PANRAN

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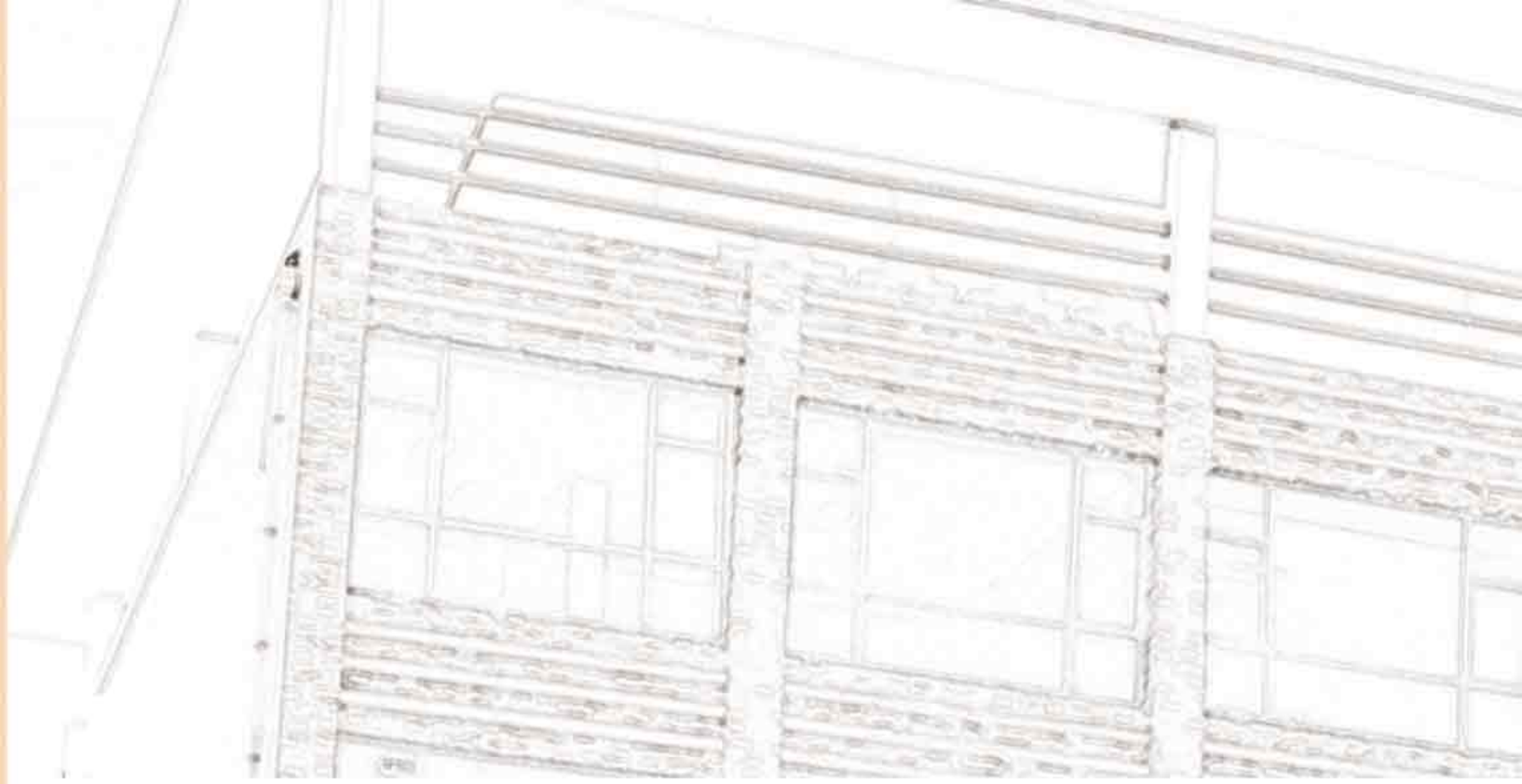
PRODUCT CATALOGUE

2025.07

SINCE 2003



Brand Development

PANRAN was founded in 2003, tracing its origins to a state-owned enterprise under the Bureau of Coal (established in 1993). Building on profound industry expertise and refined through both state-owned enterprise reform and independent innovation, it has grown into a backbone enterprise in China's thermal metrology and calibration instrumentation manufacturing sector.

Product Applications

PANRAN specializes in thermal metrology and calibration instruments as well as integrated automated test systems, leading the industry in hardware/software R&D, system integration, and precision manufacturing. Its products are widely used across high-end global industrial chains, including global metrology and calibration institutes, aerospace, military manufacturing, high-speed rail, energy, petrochemicals, metallurgy, and automotive manufacturing. PANRAN delivers precise and reliable metrological support for China’ s national key projects, including the Long March series of launch vehicles, military aircraft, nuclear submarines, and high-speed railways.

Development Philosophy

Headquartered is located at the foot of Mount Tai (revered as the foremost of China's Five Great Mountains), PANRAN has established branches in Xi'an (R&D Sub-center) and Changsha (International Trade), forming an highly efficient collaborative R&D and service network. Rooted in China and reaching out to the global market, with products exported across Asia, Europe, South America, Africa, and beyond.

Adhering to the development philosophy of "Survival by quality, develop by innovation; start with customer needs, end with customer satisfaction," PANRAN is committed to becoming a global leader in thermal metrology technology. and contributing its wisdom to the development of worldwide instrumentation manufacturing industry.

Qualifications Standards

Company Qualifications

◎ Member of the National Temperature Metrology Technical Committee
◎ Member of the Temperature Committee of China Metrology and Testing Society
◎ Member of the Thermometric Engineering Professional Technical Committee of Central-South National Metrology Center
◎ Member of the Henan Province Thermal and Meteorological Metrology Technical Committee
◎ Member of the Professional Metrology Technical Committee of Xinjiang Uygur Autonomous Region
◎ Governing Unit of Shandong Metrology and Testing Society
◎ Correspondent Member of Shandong Provincial Pressure Metrology Technical Committee
◎ National High-Tech Enterprise
◎ Provincial-Level "Specialized, Refined, Unique, and Innovative" Enterprise
◎ Taian Intelligent Thermometric Metrology Industrial Technology Research Institute
◎ Taian Municipal Enterprise Technology Center
◎ Taian Industrial Enterprise "One Enterprise, One Technology" R&D Center

Up to now, PANRAN has 95 patents and software copyrights, including 7 invention patents and more than 20 utility model and appearance patents.

Drafting of National Metrological Technical Regulations, Specifications, etc.

◎ JJF 1098-2003 Calibration Specification for Auto-measuring System of Thermocouples and Resistance Thermometers
◎ JJF 1184-2024 Testing Specification for Temperature Uniformity in Thermocouple Calibration Furnaces
◎ JJF 1171-2024 Calibration Specification for Temperature and Humidity Itinerant Detecting Instruments
◎ JJF 1991-2022 Calibration Specification for Short Base Metal Thermocouples
◎ JJF 1909-2021 Calibration Specification for Filled System Thermometers
◎ JJF 2019-2022 Measurement Specification for Temperature Performance of Liquid Constant Temperature Testing Equipment
◎ JJF 2058-2023 Calibration Specification for Environment Parameters of Constant Temperature and Humidity Laboratories
◎ JJF 2188—2025 Calibration Specification for Ice Point Thermostats
◎ JJF(BC) 198-2023 Specification for calibration of concrete freeze-thaw resistance test equipment
◎ QX/T 16-2020 Calibration Chambers for Temperature and Humidity Instrument
◎ T/CSMT-YB 006-2023 Precision Digital Thermometer Performance Testing and Evaluation Methods
◎ T/CMA ZK 099-2024 Guidelines for the Construction of Intelligent Metrology Laboratory

PANRAN®

contents

℃ Temperature Product

Pa Pressure Product

ZRJ-23 Series
Intelligent Thermal Instrument Verification System

new!

