SG-3013 User's Manual
Isolated RTD Input Module

Introduction

The SG-3013 is a RTD input signal conditioning module to transform RTD input to voltage or current output. SG-3013 uses a microprocessor-based transducer, which integrating two high resolution ADCs and an MCU, to acquire the RTD signal. The supported RTD types are Pt100 , Pt1000 , Ni 120 , Cu100 ,and Cu1000.

The SG-3013 supports 1000 V_{DC} isolation. The power supply that drives the module`s input and output circuitry is internally isolated.

It's easy to mount the SG-3013 on a standard DIN rail and can operate in environment with wide temperature range.

Specifications

Signal Input:

- **Input Type:** Pt100 α=0.00385 / Pt100 α=0.003916 / Ni 120 / Pt1000 α=0.00385
- **Input Connections**:2 / 3 / 4 wires
- **RTD Type and Temperature Ranges:**

RTD Type	α	Temperature range (℃)
Pt100	0.00385	-200~600
Pt100	0.003916	-200~600
Pt1000	0.00385	-200~600
Ni 120		-80~300
Cu 100 at 0 °C	α= 0.00421	-20~150
Cu 100 at 25 °C	α= 0.00427	0~200
Cu 1000 at 0 °C	α= 0.00421	-20~150

Voltage output:

- Unipolar: 0~5 V_{DC}, 0~10 V_{DC}
- Output impedance: < 50 Ω

Current output:

- Current: 0~20 mA, 4~20 mA
- Current load resistor:0~500 Ω (Source)

General

- Three-way isolation: 1000 V_{DC}
- Accuracy: ±0.1 % of full range
- Operation temperature range:-25 °C～75 °C
- Storage temperature range:-30 °C～85 °C
- Weight: 94 gram

Supply Voltage

- Input Range: 10~30 V_{DC}
- Consumption: < 1.2 W

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Configuration

The terminal wiring for the SG-3013 is shown in Figure A. The SG-3013 uses a power input range of 10~30 V_{DC}.

Table 1 and table 2 show the switch positions used to configure the input and output range. The I/O configuration switches are located inside the module. And can be accessed by removing the DIN-rail bracket covers by sliding them in the direction shown in Figure B.



Figure A:
Pin assignment

Pin	Name
1	EXEC-
2	SENSE-
3	FGND
4	EXEC+
5	SENSE+
6	FGND
7	PWR+
8	VOUT+
9	IOUT+
10	PWRCOM
11	VOUT-
12	IOUT-

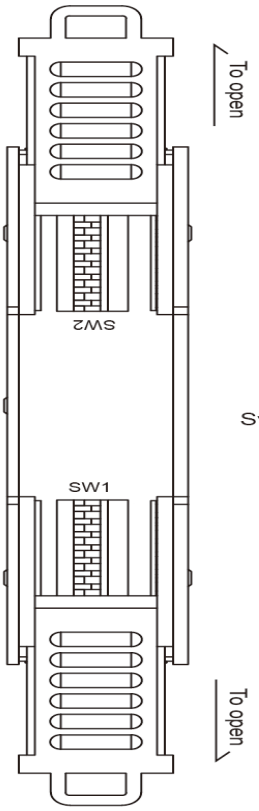


Figure B:
Switch location

Switch Setting

SW1	Dip switch							
N.O	1	2	3	4	5	6	7	8
Function	2^0	2^1	2^2	2^3	2^4	2^5	2^6	+/-

Table 1: Offset setting (SW1)
◆offset: 0.1 ℃

SW2	Dip switch							
N.O	1	2	3	4	5	6	7	8
Function	RTD Type Set					Open RTD	Current output	Voltage output
	2^0	2^1	2^2	2^3	2^4	0 V/0 mA 10 V/20 mA	0-20 mA 4-20 mA	10 V 5 V

Table 2: In/Output type setting (SW2)

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RTD Type Setting table：

No	Switch		Temperature Range (℃)	RTD Type
1	0x00	00000	-200~200	Platinum 100,α= 0.00385
2	0x01	10000	-200~600	
3	0x02	01000	-100~100	
4	0x03	11000	-100~0	
5	0x04	00100	-100~200	
6	0x05	10100	-50~50	
7	0x06	01100	-50~150	
8	0x07	11100	0~100	
9	0x08	00010	0~200	
10	0x09	10010	0~600	
11	0X0A	01010	-200~200	Platinum 100,α= 0.003916
12	0X0B	11010	-200~600	
13	0X0C	00110	-100~100	
14	0X0D	10110	-100~0	
15	0X0E	01110	-100~200	
16	0X0F	11110	-50~50	
17	0x10	00001	-50~150	
18	0x11	10001	0~100	
19	0x12	01001	0~200	
20	0x13	11001	0~600	
21	0x14	00101	-200 ~ 600	Platinum 1000,α= 0.00385
22	0x15	10101	-80 ~ 100	Nickel 120
23	0x16	01101	0 ~ 100	
24	0x17	11101	0~300	
25	0x18	00011	-80~300	
26	0x19	10011	-20 ~ 150	Cu 100 at 0℃,α=0.00421
27	0x1A	01011	0 ~ 200	Cu 100 at 25℃,α=0.00427
28	0X1B	11011	-20 ~ 150	Cu 1000 at 0℃,α=0.00421

