

931 Signal Conditioners

Precise Process Measurement and Control

Features and Benefits

- Helps protect your expensive control system from transients and noise
- Eliminates ground loop/noise-induced errors in process measurements through high levels of galvanic isolation
- Cost effective signal conversion to solve a signal mismatch between field device and I/O
- Eliminates signal degradation of critical process measurement during transmission
- Converts thermocouple/RTD measurements economically
- Accurately reproduces the signal using latest transformer and optical technologies
- Reduces the need to run expensive cables to transfer signals to control system
- Enables dedicated local display through signal splitting
- Rated for hazardous areas
- Extensive certifications for global use including: cULus, CE, ATEX, IECEx, FM, DNV-GL, KC, RCM, Class 1 Div 2

These signal conditioners help protect your measurements and provide a more reliable signal so your processes can run efficiently.



Signal Conditioners Help Protect Equipment, Maintain Process Integrity and Integrate Sensors

The Allen-Bradley® 931 Signal Conditioners provide optimal signal isolation, conversion and amplification. We offer many isolation and conversion options and a powered DIN-rail feature that eliminates the need to separately wire devices to the power supply. And the space-saving 931 Nano versions are only 6 mm wide.

Critical process measurements such as temperature, pressure, flow, level, weight, speed, frequency, current or voltage in your continuous or batch production process are exposed to noise and harsh environmental conditions that result in erroneous signal. These signal conditioners help protect your measurements and provide a more reliable signal so your processes can run efficiently.

These DIN rail-mounted analog signal conditioners are compatible with all types of integrated PLC and DCS I/O systems. They can also be integrated with PlantPAx® DCS to leverage a single control platform for batch, drives, motion control, process and safety.

Signal conditioners are commonly used in food and beverage production, water treatment, chemical processing, energy and power plants, steel production, oil and gas, and pharmaceutical industries.

931 Nano Series

Thoughtful design

- Space-saving 6 mm housing
- Easy onboard configuration
- Angled terminals for ease of wiring

Isolate and convert numerous signals

- Analog: 0/4...20 mA, 0/1/2...10V
- Bipolar: ± 10 mA, ± 20 mA and -11.5...+11.5V
- Thermocouple: B, E, J, K, L, N, R, S, T, U, W3, W5, LR
- RTD: Pt10/20/50/100/200/250/300/400/500/1000, Ni50/100/120/1000
- Linear resistance: 0 Ω ...10000 Ω
- Potentiometer: 10 Ω ...100 k Ω

High performance

- High galvanic isolation: 2.5 kV AC
- High accuracy: 0.05%
- Fast response time for all analog signals: <5/7 ms
- Low power consumption
- Sensor and signal error detection

Reduced wiring time

- Power rail option reduces supply wiring
- One feed module powers up to 75 devices

Extensive global certifications

- UL/CSA, CE, ATEX, IECEx, FM, DNV-GL, KC, RCM, Hazardous Area (Class 1 Div 2/Zone 2)



Product Selection

Output / Input	0...23 mA	0/4...20 mA; 0/1/2...5/10 V (Configurable)	4...20 mA; 20...4 mA	± 10 mA, ± 20 mA	Channel	Power
0...23 mA	931N -C121				1	24V DC
	931N -C122				Splitter	24V DC
	931N -C141				1	Input Loop
	931N -C144				2	Input Loop
	931N -C161				1	Output Loop
	931N -C164				2	Output Loop
0/4...20 mA; 0/1/2...5/10V (Configurable)		931N -A221			1	24V DC
					Splitter	24V DC
$\pm 10/\pm 20$ mA, ± 10 V (Configurable)		931N -X221			1	24V DC
		931N -X422		931N -X422	Splitter	24V DC
Thermocouple J, K		931N -T221			1	24V DC
PT100			931N -R161		1	Output Loop
			931N -R221		1	24V DC
Thermocouple J, K; PT100			931N -N161		1	Output Loop
Universal (All Thermocouples, PT/RTDs, Potentiometer, Resistance, Current, Voltage)		931N -U221			1	24V DC

Standard Signal Isolators

- Cost-effective way to isolate 0...23 mA signal
- Galvanic Isolation of input, output and power supply
- Replicates the exact input signal value to output, no configuration needed
- Eliminates ground loop/noise related errors to provide a reliable signal
- Sensor error and wire breakage detection, NAMUR NE43 compliance



931N-C121: Analog Signal Converter

- Three-way galvanic isolation between input, output and power supply
- Powered by 24V DC, compatible for power bus DIN system

