

## 2-wire Passive V/I Conversion Distribution Isolation Transmitter

### Passive 2-wire Voltage to 4-20mA Signal Isolation Transmitter ISO V-4-20mA Series

Features	Applications
<ul style="list-style-type: none"> <li>● Unique high efficient signal loop power extraction technique, external power supply is not required.</li> <li>● 2-wire V/I conversion, 3KVDC isolation between signal input and output.</li> <li>● DC voltage signal input, loop powered 4-20mA output.</li> <li>● Input potentiometer signal: 0-2K<math>\Omega</math> / 0-5K<math>\Omega</math> / 0-10K<math>\Omega</math>, etc. Input standard voltage signal: 0-5V/0-10V/1-5V/0-75mV, etc.</li> <li>● Input terminal can provide distribution power (5V/3mA) regulated power supply for functions extension.</li> <li>● High accuracy and linearity in full measuring range, non-linearity error grade &lt; 0.1%.</li> <li>● Micro size (33X10.5X15.5mm), error grade: 0.1, 0.2.</li> <li>● SIP7 Pin PCB-mounted, UL94V-0 flame-retardant package.</li> <li>● Industrial operating temperature range: -40 ~ +85 <math>^{\circ}</math>C.</li> </ul>	<ul style="list-style-type: none"> <li>● Displacement signal, potentiometer signal data acquisition isolation and control.</li> <li>● PLC/DCS directly gathers voltage signals from sensor.</li> <li>● Converts weighing mV signal into standard 4-20mA analog signal.</li> <li>● Interference rejection of industrial field ground.</li> <li>● Pressure signal acquisition and distribution</li> <li>● Sensor voltage signal acquisition and long-term distortion-less transmission</li> <li>● Bridge (weighing) detecting circuit voltage signal distribution and transmission</li> <li>● Voltage signal to passive 2-wire 4-20mA current signal isolated conversion: 1-input 1-output, 2-input 2-output, 3-input 3-output.</li> </ul>

### Introduction

**Sunyuan ISO V-4-20mA** is kind of SIP 12Pin PCB-mounted passive 2-wire voltage to 4-20mA isolation transmitters. The isolation transmitter IC can provide a set of 5V(3mA) power supply for function extension in next step current loop powered mode. And it receives the voltage signal from the input terminal and converts it into standard 4-20mA 2-wire current signal.

The design of product follows the low cost, small size standards, and adopts SIP12PIN fire protection IC package. Inside the product, there are current signal modulation circuit, magneto-electric isolation transform circuit and signal reduction demodulation circuit. It's power supply voltage range is 12-36VDC, low input equivalent resistance, high linearity, the isolation withstand voltage between signal input and output is up to 3000VDC. The power modules are convenient to use, which achieve isolated distribution of voltage signals from the two-wire voltage input distribution sensor and bridge (weighing) detection circuit only by adding some peripheral devices. The isolation transmitter can be used with sensor to directly convert displacement, angle resistance signal into standard 4-20mA signal, zero and gain can be adjusted by adding external potentiometers. When using the module, user should refer to the typical application circuit diagram.

Unique magneto-electric isolation mode and high efficient loop powered technology are used to make the modules convert voltage signal into standard 2-wire 4-20mA signal. The signal transmitter is compatible with the standard analog input terminals, like PLC, DCS, Digital display meter. It can be used in normal in abominable industrial conditions like wide temperature, humidity and vibration. The signal transmitter have two types of package, small size PCB-mounted package, 35mm DIN rail-mounted package. The 35mm DIN rail-mounted products can be 1-input 1-output, 2-input 2-output, 3-input 3-output and 16-channel V/I isolated conversion functions.

### Max. Rated Value

(If operates in the max. rated value in a long time, may affect the durability, exceeds the max. values, may cause un-repairable damage.)