Open RTD：

SW2-6 determines output range of SG-3013 when RTD wiring open.

Current Output：

SW2-7 determines current output range.

Voltage Output：

SW2-8 determines Voltage output range.

Label：

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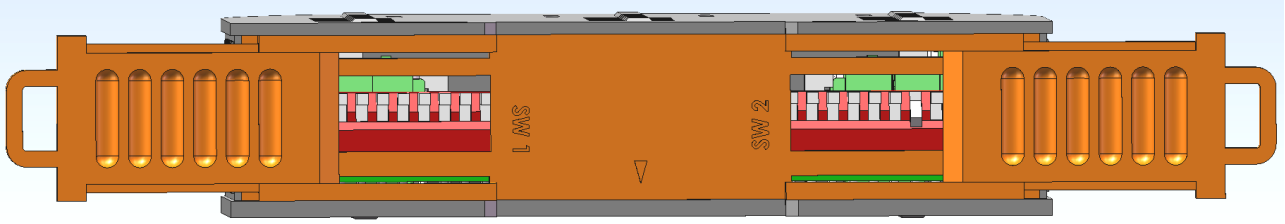
SG3013 Configuration	SW2-6 Open RTD: ☐ 0V/0mA ■ 10V/20mA SW2-7 Current Output: ☐ 0~20mA ■ 4~20mA SW2-8 Voltage Output: ☐ 0~10V ■ 0~5V			
Switch (SW) Setting: ■ON ☐OFF			Temperature Offset Switch	
RTD Type	Range(˚C)	(SW2-) 1 2 3 4 5	(SW1-) 1 2 3 4 5 6 7 8	(˚C)
Pt100 α =0.00385	-200~+200	☐☐☐☐☐	■■■■■■■☐	12.7
Pt100 α =0.00385	-200~+600	■☐☐☐☐	☐■■■■■■☐	12.6
⋮	⋮	⋮	⋮	⋮
Pt100 α =0.003916	0~+100	■☐☐☐■	■☐☐☐☐☐☐☐	0.1
Pt100 α =0.003916	0~+200	☐■☐☐■	☐☐☐☐☐☐☐☐	0.0
Pt100 α =0.003916	0~+600	■■☐☐■	■☐☐☐☐☐☐■	-0.1
Pt1000 α =0.00385	-200~+600	☐☐■☐■	☐■☐☐☐☐☐■	-0.2
Ni120	-80~+100	■☐■☐■	■■☐☐☐☐☐■	-0.3
Ni120	0~+100	☐■■☐■	☐☐■☐☐☐☐■	-0.4
⋮	⋮	⋮	⋮	⋮
Cu100 α =0.00427	0~+200	☐■☐■■	☐■■■■■■■	-12.6
Cu1000 α =0.00421	-20~+150	■■☐■■	■■■■■■■■	-12.7

1	EXC-	4	EXC+	7	PWR+	10	PWRCOM
2	SENSE-	5	SENSE+	8	VOUT+	11	VOUT-
3	FGND	6	FGND	9	IOUT+	12	IOUT-

Factory default setting：

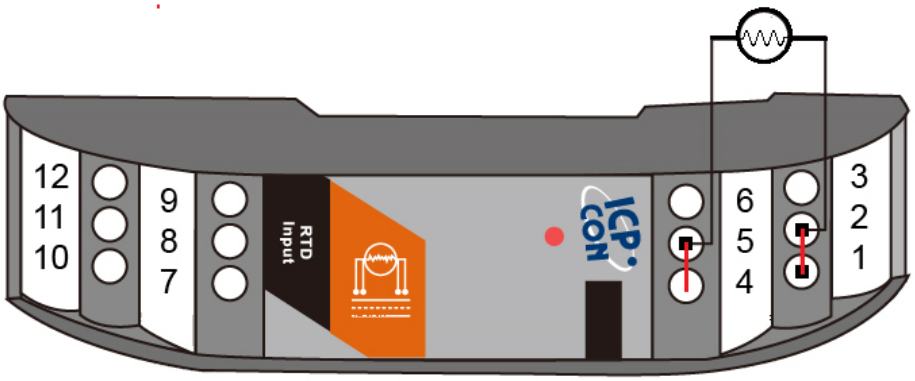
SW1	Dip switch							
N.O	1	2	3	4	5	6	7	8
On/Off	□	□	□	□	□	□	□	□
Input	Pt100, α=0.00385, -200℃~+200℃							

