

## Two-wire 4~20mA Current Loop 10KV High Isolation Distributor

Loop Powered Type Analog Signal Current Loop 10KV High Isolation Power Distribution Safety  
Barrier: ISOH 4-20mA-F Series

### Features:

- Small size (46X22X12mm), no zero and gain adjustment required
- Unique and high-efficiency signal loop coupling power-taking technology, no need external power supply
- Two-wire 4~20mA(0~20mA) signal loop powered transmission method
- Two-wire 4~20mA sensor loop powered active output method
- The working power provided for the sensor: 16V ~ 21.5V DC
- High precision and linearity over the full scale, non-linearity error < 0.2%
- Error level: 0.1、0.2, Low loss of signal value (Pressure drop 3.5V, type @20mA)
- Industrial grade temperature range: -40 ~ +85 °C
- SIP 16 Pin standard PCB mounted, compliant with UL94V-0 flame retardant package.

### Typical Application:

- Two-wire passive sensor power distribution and signal transmission
- Realization of 4-20mA current signal isolated power-distribution transmission method
- Industrial site 4-20mA signal isolation and long-distance transmission
- PLC, DCS site analog signal isolation and acquisition.
- Multi-channels analog signal acquisition: ground wire current loop isolation and interference
- Reliable transmission, reception and monitoring between Instrumentation and sensors
- Analog signal data acquisition, isolation and long-distance distortion-free transmission
- Instrumentation, medical equipment monitoring and isolation safety barrier
- High voltage monitoring and isolation safety barrier for electric power and rail transit

### Generalization:

**SunYuan ISOH 4-20mA-F** is a two-wire passive 4~20mA current loop isolation distributor module with 10KV high voltage isolation, small size and low cost. Which is the highest voltage isolation amplifier IC on the market and developed by Sunyuan Technology. This new product could get power from the active equipment and supply for the passive sensor, at the same times, receive 4~20mA current signal from two-wire sensor or other instrumentation and output a isolated 4~20mA signal of the same linearity and same scale. The new product can realize high precision, high linearity and 10KV anti-EMC interference high isolation transmission and power distribution between industrial field sensor and instrument, PLC, DCS.

Inside the **ISOH 4~20mA-F** module, there are current signal modulation and demodulation circuit, signal coupling isolation and conversion circuit, and high efficiency DC-DC boost circuit, etc. circuit. DC-DC boost circuit supply power of 16~21.5V for two-wire passive sensor or PLC, DCS equipment, be convenient to the signal measuring, long-distance transmission and isolation for passive sensor, meets the needs of users to transmit distortion-free signal in long distance without power supply. This IC was designed for the two-wire powered loop (explosion-proof) of series connection between 24VDC and sampling resistors (load resistance), it is matched with the analog input interface board (host machine), PLC, DCS or other instruments (With active load in analog input port) commonly used in industrial fields. The integrated process and isolation technology which inside the product makes the input and output signal reach 10 KV AC voltage high isolation and insulation, and meet the harsh environment requirements in industrial site which with industrial grade wide temperature, damp, vibration, etc.

The **ISO 4-20mA-F** product is very convenient to use, it can realize the isolation, transmission and conversion of the two-wire 4-20mA signal without external adjustment circuit. The product's unique electromagnetic isolation mode and high-efficiency power distribution technology effectively solve the problem

of dependence of the current signal isolation and transmission for sensors and transmitter to power supply, and achieve the precision and isolation transmission of 4~20mA standard signal. SIP 16 Pin PCB mounted and DIN 35 Rail mounted packages are available, which were widely used in rail traffic voltage monitoring, power generator or electric motor safety operation monitoring, electric power transmission and distribution long distance monitoring, signal transmission and reception between instrument and meter, medical equipment isolation safety barrier, industrial intelligent control, nuclear power, etc. field.

### Rated Maximum Values:

(Operating the products in the rated maximum value environment for long-term will affects the service life of the product. If the maximum value is exceeded, irreparable damage may be occurred.)

