

Signal Isolator 4–20mA AC-420-420

The AC-420-420 is an industrial precision active 4–20mA current loop isolator designed to break electrical ground loops, suppress common-mode noise, and protect sensitive PLC and DCS analog input channels. Built with a pure linear analog isolation amplifier without PWM conversion or digital reconstruction, it achieves an ultra-fast response time (< 1 ms) and exceptional signal fidelity ($< \pm 0.1\%$ output ripple). With an ultra-high galvanic isolation barrier of 4.25 kV RMS between input and output circuitry, it safely separates field instrumentation grounds from control room automation systems, preventing signal degradation, measurement ground drift, and equipment damage from hazardous industrial electrical faults.



Key Features

- 4–20mA input to 4–20mA output galvanic current loop isolation
- 4.25 kV RMS galvanic isolation between input and output
- 1.5 kV RMS isolation between input and auxiliary power
- Ultra-fast response time (< 1 ms) for dynamic process loops
- Drives loop loads up to 500Ω with $\pm 0.2\%$ full-scale accuracy
- Pure analog linear amplifier topology with zero digital sampling delay
- Front-panel multi-turn Zero and Span calibration potentiometers
- 24V DC auxiliary power supply (18V to 30V DC operating range)
- Compact 22 mm DIN rail and wall mountable enclosure
- Dimensions: 100 mm $\times$ 76 mm $\times$ 22 mm

Ordering Information

Product Code	Description
AC-420-420	Signal Isolator 4–20mA to 4–20mA Current Loop Isolator (24V DC, 4.25kV Isolation)
AC-20mA-2	Isolated 20mA Splitter (1 In, 2 Out)
AC-10V-10V	Isolated Analog Signal Converter 10V to 10V DC
SPD-20MA	4–20mA Surge Protection Device
USS20M24V-D	Current Source Simulator 0/4 to 20mA with Digital Display
SPD-24V-DC	Surge Protection Device 24V DC SPD

Applications

- **Ground Loop Elimination:** Resolves ground potential differences between remote field transmitters and central control systems.
- **PLC & DCS Analog Input Protection:** Protects expensive automation analog input channels from voltage spikes and fault currents.
- **VFD & Motor Drive Feedback:** Isolates speed, current, and torque 4–20mA feedback signals in high-EMI drive enclosures.
- **Water & Wastewater Treatment:** Isolates flowmeters, pH sensors, and level probes across distant pump stations.
- **Chemical & Petrochemical Processing:** Clean 4–20mA signal transmission between hazardous field areas and safe control rooms.

Specifications

Parameter	Value
Mounting Type	35 mm DIN Rail & Wall Mounting
Dimensions	100 mm x 76 mm x 22 mm (L x H x W)
Weight	100 g
Enclosure Material	Industrial Grade ABS
Operating Temperature	0 °C to +50 °C (Industrial: –10 °C to +60 °C)
Storage Temperature	–40 °C to +85 °C
Relative Humidity	5% to 95% RH (non-condensing)

