Industrial Automation with PCs

ADVANTECH®

ADAM-3014

Isolated DC Input/Output Signal Conditioning Module

User's Manual

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Introduction

The ADAM-3014 is one of the most cost-effective, field-configurable, isolation-based signal conditioners available for protecting processed signals from harmful effects of ground loop, motor noise, and other electrical interference.

The ADAM-3014 features a new optical isolation technique to provide 1000 V_{DC} isolation with low power consumption and extreme accuracy and stability within a wide range of operating environments. ADAM-3014 typically has a 150 ppm temperature drift and up to 2.4 kHz input bandwidth using only 0.85 W (voltage output) of power. The ADAM-3014 offers superior performance at the lowest price of any signal conditioner or in-house design. A wide variety of input and output ranges can be configured to scale and transmit, therefore spare parts inventory can be reduced and the optimal system flexibility can be achieved.

The ADAM-3014 features three-way isolation. The power supply that drives the module's input circuitry and output circuitry is internally isolated, enabling ADAM-3014 to offer true channel-to-channel isolation.

ADAM-3014's input bandwidth is typically 2.4 kHz. The ADAM-3014 is powered by a single +24 V_{DC} input. Power can be easily connected from the adjacent modules, making the wiring simple to maintain. The ADAM-3014 can be mounted on a DIN rail and operate in envirionments with high humidity and wide temperature variation.

Applications

- Signal isolation
- Signal conversion for DCS and PLC
- Signal transmitter (0-20 mA)
- Signal amplifier

Features

- 1000 V_{DC}, fully isolated
- Wide input/output range
- Easy input/output range configuration
- Flexible DIN-rail mounting
- Low power consumption, 0.85 W (Voltage Output)
- Temperature range -10 to 70°C
- Operates from single +24 V_{DC}

Specifications

Voltage input

- **Bipolar input:** ±10 mV, ±50mV, ±100mV, ±0.5 V, ±1 V, ±5 V, ±10 V
- **Unipolar input:** 0~10 mV, 0~50 mV, 0~100 mV, 0~500 mV, 0~1 V, 0~5 V, 0~10 V
- **Input impedance:** 2 MW
- **Input bandwidth:** 2.4 kHz (typical)

Current input

- **Bipolar:** ±20 mA
- **Unipolar**: 0~20 mA
- **Input impedance:** 250 W (typical)

Voltage output

- **Bipolar:** ±5 V, ±10 V
- **Unipolar:** 0~10 V
- **Impedance:** <50 W
- **Drive:** 10 mA maximum

Current output

- **Current:** 0~20 mA
- **Current load resistor:** 0~500 W (source)

General

- **Isolation (three way):** 1000 V_{DC}
- **Accuracy:** ±0.1% of full range
- **Stability (temperature drift):** 150 ppm (typical)
- **Isolation Mode Rejection:** >100 dB @ 50 Hz/60 Hz
- **Operating Temperature Range:** -10 to 70°C

Power

- **Range:** 24 V_{DC} ±10%
- **Consumption:** 0.85 W (voltage output)
1.2 W (current output)

Ordering Information

- **ADAM-3014**: Isolated DC-input Signal Conditioning Module
- **ADAM-3920**: 20-pin Wiring Adapter
- **ADAM-3937**: 37-pin Wiring Adapter
- **ADAM-4350**: Intelligent Calibrator
- **PWR-242:** Switching Power Supply for DIN Rail Mounting

Configuration

Figure 1 shows the terminal wiring of ADAM-3014. Positive power terminals 9 and 7 are internally connected, as are negative terminals 12 and 10. Power can be connected through the adjacent modules, making wiring much easier. ADAM-3014 uses single +24 V_{DC}. Tables 1 and 2 below show the switch positions to configure input and output range. The I/O configuration switches are located inside the module. To reach the switches, you need to remove the DIN-rail bracket by sliding it down.

