Displacement Sensor Potentiometer Signal Transmitter

Potentiometer, Electric-scale, Displacement Sensor Signal Small Size Converter

SY R-P-O Series

Characteristics	**Applications**
• Resistance, electrical ruler, position sensor signal input • Accuracy Grade:0.1,0.2 •Internally installed linear processing and long-line compensation circuit（non-linearity<0.05%） • Auxiliary power: 5V/12V/15V/24V DC Single supply • Input potentiometer signal: 0-50Ω/0-500Ω/0-2KΩ/0-10KΩ Output standard voltage or current signal: 0-2.5V/0-5V/0-10V/1-5V/0-10mA/0-20mA/4-20mA,etc. • IC PCB-mounted type, electrical ruler embedded or water proof case and DIN35 DIN rail-mounted type. • Industrial grade temperature range：- 40 ~ + 85 ℃	• Electrical ruler/angular transducer signal isolation, acquisition and conversion. •Displacement, potentiometer signal acquisition or isolation and control. • Ground interference suppression in industrial site • Resistance signal convert to standard analog signal • Distance measurement and alarm. •Analog signal long-term distortionless transmission •CNC or Rail transit equipments displacement control and signal conversion. •Precision measuring equipments displacement signal acquisition.

Introduction

Sunyuan SY R-P-O Series isolation amplifier is a kind of integrated circuits that convert position resistance signal into standard signal that linear to resistance accordingly. It integrates a set of input filtering circuits, input protection circuits and high accuracy regulated IC, isolation and amplification circuit, and zero gain adjustment circuit into a single chip. It is especially applied to convert resistance signal to standard signal and transmission of position signal, electrical ruler, angular transducer signal acquisition and conversion.

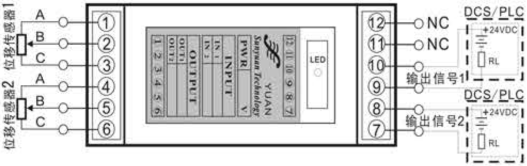
SY R-P-O Series non-isolated products have high precision and linearity (>0.05F.S), it is usually applied in bull-in electrical ruler, angular displacement signal transducer etc, precision measuring instrument. Small size, easy to install. It can be installed in the inner of the sensor and directly convert the position, angular signal to standard 4-20mA signal. Zero and Span can be adjusted through external potentiometer. New technique is used, it can meet industrial site temperature, humidity, vibration harsh environment requirements.

35mm DIN Rail-mounted type DIN1x1/2X2 SY R-P-O-B series Displacement Signal Transmitter is easy to use, the wiring method is terminal wiring. It can achieve displacement resistance signal isolation and transmission without external components. The transmitter with

Max. rated value

（If beyond this range, it will cause product perpetual damaged）

Continuous isolation voltage	Non-isolation
Power supply voltage input range	±10%Vin
Lead temperature (<10s continuous)	+300℃
Min load of output voltage	2KΩ



DIN 1X1 / 2X2(无源型)电流输出导轨式单/多路位移信号变送器

Passive Type Rail-mounted single/Multi-channel displacement signal transmitter (Current output)

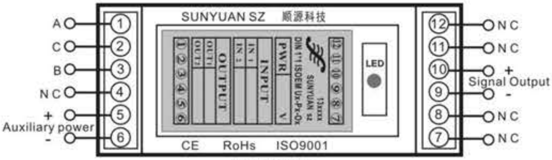
DIN 1X1 / DIN 2X2 II Type Dimension & PIN Definition

Pin	Pin	Terminal function descriptio
1	A	Electric Scale power #1+
2	B	Electric Scale power central tap #1
3	C	Electric Scale power #1-
4	A	Electric Scale power #2+
5	B	Electric Scale power central tap #2
6	C	Electric Scale power #2 -
7	IO+	Current output #2
8	V+	Voltage input #2
9	IO+	Current output #1
10	V+	Voltage input #1
11	NC	No connection
12	NC	No connection

Note: The specification is subject to change without notice!