Electrical Specifications

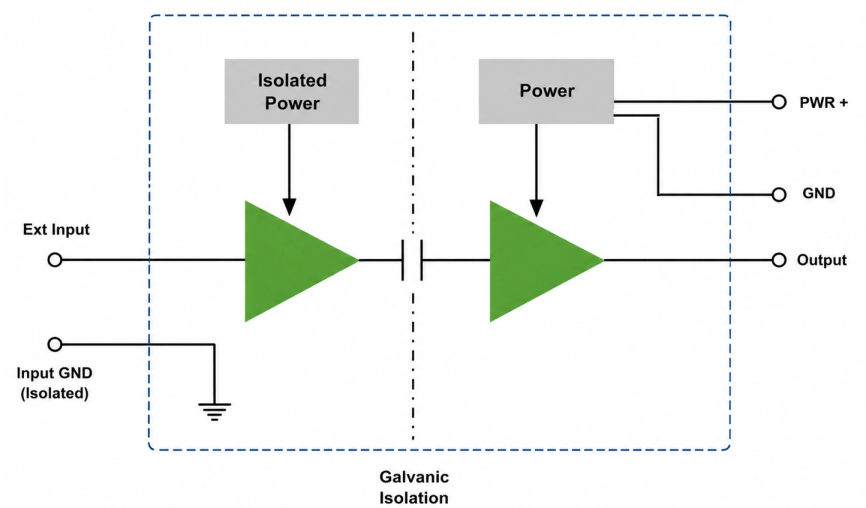
Parameter	Specification
Power Supply Voltage	24V DC $\pm 25\%$ (18V to 30V DC)
Operating Current	100 mA @ 24V DC
Input Signal Range	4.00 mA to 20.00 mA DC (operational: 0 to 22 mA)
Input Impedance	$\leq 100\ \Omega$
Output Signal Range	4.00 mA to 20.00 mA DC (Active Current Loop, Load $\leq 500\ \Omega$)
Conversion Accuracy	$\pm 0.2\%$ of Full Scale @ 25 °C (max $\pm 0.5\%$)
Output Ripple Noise	$< \pm 0.1\%$ of Full Scale
Response Time	$< 1\ \text{ms}$ ($< 1\ \text{milliSec}$)
Temperature Drift	$< 100\ \text{ppm}/^\circ\text{C}$
Status Indication	Power LED ON (PWR)
Field Calibration	Front-panel multi-turn Zero and Span trimpots

Isolation & Protection Specifications

Parameter	Value	Standard / Notes
Galvanic Isolation (Input to Output)	4,250 V RMS (4.25 kV)	Optical & magnetic isolation barrier (1 min)
Galvanic Isolation (Input to Aux. Power)	1,500 V RMS (1.5 kV)	Continuous dielectric isolation
Output to Aux. Supply	Shared Common Ground	Non-isolated reference ground
Reverse Polarity Protection	Integrated	Protects internal circuitry against reverse DC supply wiring
Transient Clamping	600W TVS	Surge and spike suppression across all ports

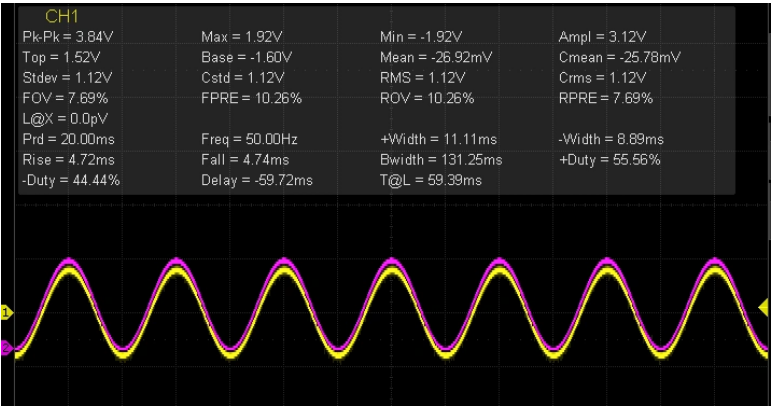
Functional Isolation Architecture & Dynamic Response

The pure linear analog architecture provides true continuous signal isolation without quantization stepping or switching ripples.

