

DC to DC Isolated Transmitter with Sink/Source Input

K109S 

Input: 20-0 mA, 0-20 mA, 20-4 mA, 4-20 mA, 0-5 VDC, 1-5 VDC, 0-10 VDC, 10-0 VDC
Output: 20-0 mA, 0-20 mA, 20-4 mA, 4-20 mA, 0-5 VDC, 1-5 VDC, 0-10 VDC, 10-0 VDC

- Only 6.2 mm Wide
- Convert and Isolate DC Signals
- DIP Switch Configuration
- Full 4-Way Isolation
- Bus Power Options

Quick Link
api-usa.com/k-line



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
 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, setting error, internal fault

Configuration

DIP switches

Conversion

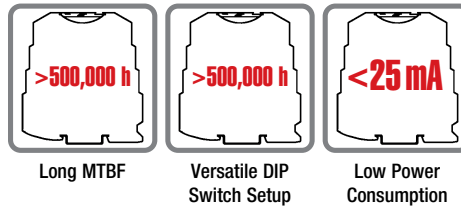
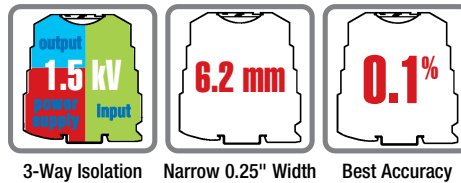
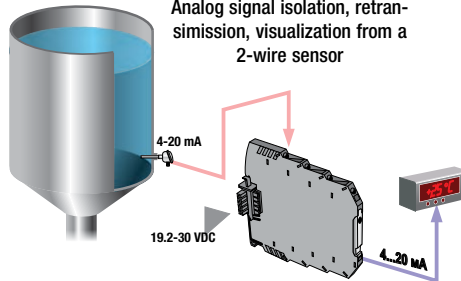
Input: 14 bit A/D conversion
 Output: 16 bit A/D conversion, floating point 32 bit

Isolation

Full 4-way isolation: input, auxiliary power, output, power
 Galvanic and optocoupler
 1500 V_{RMS} 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 via terminals or K-BUS
 23 mA max. at 24 VDC with output at 20 mA and auxiliary supply not used
 45 mA max. at 24 VDC with output at 21 mA and 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

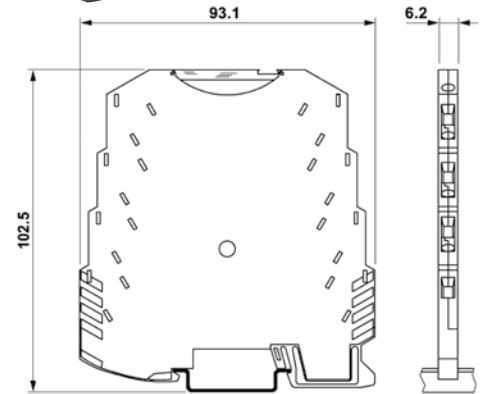
CE, EN 50081-2; EN 55011; EN 50082-2; EN 61000-2-2/4; EN 50140/141; EN 61010-1

Call 1-800-942-0315 to place your order!	
Model	Description
K109S	DC current/voltage to DC current/voltage isolator/converter with power for sensor input. 19.2-30 VDC powered.
K-BUS	DIN rail power connector system. See api-usa.com/kbus
K-SUPPLY	DIN rail 24 VDC power supply. See api-usa.com/ksupply

K LINE



Actual Size



K-Bus Power



K-BUS Backplane power connection snaps into DIN rail.

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

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.

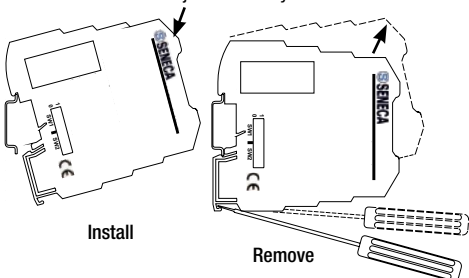
DIP Switch Settings

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.