931N-C122: Analog Signal Splitter

- Provides two isolated output signals from one input signal, which can be used for local HMI or other use
- Four-way galvanic isolation between power supply, input, 2 outputs
- Powered by 24V DC, compatible for power bus DIN system

931N-C141: Analog Signal Converter

- Two-way galvanic isolation between the input and output
- Powered by input measuring circuit

931N-C144: Dual Channel Converter

- Two isolated channels
- Four-way galvanic isolation between the inputs and outputs
- Powered by input measuring circuit

931N-C161: Analog Signal Converter

- Two-way galvanic isolation between the input and output
- Powered by output loop circuit

931N-C164: Dual Channel Converter

- Two isolated channels
- Four-way galvanic isolation between the inputs and outputs
- Powered by output loop circuit

Standard Signal Converters with Isolation

- Cost-effective way to convert 0/4...20 mA and 0...10V signals
- Galvanic isolation of input, output and power supply
- Configurable input and output signals
- Easy configuration with DIP switch



931N-A221: Analog Signal Converter

- Converts analog current and voltage signals
- Three-way galvanic isolation between input, output, and power supply
- Powered by 24V DC, compatible for power bus DIN system

931N-A222: Analog Signal Splitter

- Provides two isolated output signals from one input signal, which can be used for local HMI or other use
- Four-way galvanic isolation between power supply, input, 2 outputs
- Powered by 24V DC, compatible for power bus DIN system

Bipolar Signal Converters with Isolation

- Convert ± 20 mA and ± 10 V signals
- Galvanic Isolation of input, output and power supply
- Configurable input and output signals
- Easy configuration with DIP switch



931N-X221: Bipolar Signal Converter

- Converts positive and negative current/voltage signals
- Three-way galvanic isolation between input, output and power supply
- Powered by 24V DC, compatible for power bus DIN system

931N-X422: Bipolar Signal Splitter

- Provides two isolated output signals from one input signal, which can be used for local HMI or other use
- Four-way galvanic isolation between power supply, input, 2 outputs
- Powered by 24V DC, compatible for power bus DIN system

Thermocouple Signal Converters

- Converts thermocouple J and K measurements to configurable analog current/voltage output signals



931N-T221: Thermocouple Signal Converter

- Three-way galvanic isolation between input, output and power supply
- Powered by 24V DC, compatible for power bus DIN system
- Pre-calibrated temperature ranges
- Sensor error and wire breakage detection, NAMUR NE43 Compliance
- Eliminates signal degradation to provide a reliable temperature measurement

RTD Signal Converters

- Converts temperature measurement from PT100 (2/3/4 wire) to configurable analog current output signal
- Sensor error and wire breakage detection, NAMUR NE43 compliance
- Pre-calibrated temperature ranges
- Easy configuration with DIP switch



931N-R161: RTD Signal Converter

- Converts PT100 signal to analog current signal for better reliability
- Powered by the output loop circuit

931N-R221: RTD Signal Converter

- Three-way galvanic isolation between input, output and power supply
- Powered by 24V DC, compatible for power bus DIN system

Temperature Signal Converters

- Converts PT100 (2/3/4 wire) and thermocouple J and K signals to configurable analog current output



931N-N161: Temperature Signal Converter

- Sensor error and wire breakage detection, NAMUR NE43 compliance
- Pre-calibrated temperature ranges
- Easy configuration with DIP switch
- Eliminates signal degradation to provide a reliable temperature measurement
- Powered by the output loop circuit

Universal Signal Converters

- Convert a broad range of signals including RTDs, thermocouples, current, voltage, potentiometer and resistance inputs to analog current/voltage outputs



931N-U221: Universal Signal Converter

- Sensor error and wire breakage detection, NAMUR NE43 compliance
- Three-way galvanic isolation between input, output and power supply
- Powered by 24V DC, compatible for power bus DIN system

931S Smart Series



These signal conditioners provide a wide range of highly configurable and flexible functionality – to help solve and prevent many problems in control and process applications.