Continuous isolation voltage	3KVrms
Vin (Max. input voltage)	36VDC
Junction Temperature (Max. Range of ambient temperature)	- 40 $^{\circ}$ C ~ + 85 $^{\circ}$ C
Storage temperature	+150 $^{\circ}$ C
Lead Temperature (Continuous time <10S)	+300 $^{\circ}$ C
Output Short to Common	Continuous

**General Parameters**

Accuracy, linearity error grade ----- 0.1, 0.2	Load regulation ratio ----- <0.05% meas.val./100Ω
Auxiliary power supply ----- None	Isolation ----- Signal input and output, dual isolation.
Operating temperature range ----- -40 ~ +85°C	Package ----- SIP 12 Pin
Operating humidity----- 10 ~ 90% (non-condensation)	Isolation voltage ----- 3KV(60HZ / S), leakage current < 1mA
Storage temperature----- -45~ +105°C	Impulse withstand voltage----- 3KV, 1.2/50us (peak value)
Storage humidity----- 10 ~ 95% (non-condensation)	Temperature drift ----- 0.0050%F.S./°C (-40°C ~ +85°C operating temperature range)

**Technical Parameters**

Parameters	Testing Conditions	ISO V(R)-4-20mA			Unit
		MIN	TYP	MAX	
Isolated voltage AC, 50Hz	10S		3000		VDC
Insulation resistance	500VDC		100		MΩ
Leakage current	240Vrms, 50Hz		0.5		uA
Current output linearity range		3.5		24	mA
Gain		0.005	0.3125	0.625	V/mA
Temperature drift	- 40- + 85°C		±50	±100	PPM/°C
Non-linearity	0-5V	±0.1	±0.2	±0.4	%FSR
Input offset voltage			±1	±2	mV
Input voltage signal		0.075		10	V
Input resistance signal		50		10K	Ω
Frequency features			100		Hz
Distribution power voltage	Ireg=3mA	4.75	5	5.25	V
Loop powered voltage		12	24	36	V

**Model Selection & Definition**

**Installation ISO V(R)□ - 4-20mA**

Isolation	Input signal	Output signal
Small size	V1: 0-5V	R6: 0-2KΩ
Input/Output	V2: 0-10V	R7: 0-5KΩ
Dual isolation	V3: 0-75mV	R8: User-defined
	V4: 0-2.5V	R9: 0-10KΩ
	V8: User-defined	



Installation package

**Omitted:** PCB-mounted type (IC Package)

**Model Selection Examples**

E.g.1: Signal input 0-5V; signal output 4-20mA; micro-size SIP 7 Pin. Model NO.: **ISO V1-4-20mA**

E.g.2: Signal input 0-5KΩ; signal output 4-20mA; micro-size SIP 7 Pin. Model NO.: **ISO R7-4-20mA**

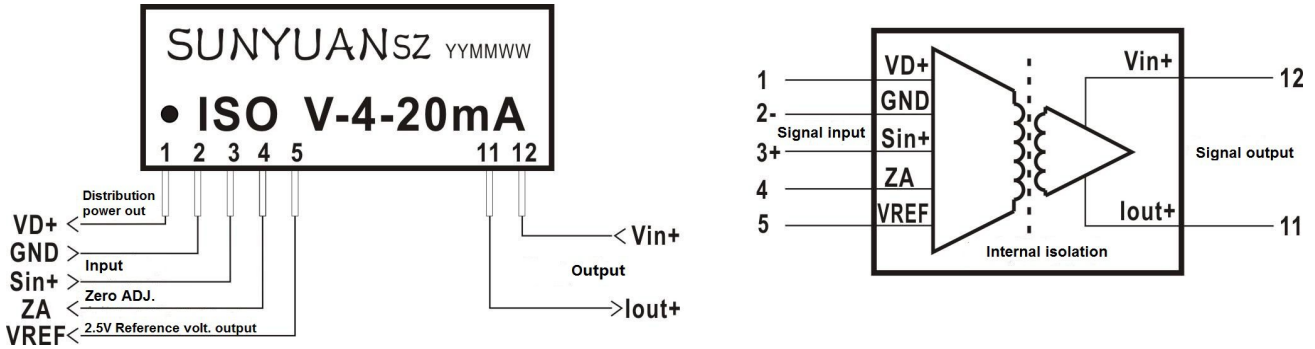
E.g.1: Signal input 0-5V; signal output 4-20mA; 1-ch input, 1-ch output DIN rail-mounted type.