Continuous Isolation Voltage	10000Vrms
Input voltage	32VDC
Operating Temperature	- 40 ~ +85 °C
Storage Temperature	+150°C
Pin Welding Temperature	+300°C/<10S
Output short-circuit time	Continuable

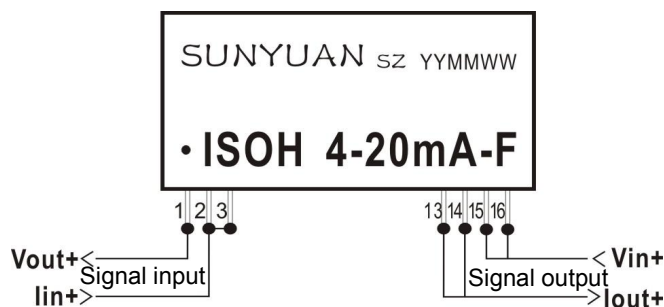
### General Parameters:

Accuracy, linearity error grade ----- 0.1, 0.2	Load regulation rate ----- <0.05% meas.val./100Ω
Auxiliary power ----- No	Isolation ----- Signal input/output, dual isolation
Operating Temperature ----- -40 ~ +85 °C	Package ----- SIP16 Pin (16Pin PCB Mounted)
Operating Humidity ----- 10 ~ 60% (No condensation)	Withstand voltage ----- 10KV(50HZ / S), leak current <1mA
Storage Temperature ----- -45 ~ +105°C	Impact Resistance Voltage ----- 10KVAC, 1.2/50us (peak)
Storage Humidity ----- 10 ~ 95% (No condensation)	Temperature drift ----- 0.0050%F.S./°C (In -40°C ~ +85°C operating temperature range)

### Technical Parameters:

Parameters	Condition	Min.	Typical Value	Max.	Unit
Isolation voltage AC, 50Hz	10S		10000		Vrms
Insulation resistance	500VDC		100		MΩ
Leak current	240Vrms, 60Hz		0.5		uA
Temperature drift	-40~+85°C		±50	±100	PPm/°C
Non-linearity	Within full scale		±0.1	±0.2	%FSK
Output linear range		0	4	24	mA
Output current		1.2		40	mA
Output pressure drop	Io=20mA		3		V
Output signal voltage range		10	24	32	V
Output load capacity	24VDC		500		Ω
Frequency response (small signal bandwidth)	Io=20mA		100		Hz

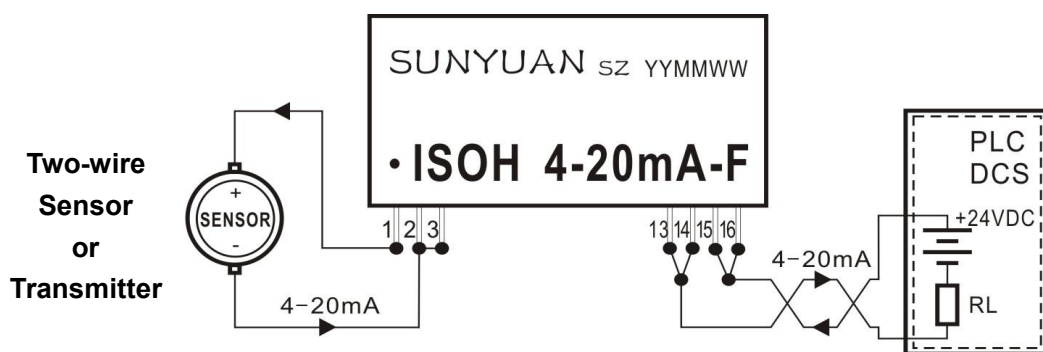
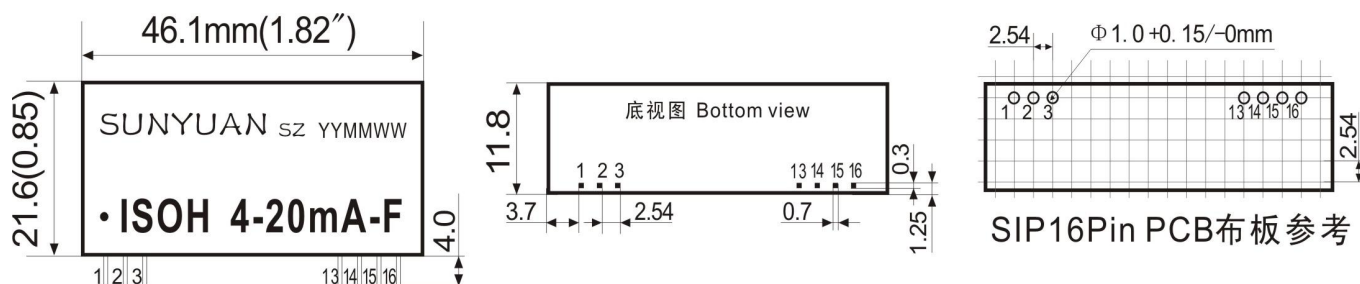
## Pin definition and block diagram:



## Pin function description (SIP16 Pin)

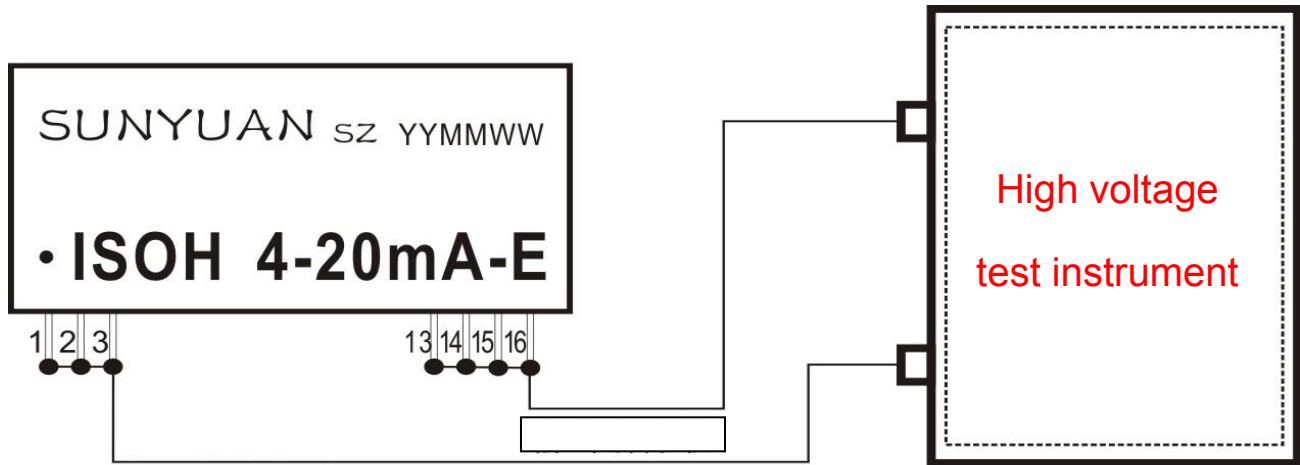
Power distribution output Positive	Signal input Positive	No connection	Signal output Positive	Signal output Positive	Voltage input Positive	Voltage input Positive
<b>Vout+</b>	<b>lin+</b>	<b>NC</b>	<b>lout+</b>	<b>lout+</b>	<b>Vin+</b>	<b>Vin+</b>
<b>1</b>	<b>2~3</b>	<b>4~12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>

## Dimension and Typical application:



4~20mA current loop 10KV high isolation distributor IC connection diagram

## High voltage isolation safety test methods:



### High voltage isolation safety test methods and precautions

1. Please connect the wire as the above picture, set the rated high voltage value on the high voltage test instrument according to the technical parameter. Please pay attention to personal safety during the test, beware of electric shock!

Test environment: room temperature  $TA = 25^{\circ}C$ , air humidity  $< 75\%$

2. High-voltage test operator must wear rubber-insulated gloves, with rubber insulation pads on the ground to prevent high-voltage electric shock.

3. The house of the high voltage test instrument must be reliable and reachable for the ground, please do not make the test in the high temperature, humid and dusty environments.

4. When the high voltage test instrument is connected to the measured object, please make sure that the high voltage output value is "0" and the test function key is in the "reset", and prohibit the high voltage test instrument connected to other object.