ZRJ series intelligent thermal instrument verification system integrates software, hardware, engineering and service. After more than 30 years of market tests, it has long been at the forefront of the industry in terms of software and hardware level, product quality, after-sales service, and market ownership, and has been widely accepted by customers. It has played an important role in the field of temperature measurement for a long time.

The new-generation ZRJ-23 series intelligent thermal instrument verification system is the latest member of the ZRJ series products, which greatly simplifies the structure of the traditional thermocouple and thermal resistance verification systems. The PR160 reference standard scanner with excellent electrical performance is used as the the core, which can be expanded up to 80 sub-channels, can be flexibly combined with various temperature sources to meet the verification/calibration requirements of various thermocouples, thermal resistances and temperature transmitters. It is not only suitable for new laboratories, but also very suitable for traditional temperature laboratory upgrading their equipment.

Applied Patented Technology:

ZL 2015 1 0534149.2
ZL 2016 1 0001918.7
ZL 2018 1 1642519.4

- ✓ A New Generation of Thermocouple, RTD Verification System
- ✓ Enhanced Standard Temperature Control
- ✓ Composite Switch Structure
- ✓ Accuracy Better than 40 ppm

Typical Application

- ■ Calibrate Standard Thermocouples using the Homonymous Pole Method or Dual-polarity Method
- ■ Verification/Calibration of Base Metal Thermocouples
- ■ Verification/Calibration of RTD of Various Grades
- ■ Calibrating the Integral Temperature Transmitter
- ■ Calibrating Thermocouple Wires
- ■ Calibrating HART Type Temperature Transmitters
- ■ Mixed Verification/Calibration of Temperature Sensors

Mixed Verification/Calibration of Thermocouple & RTD

Dual Furnace Thermocouple Verification/Calibration

Group Furnace Thermocouple Verification/Calibration

I.Brand New Hardware Design

The new-generation ZRJ-23 system is the crystallization of years of technical development. Compared with the traditional thermocouple/thermal resistance verification system, its scanner structure, bus topology, electrical measurement standard and other key components are all newly designed, rich in functions, novel in structure, and highly expandable.

1.Hardware Technical Features

■ Compact Structure

The core control unit integrates a scanner, a thermometer, and a terminal block, and is equipped with a constant temperature chamber for the thermometer, so there is no need to set up a constant temperature room for the electrical standard. Compared with the traditional thermocouple and RTD verification system, it has fewer leads, a clearer structure, and saves space.

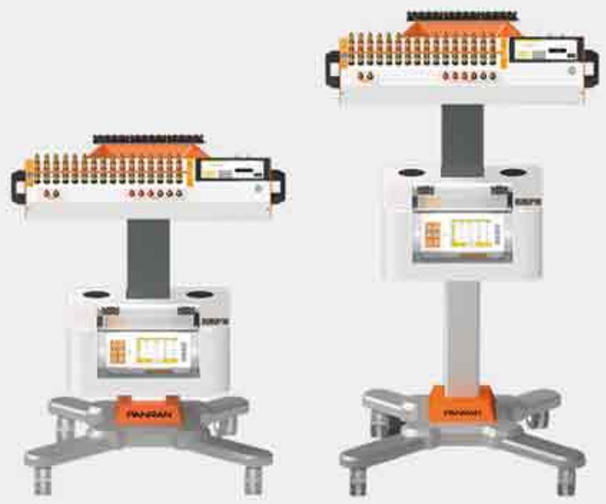
■ Composite Scan Switch

Featuring both high performance and versatile functions. The main scanning switch adopts a mechanical switch made of tellurium-copper plated with silver, which has extremely low parasitic potential and contact resistance. The function switch uses low-potential relays, allowing independent configuration of up to 10 switch combination states..

■ Enhanced Standard Temperature Control

The scanner integrates a dual-channel temperature control unit with voltage compensation function. It can use the temperature value of the standard and the tested channel to perform hybrid constant temperature control through the decoupling algorithm. Compared with the traditional temperature control method, it can greatly improve the temperature control accuracy and effectively shorten the waiting time for thermal equilibrium at constant temperature.

▲ Composite scan switch



▲ Core control unit

■ Supports Homonymous Pole Method to Verify Thermocouples

Through the logical coordination between the PR160 series scanners and the PR293A thermometers, the homonymous pole method can be used to verify noble metal thermocouples and standard thermocouples.

■ Professional & Flexible Reference Junction Options

Optional options include ice point compensation, external reference junction, mini thermocouple plug, or intelligent reference junction. The intelligent reference junction is built with a temperature sensor featuring correction values and made of tellurium-copper. It can be split into two independent clamps, whose unique jaw design allows easy clamping of conventional wires and nuts, making the handling of the reference junction no longer cumbersome.

■ Symmetric On-Resistance Characteristics

Enables batch calibration of multiple three-wire secondary instruments without additional wiring conversions.

■ Professional Transmitter Calibration Mode

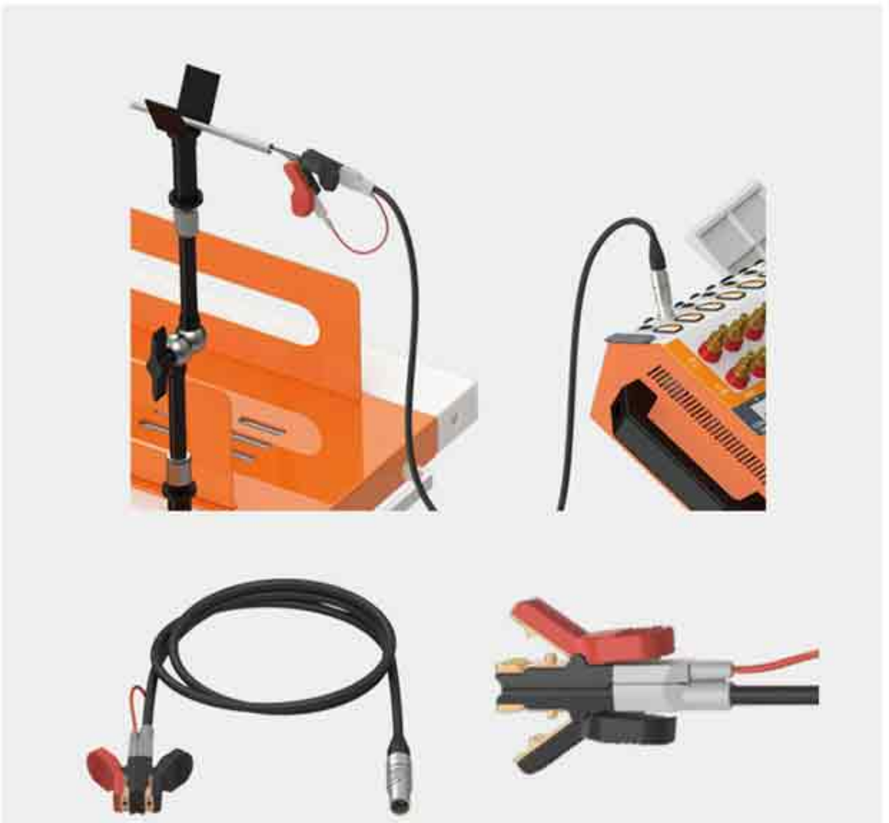
Built-in 24V output, supports batch calibration of voltage-type or current-type integrated temperature transmitters. Featuring a unique design for current-mode transmitters, the patrol inspection of the current signal can be carried out without disconnecting the current loop.

