

Pt100 Temperature measurement to frequency signal isolation transmitter

Pt100/Cu50 Thermal resistance signal to frequency signal IC: ISO Z-W-P-F series

Features

- Three-wire, four-wire or two-wire Pt100 thermal resistance signal input directly
- Accuracy, linearity error level: 0.2 (relative temperature)
- Built-in linearization processing and long-line error compensation function circuit
- Power, signal: input / output 3000VDC three isolation
- Auxiliary power supply: 5V/12V/15V/24V DC single power supply
- Signal output: 0-5KHz / 0-10KHz / 1-5KHz, etc.
- Low cost, small size, easy to use, high reliability
- Standard SIP 16 Pin in accordance with UL94V-0 Flame retardant packaging
- Industrial temperature range: - 40 ~ + 85 °C

Typical application

- Temperature measurement signal isolation, acquisition and transformation
- Industrial site high precision temperature measurement and transmission
- Signal isolation and control of Pt100/Cu50 thermal resistance sensor
- Multi-loop temperature measurement sensor ground loop interference suppression
- Make the temperature signal into square wave pulse frequency signal remote transmission
- Safety monitoring and monitoring of equipment such as oil temperature/water temperature/furnace temperature
- Power monitoring, medical equipment temperature control isolation barrier
- PT100 thermal resistance temperature measurement transmitter signal, 1-input&2-output , 2-input&2-output isolation amplification conversion and remote transmission without distortion transmission

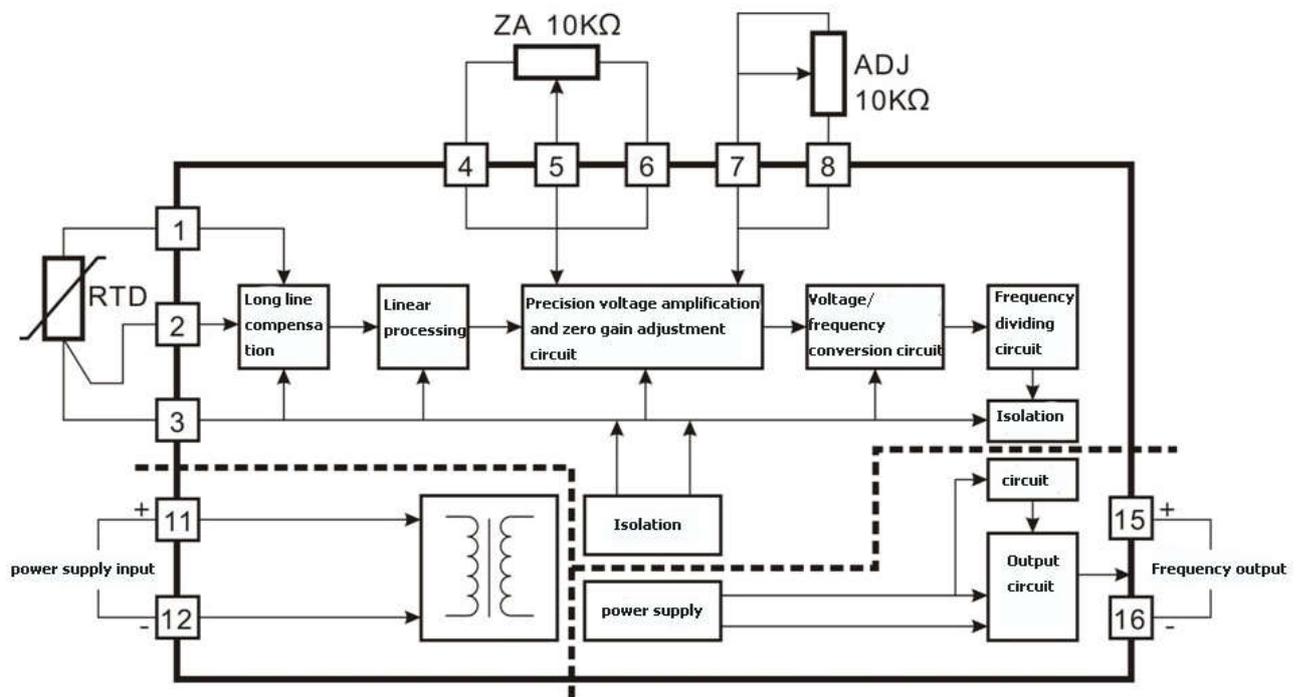
Summarize

SunYuan ISO Z-W-P-F series isolation transmitter IC is a digital pulse frequency signal hybrid integrated circuit that converts the Pt100/Cu50 thermal resistance sensor analog signal into a digital pulse frequency signal that is linearly proportional to the temperature change. The IC converts the thermal resistance signal into a unit pulse frequency signal and then isolates the output, which can significantly enhance the signal anti-interference ability and is advantageous for long-distance distortion-free transmission. The product can complete the AD conversion and the radio frequency signal modulation wireless remote transmission through connected to the counter of the single-chip microcomputer, and also can be combined with the optical transceiver module to carry out the optical fiber remote transmission.