High Performance

- High galvanic isolation, up to 4 kV AC
- High accuracy: up to 0.05%
- Fast response time up to 0.5 ms
- Low power consumption
- Extensive global certifications: UL, CE, ATEX, IECEx, KC, RCM, Hazardous Area (Class 1 Div 2/Zone 2)

Thoughtful Designs

- Configuration without any tools
- Interactive display
- Three phase voltage and current monitoring in a compact housing
- Removable terminals with error-proof keys

Isolate and Convert Numerous Signals

- HART transparent and bidirectional
- Current up to 60 A AC/DC, through-hole and inline wiring voltage up to 480V AC and 660V DC frequency
- Load cell, strain gauge and bridge circuits
- Universal (including most thermocouples and potentiometers analog and relay outputs)



Product Selection

Output	0...22 mA, 0...11 V (Config small measurement ranges, 4mA/2V)	0/4...20 mA; 0/1/2...5/10 V (Configurable)	0/4...20 mA with HART	0/2...10 V	0/4...20 mA, ±20 mA, 0/1/2...5/10 V, ±5/10 V	Relay	Relay; 0/4...20 mA, ±20 mA, 0/1/2...5/10 V, ±5/10 V	0/4...20 mA, Transistor	Channels	Power
0...22 mA, 0...11 V (Config small meas. ranges, 4mA/2V)	931S-A481								1	12...60V DC
Load Cell/Bridge ±10 mV, ±20 mV, ±30 mV, ±50 mV		931S-B481							1	10...60V DC
0/4...20 mA with HART			931S-C121						1	24V DC
			931S-C122						Splitter	
			931S-C124						2	
0/4...20 mA				931S-C221					1	24V DC
0...1/5/10 A AC or DC					931S-L521				1	24V DC
0...40/50/60 A AC or DC						931S-M321			1	24V DC
0...5/10 A AC or DC							931S-M5211		Splitter	24V DC
0...20/25/30 A AC or DC							931S-M5213		Splitter	24V DC
0...40/50/60 A AC or DC							931S-M5216		Splitter	24V DC
PT100, PTC						931S-N392			Splitter	20...264V AC/DC
±0.1mA...±100 mA, ±20 mV...±300 V					931S-P491				1	24...240V AC/DC
0...660V DC, 0...440V AC		931S-V291							1	24...240V AC/DC
200...480V AC (3Ph)						931S-V342			Splitter	Input Loop Powered
110/240/400V AC/DC						931S-V392			Splitter	24...240V AC/DC
Universal (All Thermocouples, PT/RTDs, Potentiometer, Resistance, Current, Voltage)						931S-U382			Splitter	9...60V DC
						931S-U392				90...264V AC
								931S-U561		Output Loop Powered

Configurable Signal Converter – Low Span

- Highly configurable input and output analog current/voltage signals conversion



9315-A481: Configurable Signal Converter

- Easy set-up via built-in buttons and dip switches
- Minimum range/span: 4 mA or 2V
- Measure and convert from 0 mA or 0V
- Wide power supply option

Strain Gauge Converter

- Signal data conversion from resistance measuring bridges to standard analog signals
 - Weigh scale
 - Strain gauge
 - Wheatstone bridge
 - Load cell



9315-B481: Strain Gauge Converter

- 5 or 10V excitation
- Simple tare weight compensation with external button or an external PLC signal
- Supply up to 4 parallel connected measuring bridges, 350 Ω
- 4- and 6-wire measurement
- Three-way galvanic isolation between input, output and power supply

Analog Signal Converter – HART

- Galvanic Isolation of input, output and power supply
- Replicates the exact input signal value to output, no configuration needed
- HART compatible, 0.5 - 2.5 kHz
- Bidirectional HART signal transmission between input and output
- Eliminates ground loop/noise related errors to provide a reliable signal



9315-C121: Analog Signal Converter

- Three-way galvanic isolation between input, output and power supply
- Powered by 24V DC

9315-C122: Analog Signal Splitter

- Provides two isolated output signals from one input signal, which can be used for local HMI or other use
- Four-way galvanic isolation between power supply, input, 2 outputs
- Powered by 24V DC, compatible for power bus DIN system

9315-C124: Analog Signal Converter

- Two isolated channels
- Five-way galvanic isolation between power supply, inputs and outputs
- Powered by 24V DC

9315-C221: Dual Channel Converter (non-Hart)

- Converts analog current input signal to voltage output signal
- Hazardous Area rated
- Three-way galvanic isolation between input, output and power supply

Temperature Signal Converter

- Convert temperature measurements from PT100 and PTC to relay outputs



9315-N392: Temperature Signal Converter

- Dual relay output, 5 A rated
- Four-way galvanic isolation between the input, outputs and power
- Wide power supply option

Signal Converter with Configuration Using Display

- Configure without any tools or programs



9315-P491 Signal Converter

- Interactive on-board display for easy configuration
- User-friendly, three-button front face plate configuration with display
- Wide range of input signals
- Universal power supply
- Three-way galvanic isolation and conversion of a broad range of input signals to standard analog signals
- Hazardous Area rated