Model NO.: **DIN1X1 ISO V1-4-20mA**

E.g.1: Signal input 0-10V; signal output 4-20mA; 2-ch input, 2-ch output DIN rail-mounted type.

Model NO.: DIN2X2 ISO V2-4-20mA

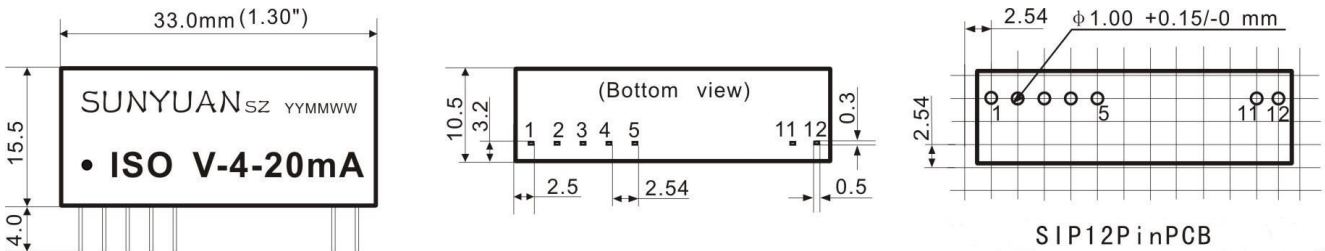
### Pin Definition & Functional Block Diagram



### Pin functions description (SIP 12Pin)

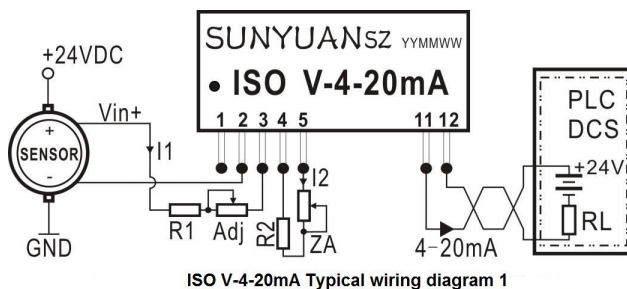
+5VDistributi on power output +	Signal input GND	Signal input +	Zero adjustment	2.5V Reference volt. output	No connection	Current output +	Voltage input +
VD+	GND	Sin+	ZA	VREF	NC	lout+	Vin+
1	2	3	4	5	6-10	11	12

### Dimension & PCB Diagram



### Typical Applications

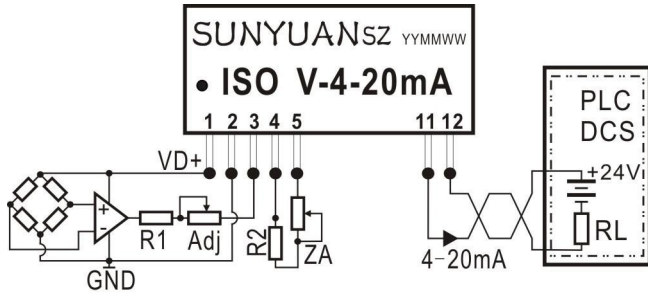
#### 1. Sensor voltage signal acquisition & isolated transmission (2-wire distribution power loop output)



0-Vin voltage input calculation formula:  
 $I1 = Vin / (R1 + Adj) = 160\mu A$   
 $I2 = 2.5V / (R2 + ZA) = 40\mu A$

1-5V Input calculation formula:  
 1-5V input, R2, ZA are not required.  
 $I1 = 5V / (R1 + Adj) = 200\mu A$

#### 2. Bridge (Weighing) detection circuit mV voltage signal isolated power distribution transmission (2-wire distribution power loop output)



ISO V-4-20mA Typical wiring diagram 2

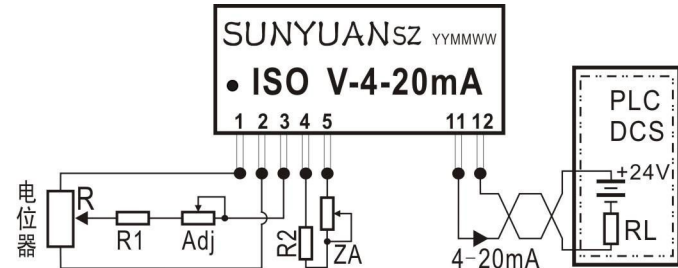
Resistance & Potentiometer value calculation formula:

$$R2+ZA=2.5V/0.04mA$$

$$R1+Adj=Vin/0.16mA$$

Note:  
In measuring mV small signal, integrated amplification circuit are required in input terminal.

