**

**DC Input Ranges**
- 0-20 mA, 4-20 mA: 35 Ω impedance
- 0-5 V, 1-5 V: 110 kΩ impedance
- 0-10 V, 2-10 V: 110 kΩ impedance
- 0-15 V, 0-30 V: 325 kΩ impedance

DIP switch setting for input inversion

**Output**
- 0-20 mA, 20-0 mA, 4-20 mA, 20-4 mA

Sourcing mA output, 10 V, max. load: 500 Ω

0-5 V, 1-5 V, 5-1 V, 0-10 V, 10-0 V, 2-10 V
Min. load: 2 kΩ

Square root of input

Horizontal cylindrical tank linearization

**Accuracy**
- ±0.08% of FS for mA or 5 V output
- ±0.07% of FS for 10 V output
- ±0.05% of FS linearization error for cylindrical tank

Thermal drift: <120 ppm/K

Output resolution: 1 mV for voltage output
2 µA for current output

**Response Time**
10-90%: 35 ms max., 74 ms with 60 Hz filter

**LED Indicator**
- Red LED: I/O limit error, internal fault

**Configuration**
- DIP switches

**Conversion**
- Input: 14 bit A/D conversion
- Output: 16 bit A/D conversion, floating point 32 bit

**Isolation**
- Full 3-way isolation: input, output, power
- Galvanic and optocoupler
- 1500 Vrms: 1 minute isolation
- Hot swappable

**Over-Range Output**
- Over-range 102.5% FS, malfunction 105% of FS
- Current output protection approximately 25 mA

**Ambient Conditions**
- –20°C to +65°C operating
- –40°C to +85°C storage
10 to 90% RH at 40°C non-condensing

**Connections**
- 24 to 14 AWG wire size stripped 5/16”
- Spring clamp terminals or DIN rail K-BUS for power

**Housing**
- IP 20, requires vertical installation in panel or enclosure
- Mounts to standard 35 mm DIN rail
- 1.7 ounces (50 grams)

**Power**
- 19.2 to 30 VDC via terminals or K-bus, 500 mW max typ.

**Dimensions**
- 2.5” H x 0.25” W x 4” D (93.1 x 6.2 x 102.5 mm)

**Standards**
- CE, UL-UR EN 50081-2; EN 55011; EN 50082-2; EN 61000-2-2/4; EN 50140/141; EN 61010-1

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

**More Slim Transmitters**
- K109TC Thermocouple to DC transmitter
- K109PT 100 Ohm RTD to DC
- K121 Universal temperature/mA/V/Ohm to DC
- K107A RS485 - RS485 serial amplifier/isolator
- K107B RS232 - RS485 serial isolator/converter
- K107USB USB - RS485 isolator/converter

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**Absolute Process Instruments**
1220 American Way Libertyville, IL 60048
Phone: 800-942-0315 Fax: 800-949-7502

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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.

DIP Switch Settings
- Set DIP switches SW1 and SW2 for your application as indicated in the tables at right.
- Factory configuration with all DIP switches OFF is as follows: 0-20 mA input, 50 Hz line filter, input filter ON, no linearization. 0-20 mA output, input over-range 5% limit.

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.

**Instructions**

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

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.

Power Connections
- See the wiring diagram below. Use a Class 2 power supply. When using an isolated voltage/limited power supply, a max. 2.5 A fuse must be installed.
- K-Line signal conditioners can be powered by a 24 VDC power supply connected to the module terminals or the K-BUS DIN rail power supply connector that can power up to 16 devices using up to 400 mA. The K-BUS eliminates the need to connect the power supply to each module. See api-usa.com/kbus.

**Input**
- The module accepts a mA current or voltage input signal. Shielded cables are recommended for signal connections.

**Output**
- The module provides a voltage or passive (unpowered) mA current output signal. Shielded cables are recommended for signal connections.

In order to reduce the module’s heat dissipation, either use the voltage output or the current output with a load of > 250 Ω. Polarity must be observed for output wiring connections. If the output does not function, check wiring and polarity.