5. Do not touch the measured object, the test line and the high voltage output side when the instrument is in the high voltage test state or before the end of the high voltage discharge.

6. Product isolation withstand voltage test method as shown above picture, short-circuit the input and output pins respectively and load the rated voltage for 1 minute.

7. According to the rated isolation voltage value of the product, use the manual gear to adjust the output voltage of the instrument from 0 to the rated value and keep it for a few minutes.

8. The insulation voltage test itself is a destructive test for an insulate product, and the high voltage test should be performed as little as possible for the same product. If there are different customers require multiple inspections, the general requirements are as follows: the batch product is tested according to the rated voltage value of the parameter for the first time, and the test voltage value and the high-voltage detection frequency should be reduced by 0.7 times of the rated value each time. Otherwise, the unrecoverable damage will be occurred to the product in the process of multiple high-voltage tests.

## DIN1x1/DIN2x2 ISO4-20mA-F

### Two-wire 4-20mA Isolation Distributor

#### Applications:

- PLC, DCS analog signal data acquisition and isolation
- Industrial process 4-20mA signal isolation
- Ground-loop elimination
- No distortion in long distance signal transmission
- Instrument signal acquisition
- Electric supervision, medical application and Petrochemical protection

#### Features:

- Supply power to sensor: 24V
- 4-20mA Signal loop input
- High linearity(0.2/0.4) (Nonlinearity<0.2%)
- (Connecting ZERO & FRS)
- 4-20mA signal input / Output, 3000VDC isolated voltage
- Industrial temperature (-45—+85℃)
- DIN rail-mounted



#### Description:

DIN 1X1 ISO 4-20mA-F, DIN 2X2 ISO 4-20mA-F is 4-20mA Two-wire Signal Isolation Distributor IC, it belongs to SUNYUAN ISO 4-20mA series. The IC contains an electromagnetic coupled converter and current modulate, and a high efficiency DC-DC circuit and so on. The IC supplies to loop distributor 16V~21.5V, and meets requirements for 4-20mA loop sensor signal measurement, transmission, isolation and so on. it can save energy and prevent exploding. The IC output is designed according to Loop circuit power supply of 24VDC and resistance connecting in series, it match to popular module input attachment board, PLC and DCS or the other equipment module input attachment. The internal ceramic PCB, printed impedance and new isolation technologies allow the IC for the 3KVAC insulated voltage and meets the industrial level for the extremely poor temperature, humidity and shaking conditions. DIN 1X1 ISO 4-20mA-F, DIN 2X2 ISO 4-20mA-F is easy to use, it is able to meet 4-20mA current loop signal isolation and transmission without external components.

#### Maximum Ratings:

\* If input value is over above range, it may cause permanent damage.

Continuous Isolation Voltage	3000VDC
Vin (TYP)	28V
Operation Temperature	+80℃
Storage Temperature	+80℃
Output Short to Common	Continuous

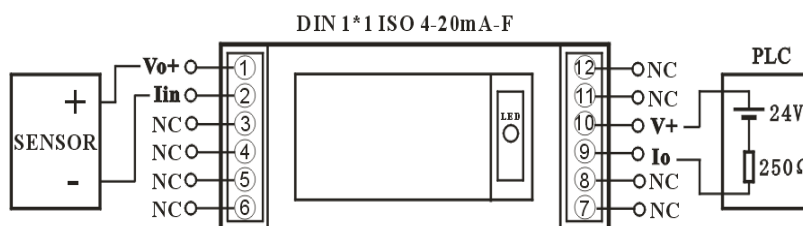
General Parameters:

Parameter	Condition	Min	Typ	Max	Unit
Isolation voltage	AC,50Hz	10S	3000		VDC
Barrier impedance			$10^{12}$	1	$\Omega$ Pf
Leakage current	240Vrms,50Hz		0.5		$\mu$ A
Temperature Drift			$\pm 50$	$\pm 100$	PPm/°C
Nonlinearity			$\pm 0.2$	$\pm 0.5$	%FSK
Load capability	24VDC			50 0	$\Omega$
Signal input voltage range		1. 2		30	mA
Signal output voltage range			24	28	VDC
Output linearity range			4	24	mA
Output current $I_o$		1. 2		30	mA
Output signal ripple				5	mV
Frequency response (Small signal bandwidth)	$I_o=20mA$		50		Hz