※ SY R-O-B Series DIN35 I Type Rail-mounted Displacement Signal Transmitter (Active voltage output type)

SY R-O-B Series DIN35 Rail-mounted Displacement Signal Transmitter embeds input filtering circuit, input protection circuits, high precision standard IC, protection of inversed circuits, isolation & amplification circuits, zero and span adjust circuit,etc into the pcb inside. The transmitter has high precision and linearity (better that 0.05F.S), it usually applied in electric-scale, angular displacement signal transmitters and other high precision meters and instruments.

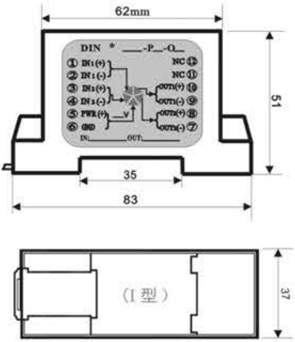


DIN Rail Type

Active Type Rail-mounted single-channel displacement signal transmitter (Voltage output)

DIN35 I Type Dimension & PIN Definition

Pin	Terminal function description	
1	A	Electrical Scale power+
2	B	Electrical Scale Central tap
3	C	Electrical Scale power-
4	NC	No connection
5	Power In	Auxiliary power supply+
6	Power	Auxiliary power supply-
7	NC	No connection
8	NC	No connection
9	Out-	Output signal -
10	Out+	Output signal +
11	NC	No connection
12	NC	No connection



※ SY R-O-B Series DIN35 II Type Rail-mounted Displacement Signal Transmitter (Passive type, current output type)

SY R-O-B Series DIN35 Rail-mounted Displacement Signal Transmitter embeds input filtering circuit, input protection circuits, high precision standard IC, protection of inversed circuits, isolation & amplification circuits, zero and span adjust circuit,etc into the pcb inside. The transmitter has high precision and linearity (better that 0.05F.S), it usually applied in electric-scale, angular displacement signal transmitters and other high precision meters and instruments.

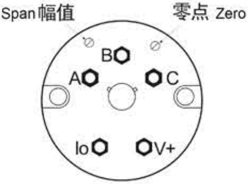
※ SY R-O-E Series Non-isolation External-embedded Linear electric scale, angular displacement sensor used transmitter

SY R-O-E Series small size sensor signal transmitter can convert position or angle signal to standard 4-20mA signal. High linearity, better than 0.05F.S. Span and Zero can be adjustable by user through the potentiometer in the top. It can be installed in the electric ruler externally.

There are total five external points to be connected to electrical ruler and power supply.

Terminal description

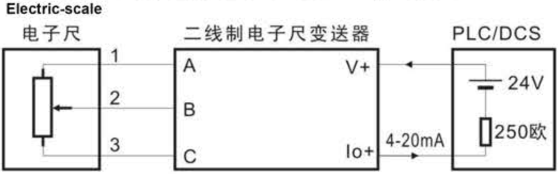
A	Electric-scale Power +
B	Electric-scale Centre Tap
C	Electric-scale Power -
V+	Signal transmitter Power+
IO	Signal transmitter Power-



Adjustment method:

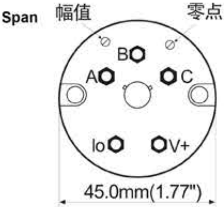
Electrical ruler and power supply, load and measurement instrument (high precision current measuring meter is recommended) should be properly connected. Power on in ten minutes, then adjust ZERO when the electrical ruler is in state of zero to obtain Iout=4mA. Then adjust electrical ruler to rated max. Value to adjust Span, and adjust potentiometer to obtain Iout=20mA. Do that adjustment for two times to improve the accuracy grade.