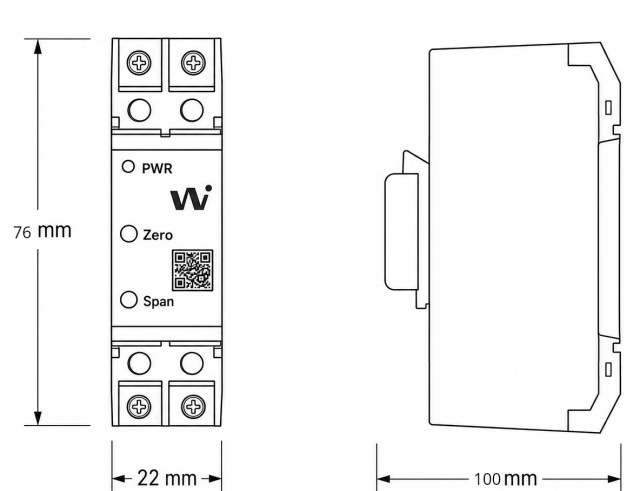


Oscilloscope Dynamic Waveform Verification

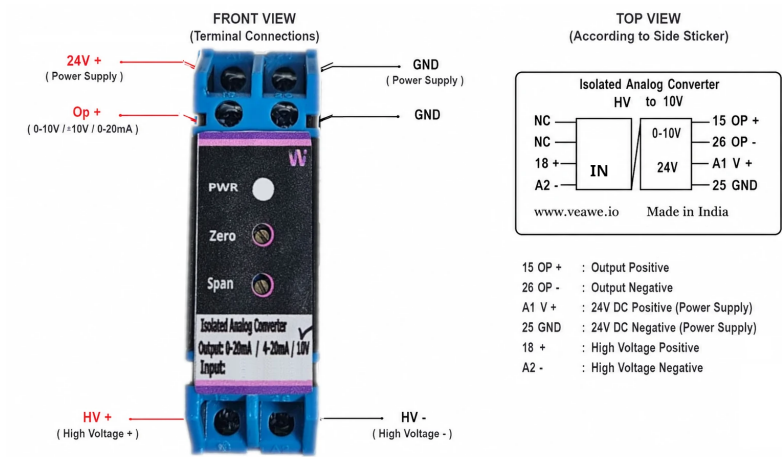
Oscilloscope measurement verifying that the isolated output signal reproduces the input waveform with sub-millisecond response latency (< 1 ms) and clean signal fidelity:



Mechanical Dimensions



Terminal Details & Wiring



Connection Pinouts

Terminal Block	Pin	Label	Signal	Description
Input Terminals	18	18 +	Input (+)	4–20mA Current Loop Input (+)
(Bottom Block)	A2	A2 -	Input (-)	4–20mA Current Loop Return (-)
	–	NC	Unused	Reserved / Not Connected
	–	NC	Unused	Reserved / Not Connected
Output Terminals	15	15 OP+	Output (+)	Active 4–20mA Analog Output (+)
(Top Block)	26	26 OP-	Output (-)	Analog Output Ground Return (-)
Power Terminals	A1	A1 V+	+24V DC	Auxiliary Power Supply Input (+24V DC)
(Top Block)	25	25 GND	Power 0V	Auxiliary Power Supply Ground Return

Available Variants & Configurations

The Veawe Precision Analog Isolator family is available in standardized and custom input/output configurations:

Signal Con- verter Input	Output	High Volt- age Input	Output	Transducer Input	Output
0–20 mA	0–20mA, 4– 20mA, 0– 10V, ±10V	30V DC	0–20mA, 4– 20mA, 0– 10V	Pt100	0–20mA, 4– 20mA, 0– 10V
4–20 mA	0–20mA, 4– 20mA, 0– 10V, ±10V	70V DC	0–20mA, 4– 20mA, 0– 10V	Pt1000	0–20mA, 4– 20mA, 0– 10V
0–10 V DC	0–20mA, 4– 20mA, 0– 10V, ±10V	100V DC	0–20mA, 4– 20mA, 0– 10V	K type	0–20mA, 4– 20mA, 0– 10V
0–5 V DC	0–20mA, 4– 20mA, 0– 10V, ±10V	150V DC	0–20mA, 4– 20mA, 0– 10V	J type	0–20mA, 4– 20mA, 0– 10V
75 mV DC	0–20mA, 4– 20mA, 0– 10V, ±10V	300V / ±300V DC	0–20mA, 4– 20mA, 0– 10V	Resistance	0–20mA, 4– 20mA, 0– 10V
±75 mV DC	0–20mA, 4– 20mA, 0– 10V, ±10V	350V DC	0–20mA, 4– 20mA, 0– 10V	—	—
—	—	100V AC	0–20mA, 4– 20mA, 0– 10V	—	—
—	—	5A AC (CT)	0–20mA, 4– 20mA, 0– 10V	—	—

LED Indications and Diagnostics

LED	Color	Status	Description
PWR	Green	ON	Auxiliary 24V DC operating power connected and regulated

Revision History

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

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