■ Press-Type Multifunctional Tellurium -Copper Terminal

Using tellurium-copper gold plating process, it has excellent electrical connection performance and provides a variety of wire connection methods.

■ Rich Temperature Measurement Functions

The electrical measuring standard adopts PR291 and PR293 series thermometers, which have rich temperature measurement functions, 40ppm electrical measurement accuracy, and 2 or 5 measurement channels.



▲ Schematic diagram of the intelligent reference junction

▲ Constant temperature chamber for thermometer

■ Constant Temperature Chamber for Thermometer with Constant Temperature Heating and Cooling Capability

To meet the requirements of various regulations and standards for the ambient temperature of electrical measurement standards, a constant temperature chamber for thermometer is integrated. It features constant temperature heating and cooling capabilities, and can provide a stable 23°C working environment for the thermometer in an external environment of -10~30°C.

2.Scanner Function

Scanner Function	
■ Channel and channel function settings ■ Multiple selection of temperature control sensor graduation ■ Temperature stability judgment ■ Setting and display of temperature control parameters such as PV and SV ■ Temperature control parameter self-tuning function ■ Multi-group temperature control parameters ■ Real-time temperature and power curve display ■ Reference CJ temperature value display ■ Self-defined temperature fluctuation calculation ■ Self-defined alarm setting on temperature upper and lower limits ■ Settable temperature unit of °C, °F, K	■ Dual temperature control PWM output or PV digital output ■ 7 inch industrial grade touch screen ■ DC24V output ■ CAN Bus ■ Optional “WIFI” ■ Optional “HART” ■ Electric lift for scanner ■ Wire harness organizer

3.Channel Function

Scanner Channel Function	
■ Thermocouple, voltage ■ Two-wire resistance, three-wire resistance, four-wire resistance ■ Three-wire resistance (including one internal lead) ■ Three-wire resistance (including two internal leads) ■ Excitation current commutation	■ Voltage-output transmitter (with built-in 24V) ■ Voltage-output transmitter (without 24V) ■ Current-output transmitter (with built-in 24V) ■ Current-output transmitter (without 24V)

II. Excellent Software Platform

The supporting software for the ZRJ series products has obvious comprehensive advantages. It is not merely a tool software that can perform verification or calibration in accordance with existing regulations and standards, but a software platform composed of multiple powerful specialized software for temperature metrology. Its professionalism, ease of use, and operability have been recognized by numerous customers in the industry, and it can provide great convenience for customers' daily verification/calibration work.

1.Software Technical Features

■ Professional Uncertainty Analysis Function

The evaluation software can automatically calculate the uncertainty values, degrees of freedom and expanded uncertainty of each standard, and generate a summary table of uncertainty components as well as an uncertainty evaluation and analysis report. After the verification is completed, the actual expanded uncertainty of the verification result can be automatically calculated, and a summary table of the uncertainty components of each verification point can be automatically drawn.

■ New Constant Temperature Assessment Algorithm

The new algorithm takes the uncertainty analysis as a reference, according to the repeatability ratio of the calibrated thermocouple' s reasonable measurement data, the repeatability standard deviation that the calculation system should achieve is used as the basis for judging the timing of data collection, making it highly suitable for cases where the thermocouples are relatively thick or there are multiple calibrated thermocouples.

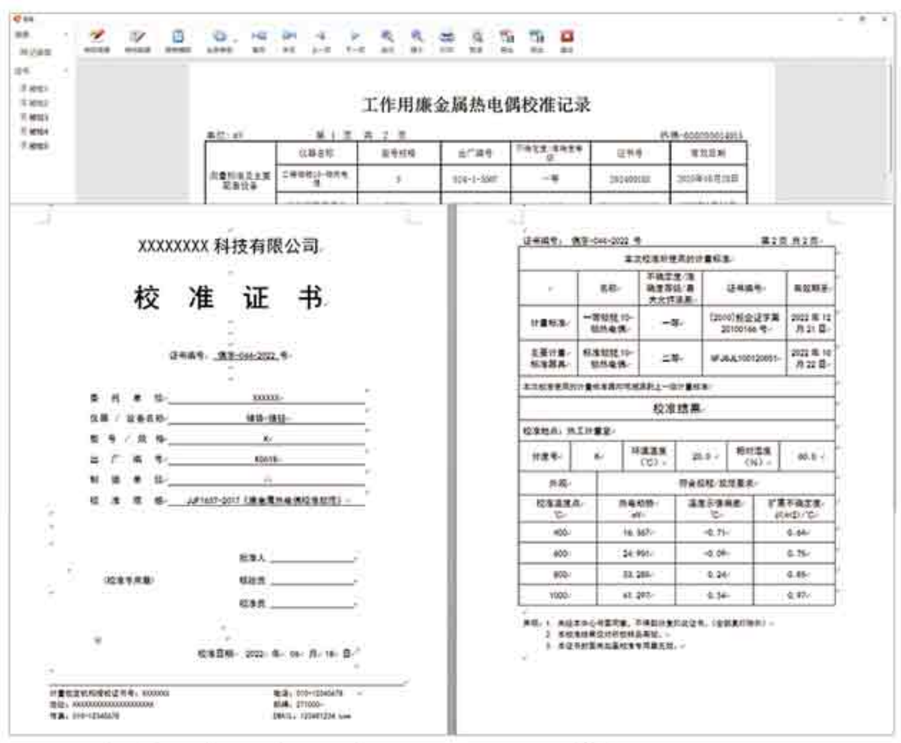
■ Comprehensive Data Analysis Function

During the verification or calibration process, the system will automatically perform statistics and analysis on real-time data and provide contents including temperature deviation, measurement repeatability, fluctuation level, external interference, and adaptability of adjustment parameters.

■ Smart Cloud Metrology

The Panran Smart Metrology APP enables remote operation or status checks of current tasks. Operational data is uploaded to the cloud server in real time, and users can conduct visual monitoring of the site via the intelligent camera. Additionally, the APP integrates a variety of tool software to facilitate operations such as temperature conversion and regulation specification queries for users.

▲Working thermocouple verification software



▲ Professional report, certificate output

■ Professional and Rich Report Output Function

The software can automatically generate verification records in Chinese and English, support digital signatures, and can provide users with certificates in various formats such as verification, calibration, and customization.

■ Mixed Verification Function

Based on multi-channel nanovolt and microhm thermometer and scanning switch unit, the software can realize multi-furnace thermocouple group control and mixed verification/calibration tasks of thermocouple and RTD.