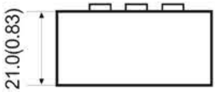
External-embedded Electric-scale Transmitter Wiring Diagram



E型（外置式）非隔离位移变送器

External-embedded Electric-scale Transmitter Dimension





Pin Description

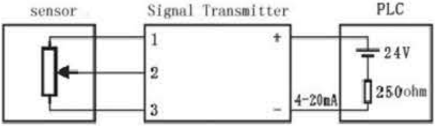
Electric ruler power+	Electric ruler Centre tap	Electric ruler Power GND	Zero adjust 1	Zero adjust 2	Zero adjust 3	Gain adjust 1	Gain adjust 2	Two-wire current output+	Power input+
A	B	C	ZA1	ZA2	ZA3	FB1	FB2	IO+	V+
1	2	3	4	5	6	7	8	9	10

※ Special designed transducer for linear electrical ruler and angular position transducer

SY R-O-C Series Non-isolation internal embedded type

SY R-O-C Series small size sensor signal transmitter can convert position or angle signal to standard 4-20mA signal. High linearity, better than 0.05F.S. Span and Zero can be adjustable by user through the potentiometer on the PCB. It can be embedded into the electric ruler. User can order the products with different suitable size and dimension according to application environment. There are total five external points to be connected to electrical ruler and power supply. (Size:PCB 22x45mm)

Schematic & Wiring Diagram



1	position sensor Power +
2	position sensor center
3	position sensor Power —
+	Signal transmitter Power+
-	Signal transmitter Power-

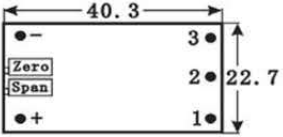
Span:20mA Full-scale adjustment potentiometer **Zero:**4mA Zero adjustment potentiometer

Adjustment method:

Electrical ruler and power supply, load and measurement instrument (high precision current measuring meter is recommended) should be properly connected. Power on in ten minutes, then adjust ZERO when the electrical ruler is in state of zero to obtain Iout=4mA. Then adjust electrical ruler to rated max. Value to adjust Span, and adjust potentiometer to obtain Iout=20mA. Do that adjustment for two times to improve the accuracy grade.

Dimension (Customized products available)

Unit:mm



Span:20mA Zero:4mA

Type-C: Internal Embedded type

Model selection and definition

SY R - P - O -□

	Input **R**	Power supply: **P**	Output **O**	**Installation Package**
Non-isolation Type **SY** Series	R1:0-50Ω	P1: DC24V	O1: 4-20mA	A: PCB-mounted
	R2:0-100Ω	P2: DC12V	O4: 0-5V	B: DIN Rail 35

	R3:0-200Ω	P3: DC5V	O5: 0-10V	C: Internal embedded
	R4:0-500Ω	P4: DC15V	O6: 1-5V	E: External
	R5:0-1KΩ	P8: User-defined	O8:	
	R6:0-2KΩ			
	R7:0-5KΩ			
	R8:			
	R9: 0-10KΩ			

Model selection examples

E.g.1	Input: 0-1KΩ	No power supply	Output: 4-20mA	PCB-mounted	Model NO: SY–R5-O1 -A
E.g.2	Input: 0-5KΩ	Power supply 12VDC	Output: 0-5V	DIN35 mounted type	Model NO: SY-R7-P2-O4 -B
E.g.3	Input: 0-10KΩ	No power supply	Output: 4-20mA	Internal embedded	Model NO: SY R9-O1-C
E.g.4	Input: 0-5KΩ	No power supply	Output: 4-20mA	External embedded	Model NO: SY R7-O1-E

General parameters

Precision ---------- 0.05%　0.1%　0.2%

Power supply---------- DC5V, 12V, 15V, 24V, 220VAC ±10%

Insulation resistance ---------- ≥20MΩ

Work temperature---------- -25 ~ +70℃

Work humidity---------- 10 ~ 90% (non-condensation)

Storage temperature---------- -45 ~ +80℃

Storage humidity---------- 10 ~ 95% (non-condensation)

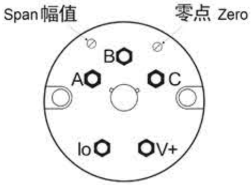
※ SY R-O-E Series Non-isolation External-embedded Linear electric scale, angular displacement sensor used transmitter

SY R-O-E Series small size sensor signal transmitter can convert position or angle signal to standard 4-20mA signal. High linearity, better than 0.05F.S. Span and Zero can be adjustable by user through the potentiometer in the top. It can be installed in the electric ruler externally.