Dimension PIN Description:

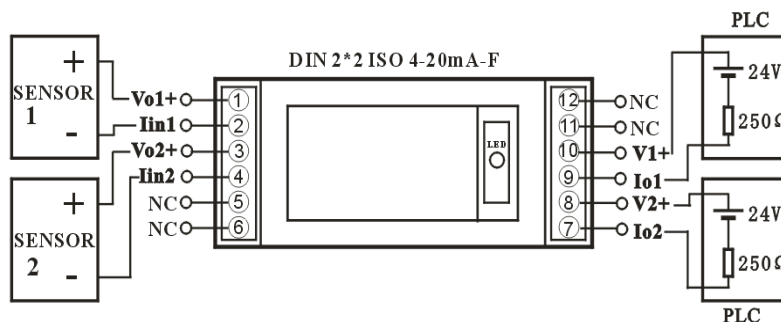
D-I Type: (Green)

Pin	DIN1X1 ISO 4-20mA-F
1	Vo+
2	Iin
3	NC
4	NC
5	NC
6	NC
7	NC
8	NC
9	Io
10	V+
11	NC
12	NC



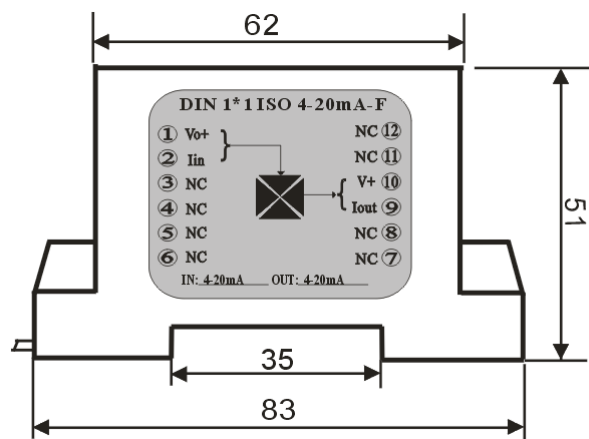
Top View

Pin	DIN2X2 ISO 4-20mA-F
1	Vo1+
2	Iin1
3	Vo2+
4	Iin2
5	NC
6	NC
7	Io2
8	V2+
9	Io1
10	V1+
11	NC
12	NC



Top View

Unit:mm



Front View



Bottom View

\*For details, please email us sy@sunnyuansz.net.

## DIN3 Series Two-wire 4-20mA Analog Isolation Distributor

Small size, low cost standard DIN Rail 35 package  
 Designed for two-wire passive sensor signal isolated power distribution

Features	Applications
<ul style="list-style-type: none"> <li>Two-wire 4-20mA signal loop (explosion proof) input.</li> <li>Two-wire 4-20mA power distribution, active output.</li> <li>High precision and linearity in full measuring range (error &lt;0.2%).</li> <li>3KVDC high isolation between input and output.</li> <li>Low impedance (overall pressure drop &lt;2V) external components and power are not required.</li> <li>DIN Rail 3 small size, UL94V-0 flame retardant package.</li> <li>Power distribution for sensor: 16V ~ 21.5VDC</li> <li>Frequency response (small signal bandwidth):2KHZ (Io=20mA)</li> <li>Industrial operating temperature range: - 25℃ ~ + 70℃</li> </ul>	<ul style="list-style-type: none"> <li>Supply power to two-wire passive sensor and signal transmission.</li> <li>PLC, DCS analog signal isolation and data acquisition.</li> <li>Ground wire current loop isolation and interference inhibition.</li> <li>Monitoring and controlling signals from metering and instruments to sensors</li> <li>Analog signal data acquisition and long-distance transmission without distortion.</li> <li>Electric meters, medical equipments monitoring.</li> <li>Isolated safety bar for mining or explosion-proof equipments.</li> </ul>

### Introduction

Sunyuan Small size, low cost, high precision standard DIN Rail 35 Two-wire Passive Sensor Signal Isolated Distributor IC is a kind of signal modules with electro-magnetic hybrid integrated circuits inside. There are signal interference suppression circuit, signal modulation circuit, signal isolation circuit and output demodulation filtering circuit in the IC. By employing internal isolation technique, proper I/O side creepage distance, the isolated voltage of that signal transmitter is up to 3000VDC.

