

# 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<sub>DC</sub> 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  $\alpha=0.00385$  / Pt100  $\alpha=0.003916$  / Ni 120 / Pt1000  $\alpha=0.00385$
- **Input Connections:** 2 / 3 / 4 wires
- **RTD Type and Temperature Ranges:**

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

#### Voltage output:

- Unipolar: 0~5 V<sub>DC</sub>, 0~10 V<sub>DC</sub>
- Output impedance: < 50  $\Omega$

#### Current output:

- Current: 0~20 mA, 4~20 mA
- Current load resistor: 0~500  $\Omega$  (Source)

#### General

- Three-way isolation: 1000 V<sub>DC</sub>
- Accuracy:  $\pm 0.1$  % of full range
- Operation temperature range: -25 °C ~ 75 °C
- Storage temperature range: -30 °C ~ 85 °C
- Weight: 94 gram

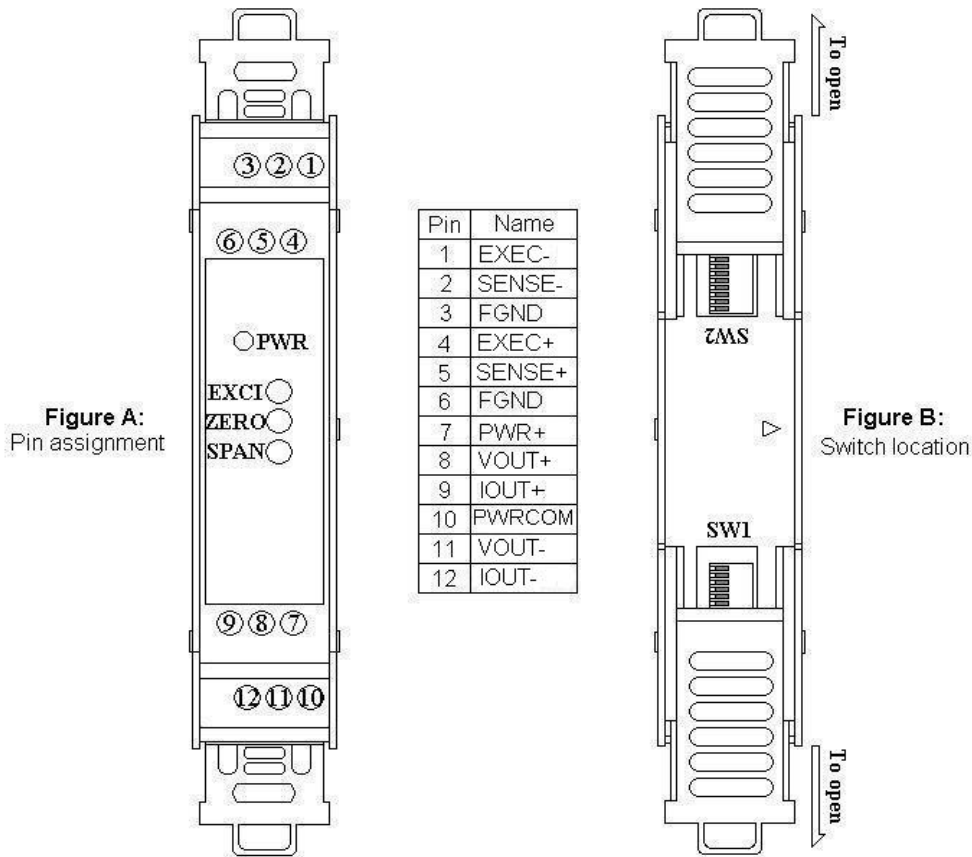
#### Supply Voltage

- Input Range: 10~30 V<sub>DC</sub>
- Consumption: < 1.2 W

## 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<sub>DC</sub>.

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.



