

## PR231 Portable Multi-function Temperature Calibrator



The PR231 series products have excellent performance indicators, numerous practical functions and powerful human-interface. The series includes two levels of accuracy, 0.01% and 0.02%. The measure and source are completely isolated, in addition to the general functions of a two-channel calibrator, it also has the measurement function of  $\rho$  value and standard temperature. The enhanced type also features a temperature difference test and a precision temperature control function. It is compact in design, portable, and suitable for on-site and laboratory applications, making it the first choice for temperature calibration.

### ● Products Features

#### 1. Temperature difference measurement with accuracy of 0.003 °C

PR231A calibrator measures the temperature difference between two points in space without other instruments. When the function is used, the four terminals of the source function be used as measurement terminals and the process of the temperature difference data acquisition can be completed within 0.4 Seconds, which effectively improves the accuracy of the measurement. The stability can also be calculated in real time during the test



#### 2. Standard temperature measurement

Different from ordinary TC and RTD measurement, the standard temperature measurement may use the certificate value for temperature traceability. The input signals include: STC -> S type, R type, B type, T type. SPRT->  $R_{tp} = 25\Omega$  or  $R_{tp} = 100\Omega$ .



#### 3. Reference Junction Compensation

The reference junction compensation methods of the PR231 series calibrator are very flexible and three methods are available, namely internal, external, and customized. The external reference junction adopts Grade A Pt100, and can input the certificate value for the reference junction data correction. When PR231 series calibrator is combined with PR1501 temperature equalization compensation module, a reference junction compensation error of less than 0.07°C can be obtained.



## 4. Precision temperature control function

Using the precision temperature control function, temperature closed-loop control of the constant temperature equipment can be realized instead of the high-precision PID controller. In the case that the constant temperature equipment and grid voltage are satisfactory to the conditions, the temperature fluctuation of the equipment can be better than 0.02°C/10min (thermostatic bath).

## 5. p value measurement

The PR231 series calibrator can measure the duty factor of the periodic square signal and can be used to verify and calibrate the PID parameters of various digital temperature indicating regulators for time proportional output, and meet the requirements of JJG 617-1996 Verification Regulation of Digital Temperature Indicators and Controllers.

## 6. Thermal calculator

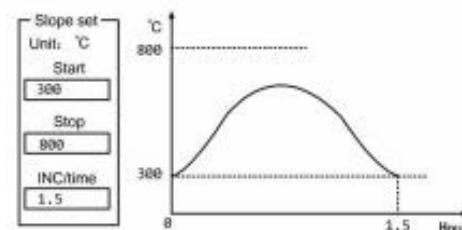
It is used to achieve various conversions between electric and temperature. The conversion support a variety of TCs, RTDs and thermistors.

## 7. Value Settings

The PR231 series calibrator has the most flexible and convenient output value setting method. It is possible to directly set the output value through the numeric keypad, or to increase the increment setting by pressing the direction key. In addition, the device has an editable phase step or slope value setting method.

## 8. Sinusoidal signal output function

The verification/calibration of some process loggers, especially mechanical recorders, usually involves the operation test. In this case, the user can use the device's sinusoidal signal output function to provide signals for the verified instrument.



The verification/calibration of some process recorders (especially mechanical recorders) usually involves the operation of the test. At this time, the device's sinusoidal signal output function can be used to signal the meter.

## 9. Data logging function

The logging function saves measurement and output data. PR231 series calibrator has powerful record management functions. Up to 32 device numbers can be created. Each device number has 16 logging pages. Each logging page contains four kinds of basic information, namely time, measured value, output value and custom value. Basic information. Users can perform device processing, record deletion, etc. according to their needs.

## ● PR231 series model selection table

Item	PR231A-1	PR231A-2	PR231B-1	PR231B-2
Enhancement model	●	●		
Basic model			●	●
0.01 grade	●		●	
0.02 grade		●		●

## ● Basic Parameters

Weight	990g	charging source	100 ~ 240V AC, 50 ~ 60Hz
Dimension	225mm*130mm*53mm	Working temperature	-10°C ~ 50°C
Cell type	7.4V 4400mAh, Rechargeable lithium battery	Working time	≥20 hours ( 24V power off )
Preheating time	10 minutes after preheating	Humidity	0 ~ 80% , Non condensing
Charging time	5 hours	Calibration period	2 years