2.Verification\Calibration Function List

Verification\Calibration Function	
■ First-class, second-class standard thermocouples ■ Working base and noble metal thermocouples ■ Two, three, four wire industrial thermal resistances ■ Thermocouple Wires (KP, KN, NP, NN, JP, etc.) ■ Integrated temperature transmitters	■ Standard mercury thermometers ■ Working liquid-in-glass thermometers ■ Bimetallic thermometers ■ Pressure thermometers

3.Other Software Functions

Other Software Functions	
■ Implement more than 20 regulations and standards ■ Supports various types of thermocouples, thermal resistance calibration at any temperature point, repeatability testing, comparison testing ■ A variety of working modes, support group and mixed verification\calibration ■ Different standard devices can be used between each group when the thermal resistance is verified for each temperature point or group ■ Calibration of platinum resistance temperature sensor in weather station ■ Customized platinum resistance level verification ■ Customized cyclic collection times, and handling method for unqualified results ■ Automatic test of temperature field of calibration furnace and constant temperature bath ■ Compensation wire calibration function	■ Support continuous verification/calibration after power failure ■ Chinese and English reports, digital signatures, exporting EXCEL format verification records ■ Support user-defined certificate, import WORD format certificate template ■ Supports output of records and certificates in PDF format ■ Support loading historical be-calibrated information ■ Open software interface for easy access to ERP system ■ Self-diagnostics: channel check, calibration point measurement reminder ■ Double backup of historical records for data security ■ Database management functions

III.Technical Parameters

1.Metrological Technical Parameters Related to the Scanner

Items	Parameters	Remarks
Parasitic EMF of each channel of the system and the difference of Parasitic EMF of each channel	⩽0.4μV	
Inter-channel data acquisition difference	⩽0.5μV 0.5mΩ	
Measurement repeatability	⩽1.0μV 3.0mΩ	Using the PR293 Series Thermometer

2.Scanner General Parameters

Item \ Model	PR160A	PR160B	Remarks
Numbers of Channels	16	12	
Standard Temperature Control Circuit	2 sets	1 sets	
Dimension	650×200×120	550×200×120	L×W×H(mm)
Weight	9kg	7.5kg	
Display Screen	7.0-inch industrial touch screen,resolution 800×480 pixels		
Working Environment	Operating temperature range: (-10～50)°C, non-condensing		
Power Supply	220VAC±10%，50Hz/60Hz		
Communication	RS232		

3.Standard Temperature Control Technical Parameters

Item	Parameters	Remarks
Supported sensor types	S, R, B, N, T	
Temperature Control Resolution	0.01°C	
Temperature Control Accuracy	0.5°C, @≤500°C 0.1%RD, @＞500°C	Type N thermocouple, excluding sensor and reference junction compensation errors
Temperature Stability	0.3°C/10min	10min maximum difference, the controlled object is PR320 or PR325

IV.Typical Configuration

ZRJ-23 series intelligent thermal instrument verification system has excellent equipment compatibility and extensibility, and can support various types of electrical measuring instruments for RS232, GPIB, RS485, and CAN bus communication by adding drivers.

Core Configuration

Parameters/Model	ZRJ-23A	ZRJ-23B	ZRJ-23C	ZRJ-23D	ZRJ-23E	ZRJ-23F
Maximum Number of Calibrated Channels	11	15	30	45	60	75
PR160A Scanner		×1	×2	×3	×4	×5
PR160B Scanner	×1					
PR293A Thermometer	○	○	○	●	●	●
PR293B Thermometer	●	●	●			
Maximum Number of Calibration Furnaces Supported by the Standard Temperature Control Function	×1	×2	×4	×6	×8	×10
Manual Lifting Workbench	○	○	×1	×2	×3	×4
Electric Lifting Workbench	×1					
PR542 Constant Temperature Chamber for Thermometer	●					
Professional Software	●					

Note 1: When using dual-channel standard temperature control, the number of calibrated channels of each group of scanners should be subtracted by 1 channel, and this channel will be used for the standard temperature control function.
Note 2: The maximum number of supported calibration furnaces refers to the number of calibration furnaces that can be independently operated when standard temperature control is used. The calibration furnaces with their own temperature control are not subject to this restriction.
Note 3: When using homonymous pole method to verify the standard thermocouple, the PR293A thermometer must be selected.
Note 4: The above configuration is the recommended configuration and can be adjusted according to the actual usage.
Note 5: ○ Optional supporting equipment; ● Recommended supporting equipment.

ZRJ-03 Series
Intelligent Thermal Instrument Verification System

ZRJ series intelligent thermal instrument verification system is based on powerful software and hardware platforms, which can be configured into different intelligent temperature metrology standard devices and their combinations according to requirements, and carry out the automatic verification/calibration work of various primary and secondary contact temperature measuring instruments.

ZRJ-03 Series

ZRJ-05 Series

I. Feature

1.Minimized Uncertainty

Minimizing the uncertainty of the test devices at reasonable cost and improving the reliability of the measurement results is an eternal pursuit of PANRAN.

■ Low Potential Scanning Switch

Through the special low thermal potential switch, terminal, lead wire and carefully assembled in strict accordance with the process specifications, it is ensured that the overall parasitic potential of the low potential scanning switch does not exceed 0.2μV, and ensure good consistency, long-term stability and reliability between channels. The reversing switch connected in series can eliminate the influence of stray parasitic potential on the measurement result during RTD measurement.

■ Dedicated Supporting Temperature Source and High-precision Constant Temperature Adjustment Scheme

The temperature field and temperature stability of the temperature source in the thermocouple verification are the largest sources of uncertainty in the thermocouple verification device except the main standard. Panran Measurement and Control minimizes the measurement uncertainty component introduced by the temperature field by using a series of temperature sources independently developed, including single-zone and multi-zone series thermocouple verification furnaces with wide temperature fields, heat pipe constant temperature baths, and zero-point dry-well, etc.

ZRJ-03 series products can use standard sensors to control the temperature, use the system's own matching standard thermocouples that have been corrected and traced to the source of the certificate, through the professionally optimized constant temperature adjustment software algorithm, to perform fine constant temperature adjustment on the thermocouple calibration furnace to achieve minimization, linearization and visualization of furnace temperature fluctuations in calibration furnaces.The product also supports optional intelligent PID regulator temperature control mode.

2.Professional Uncertainty Evaluation And Analysis Function

Provide professional uncertainty evaluation and analysis software: automatically calculate the standard uncertainty values, degrees of freedom (thermal resistance) and expanded uncertainty; generate uncertainty component summary table and professional uncertainty evaluation report. After the verification of working thermocouple and industrial thermal resistance is completed, the actual expanded uncertainty data of the verification result can be automatically calculated, and a summary table of uncertainty components can be output.

▲ Professional uncertainty evaluation & analysis software

3.Software / Hardware Protection Function

The over-temperature protection function uses the timer trigger principle inside the scanner to ensure that when the scanner detects an abnormal communication with the upper computer, it stops sending drive pulses to the SSR, thereby stopping the power supply to the thermocouple verification furnace to avoid over-temperature damage to the calibration furnace. All types of products equipped with intelligent instrument for temperature control are protected by the over-temperature protection function of intelligent instrument.

In addition, the system software functions also include many humanized preventive protection measures, such as short circuit, open circuit, reverse connection of digital meter readout, abnormal communication of digital meter readout, and over-temperature alarm of calibration furnace.

4.Software Platform With Outstanding Functions

The software function of ZRJ series verification system has unparalleled comprehensive advantages. It is not only a tool software that can perform verification or calibration according to the existing regulations and specifications, but also a software platform composed of multiple powerful temperature measurement software. Its professionalism, ease of use and operability have been recognized by many customers in the industry, and it can provide great convenience for customers' daily verification/calibration work.