There are total five external points to be connected to electrical ruler and power supply.

Terminal description

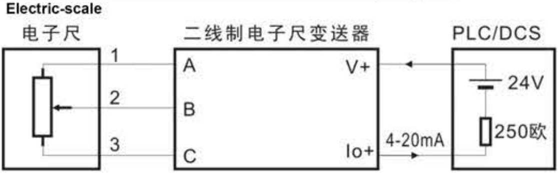
A	Electric-scale Power +
B	Electric-scale Centre Tap
C	Electric-scale Power -
V+	Signal transmitter Power+
IO	Signal transmitter Power-



Adjustment method:

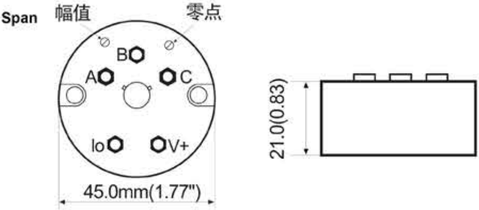
Electrical ruler and power supply, load and measurement instrument (high precision current measuring meter is recommended) should be properly connected. Power on in ten minutes, then adjust ZERO when the electrical ruler is in state of zero to obtain Iout=4mA. Then adjust electrical ruler to rated max. Value to adjust Span, and adjust potentiometer to obtain Iout=20mA. Do that adjustment for two times to improve the accuracy grade.

External-embedded Electric-scale Transmitter Wiring Diagram



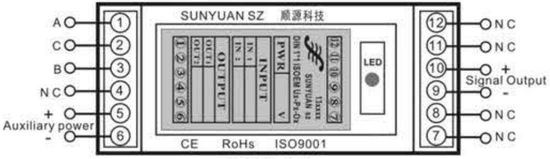
E型（外置式）非隔离位移变送器

External-embedded Electric-scale Transmitter Dimension



※ SY R-O-B Series DIN35 I Type Rail-mounted Displacement Signal Transmitter (Active voltage output type)

SY R-O-B Series DIN35 Rail-mounted Displacement Signal Transmitter embeds input filtering circuit, input protection circuits, high precision standard IC, protection of inversed circuits, isolation & amplification circuits, zero and span adjust circuit,etc into the pcb inside. The transmitter has high precision and linearity (better that 0.05F.S), it usually applied in electric-scale, angular displacement signal transmitters and other high precision meters and instruments.

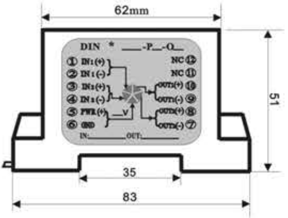


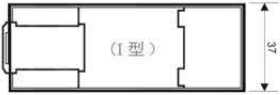
DIN Rail Type

Active Type Rail-mounted single-channel displacement signal transmitter (Voltage output)

DIN35 I Type Dimension & PIN Definition

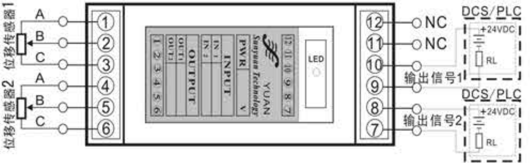
Pin	Terminal function description	
1	A	Electrical Scale power+
2	B	Electrical Scale Central tap
3	C	Electrical Scale power-
4	NC	No connection
5	Power In	Auxiliary power supply+
6	Power	Auxiliary power supply-
7	NC	No connection
8	NC	No connection
9	Out-	Output signal -
10	Out+	Output signal +
11	NC	No connection
12	NC	No connection