The module integrates high-efficiency DC-DC, it can generate two sets of isolated power supplies to the internal input end of the thermal resistance long-line compensation circuit, linearization processing circuit, voltage amplification adjustment circuit, precision voltage frequency conversion circuit, frequency division circuit, Isolation anti-interference suppression circuit power supply and output output circuit power supply. It is especially suitable for the isolation and conversion of the thermal resistance signal into digital pulse frequency signal, temperature signal transmission and distortion-free remote transmission, temperature signal acquisition and isolation of industrial field PLC or DCS system. The internal SMD process structure and new technology isolation measures enable the device to achieve: operating power / signal input / output 3000VDC three isolation, and can meet the industrial requirements of wide temperature, humidity, vibration, the harsh working

environment.

ISO Z-W-P-F series temperature signal isolation amplifier is very convenient to use. Users only need external zero point and full potentiometer to calibrate to realize the isolation and transmission of Pt100 thermal resistance sensor signal into unit pulse frequency signal. The product can be customized according to the user's industrial field custom parameter requirements. The installation method is standard SIP 16Pin PCB board soldering installation or standard DIN 35 rail mounting. It is especially suitable for occasions such as frequency modulation and phase modulation, AD conversion, GPRS/GMS wireless data transmission, digital thermometer, data measuring instrument, etc., which need to realize Pt100 thermal resistance signal isolation transmission in instrumentation and industrial intelligent remote telemetry remote control equipment. It can realize the function of long-distance transmission of industrial field temperature control signals 1-input&1-output, 2-input&2-output. Products are widely used in metallurgical mining, petrochemical, power equipment, medical equipment, industrial automation, new energy facilities and military research and other fields, users can choose the right products according to the needs of the site.



Picture 1 ISO Z-W-P-F Series Isolation Transmitter Block Diagram

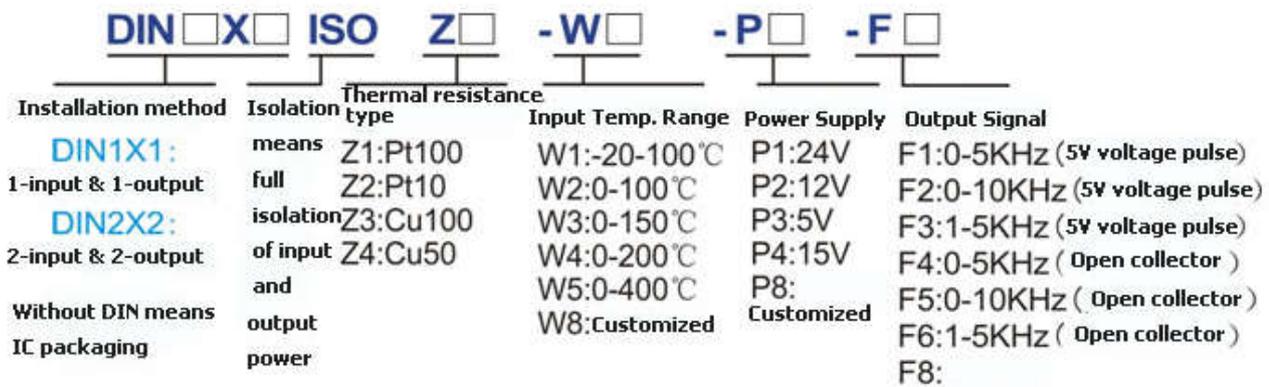
Product maximum rating (Operate in the maximum rated environment for long-term which will be effects the service life of the product. Exceeding the maximum value may cause irreparable damage.)

Continuous 3000VDC/rms	Isolation	Voltage
Power(The maximum range of power supply voltage input)		±25%/VD
Junction Temperature +85 °C		- 40 ~
Storage Temperature		+125°C
Lead Temperature (The Highest temperature of installation soldering < 10S)		+300°C

General parameters

Accuracy, linearity error level----0.2grade (Relative temperature)	Backlash ----- <0.5%
Working temperature ----- -40 ~ +85℃	Isolation ----- Signal input / output Two isolation
Working humidity -----10 ~ 90% (No condensation)	Response time ----- ≤100mS
storage temperature ----- -45 ~ +105℃	Pressure resistance --3KV(60HZ / S), Leakage current <1mA
Storage humidity -----10 ~ 95% (No condensation)	Withstand voltage -----3KV, 1.2/50us(Peak)
Auxiliary power supply----- 5V/12V/15V/24V DC Single power supply	Insulation resistance ----- ≥100MΩ

