

## 4-20mA Differential Signal Acquisition Converter

### Low cost 2-wire 4-20mA Differential Signal Conditioner

#### SY C-A-P-O Series

Features	Applications
<ul style="list-style-type: none"> <li>Two wires differential signal input, common ground output</li> <li>(<math>\pm 9 \sim \pm 15V</math>) wide range or single power supply.</li> <li>4-20mA range high accuracy (0.05/0.1/0.2)</li> <li>High linearity (NON-linearity &lt; 0.1%)</li> <li>Small size, standard SIP7 anti-fire UL94V-0 package</li> <li>4-20mA/0-20mA/0-10mA/0-1mA differential signal input 0-2.5V/0-5V/0-10V/4-20mA/0-20mA standard signal output</li> <li>Industry Temperature Range: -45~+85 °C</li> </ul>	<ul style="list-style-type: none"> <li>PLC/DCS data acquisition and conversion.</li> <li>Differential 4-20mA signal acquisition Conditioning and transmission</li> <li>Sensor signal and analog input interface to match</li> <li>Signal transmit no-distortion</li> <li>Signal transceiver and control instruments</li> <li>Industrial analog signal data acquisition and control</li> </ul>

#### Introduction

SUNYUAN SY C-A-P-O series converter is a kind of 2-wire 4-20mA Differential Signal Acquisition Conditioner IC, it contains an internal differential signal acquisition, conditioning and conversion coupled circuits. Standard input equivalent resistance enables the IC collect differential signals from sensor to meet the user's requirements in MCU applications. ( $\pm 9 \sim \pm 15V$ ) Wide range power supply or single power supply. It can meet the temperature, humidity, vibration and other industrial site in harsh environment. SY C-A-P-O is easy to use, do not take any regulation loop that can achieve the required accuracy, to achieve the two-wire 4-20mA signal transmission and transmitter functions.

#### Max. Rated Value

(If the product operates in the max. rated value in the long-term, may affect the durability, if exceed the max. values, may cause unrepairable damage.)

Power supply Volt. Input Range:	$\pm 16VDC$
Operating Temperature	- 45°C ~ + 85°C
Welding Temperature (<10S)	+300°C
Output Short to Common	Continuous

#### General Parameters

Parameters	Conditions	Min.	Typical	Max.	Unit
Temperature Drift			$\pm 50$	$\pm 75$	PPm/°C
Non-linearity			$\pm 0.1$	$\pm 0.3$	%FSR
Gain			4		mA/V
Input current range		0.2	24	40	mA
Input impedance			250		$\Omega$
Input over-current capability				50	mA
Output voltage range		-VSS+3		+VSS-3	VDC
Load capability			1000		$\Omega$

Output linearity range		-1.25		5	V
Signal output ripple				5	mV
Frequency response	I <sub>o</sub> =20mA		2		KHz
Small signal bandwidth					

## Model Selection

**SY C-A□ - P□ - O□**

(SY: Sunyuan brand; C: Differential signal input)