## ● Performance Index

### 1. Basic parameters of measurement:

Function	Range	Measurement range	Resolution	0.01 accuracy	0.02 accuracy	Remarks
Voltage	100mV	-5mV ~ 120mV	0.1uV	0.005%RD+5uV	0.015%RD+5uV	Input impedance ≥80mΩ
	1V	-50mV ~ 1.2V	1uV	0.005%RD+0.005%FS	0.015%RD+0.005%FS	Input impedance ≥1mΩ
	10V	-0.5V ~ 12V	10uV			
	50V	-0.5V ~ 50V	0.1mV			
Current	50mA	-5mA ~ 50 mA	0.1uA	0.005%RD+0.005%FS	0.015%RD+0.005%FS	Internal resistance =10Ω
Ohm	50Ω	0Ω ~ 50Ω	0.1mΩ	0.005%RD+5mΩ	0.015%RD+5mΩ	Output 1mA current
	500Ω	0Ω ~ 500Ω	1mΩ	0.005%RD+0.005%FS	0.015%RD+0.005%FS	Output 0.1mA current
	5kΩ	0kΩ ~ 5kΩ	10mΩ			
Thermal couple	S、R、B、K、N、J、E、T、EA2、Wre3-25、Wre5-26		0.1℃	/		According to ITS-90 scale
Cold end compensation	Internal	-10℃ ~ 60℃	0.01℃	0.5℃	0.5℃	
	External			0.1℃	0.1℃	
Thermal resistance	Pt10、Pt100、Pt200、Cu50、Cu100、BA1、BA2、JPt100、Pt500、Pt1000		0.01℃	/		
Standard temperature	S、R、B、T、SPt25、SPt100		0.01℃	/		Need to enter the correction value

p-value	50S	0.001% ~ 99.999%	0.001%	0.005%	0.005%	Input pulse width amplitude range : 1V ~ 50V
Frequency	10Hz	0.001Hz ~ 12Hz	0.001Hz	0.01%FS	0.01%FS	
	1kHz	0.00001kHz~ 1.2 kHz	0.01Hz			
	100kHz	0.01kHz ~ 120 kHz	10Hz	0.1%FS	0.1%FS	
Temperature difference	S、R、B、K、N、J、E、T		0.01℃	/		Need to enter the correction value
	SPt25、SPt100		0.001℃			

## 2. Basic parameters of the output function:

Function	Range	Measurement range	Resolution	0.01 accuracy	0.02 accuracy	Remarks
Voltage	100mV	-20mV ~ 120mV	1uV	0.005%RD+5 uV	0.015%RD +5uV	Maximum load current =2.5mA
	1V	-0.2mV ~ 1.2V	10uV	0.005%RD+0 .005%FS	0.015%RD +0.005%FS	
	10V	-2V ~ 12V	0.1mV			
Current	30mA	-5mA ~ 30 mA	1uA	0.005%RD+0 .005%FS	0.015%RD +0.005%FS	Maximum load voltage =24V
Ohm	50Ω	0Ω ~ 50Ω	0.1mΩ	/		According to ITS-90 scale
	500Ω	0Ω ~ 500Ω	1mΩ			
	5kΩ	0kΩ ~ 5kΩ	10mΩ			
Thermal couple	S、R、B、K、N、J、E、T、EA2、Wre3-25、Wre5-26		0.1℃	/		
Thermal resistance	Pt10、Pt100、Pt200、Cu50、Cu100、BA1、BA2、JPt100、Pt500、Pt1000		0.01℃	/		
Frequency / Pulse	10Hz	0.001Hz ~ 12 Hz	0.001Hz	0.01%FS	0.01%FS	Maximum load current =2.5mA
	1kHz	0.00001kHz ~ 1.2 kHz	0.01Hz			
	100kHz	0.01kHz ~ 120 kHz	10Hz	0.1%FS	0.1%FS	
Precision temperature control	S、R、B、K、N、J、E、T		0.01℃	/		
	Pt100					
24V output	Maximum voltage error: 0.3V    Ripple noise : 35mVp-p(20MHz bandwidth) Maximum load current : 70mA    Load regulation: 0.5% ( 10% -100% load change )					

## • DETAILS INTRODUCE

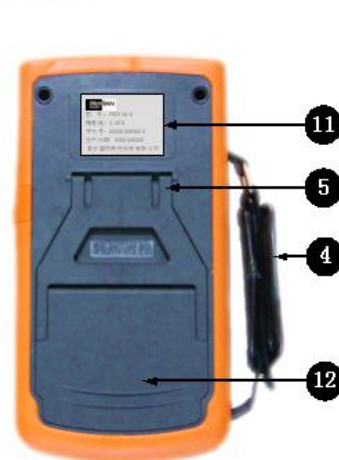
Front panel



Right panel



Rear panel



1. Measuring function terminal area (withstand 100V DC voltage input error)
  2. Output function terminal area(withstand 36V DC voltage input error)
  3. Dust cover
  4. Side band(length adjustable )
  5. Holder
  6. External Pt100 Reference point sensor interface
  7. USB2.0 communication interface
  8. Multi-function port (With RS232 communication, USB communication, isolated 24V voltage output, precision temperature control signal output, pressure calibration, and other functions)
  9. Reset
  10. Supply hub ( Connect the external AC power adapter )
  11. Equipment nameplate
  12. Battery
  - 13 . Protective tube
  - 14 . Screen contrast adjusting knob
  - 15 . Battery port
- a . Adjust length here  
b . Unfold jacket toward this direction  
c . Holder unfold direction