**SW1 Switches**

**SW1 1** Line Filter
- ON 0 - 20 mA
- 60 Hz

**SW1 2** Input Filter
- ON Yes
- 50 Hz

**SW1 3** Inversion
- ON Yes
- No

**SW1 4** Function
- ON Yes
- None

**SW1 5** Function
- ON Yes
- Square root

**SW1 6** Function
- ON No
- Horizontal cylindrical tank

**SW2 Switches**

**SW2 1** Input Out-Of-Range Limit (See table below)
- ON 0 - 20 mA

**SW2 2** Output
- ON 4 - 20 mA

**SW2 3** Output
- ON 20 - 0 mA*
- ON 20 - 4 mA*
- ON 0 - 10 VDC
- ON 0 - 5 VDC
- ON 1 - 5 VDC
- ON 2 - 10 VDC

* These are inverse output ranges that are useful whenever the linearization applied is incompatible with the inversion of the input.

<table>
<thead>
<tr>
<th>SW1</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>0 - 20 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ON</td>
<td>4 - 20 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ON</td>
<td>0 - 10 VDC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ON</td>
<td>2 - 10 VDC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ON</td>
<td>1 - 5 VDC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ON</td>
<td>0 - 5 VDC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ON</td>
<td>0 - 30 VDC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ON</td>
<td>0 - 15 VDC</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SW1**

<table>
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<tr>
<th>SW1</th>
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<tbody>
<tr>
<td>ON</td>
<td>No indication in table = DIP switch is set to OFF.</td>
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**Rated Value**

<table>
<thead>
<tr>
<th>Rated Value</th>
<th>±2.5%</th>
<th>±5%</th>
</tr>
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<tbody>
<tr>
<td>20 mA</td>
<td>20.5 mA</td>
<td>21 mA</td>
</tr>
<tr>
<td>4 mA</td>
<td>3.5 mA</td>
<td>3 mA</td>
</tr>
<tr>
<td>0 mA</td>
<td>0 mA</td>
<td>0 mA</td>
</tr>
<tr>
<td>30 VDC</td>
<td>30.75 VDC</td>
<td>31.5 VDC</td>
</tr>
<tr>
<td>15 VDC</td>
<td>15.375 VDC</td>
<td>15.75 VDC</td>
</tr>
<tr>
<td>10 VDC</td>
<td>10.25 VDC</td>
<td>10.5 VDC</td>
</tr>
<tr>
<td>5 VDC</td>
<td>5.125 VDC</td>
<td>5.25 VDC</td>
</tr>
<tr>
<td>2 VDC</td>
<td>1.75 VDC</td>
<td>1.5 VDC</td>
</tr>
<tr>
<td>1 VDC</td>
<td>0.875 VDC</td>
<td>0.75 VDC</td>
</tr>
<tr>
<td>0 VDC</td>
<td>0 VDC</td>
<td>0 VDC</td>
</tr>
</tbody>
</table>

Output signal limits: 0-21 mA, 0-5.25 VDC, 0-10.5 VDC

**DIP Switches**

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**Input Signal**

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<tr>
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<td></td>
</tr>
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<td></td>
<td></td>
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<td></td>
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<tr>
<td>ON</td>
<td>0 - 15 VDC</td>
<td></td>
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</table>

**No indication in table = DIP switch is set to OFF.**

**SW1 1** Line Filter
- ON 0 - 20 mA
- 60 Hz

**SW1 2** Input Filter
- ON Yes
- 50 Hz

**SW1 3** Inversion
- ON Yes
- No

**SW1 4** Function
- ON Yes
- None

**SW1 5** Function
- ON Yes
- Square root

**SW1 6** Function
- ON No
- Horizontal cylindrical tank

**SW2 1** Input Out-Of-Range Limit (See table below)
- ON 0 - 20 mA

**SW2 2** Output
- ON 4 - 20 mA

**SW2 3** Output
- ON 20 - 0 mA*
- ON 20 - 4 mA*
- ON 0 - 10 VDC
- ON 0 - 5 VDC
- ON 1 - 5 VDC
- ON 2 - 10 VDC

* These are inverse output ranges that are useful whenever the linearization applied is incompatible with the inversion of the input.

**SW2 4** Input Out-Of-Range Limit (See table below)
- ON 93% ±5%