※ SY R-O-B Series DIN35 II Type Rail-mounted Displacement Signal Transmitter (Passive type, current output type)

SY R-O-B Series DIN35 Rail-mounted Displacement Signal Transmitter embeds input filtering circuit, input protection circuits, high precision standard IC, protection of inversed circuits, isolation & amplification circuits, zero and span adjust circuit,etc into the pcb inside. The transmitter has high precision and linearity (better that 0.05F.S), it usually applied in electric-scale, angular displacement signal transmitters and other high precision meters and instruments.



DIN 1X1 / 2X2(无源型)电流输出导轨式单/多路位移信号变送器

Passive Type Rail-mounted single/Multi-channel displacement signal transmitter (Current output)

DIN 1X1 / DIN 2X2 II Type Dimension & PIN Definition

Pin	Pin	Terminal function descriptio
1	A	Electric Scale power #1+
2	B	Electric Scale power central tap #1
3	C	Electric Scale power #1-
4	A	Electric Scale power #2+
5	B	Electric Scale power central tap #2
6	C	Electric Scale power #2 -
7	IO+	Current output #2
8	V+	Voltage input #2
9	IO+	Current output #1
10	V+	Voltage input #1
11	NC	No connection
12	NC	No connection

Displacement Sensor Signal Transmitter

Industrial Acceleration Sensing Transmitter

Especially for Linearity Position Sensor

Characteristic：

- Resistance, electrical ruler, position sensor signal input
- Accuracy Grade: (Non-isolation)0.1, (Isolation)0.2
- Internally installed linear processing and long-line compensation circuit（non-linearity<0.05%）
- APS, signal input and output three port isolation:3000V DC
- APS：5V、12V、15V or 24V DC Single supply
- Input potentiometer signal：0-50Ω/0-500Ω/0-2KΩ/0-10KΩ
  Output standard voltage signal：0-2.5V/0-5V/0-10V/1-5V/
  Ouput Standard current signal：0-10mA/0-20mA/4-20mA
- IC type、electrical ruler embedded、Water proof case and DIN35 Din-rail install method
- Industrial grade temperature range：-40～+85 ℃

Application：

- Electrical ruler 、 angular transducer signal isolation, acquisition and conversion.
- Displacement 、 potentiometer signal acquisition/isolation and control
- earth wire interference suppression on industrial site
- Resistance signal convert to standard analog signal
- Distance measurement and Alarm
- Analog signal long-term distortionless transmission
- CNC、Rail transit equipment displacement control and isolation safety Barrier

SunYuan ISO V-4-20mA and ISO R-P-O series isolation amplifier is a kind of integrated circuit that convert and isolate position resistance signal into standard signal that linear to resistance according to change in size. It integrated a set that multi-channel high isolated DC-DC converter, some high-powered signal isolator, and resistance linearization, long-term compensation, interference suppression circuit in single chip. Especially apply to convert/isolate resistance signal to standard signal, transmission of position signal, Electrical ruler、 angular transducer signal isolation, acquisition and conversion.

The inner of the chip integrated high-efficiency DC-DC converter that produce two sets isolated power separately supply for inner input port amplifier circuit, modulator circuit and output port demodulator circuit, conversion circuit, filter circuit. SMD technology and new technique quarantine measure made it can achieve among working power supply, signal input, signal output arrive 2500V AC isolation voltage, and meet industrial site temperature/humidity/vibration mal-environment requirements.

ISO V-4-20mA and ISO R-P-O series position signal isolation amplifier is easy to use, only need a few external component, then can realize position resistance signal transducer and isolation. And can realize industrial site one in two out and even one in four out.