■ Professional Data Analysis Function

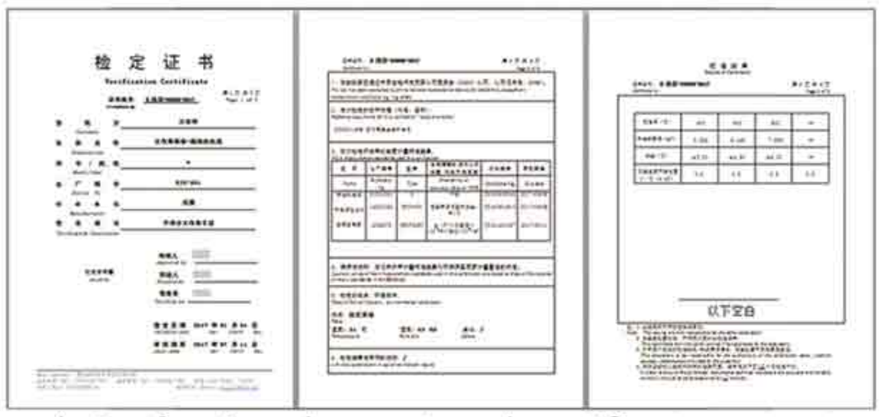
Based on a powerful software platform, the ZRJ system can statistic and analysis the data in the verification process and provide data analysis reports, including temperature deviation and fluctuation level, invisible faults in the power supply lines of constant temperature equipment, electromagnetic interference, and dynamic/static adaptability of temperature adjustment parameters, measurement repeatability, device parasitic potential, measured thermal resistance parasitic potential, measurement result expansion uncertainty, etc. The data analysis results can help users to grasp the overall situation of the device operation in time, and make necessary adjustments in a timely manner to keep the system under control for a long time.

■ Innovative Constant Temperature Assessment Algorithm

On the basis of national regulations and specifications, ZRJ series products are innovatively guided by the idea of uncertainty analysis. The constant temperature assessment adds an optional assessment of indication error repeatability of the calibrated thermocouple for judging the timing of data collection. This assessment algorithm is very suitable for calibrating thermocouples in a calibration furnace with a temperature equalizing block, which can maximize the calibration efficiency on the premise of ensuring the quality of calibration data.

■ Professional and Rich Report Output Function

The software can automatically generate verification records in Chinese and English, support digital signatures, and can provide users with professional reports. Record forms and certificates in multiple formats such as "verification" or "calibration" can be selected. Verification certificate or calibration certificate can choose standard format or custom format. According to customer requirements, the record forms and original data of certificates can be exported to Excel.



▲ Professional report and certificate output

Contains a professional Word format certificate output program, users can quickly import existing Word format template files, and can customize the certificate output options, the number of custom templates, and the custom Word format template files; You can quickly output certificate files in various Word formats without modifying the source program.

■ Mixed and Grouped Verification

Through the Extended Scanner Module, ZRJ series products can realize the group control and group verification of thermocouples and thermal resistances, and can realize the mixed verification of base metal thermocouples in the same furnace. In addition, ZRJ series products can also realize the group verification of temperature measuring instruments that need to be verified in a liquid thermostatic bath, such as thermal resistance, low temperature thermocouple, low temperature integrated temperature transmitter, etc. Up to 10 groups can be processed in a batch, up to 100 pieces can be tested each batch, which greatly improves the work efficiency of the verification personnel.

■ Database Management Functions

ZRJ series products have a professional internal database, which can not only realize basic functions such as query and statistics, but also restore the verification record file through the database to view the verification process data.

■ Data Rounding and Traceability

Data processing strictly implements verification regulations and data rounding rules to ensure the traceability of verification/calibration results.

■ LIMS/ERP Management System Connection (To be Customized)

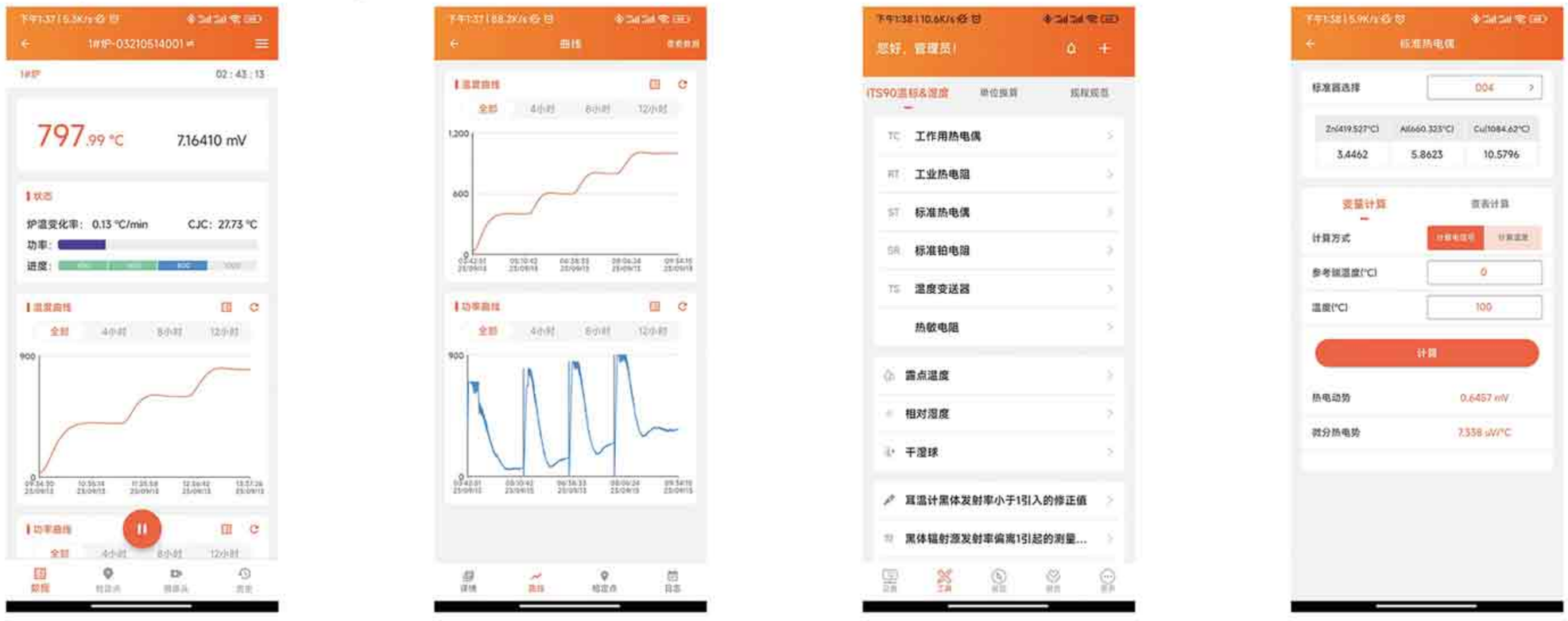
Using an open software interface, the verified data can be obtained through LIMS/ERP, and the result data will be automatically uploaded to the LIMS/ERP management system after the verification is completed.

■ Auxiliary Testing Functions

ZRJ series products can perform automatic repeatability test and comparison test according to "JJF 1098-2003 Calibration Specification for Auto-measuring System of Thermocouples and Resistance Thermometers". It can also automatically test the temperature field of various thermocouple calibration furnaces and liquid thermostatic bath.

5.Smart Metrology

The smart metrology APP can realize the remote start and stop of verification/calibration tasks and real-time monitoring of the running status, and the operation data can be uploaded to the cloud in real time, so that the measurement personnel can monitor the calibration process in real time without being on site. Verification/calibration history records and result data can be viewed at any time, and an optional smart camera can be equipped with real-time visual monitoring of the verification/calibration site. The establishment of a cloud data center, combined with special metrology equipment, provides customers with long-term data cloud storage, cloud computing and other services.