Current Monitoring Converters

- Measure, monitor and convert AC or DC current up to 60 A
- Contactless through-hole for the current carrying conductor
- One relay and one analog (configurable voltage/current) output
- Relay output can be configured for desired conditions such as over-current, under-current, etc.
- True RMS or Arithmetic Average for precise monitoring
- Adjustable trigger delay for filtering current peaks
- Four-way galvanic isolation between the input, outputs and power supply



9315-M5211: Current Monitoring Converter

- 0...10 A

9315-M5213: Current Monitoring Converter

- 0...30 A

9315-M5216: Current Monitoring Converter

- 0...60 A

9315-M321: Current Monitoring Converter

- 0...60 A

9315-M521: Current Monitoring Converter

- In-line (wired) AC or DC up to 10 A
- One relay and one analog (configurable voltage/current) output
- Relay output can be configured for desired conditions such as over-current, under-current, etc.
- Four-way galvanic isolation between the input, outputs and power

Voltage Monitoring Converters

- Monitor and convert voltage up to 660V DC or 480V AC
- Analog or digital outputs, configurable for:
 - Preset voltage measurement levels
 - Phase asymmetry
 - Phase loss
 - Phase sequence and phase angle errors



931S-V291: Voltage Monitor

- Monitor and convert single-phase AC (440 max) and DC (660V)
- Configurable analog output
- Three-way galvanic isolation between input, output and power supply
- Wide power supply option

931S-V342: Voltage Monitor

- Monitor and convert three-phase AC up to 480V
- Two isolated relay outputs
- Three-way galvanic isolation between input and 2 outputs
- Powered by the input loop circuit

931S-V392: Voltage Monitor

- Monitor and convert single-phase AC and DC voltages up to 400V
- Two isolated relay outputs
- Four-way galvanic isolation between power, input and 2 outputs
- Wide power supply option

Universal Signal Converter

- Versatile devices that can isolate, convert and amplify several types of input signals
- Input signals include RTDs, Thermocouples, current, voltage, potentiometer and resistance input signals
- Configurable analog and digital output options
- Configuration via on-board buttons/encoders or FDT/DTM program
- Transfer functions for input to output characterization
- Hazardous Area rated



931S-U382

- Two isolated output relays that can be configured for any user desired alarm/trip settings including auto/manual resets\delay function for the output alarm
- Four way galvanic isolated between the input, output(s) and power supply

931S-U392

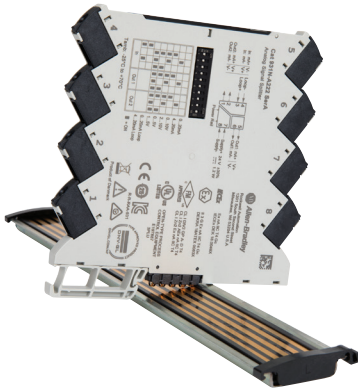
- Two isolated output relays that can be configured for any user desired alarm/trip settings including auto/manual resets\delay function for the output alarm.
- Four way galvanic isolated between the input, output(s) and power supply
- Wide power supply

931S-U561


- One analog and one transistor output
- Three-way galvanic isolation between input and 2 outputs
- Powered by output loop circuit

931 Accessories

Power Bus DIN System







- Eliminates the need to wire devices to power supply
- Provides up to 2.5 A
- One feed module powers up to 75 signal conditioners
- Redundant power can be achieved with two feeds at opposite ends

	Description	DIN Size	Length	Catalog Number
Kit Contains: <ul style="list-style-type: none"> • 1 bus circuit layer insert • 1 support section • 1 cover • 1 end left plate • 1 end right plate 	35 x 7.5 mm	250 mm	931A-CS	
		500 mm	931A-FS	
	35 x 15 mm	250 mm	931A-CL	
		500 mm	931A-FL	

Configuration Cable

Description	Part
USB Cable	931A-CB*

*Assists in the configuration of devices with DTM files.

Connect with us.    

rockwellautomation.com expanding human possibility™

AMERICAS: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444
 EUROPE/MIDDLE EAST/AFRICA: Rockwell Automation NV, Pegasus Park, De Kleetlaan 12a, 1831 Diegem, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640
 ASIA PACIFIC: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

Allen-Bradley, Expanding human possibility and PlantPAx are trademarks of Rockwell Automation, Inc.
 Trademarks not belonging to Rockwell Automation are property of their respective companies.

Publication 931-PP001E-EN-P – December 2019 | Supersedes Publication 931-PP001D-EN-P – May 2019
 Copyright © 2019 Rockwell Automation, Inc. All Rights Reserved. Printed in USA.