## 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 °C

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

**Table 2:** In/Output type setting (SW2)

**RTD Type Setting table :**

No	Switch		Temperature Range (°C)	RTD Type
1	0x00	00000	-200~200	Platinum 100, $\alpha= 0.00385$
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, $\alpha= 0.003916$
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, $\alpha= 0.00385$
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	
27	0x1A	01011	0 ~ 200	Cu 100 at 25°C, $\alpha=0.00427$
28	0X1B	11011	-20 ~ 150	Cu 1000 at 0°C, $\alpha=0.00421$

**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.

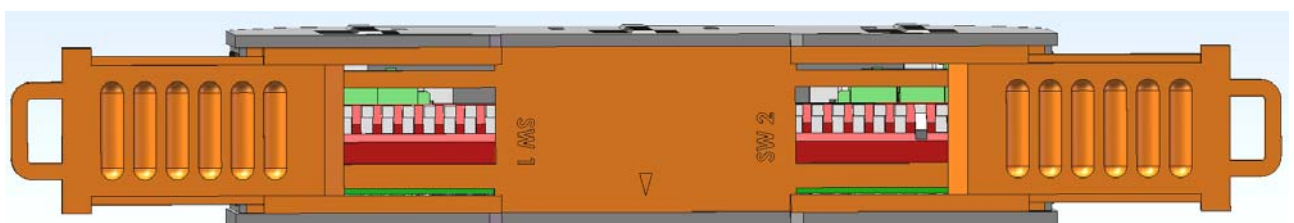
Label :

SG3013 Configuration		SW2-6 Open RTD: <input type="checkbox"/> 0V/0mA <input checked="" type="checkbox"/> 10V/20mA	
		SW2-7 Current Output: <input type="checkbox"/> 0~20mA <input checked="" type="checkbox"/> 4~20mA	
		SW2-8 Voltage Output: <input type="checkbox"/> 0~10V <input checked="" type="checkbox"/> 0~5V	
Switch (SW) Setting: <input checked="" type="checkbox"/> ON <input type="checkbox"/> 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 $\alpha = 0.00385$	-200~+200	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
Pt100 $\alpha = 0.00385$	-200~+600	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
⋮	⋮	⋮	⋮
Pt100 $\alpha = 0.003916$	0~+100	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Pt100 $\alpha = 0.003916$	0~+200	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Pt100 $\alpha = 0.003916$	0~+600	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
Pt1000 $\alpha = 0.00385$	-200~+600	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
Ni120	-80~+100	<input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
Ni120	0~+100	<input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
⋮	⋮	⋮	⋮
Cu100 $\alpha = 0.00427$	0~+200	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Cu1000 $\alpha = 0.00421$	-20~+150	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
10 PWR COM	7 PWR+	6 F GND	3 F GND
11 VOUT-	8 VOUT+	5 SENSE+	2 SENSE-
12 IOUT-	9 IOUT+	4 EXC+	1 EXC-