SY series input output non-isolated type product, has high precision and linearity (>0.05F.S), it usually applied in bull-in electrical ruler, angular displacement signal transducer etc, precision measuring instrument. Small size, easy stall. It can be installed inner of the sensor, directly convert the position, angular signal to standard 4-20mA signal. Zero and Span can be adjusted through external potentiometer.

Model selection and definition:

ISO(SY) R - P - O -A

	Input **R**	Power: **P**	Output **O**	Install
Isolation **ISO** Series	R1:0-50Ω	P1: DC24V	O1: 4-20mA	A: PCB Mounted
	R2:0-100Ω	P2: DC12V	O2: 0-20mA	B: DIN Rail 35
	R3:0-200Ω	P3: DC5V	O4: 0-5V	C: Internal insert
	R4:0-500Ω	P4: DC15V	O5: 0-10V	D: Waterproof case
	R5:0-1KΩ	P5: AC220V	O6: 1-5V	Z: User-defined
Non-isolation **SY** Series	R6:0-2KΩ	P8: User-define	O8: User-define	
	R7:0-5KΩ			
	R8: User-define			
	R9: 0-10KΩ			

Product choose example:

1: non isolation	Input: 0-1KΩ	P: 24VDC	Output: 4-20mA	Install: Waterproof case	Model: SY–R5-P1-O1 -D
2: Isolation	Input: 0-5KΩ	P: 220VAC	Output: 0-5V	Install: DIN 35	Model: ISO-R7-P5-O4 -B

Max work range:

（If beyond this range, it will cause product perpetual damaged）

Continuous isolation voltage:	2500VAC
Power voltage input range:	±10%Vin
Welding temperature(10 sacs):	+300℃
Min load of output voltage:	2KΩ

General Parameter:

Precision ---------- 0.05、0.1% 、0.2%	Isolation ---------- input/ output/power
Power supply---------- DC5V、12V、15、24V，220VAC ±10%	Insulation resistance ---------- ≥20MΩ
Work temperature---------- -25～+70℃	Withstand voltage ---------- input/output/Power
Work humidity---------- 10～90% (non-condensation)	1500VAC， 50Hz， 1min， leakage current 1mA
Storage temperature---------- -45～+80℃	impact resistance voltage---------- 3KV ，1.2/50us(peak)
Storage humidity---------- 10～95% (non-condensation)	

Input Parameter:

Electrical ruler/three－terminal adjustable potentiometer /rotation angle sensor etc.	0-50Ω/0-100Ω/0-200Ω/0-500Ω/0-1KΩ/0-2KΩ/0-5KΩ/0-10KΩ

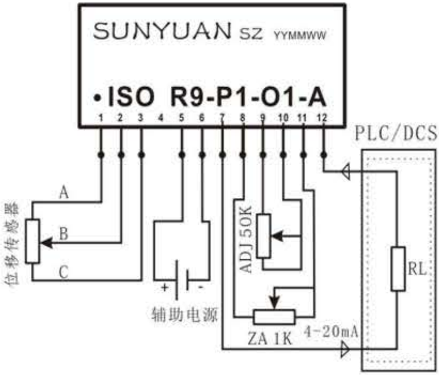
Output Parameter:

Output Item	Output overload capacity
Current signal：0-10mA/0-20mA/4-20mA etc,	No more than 350Ω，if need ＞350Ω, please inform
Current signal：4-20mA	P=24V, Max load=650Ω
Voltage signal：0-5V/0-10V/1-5V etc,	≥2KΩ

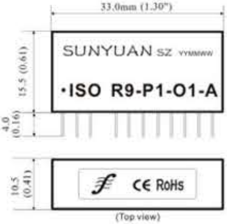
Two: Isolation type position signal amplifier IC

IC type ISO R-P-O-A position isolation amplifier can meet among resistance signal's isolation, amplifier and conversion, work power supply, signal input and output 3000VDC isolation voltage.