SW2	Dip switch							
N.O	1	2	3	4	5	6	7	8
On/Off	□	□	□	□	□	□	■	□
Output	4~20 mA or 0~10 V							

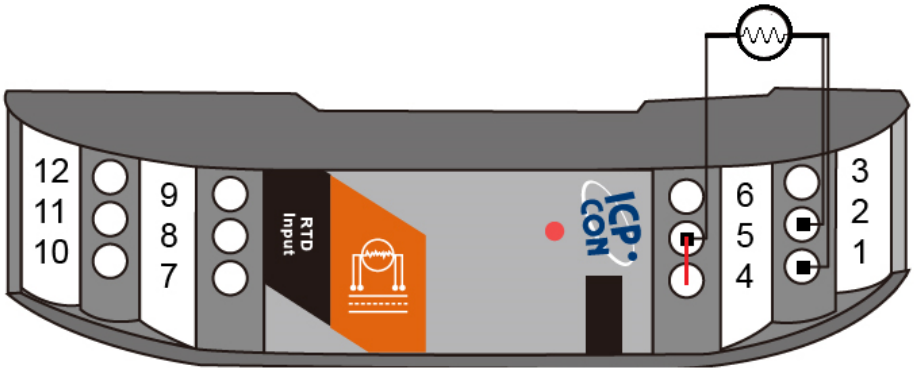


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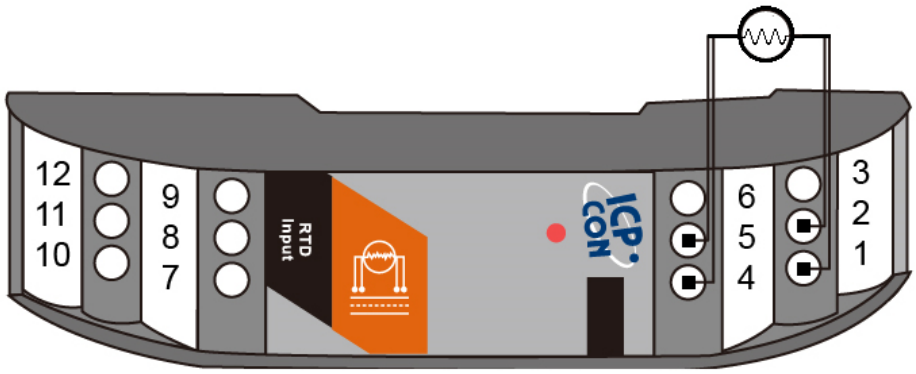
Wiring Diagram



2 wires:
Sensor connect with Pin2(SENSE-),Pin5(SENSE+)
Short Pin1(EXC-) and Pin2(SENSE-)
Short Pin4(EXC+) and Pin5(SENSE+)