Model number and definition



Product selection example:

Example 1: Input: Pt100, temperature range -20-100 °C; output: 0-5KHz (5V voltage pulse); Auxiliary power supply: 24V; IC package

Product model: ISO Z1-W1-P1-F1

Example 2: Input: Cu50, temperature range 0-100 °C; output: 0-5KHz (5V voltage pulse); auxiliary power supply: 12V; IC package

Product model: ISO Z4-W2-P2-F1

Example 3: Input: Pt100, temperature range 0-150 °C; Output: 0-10KHz (5V voltage pulse); Auxiliary power supply: 24V. 1-input & 1-output, rail-mounted packaging

Product model: DIN 1X1 ISO Z1-W3-P1-F2

Example 4: Input: Pt100, temperature range 0-200 °C; output: 0-10KHz (open collector); auxiliary power supply: 5V; IC package

Product model: ISO Z1-W4-P3-F5

Example 5: Input: Pt100, temperature range 0-150 °C; Output: 0-5 KHz (collector open circuit); Auxiliary power supply: 24V. 2-input&2-output rail-mounted packaging

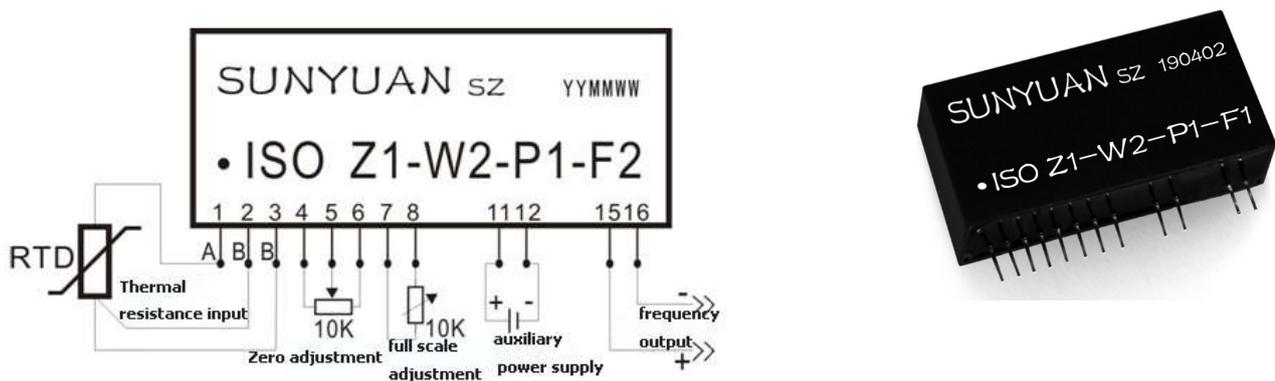
Product model: DIN 2X2 ISO Z1-W3-P1-F4

Technical Parameters

parameter name	Test Conditions	Min	Typical	Max	Unit
Isolation voltage	1min	1500	3000		VDC
Nonlinearity (for temperature)			0.2	0.5	%FSR

Signal output	Voltage pulse		3.3	5	24	V
	Open collector	Resistive load <100mA	5V/2K	24V/15K	30V/20K	Ω
Response time				100		mS
Voltage pulse	High level		3.3	5	24	V
	Low level		0		0.5	V
Output temperature drift				100		ppm/°C
Auxiliary power supply	Voltage	Customized	3.3	24	30	VDC
	Current	VD=24V		30		mA
Auxiliary power consumption			0.8	1	1.5	W
Working temperature			-40		85	°C
Storage temperature			-55		125	°C

Pin function description



Thermal resistance Input A end	Thermal resistance Input B end	Thermal resistance Input B end	Zero point Adjustment 1	Zero point Adjustment 2	Zero point Adjustment 3	Full scale adjustment 1	Full scale adjustment 2	Empty foot	Auxiliary power positive terminal	Auxiliary power supply negative	Empty foot	frequency output Positive	frequency output negative
A	B	B	ZA1	ZA2	ZA3	FB1	FB2	NC	VD+	GND	NC	Fo+	Fo-
1	2	3	4	5	6	7	8	9,10	11	12	13,14	15	16

Remarks: 1. When inputting two-wire thermal resistance, short-circuit the 2nd and 3rd pins (the thermal resistance input B terminal); when inputting the 4-wire thermal resistance, short-circuit the 1 pin and any one of the thermal resistance A terminals.

2. Thermal resistance disconnection detection: a. Output maximum value: Wire disconnection connected to 1 or 3 feet; b. Output minimum value: Wire disconnection connected to 2 feet.