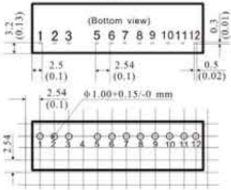
1．ISO R-P-O-A application wiring diagram:



2. Dimension and PCB diagram:



SUNYUAN SZ
•ISO R9-P1-O1-A



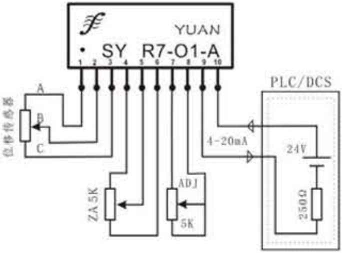
3. Pin Description:

Electric ruler power+	Electric ruler Centre tap	Electric ruler Power GND	NC	Power+	Power GND	Current output+	Zero adjust 1	Gain adjust 1	Gain adjust 2	Zero adjust 2	Current output-
A	B	C	NC	PW+	PW-	IO+	ZA1	FB1	FB2	ZA2	IO-
1	2	3	4	5	6	7	8	9	10	11	12

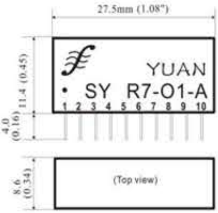
Three: Non-isolation type SY R-P-O (SIP 10 PIN) :

SY R-P-O series position transducer can high precision convert straight line or angular displacement sensor output signal to 4-20mA standard analog signal. Span and Zero can be adjust by user through external potentiometer.

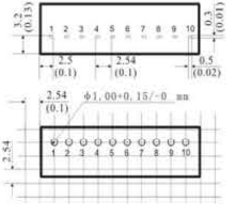
1. SY R-P-O application diagram:



2. Dimension and PCB diagram:



YUAN
SY R7-O1-A



3. Pin Description:

Electric ruler power+	Electric ruler Centre tap	Electric ruler Power GND	Zero adjust 1	Zero adjust 2	Zero adjust 3	Gain adjust 1	Gain adjust 2	Two-wire current output+	Power input+
A	B	C	ZA1	ZA2	ZA3	FB1	FB2	IO+	V+
1	2	3	4	5	6	7	8	9	10

Four: Special Transducer for linear electrical ruler and angular position transducer

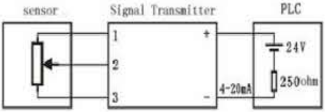
1. Non-isolation Internal Insert: (Sensor inserts type) Type-C

Non-isolation type, small size, it is easy to use. It can converter Position, angle signal to standard 4-20mA signal. High linearity, outgo 0.05F.S. Span and Zero can be adjustable by user through the potentiometer on the PCB. User can customize different suitable size and dimension product according to application environment. There are total five external points, connect to Electrical ruler and power supply.(size:PCB22x45mm)

Adjustment method:

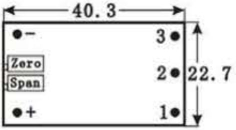
Connect right of electrical ruler and power, load and measurement instrument. It is better to use high accuracy amperemeter, after operating ten minutes, adjust ZERO when the electrical ruler be in state of zero, make Iout=4mA,
Then make electrical ruler to rated value, adjust Span, make potentiometer to 20mA.Do these for two times can improve the accuracy grade..

SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM:



1	position sensor Power +
2	position sensor center
3	position sensor Power —
+	Signal transmitter Power+
-	Signal transmitter Power-

DIMENSIONS (may option):



(Span:20mA Zero:4mA)

2. Waterproof case mounting (Four-wire Terminal Block Signal Conditioners) D size:

Housing material adopts 100*68*50 waterproof resin (Grade: IP65),
There are three terminals inside.
AC input, sign: 220VAC,

DC input, sign: "+" and "-"

Input port:

, B, C,D

A: connect position sensor Power"+"

B: position sensor Power" –"

C: position sensor center

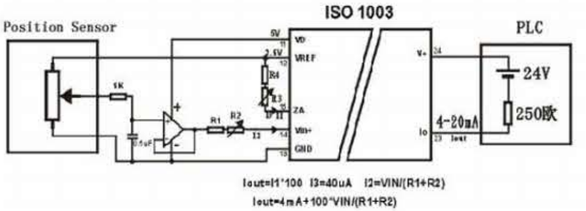
Adjustment method:

After operating ten minutes, when sensor is at 0, adjust ZA for ZERO..

then at max, adjust FB for Span.