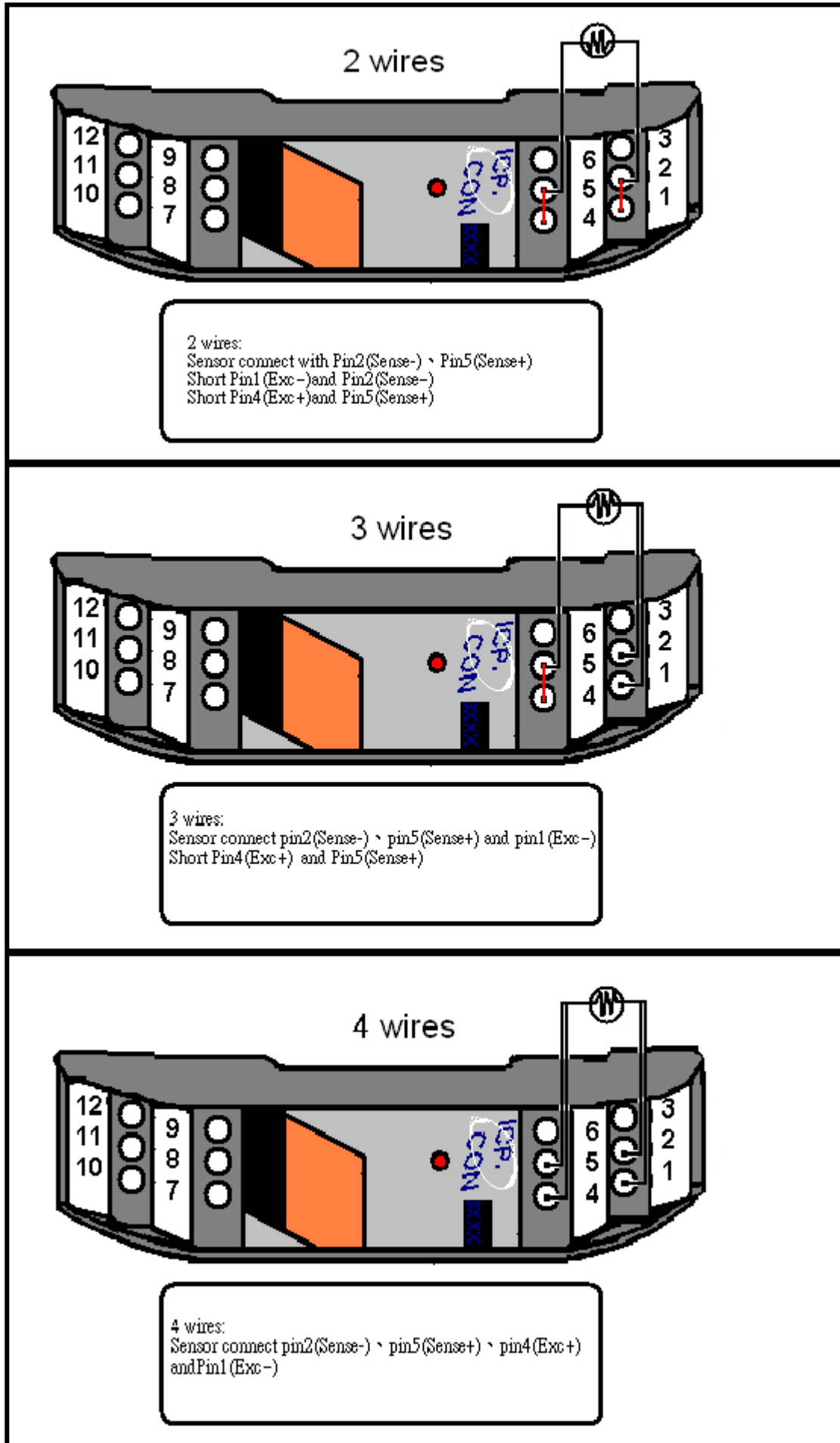
Factory default setting :

SW1	Dip switch							
N.O	1	2	3	4	5	6	7	8
On/Off	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Input	Pt100, $\alpha = 0.00385$ , -200°C ~ +200°C							

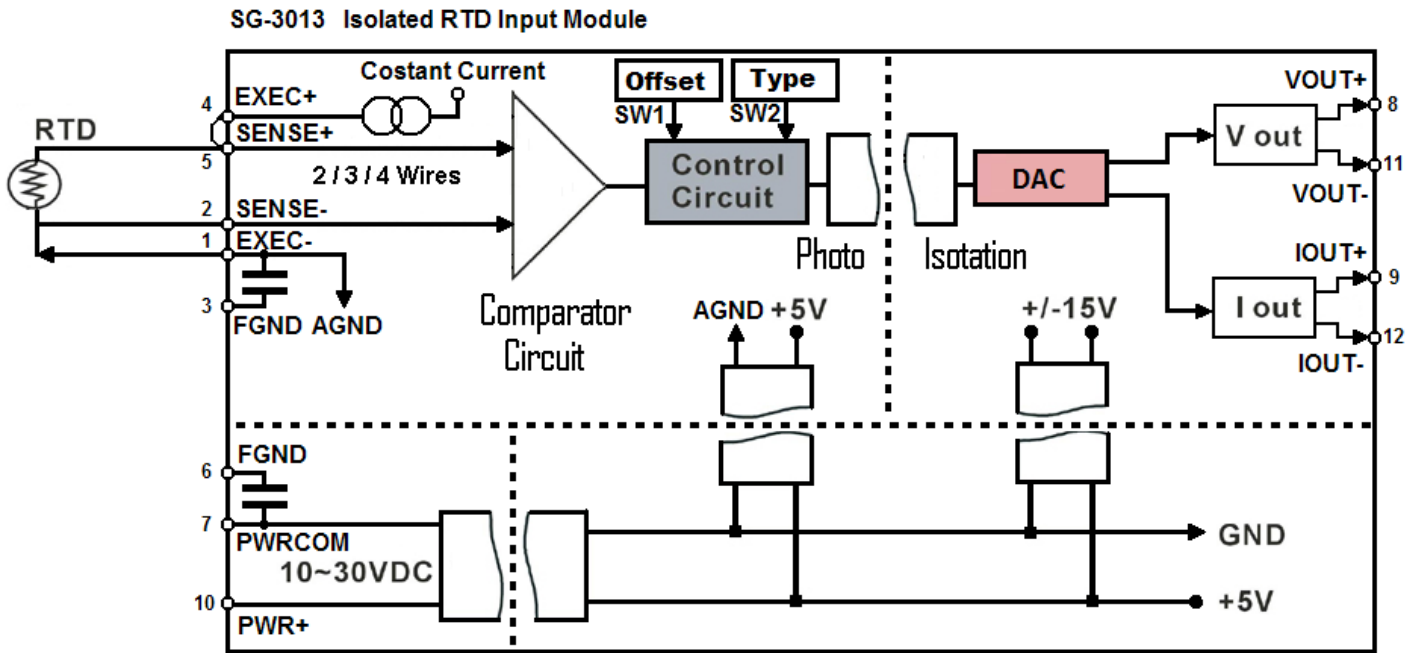
SW2	Dip switch							
N.O	1	2	3	4	5	6	7	8
On/Off	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Output	4~20 mA or 0~10 V							