▲ The smart metrology APP interface

6.Free Thermal Calculation Tool

Panran Smart Metrology APP integrates more than 30 kinds of unit conversion tools such as ITS-90 temperature scale conversion, temperature, humidity, radiation, etc. in the tool module, and provides various online thermal engineering measurement knowledge, electronic version documents of regulations and specifications, and publicity materials. Provide a convenient and powerful thermal calculation assistant for the majority of users.

II. Product Functions

Verification/ Calibration Functions	Type	Grade	Remarks
Standard thermocouple	S, R, B	First Class, Second Class	/
Working noble metal thermocouple	S, R, Short S, Short R	Grade I, II	/
	B	Grade II, III	/
Working base metal thermocouple	K, N, J, E, T, EA-2, WRe325, WRe526	Grade 1, 2, 3	Sheathed thermocouples, assembled
Industrial resistance thermometer	Pt10, Pt100, Cu50, Cu100, PtX (x=500,1000....), CuX, BA1, BA2	Multiples or fractions of grades AA, A, B, C, B	Two-wire, three-wire, four-wire
Thermocouple wire	KP, KN, NP, NN, JPJN, EP, EN, TP, TN	/	/
Temperature transmitter	0-10mA, 4-20mA, 1-5V	/	With TCs and RTDs
Expansion thermometer	Standard mercury thermometers, working liquid-in-glass thermometers, bimetallic thermometers, pressure thermometers		

III. Metrology Parameter & Implementation or Referenced Regulations/Specifications

■ Metrology Parameter

Item	Parameters of ZRJ series	Parameters of regulations and specifications(standard thermocouple and class A industrial resistance thermometers)
The difference between the parasitic potential of the scanning switch and the parasitic potential of each channel	⩽0.2μV	⩽0.4μV
Data acquisition difference between channels	⩽0.5μV 1.0mΩ	⩽1.0μV 2.0mΩ
Measurement repeatability	⩽1.0μV 3.0mΩ	⩽1.5μV 12.0mΩ
Constant temperature performance of TC calibration	Constant temperature⩽0.5°C/6min Measurement⩽0.1°C/min	Constant temperature⩽0.5°C/6min Measurement⩽0.1°C/min
Constant temperature performance of RTD calibration	Constant temperature⩽0.01°C/10min Measurement⩽0.01°C/min	Constant temperature⩽0.04°C/10min Measurement⩽0.02°C/min
Processing results verification of measurement data	⩽0.1μV 0.1mΩ	⩽0.5μV0.4mΩ

■ Implemented Product Standards

The production and manufacturing process of ZRJ series products follow the enterprise standard Q/0900 TPR001-2020 "ZRJ Intelligent Thermal Instrument Verification System".

■ Executed and Cited Regulations, Specification, and Standards

Regulations & Specifications	Name	Regulations & Specifications	Name
JJG 75-2022	Verification Regulation of the Standard Platinum-10% Rhodium/Platinum Thermocouple	JJF 1637-2017	Calibration Specification for Base Metal Thermocouples
JJG 668-1997	Verification Regulation of the Working Platinum-10% Rhodium/Platinum and Platinum-13% Rhodium/ Platinum Thermocouple with Short Length	JJG 1991-2022	Calibration Specification for Short Base Metal Thermocouples
		JJG 141-2013	Verification Regulation of Working Noble Metal Thermocouples
JJG 368-2000	Verification Regulation of the Working Copper/ Copper-Nickel Thermocouple	JJG 130-2011	Verification Regulation of Liquid-in-Glass Thermometers for Working
JJF 1098-2003	Calibration Specification for Auto-measuring System of Thermocouples and Resistance Thermometers	GB/T 2614-2010	Nickel-Chromium/Nickel-Silicon thermocouple wires
JJF 1176-2024	Calibration Specification for (0~2300)°C Tungsten Rhenium Thermocouples	GB/T 4993-2010	Nickel-Chrominum/Copper-Nickel(Constantan) thermocouple wires
JJF 1183-2025	Calibration Specification of the Temperature Transmitter	GB/T 1598-2010	Platinum-10% Rhodium/Platinem thermocomouple wires - Platinum-13%Rhodium/Platinem thermocomouple wires - Platinum-30%Rhodium/Platinem-6% Rhodium thermocomouple wires
JJF 1184-2024	Testing Specification of Temperature Uniformity in Thermocouple Calibration Furnaces		
JJG 229-2010	Verification Regulation of Industry Platinum and Copper Resistance Thermometers	GB/T 4994-2015	Iron/Copper-Nickel(Constantan) thermocouple wires
JJF 1262-2010	Calibration Specification for Sheathed Thermocouples	GB/T 17615-2015	Nickel-Chromium-Silicon/Nickel-Silicon-Magnesium thermocouple wires
AMS2750	AEROSPACE MATERIAL SPECIFICATION (R)Pyrometry	GB/T 2903-2015	Copper/Copper-Nickel(Constantan) thermocouple wires

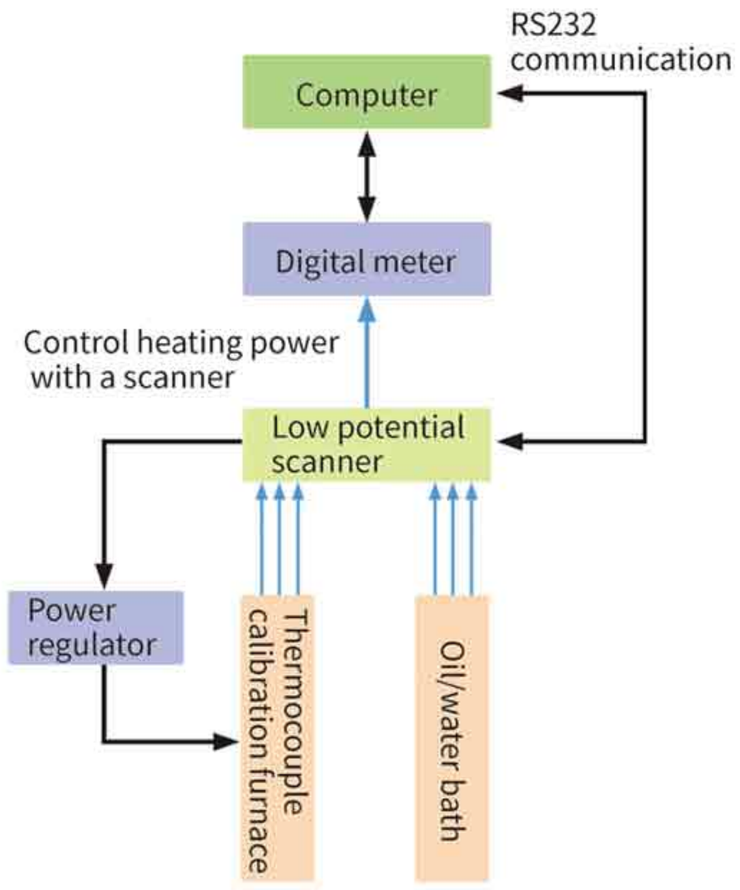
IV. Models

Specification \ Product series	ZRJ-03	ZRJ-03A	ZRJ-03B	ZRJ-03C	ZRJ-04	ZRJ-05-N (N=2,4,6,8,10)	ZRJ-06
Number of furnaces	1	1	1	1	2	N	2 (1)
Number of TC channels	6	6	10	24	20	N*10	10
Number of RTD channels	6	6	10		10	N*5	10
Verification of standard TC		●	●		●	●	
Verification or calibration of working TC	●	●	●	●	●	●	●
Verification of industrial RTD	●	●	●		●	●	●
Verification of integrated temperature transmitters	●	●	●		●	●	●
Simultaneous calibration of TCs and RTDs							●
Channel expansion						●	
Smart metrology APP	●	●	●		●	●	●

1.ZRJ-03/A/B Intelligent Thermal Instrument Verification System

Applicable objects: Metrology institutes, scientific research departments, calibration laboratories, enterprises, and institutions, that need to establish first/second-class standard thermocouple measurement standard devices, second-class standard platinum resistance thermometer measurement standard devices, and carry out the verification/calibration of standard thermocouples, working thermocouples, industrial thermal resistance, and other temperature instruments.