3. DIP 24PIN wieldable to PCB directly (two-wire isolation Type) Type-A

ISO 1003 two wires voltage isolated transmitter is 4-20mA current loop isolated interface module, standard DIP24 Pin. its internal contains current signal modulation circuit, electromagnetism isolation converter circuit and demodulation circuit. Supply voltage range: 12~32VDC.Low input equivalent resistance, high linearity. Supply 5V/3mA isolated voltage root and 2.5V base voltage root. There is 2500VAC isolation voltage between input and output.. only a few external device, can realize position sensor input, isolation4-20mA output function. User can refer to follow diagram to design:

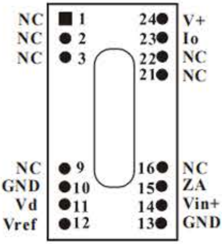


Adjustment method:

After operating ten minutes, when position sensor is at point 0, adjust R3, make Iout=4mA, then make position sensor to rated Value, adjust R2, make Iout=20mA.

ISO 1003 PIN foot function: (size: 32.0x20.2x10.2mm)

1-3	9	10	11	12	13	14	15	16,21,22	23	24
NC	NC	GND	VD	VREF	GND	VIN+	ZA	NC	IO	V+
NC	NC	Input GND	Input port can choose single power +	Input standard voltage power	Input GND	Signal input+	Zero adjust	NC	Current output	Output port power input 24V



YUAN
ISO 1003

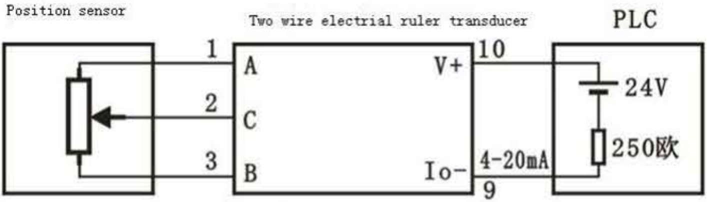
4 .DIN 35 Rail-mounted (Can realize position signal one in two out, two in two out function) Type-B

DIN35 type adopt input filter, input protection, high precision stabilivolt standard IC, protection of inversed grafting, isolation amplifier circuit, zero and span adjust circuit. There is Isolation and Non-isolation type, housing material adopts DIN 35 flame-resistant resin. If non-isolation type, there is no sign "ISO".(size:85x51x37mm)

Adjustment method:

After operating ten minutes, when position sensor is at point"0",adjust Zero, make Iout=4mA. Then make position sensor to rated value, adjust Span, make Iout= 20mA

CONNECTION DIAGRAM:

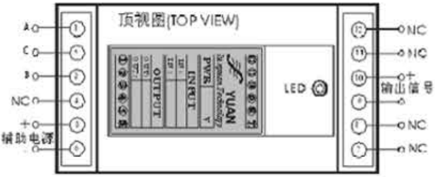


DIN 35 TYPE

'o., Ltd.

Dimension and PIN destription

Pin	Function	
1	A	Electrical ruler power+
2	C	Central tap
3	B	E power-
4	NC;	NC
5	Power In	Power+
6	Power GND	Power-
7	NC;	NC
8	NC;	NC
9	Out-	Output signal-
10	Out+	Output signal-
11	NC;	NC
12	NC;	NC



ISO9001:2008

CE RoHS