DIN3 ISO 4-20mA-F Loop Powered Distributor can transmit 4-20mA signal from PLC, DCS, PCC and other controlling system to sensors or intelligent meters to facilitate the isolation, measuring and long-distance transmission of two-wire passive sensors. The isolated distributor is designed on the basis of two-wire loop powered (explosion-proof) circuit which has serial connection on 24VDC and sample resistance (load resistance). It can operate well with analog input interface board (host machine), PLC, DCS and other meters and instruments with analog input interfaces. The two-wire 4-20mA loop powered distributor is easy to achieve two-wire sensor signal isolation, transmission and power distribution without external components and auxiliary power supply.

### Model selection

**DIN3**      **ISO 4-20mA-F**

Small size      Electro-magnetic isolation

DIN Rail      Two-wire 4-20mA isolated distributor

### Example for model selection:

**E.g.1:**      DIN35 package with wiring terminal, signal input:4-20mA; Isolated power distribution output: 4-20mA;

**Product Model No.:** DIN3      ISO 4-20mA-F



## 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.)

Continuous Isolation Voltage	3KVDC/rms
Power supply Volt. Input Range:	-Non
Operating Temperature	- 45°C ~ + 85°C
Welding Temperature (<10S)	+300°C

## General parameters

Precision, linearity error grade ----- 0.1,0.2	Backlash----- < 0.5%
Auxiliary power ----- No	Isolation ----- Signal I/O
Operating temp. ----- -20 ~ +70°C	Insulation resistance ----- ≥20MΩ
Operating humidity-----10 ~ 90% (no condensation)	Withstanding volt. ----- 3KVDC(60HZ/S), leakage current 1mA.
Storage Temp. ----- -20 ~ +70°C	Anti-impulse voltage ----- 3KVDC, 1.2/50us (peak value)
Storage humidity ----- 10 ~ 95% (no condensation)	

## General parameters

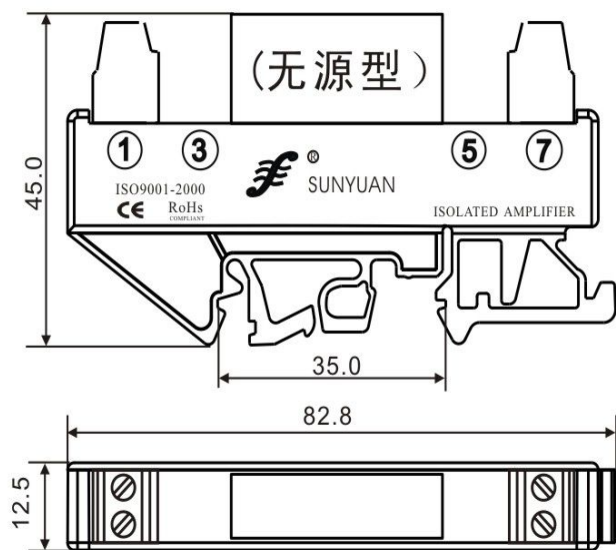
Parameters	Testing Conditions	Min.	Typical Value	Max.	Unit
Isolated volt. AC, 50Hz	10S	3000			VDC
Insulation resistance			$10^{12} \parallel 1$		$\Omega \parallel \text{Pf}$
Leakage current	240Vrms, 50Hz		0.5		uA
Temp. drift			±50	±100	PPm/°C
Non-linearity			±0.2	±0.5	%FSK
Load capacity	24VDC			500	Ω
Input signal voltage range		1.2		30	mA
Output signal voltage range			24	28	VDC
Output linearity range			4	24	mA
Output current: Io		1.2		30	mA