Main functions: used for automatic verification of standard thermocouples, verification/calibration of various working thermocouples, industrial thermal resistances, temperature transmitters. The scan switch includes 6 or 10 verifying channels, and the precise temperature control of the verification furnace adopts a high-precision constant temperature adjustment software algorithm.



▲ ZRJ-03A system diagram

2.ZRJ-03C Intelligent Thermal Instrument Verification System

Applicable objects: Verification/calibration of micro-thermocouples in military industry and special industries.

Main functions: The scan switch includes 24 verifying channels, which can verify/calibrate 24 micro thermocouples at one time. The temperature control of the calibration furnace adopts imported intelligent instruments (grade 0.1 and grade 0.25 optional) to precisely control the temperature.

3.ZRJ-04 Double Furnace Thermocouple (Resistance Thermometer) Automatic Verification System

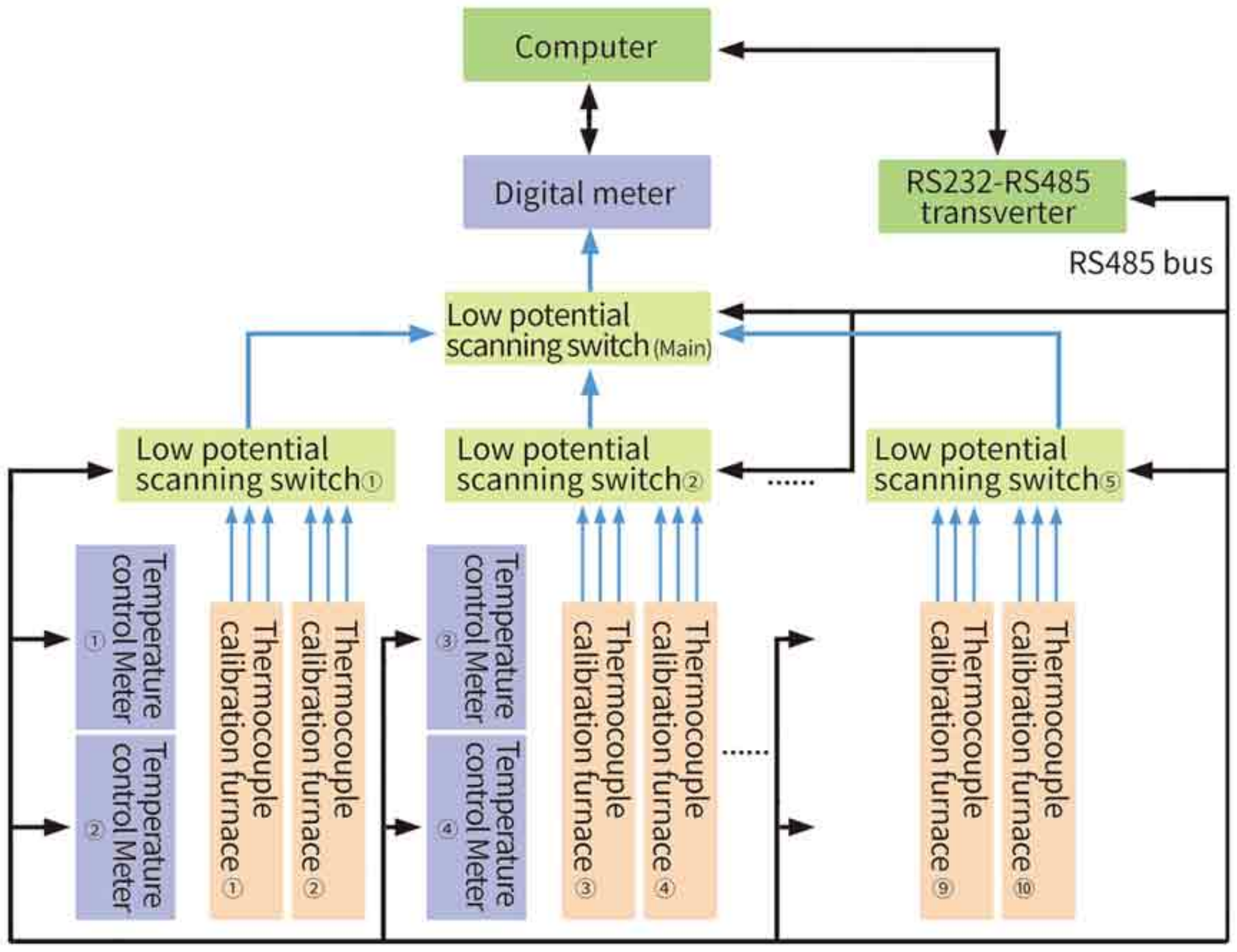
Applicable objects: enterprises with large workload of thermocouple and resistance thermometer verification, or thermocouple manufacturers.

Main function: The system can control two calibration furnaces at the same time to complete the automatic calibration of two sets of thermocouples or the calibration of a single set of resistance thermometer, which can meet the requirements of verifying large batches of thermocouples and resistance thermometers in a short time. The scan switch includes 20 verifying channels, and the calibration furnace is controlled by a smart meter to precisely control the temperature.

4.ZRJ-05-N(2/4/6/8/10) Group-furnace Thermocouple (Resistance Thermometer) Automatic Verification System

Applicable objects: manufacturers of thermocouples and resistance thermometers, large and medium-sized enterprises and measurement institutions with a large workload of verification.

Main functions: It can control 1-10 calibration furnaces to perform automatic verification/calibration of standard thermocouples, working thermocouples, and thermocouple wires at the same time. It can also carry out the verification of resistance thermometers, low temperature thermocouples and integrated temperature transmitter (with batch verification function, up to 10 batches). The group verification of resistance thermometer can be realized by adding special thermal resistance group verification software and integrated terminal station. The supporting calibration software supports the start-up of separate furnaces, and the verification/ calibration work between furnaces is independent of each other. The system automatically controls temperature, data recording and display, which can not only display the temperature control parameters of each calibration furnace in a centralized manner, but also display the working status and temperature control parameters of different calibration furnaces in detail, and automatically draw the temperature control curve., automatically realize the functions such as data collection, processing, transmission, storage and document management, and automatic generation of verification certificates.



▲ ZRJ-05 system diagram

5.ZRJ-06 Thermocouple, Resistance Thermometer Simultaneous Verification System

Applicable objects: Metrology institutes, calibration laboratories, enterprises and institutions, etc., that need to establish first/second-class standard thermocouple measurement standard devices, second-class standard platinum resistance thermometer measurement standard devices, and carry out the verification/ calibration of working thermocouples and industrial resistance thermometers.

Main functions: The system can realize the simultaneous verification/calibration of working thermocouples and industrial resistance thermometers; it can realize the maximum efficiency utilization of digital multimeters. Thermocouple scan switch: 10 channels, the calibration furnace adopts intelligent instrument temperature control, Resistance thermometers scan switch: 10 channels.