### Input rated current

A2: 0-10mA

A3: 0-20mA

A4: 4-20mA

### Auxiliary power supply

P2: DC12V

P4: DC15V

P8: Customized

P9: DC9V

P10: DC±9V

P11: DC±12V

P12: DC±15V

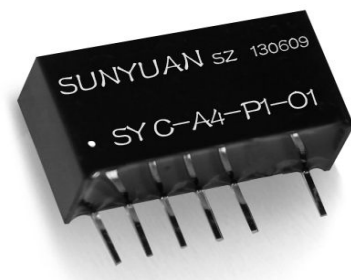
### Output

O4: 0-5V

O5: 0-10V

O6: 1-5V

O8: Customized

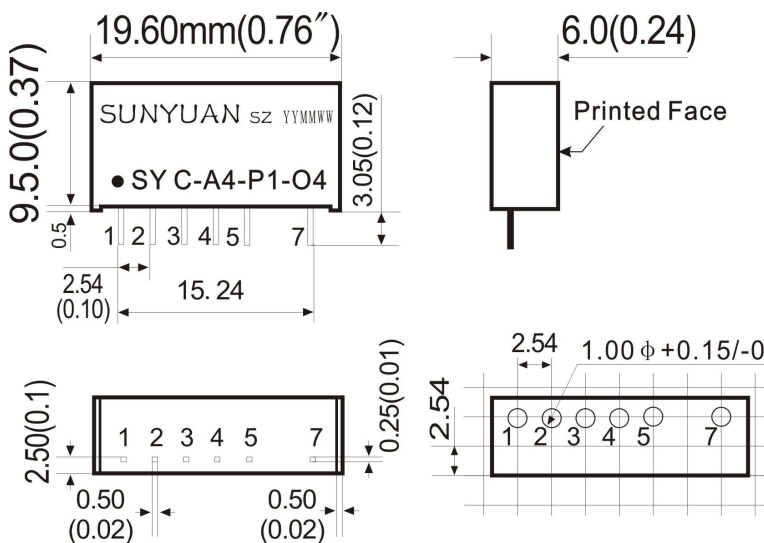


## Product Model Selection Examples

1. Current input type IN: 4-20mA OUT:0-5V Model NO.: SY C-A4-P-O4

2. Current input type IN: 4-20mA OUT:0-2.5V Model NO.: SY C-A4-P-O8 (O8: customized/user-defined value)

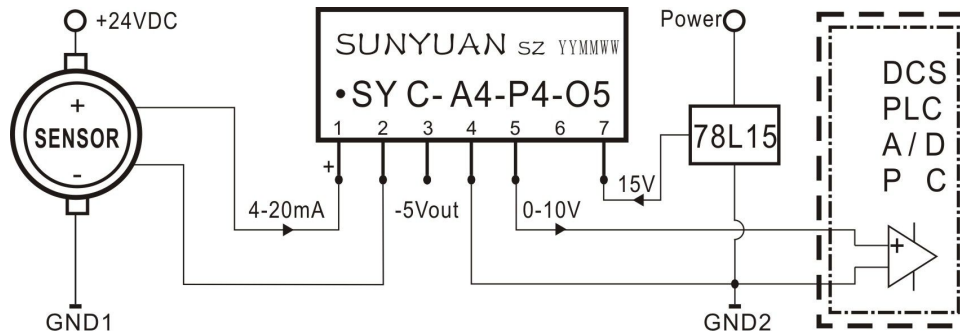
## Dimension & PIN Definition Unit:mm



Pin	PIN Functions Description	
1	Sin+	Signal input +
2	Sin-	Signal input -
3	Vss-	-5V output/Power- input
4	GND	Power GND
5	Vout	Voltage signal output
6	NC	No connection
7	Vcc+	Power + input

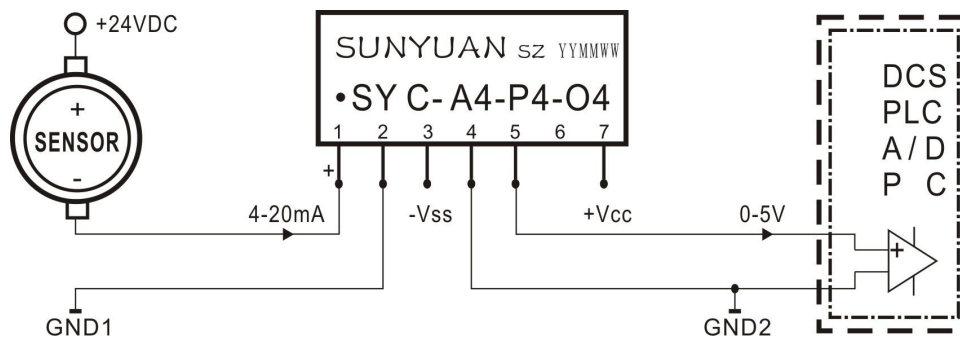
## Typical Applications

### I. Two-wire 4-20mA input, single power supply, voltage signal output.



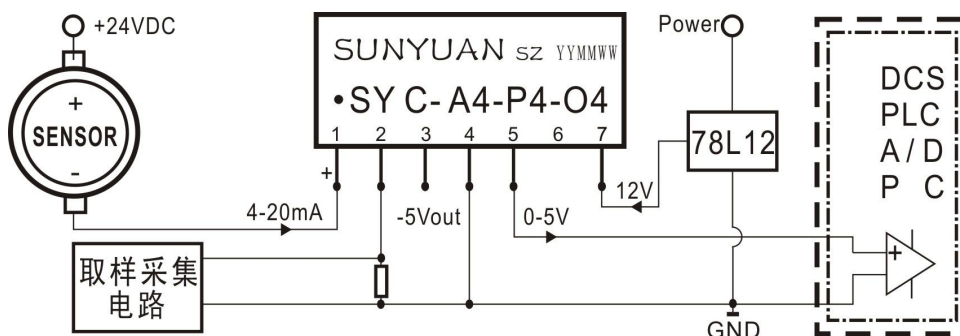
This application circuit is based on a four-wire instruments output: 4-20mA signal I / V conversion. Single power supply is used in sampling terminal, and it inputs to the A / D sampling circuit to resolve the questions about loops ground.