### 3. Displacement potentiometer resistance signal input (2-wire distribution power loop output)



ISO R-4-20mA Typical wiring diagram 3

Resistance & Potentiometer value calculation formula:

$$R2+ZA=2.5V/0.04mA$$

$$R1+Adj=5V/0.16mA$$

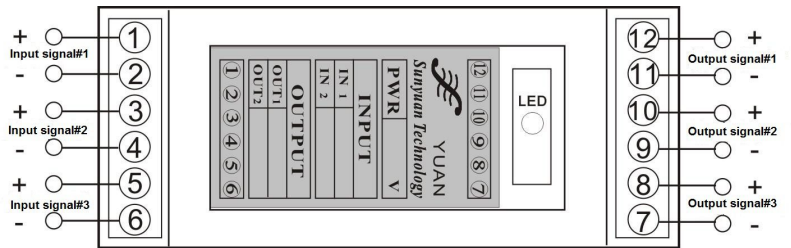
Adjusting method: First, connect the potentiometer R correctly and set R into the min. value; next adjust ZA terminal to get the output 4mA (between pin11 and pin12). Then set potentiometer R value into the max., next adjust "Adj" to get the output 20mA. The input potentiometer recommended value is between 2-5KΩ. If it requires to measure high resistance value, the integrated transfer circuits should be added in input terminal.

## Multi-channel Standard 35mm DIN Rail-mounted DIN 1X1/2X2/3X3/16X16 ISO V-4-20mA Series V/I Conversion Isolation Transmitter

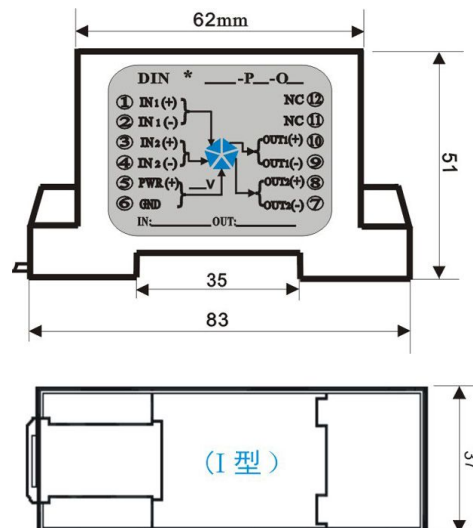
Sunyuan I-Type Standard DIN35 Rail-mounted multi-channel 2-wire V/I Conversion Isolation Transmitter has several sets of ISO V-4-20mA series IC modules inside. The converters can be 1-input 1-output (DIN1X1), 2-input 2-output (DIN 2X2), 3-input 3-output (DIN3X3) to achieve multi-channel voltage signal to 2-wire 4-20ma current isolated 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 / DIN 2X2 / DIN 3X3 Series Dimension & Pin Definition:

Pin	Pin Function Description	
1	Signal in1 +	Signal input #1+
2	Signal in1 -	Signal input #1-
3	Signal in2 +	Signal input #2+
4	Signal in2 -	Signal input #2-
5	Signal in3 +	Signal input #3+
6	Signal in3 -	Signal input #3-
7	Vout3 -	Signal output #3-
8	Vout3+	Signal output #3+
9	Vout2 -	Signal output #2-
10	Vout2+	Signal output #2+
11	Vout1 -	Signal output #1-
12	Vout1+	Signal output #1+



DIN1x1/2x2/3x3 Multi-channel Passive Isolation Transmitter



Note: The specification is subject to change without notice.