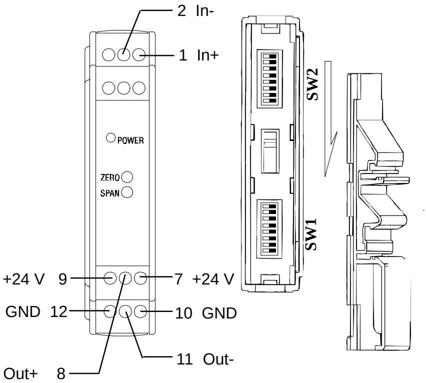

***Figure 1**: Terminal Wiring Diagram*

Table 1: Input range setting (SW2)

Input Range (SW 2)									
Bipolar	Unipolar	1	2	3	4	5	6	7	8
–10 mV	0~10 mV	n							
–50 mV	0~50 mV		n						
–100 mV	0~100 mV			n					
–0.5 V	0~0.5 V				n				
–1 V	0~1 V					n			
–5 V	0~5 V								
–10 V	0~10 V								
–20 mA	0~20 mA								n

■ : ON

Table 2: Output range setting (SW1)

Output Range (SW 1)									
Output Range	Input Range	1	2	3	4	5	6	7	8
–5 V	–10mV, –50mV, –100mV, –0 5V, –1V, –5V, –20mA	n		n					n
	0~10mV, 0~50mV, 0~100mV, 0~0 5V, 0~1V, 0~5V, 0~20mA	n		n		n			n
0~20 mA	–10mV, –50mV, –100mV, –0 5V, –1V, –5V, –20mA		n		n			n	
	0~10mV, 0~50mV, 0~100mV, 0~0 5V, 0~1V, 0~5V, 0~20mA		n		n				
	0~10V		n		n				n
–10 V	–10mV, –50mV, –100mV, –0 5V, –1V, –5V, –20mA	n		n					
	–10 V	n		n					n
0~10 V	–10mV, –50mV, –100mV, –0 5V, –1V, –5V, –20mA	n		n				n	
	0~10mV, 0~50mV, 0~100mV, 0~0 5V, 0~1V, 0~5V, 0~20mA	n		n					
	0~10V	n		n					n

■ : ON

Calibration for input/output

1.Disconnect power and set the input range (SW2) and output range (SW1) to the desired setting, then apply the power.

**Define the following variables for calibration use.

--Low_cali_input = Min_input + Full Scalar Input * 0.05;

--High_cali_input = Max_input - Full Scalar Input * 0.05;

--Low_cali_output = Min_output + Full Scalar Output * 0.05;

--High_cali_output = Max_output - Full Scalar Output * 0.05;

2.Input the Low_cali_input signal;read the Low_real_output signal;
3.Input the High_cali_input signal;read the High_real_output signal;
4.Adjust variable resistor of SPAN and repeat step 2 & 3 to meet the following condition

(High_cali_output - Low_cali_output) = (Low_real_output - High_real_output)----eq1

5. Adjust variable resistor of ZERO and repeat step 2 & 3 to meet the following condition

Low_real_output = Low_cali_output----eq2

High_real_output = High_cali_output----eq3

6. If eq2, eq3 fail to meet your requirement, repeat steps 4,5 until success in step 5

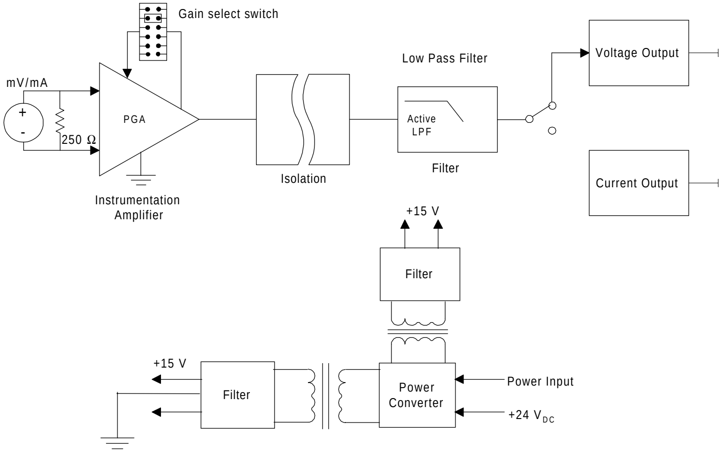

Figure 2: Block Diagram

Dimensions