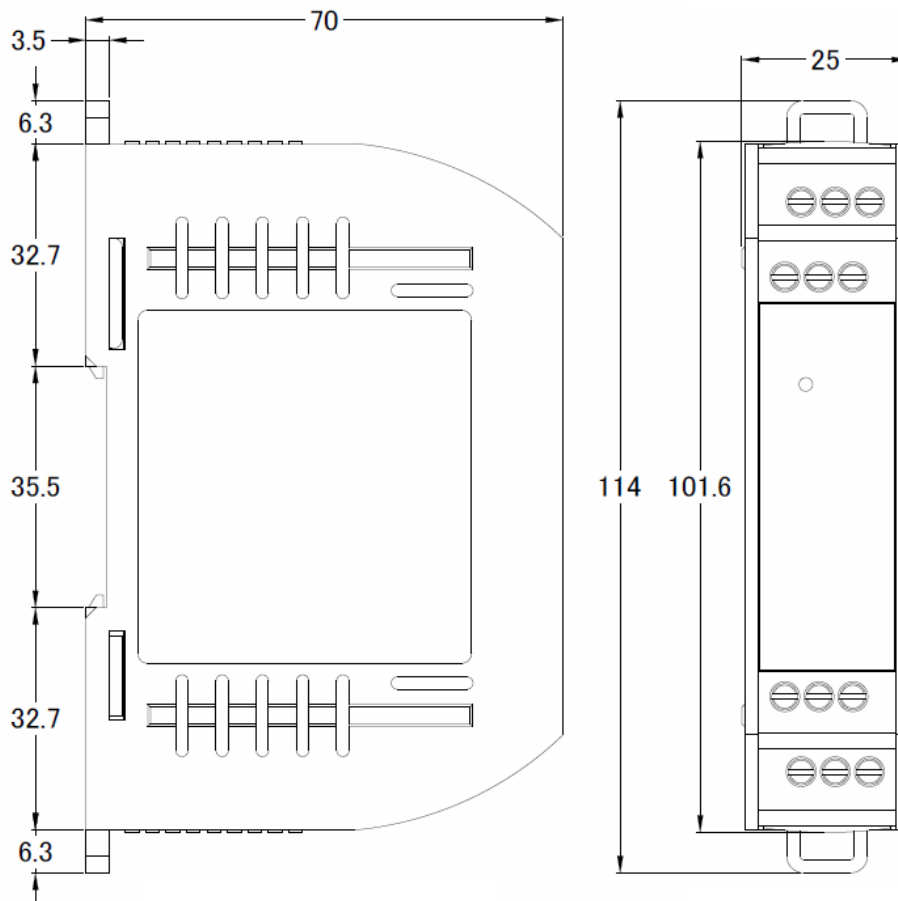
## Wiring Diagram



## Block Diagram



## Dimensions



## Technical Service:

Please E-mail your problem description to [service@icpdas.com](mailto:service@icpdas.com) if you have any questions.  
 More detail information: <http://www.icpdas.com/>