Product calibration method

Calibration equipment: one resistor box with a precision of 0.01 ohm, one DC power supply, one frequency meter or one with a frequency measurement function of more than 4 and a half multimeters.

Calibration steps:

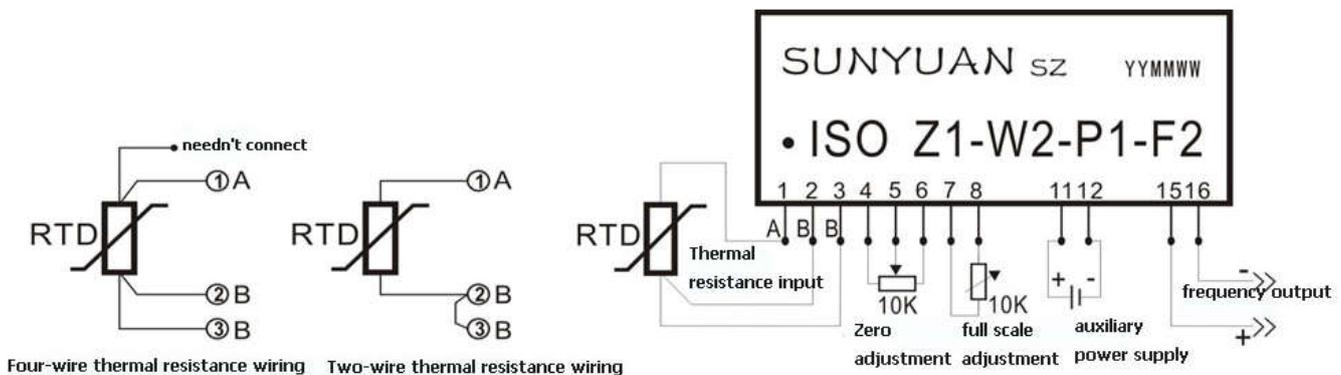
1. Connect the product according to the application diagram, or install the product on the designed circuit

board.

2. Connect the power supply according to the value of the auxiliary power supply; install the adjustment potentiometer; the output is connected to the frequency meter or multimeter.
3. According to the input temperature range, check the index table to obtain the corresponding resistance value range $R_{low} \sim R_{high}$.
4. Turn on the power and turn it on for 15 minutes.
5. Adjust the resistance of the resistor box to the value equal to R_{low} , and adjust the zero potentiometer so that the output corresponds to the corresponding output value of zero point (for example, 1KHz).
6. Adjust the resistance of the resistor box to a value equal to R_{high} , and adjust the the amplitude potentiometer so that the output is the corresponding output value of full scale (for example, 5KHz).
7. Repeat steps 5 and 6 several times to improve the output accuracy.
8. Calibration is complete.

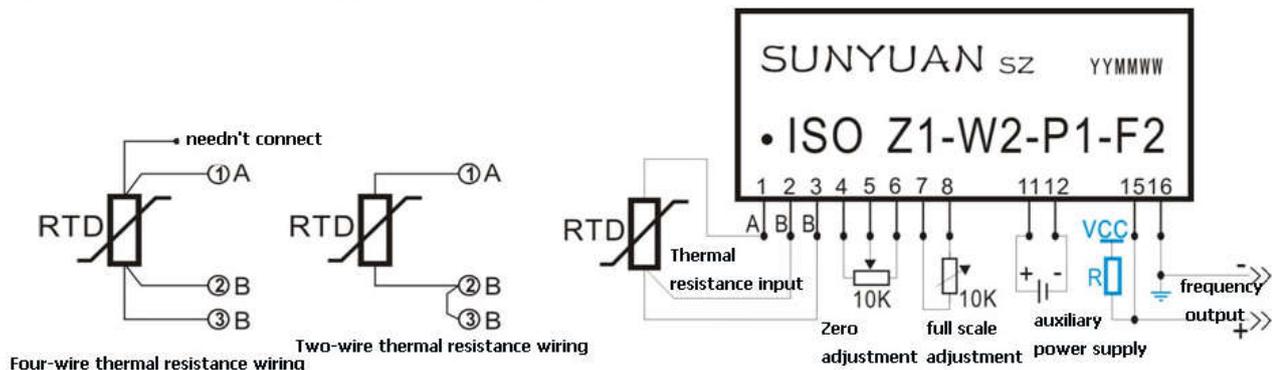
Typical application

Application 1: Typical application of voltage pulse output



Typical application diagram of voltage pulse output (fixed voltage pulse output)

Application 2: Typical application of open collector output



Typical application diagram of open collector output (plus pull voltage resistor)

shape and PCB layout reference size (standard SIP16 pin)