### II. Two-wire 4-20ma input, +/- power supply, voltage signal output



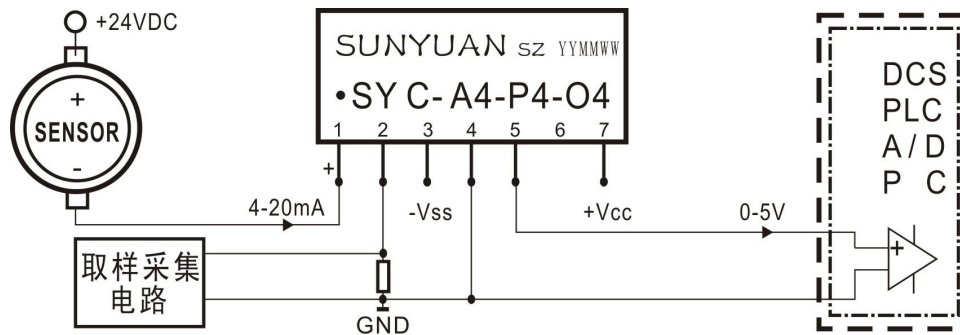
This application circuit achieves a two-wire 4-20mA instrumentation signal output I / V conversion. External positive and negative power supply is required, voltage signal output.

### III. Two-wire 4-20ma differential signal input, single power supply, voltage signal output



The circuit can be applied in the two-wire input signal and multi-channel acquisition & detection loop circuits with common-ground problems. To realize the signal acquisition functions, user only needs to disconnect 4-20mA loop from top terminal and add SY C-A-P-O. In the circuit, single power supply is required, the module can supply a -5V/2mA to enable user to add some bias circuit.

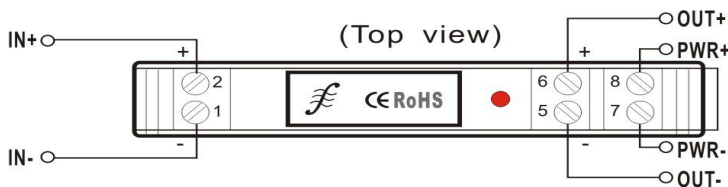
### III. Two-wire 4-20mA differential signal input, +/- power supply, voltage signal output.



The circuit can be applied in the two-wire input loop signal and multi-channel acquisition & detection loop circuits with common-ground problems. To realize the signal acquisition functions, user only needs to disconnect 4-20mA loop from top terminal and add SY C-A-P-O. In the circuit, positive and negative dual power supply is required, output is voltage signal.

### DIN3 SY C-A-P-O Series Single Channel Low Cost Small Size Standard DIN35 Rail-mounted Product Terminal Description

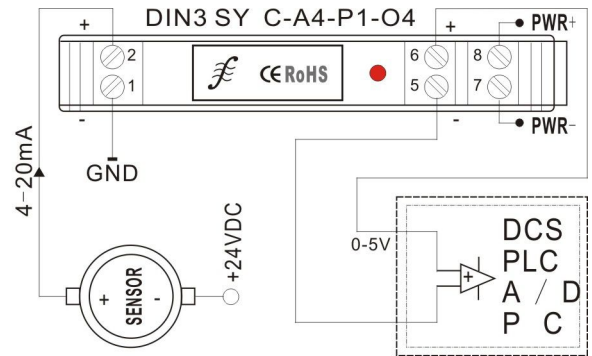
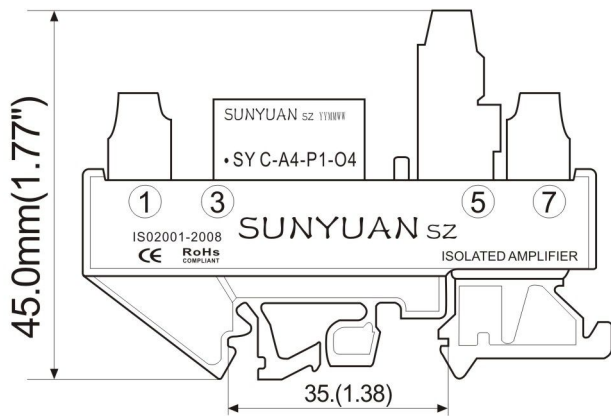
DIN3 SY C-A-P-O is a kind of differential signal converters with super slim (12.5mm in thickness) 35mm rail-mounted base. SY C-A-P-O series IC is integrated into the PCB, and wiring terminals are used as auxiliary power supply and signal input/output connections. The converter is easy to use and zero & gain adjustments are not required. Due to size limitations, DIN3 series small size rail-mounted products only have 1-in 1-out conversion function.