## DIN3 ISO 4-20mA-F Terminal Definition (without zero and gain adjustment)

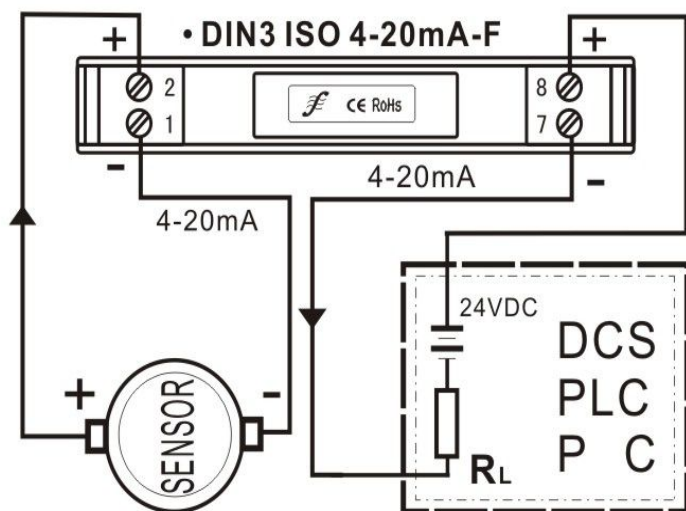
1	2	3 , 4 , 5 , 6	7	8
Distribution Volt. Vout	Current input Iin	NC	Signal output Io	Volt. Input V+

## Dimension and typical application:

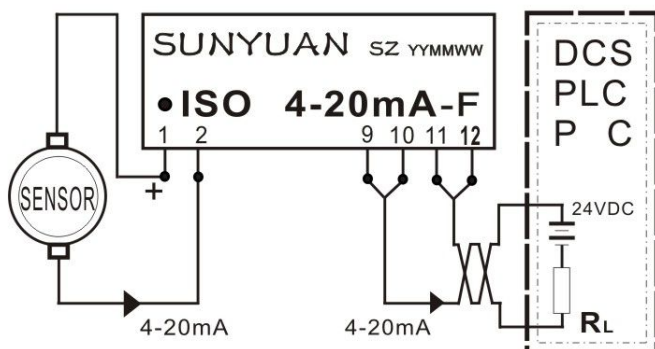
Unit:mm



(Dimension)



(Application circuit)



ISO 4-20mA-F IC in the DIN Rail package



DIN Rail 3 Series External View

## 4-20mA Tow-wire Loop Powered Distributor

### ISO4-20mA-F

Features	Applications
<ul style="list-style-type: none"> <li>·Supply power to sensor:16V--21.5VDC.</li> <li>·4-20mA signal loop active output.</li> <li>·High accuracy and linearity (Non-linearity&lt;0.2%).</li> <li>·Low cost, small size, standard SIP 12 pin package.</li> <li>·4-20mA signal input/Output, 3000VDC isolation.</li> <li>·Industrial temperature range (-45—+85℃).</li> <li>·Frequency response (small signal bandwidth): 100Hz (I<sub>o</sub>=20mA).</li> </ul>	<ul style="list-style-type: none"> <li>·PLC,DCS analog signal data acquisition and isolation</li> <li>·Industrial process 4-20mA signal isolation</li> <li>·Ground-loop elimination</li> <li>·No distortion in long distance signal transmission</li> <li>·Instrument signal acquisition</li> <li>·Electric supervision , medical application and isolated safety bar</li> </ul>

### Description

ISO 4-20mA-F 4-20mA Signal Dual Loop Isolation Distributor IC contains an electromagnetic coupled converter and current modulate, and a high efficiency DC-DC circuit and so on. The IC supplies to loop distributor 24V, and meets requirements for 4-20mA loop sensor signal measurement, transmission, isolation and so on.,it can save energy.The output is designed according to loop circuit power supply of 24VDC and resistance connecting in series, it match with popular module input attachment board, PLC and DCS or the other equipment module input attachment. The internal ceramic PCB, printed impedance and new isolation technologies allow the IC for the 3KVAC insulated voltage and meets the industrial level for the extremely poor temperature, humidity and shaking conditions. ISO 4-20mA-F is easy to use.