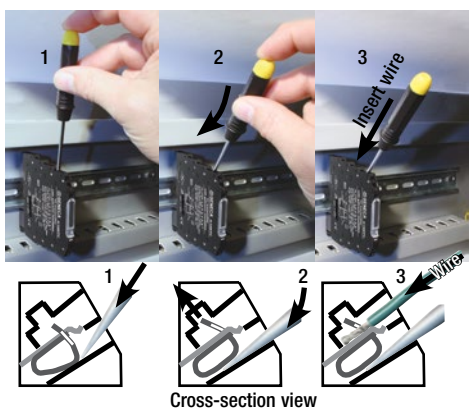
Inserting Wires

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 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 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.

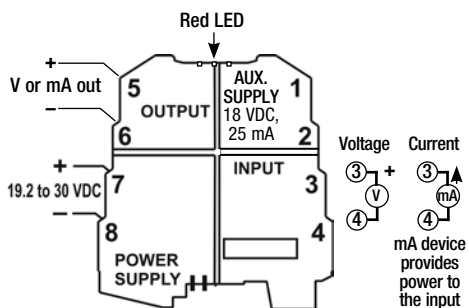
Output

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

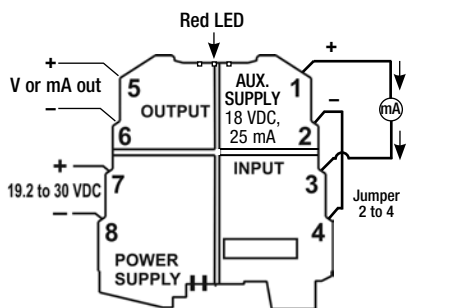
In order to reduce the module's heat dissipation, either use the voltage output or the current output with a load of > 250 Ω.

Polarity must be observed for output wiring connections. If the output does not function, check wiring and polarity.

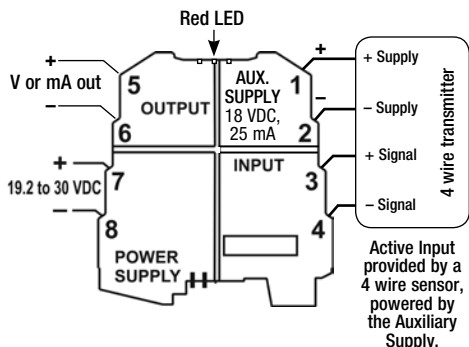
Voltage Input or Sourcing mA Input



Powering a Passive mA Input



Powering a 4 Wire Transmitter



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

SW1	1	2	3	Input Signal
				0 - 20 mA
	ON			4 - 20 mA
		ON		0 - 10 VDC
	ON	ON		2 - 10 VDC
			ON	1 - 5 VDC
	ON		ON	0 - 5 VDC
		ON	ON	Not Allowed
	ON	ON	ON	Not Allowed
SW1	4	Line Filter		
	ON	60 Hz		
		50 Hz		
SW1	5	Input Filter		
	ON	Yes		
		No		
SW1	6	Inversion		
	ON	Yes		
		No		
SW1	7	8	Function	
			Default	
	ON		None	
		ON	Square root	
	ON	ON	Horizontal cylindrical tank	
SW2	1	2	3	Output
				0-20 mA
	ON			4-20 mA
		ON		20-0 mA*
	ON	ON		20-4 mA*
			ON	0-10 VDC
	ON		ON	0-5 VDC
		ON	ON	1-5 VDC
	ON	ON	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	5%
		2.5%

Rated Value	±2.5%	±5%
20 mA	20.5 mA	21 mA
4 mA	3.5 mA	3 mA
0 mA	0 mA	0 mA
30 VDC	30.75 VDC	31.5 VDC
15 VDC	15.375 VDC	15.75 VDC
10 VDC	10.25 VDC	10.5 VDC
5 VDC	5.125 VDC	5.25 VDC
2 VDC	1.75 VDC	1.5 VDC
1 VDC	0.875 VDC	0.75 VDC
0 VDC	0 VDC	0 VDC

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

Red LED	Function
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.