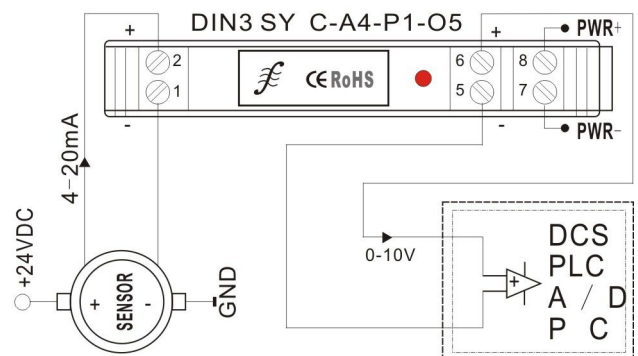
### DIN3 ISO C-A-P-O Series Standard DIN35 Rail-mounted IU Converter PIN Definition:

Signal input	Signal output	NC	NC	Signal output-	Signal output +	Auxiliary power supply _	Auxiliary power supply+
IN-	IN+	NC	NC	Out-	Out+	PWR-	PWR+
1	2	3	4	5	6	7	8

## DIN3 SY U/A-P-O Series Dimension & Wiring



两线制4-20mA输入单电源供电 IV转换接线图

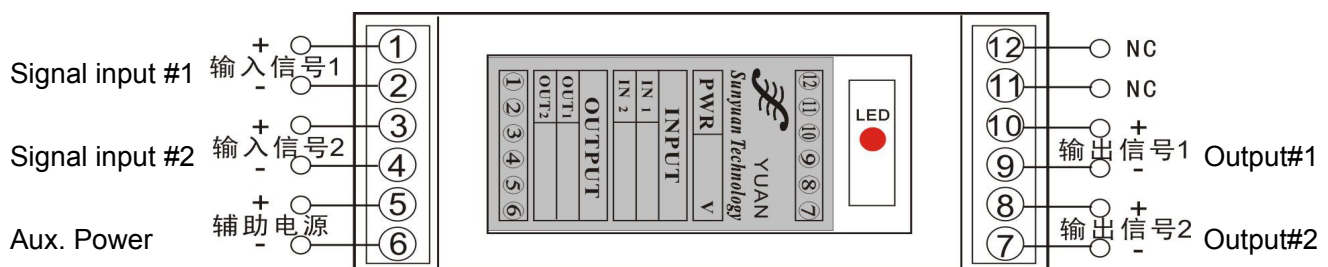


四线制4-20mA输入单电源供电 IV转换接线图

DIN3 系列小体积单路UI/IU转换器外形尺寸

## Multi-channel Standard 35mm DIN Rail-mounted DIN 1X1/1X2/2X2 SY C-A-P-O Series Dimension &Wring

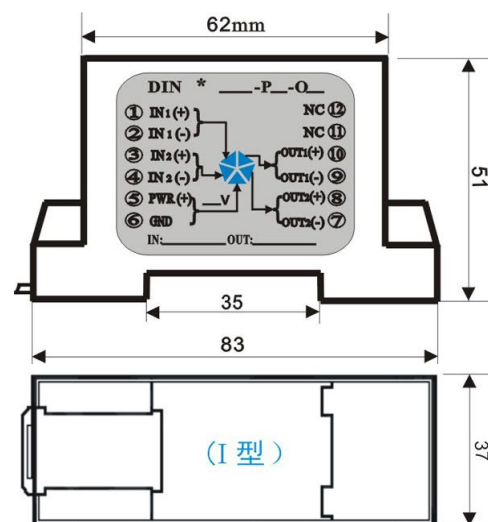
Sunyuan I Type standard DIN35 Rail-mounted multi-channel dual-isolation IU converter has several sets of SY C-A-P-O series IC modules inside. The converters can be 1-input 1-output (DIN1X1), 1-input 2-output (DIN1X2), 2-input 2-output (DIN2X2) to achieve multi-channel current voltage conversion. Zero and full adjustment is not required, internal anti-surge protection or suppression circuit is added to make sure that the products is much more reliable.



DIN 1X1 / 2X2 / 1X2 (有源型) 多路隔离放大器  
DIN 1X1/2X2/1X2 Active Type Multi-channel Isolation Amplifier

## DIN 1X1 / DIN 1X2 / DIN 2X2 Series External Dimension& Pin Definition

Pin	Pin Function Description	
1	Signal in1 +	Input signal #1+
2	Signal in1 -	Input signal #1-
3	Signal in2 +	Input signal #2+
4	Signal in2 -	Input signal #2-
5	Power +	Auxiliary power supply +
6	Power -	Auxiliary power supply -
7	Vout2 -	Output signal #2-
8	Vout2+	Output signal #2+
9	Vout1 -	Output signal #1-
10	Vout1+	Output signal #1+
11	NC	No connection
12	NC	No connection



**\*Note:** The specification is subject to change without notice.