**DC to DC Isolated Transmitter with Sink/Source Input**

**K109S**

<table>
<thead>
<tr>
<th>Input:</th>
<th>20-0 mA, 0-20 mA, 20-4 mA, 4-20 mA, 0-5 VDC, 1-5 VDC, 0-10 VDC, 10-0 VDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output:</td>
<td>20-0 mA, 0-20 mA, 20-4 mA, 4-20 mA, 0-5 VDC, 1-5 VDC, 0-10 VDC, 10-0 VDC</td>
</tr>
</tbody>
</table>

- Only 6.2 mm Wide
- Convert and Isolate DC Signals
- DIP Switch Configuration
- Full 4-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 K109S accepts a DC mA/V signal and converts it to a standard DC mA/V signal. All parameters are configurable through dip-switches.

The K109S features an isolated input power supply that can power passive mA inputs or 4 wire transmitters.

The K109S may be powered directly or via the K-BUS connector that allows a distribution of power to multiple modules via a DIN rail bus connector.

3-way (power/input/sensor power/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, 20-0 mA, 4-20 mA, 20-4 mA
- Sourcing (active) or sinking (passive) input, 35 Ω impedance
- 0-5 V, 1-5 V, 0-10 V, 10-0 V
- 110 kΩ impedance
- DIP switch setting for input inversion

#### Auxiliary Input Supply
- 17-21 VDC
- 25 mA

#### 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, 0-10 V, 10-0 V
- Min. load: 2 kΩ

#### Square root of input
- Horizontal cylindrical tank linearization

#### Accuracy
- <0.1% FS typical overall accuracy
- ±0.08% of FS for mA or 5 V output
- ±0.07% of FS for 10 V output
- ±0.05% of FS additional linearization error for cylindrical tank
- Thermal drift: <120 ppm/K

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

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

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

#### Isolation
- Full 4-way isolation: input, auxiliary power, output, power galvanic and optocoupler
- 1500 Vrms 1 minute isolation
- Hot swappable

#### Over-Range Output
- Selectable limits 2.5% FS, or 5% 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 powered.
- 23 mA max. at 24 VDC with auxiliary supply not used
- 45 mA max. at 24 VDC with auxiliary supply at 21 mA

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

#### Standards
- CE, EN 50081-2; EN 50082-2; EN 61000-2-2/4;
- EN 50140/141; EN 61010-1

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

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>K109S</td>
<td>DC current/voltage to DC current/voltage isolator/ converter with power for sensor input, 19.2-30 VDC powered.</td>
</tr>
<tr>
<td>K-BUS</td>
<td>DIN rail power connector system. See api-usa.com/kbus</td>
</tr>
<tr>
<td>K-SUPPLY</td>
<td>DIN rail 24 VDC power supply. See api-usa.com/ksupply</td>
</tr>
</tbody>
</table>

### More Slim Transmitters
- K109UI: DC to DC transmitter
- 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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See api-usa.com/k-supply

See api-usa.com/kbus

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**Absolute Process Instruments**

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

api-usa.com
**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.

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.

**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 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 diagrams 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 24 VDC 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 wire power to each module.

**Input**

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

A mA input can be wired for sinking or sourcing (passive or active). See wiring diagrams.

The auxiliary power voltage is independent from the module power supply. To maintain full isolation avoid combining power supplies in common with inputs, outputs, or unit power.

**Output**

The module provides a voltage or passive (unpowered) 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.

**Voltage Input or Sourcing mA Input**

![Voltage Input or Sourcing mA Input Diagram](image)

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 VDC</td>
<td>0 mA</td>
</tr>
<tr>
<td>20 VDC</td>
<td>5 mA</td>
</tr>
<tr>
<td>30 VDC</td>
<td>10 mA</td>
</tr>
<tr>
<td>40 VDC</td>
<td>20 mA</td>
</tr>
</tbody>
</table>

**Powering a Passive mA Input**

![Powering a Passive mA Input Diagram](image)

1. Insert wire to correct terminal hole, then remove the screwdriver and make sure wire is secure.

2. Jumper 2 to 4

**Powering a 4 Wire Transmitter**

![Powering a 4 Wire Transmitter Diagram](image)

1. Insert wire to correct terminal hole, then remove the screwdriver and make sure wire is secure.

2. Jumper 2 to 4

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

**SW1**

<table>
<thead>
<tr>
<th>Switch</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW1 1</td>
<td>Input Signal</td>
</tr>
<tr>
<td>ON</td>
<td>0 - 20 mA</td>
</tr>
<tr>
<td>ON</td>
<td>4 - 20 mA</td>
</tr>
<tr>
<td>ON</td>
<td>0 - 10 VDC</td>
</tr>
<tr>
<td>ON ON</td>
<td>2 - 10 VDC</td>
</tr>
<tr>
<td>ON ON</td>
<td>1 - 5 VDC</td>
</tr>
<tr>
<td>ON ON</td>
<td>0 - 5 VDC</td>
</tr>
<tr>
<td>ON ON</td>
<td>Not Allowed</td>
</tr>
<tr>
<td>ON ON</td>
<td>Not Allowed</td>
</tr>
</tbody>
</table>

**SW2**

<table>
<thead>
<tr>
<th>Switch</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW2 1</td>
<td>Output</td>
</tr>
<tr>
<td>ON</td>
<td>0-20 mA</td>
</tr>
<tr>
<td>ON</td>
<td>4-20 mA</td>
</tr>
<tr>
<td>ON ON</td>
<td>20-0 mA</td>
</tr>
<tr>
<td>ON ON</td>
<td>20-4 mA</td>
</tr>
<tr>
<td>ON ON</td>
<td>0-10 VDC</td>
</tr>
<tr>
<td>ON ON</td>
<td>0-5 VDC</td>
</tr>
<tr>
<td>ON ON</td>
<td>1-5 VDC</td>
</tr>
<tr>
<td>ON ON</td>
<td>2-10 VDC</td>
</tr>
</tbody>
</table>

**Rated Value**

<table>
<thead>
<tr>
<th>Voltage</th>
<th>±5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 mA</td>
<td>0 mA</td>
</tr>
<tr>
<td>3.5 mA</td>
<td>3 mA</td>
</tr>
<tr>
<td>20 mA</td>
<td>21 mA</td>
</tr>
<tr>
<td>40 mA</td>
<td>30 mA</td>
</tr>
<tr>
<td>60 mA</td>
<td>52 mA</td>
</tr>
<tr>
<td>100 mA</td>
<td>92 mA</td>
</tr>
<tr>
<td>200 mA</td>
<td>182 mA</td>
</tr>
</tbody>
</table>

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

**Red LED**

- Fast Flashing: Internal fault. Output will stay at null value.
- Slow Flashing: DIP-switch setting not allowed.
- Steady light: Input or output out-of-range, limiter device triggered, or input saturation.

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