### Max. Rated Value

\* If input value is over above range, it may cause permanent damage.

Continuous Isolation Voltage	3000VDC/rms
V <sub>in</sub> (Typ.)	28V
Junction Temperature	-45--+85℃
Storage Temperature	-20--+70℃
Lead Temperature (<10s)	+300℃
Output Short to Common	Continuous

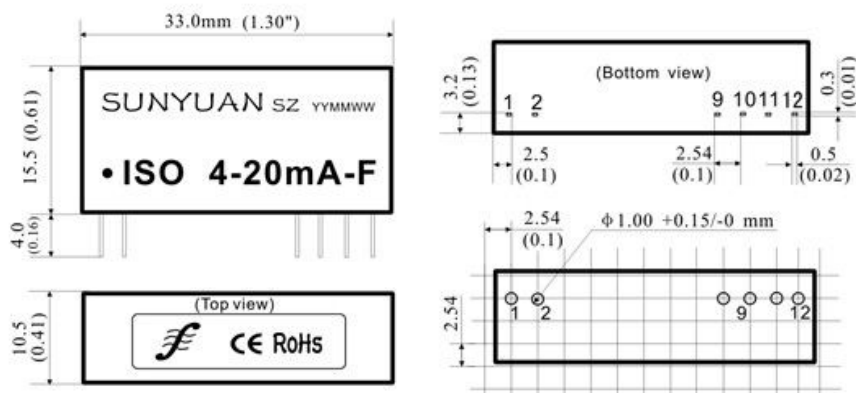
### General Parameters

Accuracy, linearity error grade ----- 0.1, 0.2	Hysteresis error ----- < 0.5%
Auxiliary power----- No	Isolation ----- signal input and output
Operating Temp.----- -20 ~ +70℃	Insulation Resistance ----- ≥20MΩ
Operating Humidity-----10~90% (no condensation)	Withstand Volt. ----- 3KV(60HZ / S), Leakage current 1mA
Storage Temp.----- -20 ~ +70℃	Impact Resistance Volt. ----- 3KV, 1.2/50us(peak value)
Storage Humidity-----10 ~ 95% (no condensation)	

## Technical Parameters

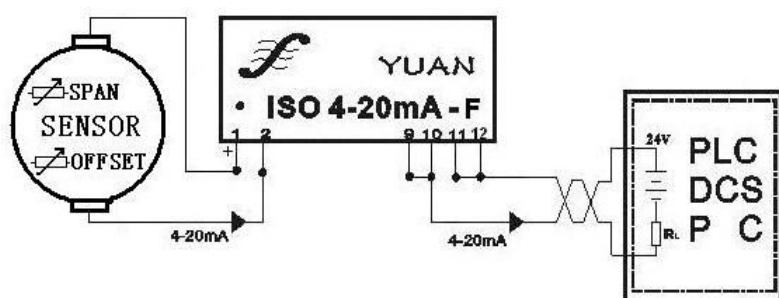
Parameters	Condition	Min	Typ	Max	Unit
Isolation		3000			VDC
Rated continuous Voltage AC, 50Hz	10S		$10^{12} \parallel 1$		$\Omega \parallel Pf$
Barrier impedance	240Vrms, 50Hz		0.5		$\mu A$
Leakage current					
Temperature Drift			$\pm 50$	$\pm 100$	PPm/°C
Non-linearity			$\pm 0.3$	$\pm 0.5$	%FSK
Load capability	24VDC			500	$\Omega$
Signal input voltage range		1. 2		30	mA
Signal output voltage range			24	28	VDC
Output linearity range			4	24	mA
Io		1. 2		30	mA
Output signal ripple				5	mV
Frequency response (Small signal bandwidth)	Io=20mA		2		kHz

## Dimension and Pin Definition



Pin	Function	
1	Vout	Voltage Output
2	Iin	Current Input
3~8	NC	No connection
9,10	Io	Signal output
11,12	VI+	Voltage input

## Typical Wiring Diagram:



ISO9001:2008



CE RoHS

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