

Isolated Analog Signal Converter K Type AC-TCK-420

The AC-TCK-420 is an industrial DIN-rail thermocouple transmitter engineered to convert low-millivolt signals from Type K (Chromel-Alumel) thermocouples into an isolated standard analog signal (4–20mA, 0–20mA, or 0–10V DC). Equipped with high-precision internal Cold Junction Compensation (CJC) and sensor burnout alarm detection, it delivers highly accurate and linear temperature measurements across broad industrial temperature spans up to +1370 °C. Engineered with 3-way galvanic isolation (1,500V AC across input, output, and power supply), it protects control equipment against ground potential shifts, high common-mode voltages, and industrial electrical noise common in furnace and thermal processing applications.



Key Features

- 3-way 1.5 kV AC galvanic isolation (input, output, and power)
- Type K thermocouple input (NiCr-NiAl)
- Internal cold junction compensation (CJC)
- Factory customizable temperature spans across –200 °C to +1370 °C
- 4–20mA active current loop output driving loads up to 500 Ω
- Fast response time (≤ 10 ms) for high-temperature process control
- Sensor burnout protection with visual alarm indicator (ALM)
- 24V DC industrial power supply input
- Slim 25 mm DIN rail mountable housing
- Dimensions: 110 mm × 47 mm × 25 mm

Ordering Information

Product Code	Description
AC-TCK-420	Isolated Thermocouple Converter K-Type to 4–20mA (24V DC, 3-Way Isolated)
AC-TCJ-420	Isolated Thermocouple Converter J-Type to 4–20mA (24V DC, 3-Way Isolated)
AC-PT100-420	Isolated Analog Signal Converter Pt 100 (4–20mA, 24V DC, 3-Way Iso-lated)
AC-PT1000-420	Isolated Analog Signal Converter Pt 1000 (4–20mA, 24V DC, 3-Way Isolated)
AC-RES-420	Isolated Resistance Signal Converter 0–5k Ω to 4–20mA
SPD-20MA	4–20mA Surge Protection Device
USS20M24V-D	Current Source Simulator 0/4 to 20mA with Display

Applications

- **Industrial Furnaces, Kilns & Ovens:** High-temperature monitoring in heat treatment, annealing, and ceramic firing operations.
- **Boiler & Combustion Exhaust Gas Monitoring:** Measuring stack and flue gas temperatures with ground loop isolation.
- **Metal Casting & Foundry Operations:** Monitoring molten metal handling and mold temperatures up to 1200 °C.
- **Plastic Extrusion & Injection Molding:** Barrel zone and nozzle temperature measurement for PID heat controllers.
- **Incineration & Flare Stacks:** Robust thermocouple signal transmission over long industrial cable paths.

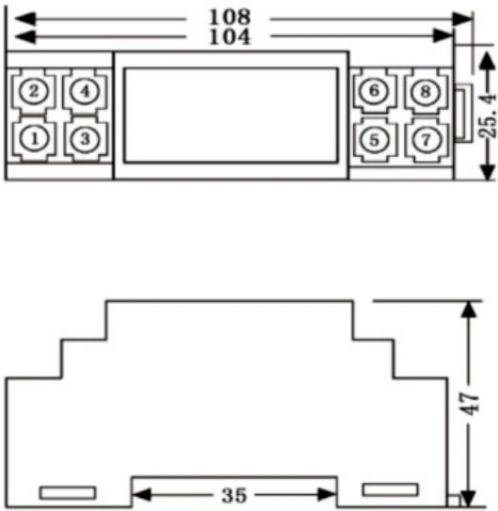
Specifications

Parameter	Value
Mounting Type	35 mm DIN Rail Mounting
Dimensions	110 mm x 47 mm x 25 mm (L x H x W)
Weight	100 g
Enclosure Material	Industrial Grade ABS
Operating Temperature	−20 °C to +55 °C
Storage Temperature	−40 °C to +85 °C
Relative Humidity	5% to 95% RH (non-condensing)

Electrical Specifications

Parameter	Specification
Power Supply Voltage	24V DC $\pm 10\%$
Operating Current	100 mA @ 24V DC
Sensor Input Type	Type K Thermocouple (Chromel-Alumel, NiCr-NiAl)
Cold Junction Compensation	Integrated internal precision CJC
Temperature Range	Customizable from $-200\text{ }^{\circ}\text{C}$ to $+1370\text{ }^{\circ}\text{C}$
Measurement Accuracy	Class 0.2% of Full Scale @ $25\text{ }^{\circ}\text{C}$ ($1\text{--}2\text{ }^{\circ}\text{C}$)
Output Signal Range	4.00 mA to 20.00 mA (or 0–20 mA / 0–10V DC on request)
Maximum Output Load Resistance	$R_L \leq 500\ \Omega$
Response Time	$\leq 10\text{ ms}$ (0–90% TYP)
Galvanic Isolation Barrier	1,500 V AC / 1 min (3-Way: Input / Output / Power Supply)
Status Indicators	PWR LED (Power ON), ALM LED (Thermocouple Burnout / Open Circuit)
Burnout Protection	Upscale / Downscale burnout output drive
Reverse Polarity Protection	Integrated diode on 24V DC input

Mechanical Dimensions



Terminal Details & Wiring

Connection Pinouts

Terminal Block	Pin	Label	Signal	Description
Input Terminals	1	SLD	Shield	Thermocouple extension cable shield (Earth ground)
<i>(Top Block)</i>	2	NC	No Connection	Reserved / Not Connected
	3	TC +	Positive Input	Type K Positive Lead (Chromel / Yellow or Green wire)
	4	TC -	Negative Input	Type K Negative Lead (Alumel / Red or White wire)
Output Terminals	5	OUT +	Signal Out (+)	Active 4–20mA Analog Output (+)
<i>(Bottom Block)</i>	6	OUT -	Signal Out (-)	Analog Signal Ground / Current Return (-)
Power Terminals	7	PWR +	24V DC (+)	+24V DC Operating Power Supply
<i>(Bottom Block)</i>	8	PWR -	0V DC (-)	Power Supply Ground Return

Sensor Wiring Configuration

- Connect the positive thermocouple lead (Chromel) to terminal 3 (TC +).
- Connect the negative thermocouple lead (Alumel) to terminal 4 (TC -).

- If using shielded thermocouple extension cable, connect the drain wire/shield to terminal 1 (SLD) for electrical noise suppression.
- Internal cold junction compensation eliminates the need for an external reference junction.

LED Indications and Diagnostics

LED	Color	Status	Description
PWR	Green	ON	Normal 24V DC operating power connected
ALM	Red	OFF	Normal operation; sensor input within valid range
ALM	Red	ON	Sensor open-circuit, broken wire, or burnout detected

Revision History

Revision	Date	Description of Change
Rev 1.0	2026-09-09	Initial datasheet release

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Support

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