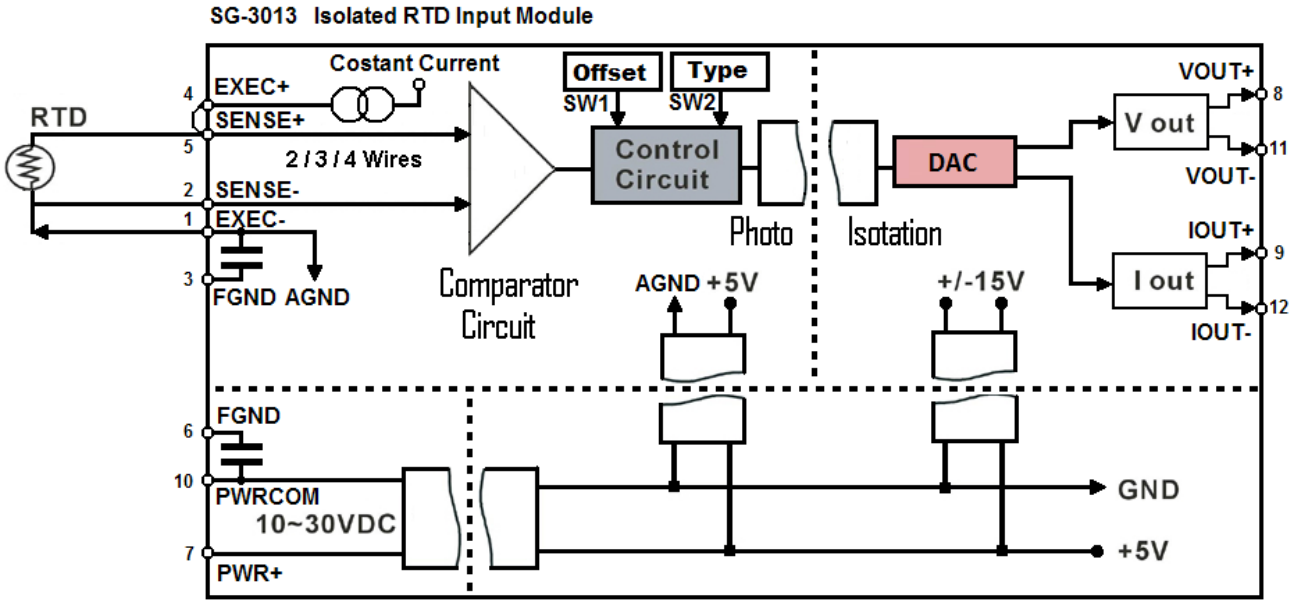
3 wires:
Sensor connect with Pin2(SENSE-),Pin5(SENSE+)
and Pin1(EXC-)
Short Pin4(EXC+) and Pin5(SENSE+)



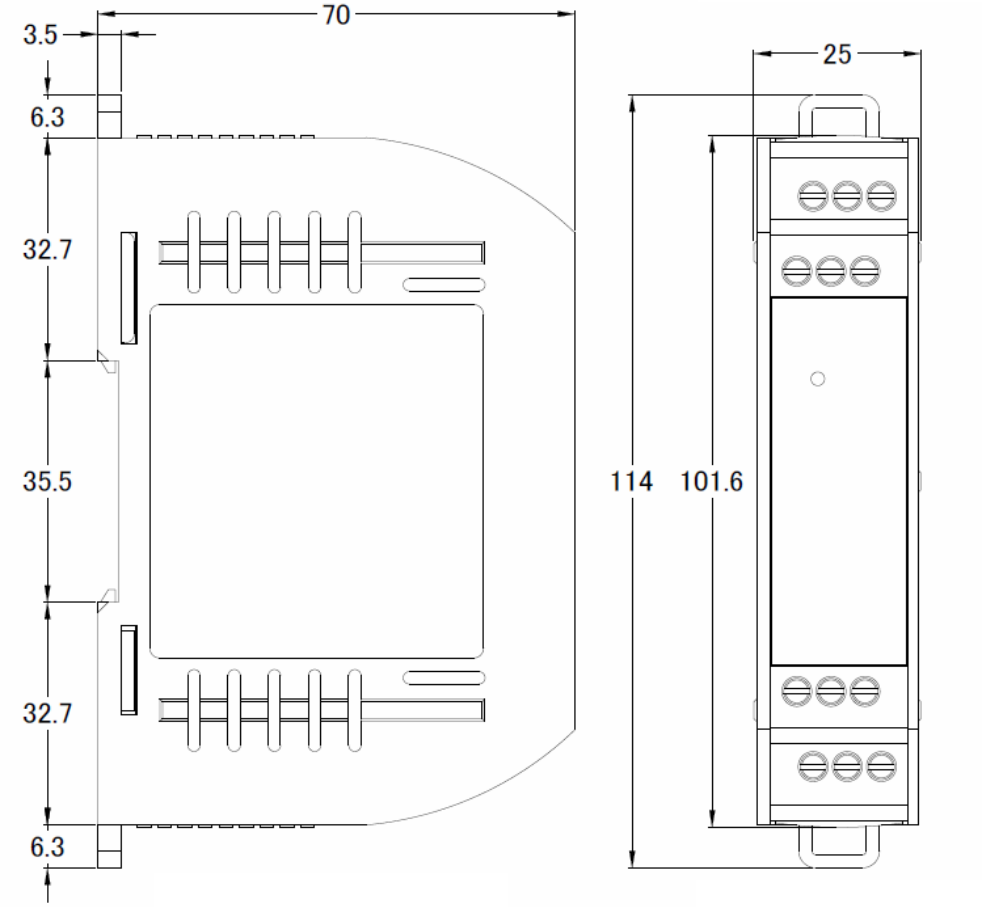
4 wires:
Sensor connect with Pin2(SENSE-),Pin5(SENSE+),
Pin4(EXC+) and Pin1(EXC-)

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Block Diagram



Dimensions



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