Professional Technical Support

Panran always adheres to the service concept of "beginning with customer needs and ending with customer satisfaction", and has a professional technical and after-sales service team to provide customers with high-quality and long-term services.

Personalized Customization

Different users have different requirements for the thermal instrument verification system. Based on a professional technical service team, Panran Measurement and Control can provide users with special accessories, indicators, software functions, ERP data access, report output and other customized services in a short time.

After Sales Service

The thermal instrument verification system has the characteristics of integrating software, hardware and engineering, and puts forward professional and long-term requirements for the quality of after-sales service. Panran has been committed to providing customers with high-level consulting, on-site debugging, maintenance and other services for a long time. It can provide relevant software and hardware upgrade services in a timely manner in accordance with the latest national regulations and specifications released and revised, and can timely and effectively eliminate the problems encountered by customers, to ensure that the equipment used by customers is in the best working condition as always.

Temperature and Humidity Acquisitor Overview

Since the launch of the first PR200 series temperature and humidity acquisitor in 2007, PANRAN has successively launched seven series of temperature and humidity automatic inspection/collection devices, which are widely used in the temperature or temperature and humidity uniformity test process of various constant temperature and humidity environments such as heat treatment furnaces and environmental test chambers. According to the differences in test requirements and operating habits, they differ in sensor connection methods, measurement accuracy, channel error, data and human-computer interaction operations, but all have the characteristics of high reliability, simple operation, compact and portable, and built-in electrical measurement.

The following is a comparison of technical parameters of some conventional series products:

Product series / Item	PR201	PR203	PR204	PR206A	PR206B
Product picture					
Accuracy	0.01%RD+7μV 0.01%RD+20mΩ	0.01%RD+5μV 0.01%RD+7mΩ	0.01%RD+7μV 0.01%RD+7mΩ	0.01%RD+6μV 0.01%RD+12mΩ	/ 0.01%RD+20mΩ
Max. deviation between channels	4μV、5mΩ	1μV、1mΩ	4μV、2mΩ	2μV、3mΩ	10mΩ
Switch type	Relay	Relay	Relay	Relay	Analog switch
Max. number of channels on the host	30 multi-function channels	32-channel thermocouples or 16-channel thermal resistors, 5-channel humidity transmitters	24 multi-function channels	12 multi-function channels	12-channel thermal resistors or humidity transmitters
Thermocouple measurement input protection	250V	220V	250V	220V	36V
Wiring method	Smart junction box	Standard terminal block	Intelligent connector	Self-locking connector	Self-locking connector
Weight	1.7kg	1.5kg	1.6kg	0.28kg	0.21kg
Screen specifications	Industrial grade 5.0-inch TFT color screen			1.2-inch segmented LCD screen	
Communication method	Wifi (Optional)、RS232			Bluetooth、Type-C	
Storage	Internal FLASH+U disk			Internal FLASH	
Charging port	DC5.5			TYPE-C	
Battery duration	11～14 hours				
Scope of application	Multiple constant temperature and humidity spaces to be tested can be calibrated simultaneously, and the sensors do not need to be replaced frequently	Scenarios where there are high requirements for measurement accuracy or where sensors need to be replaced frequently	Users who need to replace sensors frequently or are accustomed to using plug-in sensors	Scenarios with high requirements for portability, allowing the use of wireless and mobile phones, and distributed testing scenarios	The scenarios where only platinum resistance sensors are used to measure temperature
Advantages	The smart junction box allows quick sensor connection, and the internal structure of the junction box prevents wire breakage	The electrical measurement and reference terminal compensation are highly accurate	Use the smart connector to quickly connect any number of sensors	Compact size, lightweight, high measurement accuracy, can be stored together with the sensor	High cost effective

PR201 Series
Intelligent Temperature and Humidity Acquisitor

The PR201 series intelligent temperature and humidity acquisitor is the first of its kind to use an smart junction box to connect various thermocouples, thermal resistors and humidity transmitters. The smart junction box integrates a reference end temperature sensor and memory. After the first combination with the sensor and simple data editing, it can be used as a whole for a long time. When using it, you only need to insert the junction box into the slot of the acquisitor, and the acquisitor can automatically identify and load data such as the sensor number and correction value, which greatly improves the intelligence level of the acquisitor.

In addition, the acquisitor uses an embedded operating system, which can realize inspection configuration, data viewing, sensor correction, data statistics, curve display and other operations without other peripherals. After using the cloud metrology function, the temperature control deviation, temperature field, humidity field, uniformity, volatility and other parameters of heat treatment furnaces and temperature (humidity) environment experimental equipment can be automatically tested and analyzed online.

1.Features

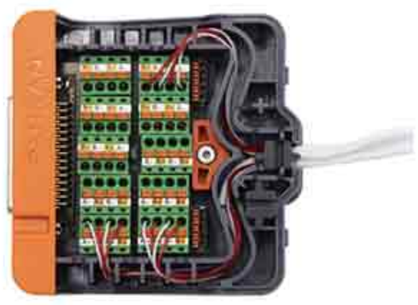
■ Smart Junction Box - intelligent

It can quickly and batch connect thermocouples, thermal resistors, humidity sensors through internal self-locking connectors to form a set of temperature and humidity measurement units. The junction box integrates a temperature sensor for reference end compensation and a memory for storing sensor parameters. It can be quickly connected to the acquisitor host in a plug-and-play manner, thereby realizing automatic recognition of sensors and automatic loading of related parameters.

■ Smart Junction Box - usability

The channels of the PR201 series acquisitor have excellent electrical measurement consistency. When the sensor correction value can be automatically loaded, the users do not need to pay attention to the correspondence between each sensor and the physical channel of the acquisitor. They only need to focus on the correspondence between the sensor number and the actual layout diagram, making the sensor location logic simpler.

■ Smart Junction Box - reliability



Special wire ducts are designed on both sides of the junction box, and necessary positions are reserved for the sequential arrangement of each sensor lead. The wire duct adopts an S-shaped structure, which can effectively disperse the stress of the sensor lead and avoid lead breakage caused by pulling force.

■ Smart Junction Box - compatibility

The junction box is compatible with sensors of various specifications, including 11 types of thermocouples,four-wire Pt100 and 0~1V output humidity or other types of transmitter measurement. At the same time, multiple sets of 3.3V power supplies with overcurrent protection function are provided internally to power the transmitter.

■ The Channel Switching Uses a Mechanical Relay Array

The channel switching uses a mechanical relay array, which does not cause additional electrical measurement errors due to leakage current, thereby achieving excellent channel consistency. Another advantage of the relay structure is that the signal loop can withstand 250V AC voltage accidentally entering and can effectively suppress surge voltage impacts under harsh working conditions.

■ The Sampling Data is Highly Reliable

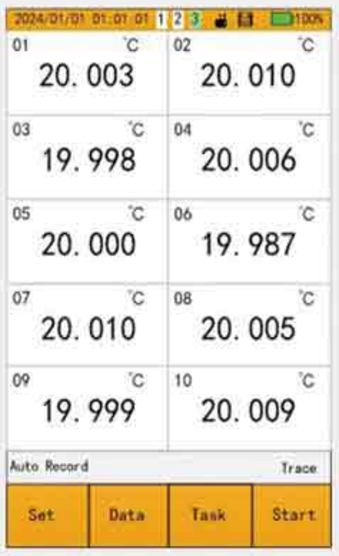
The sampling data is highly reliable, and the built-in industrial-grade FLASH memory is used to save the original data of each inspection operation, The data can be viewed and copied, but cannot be changed. During the inspection operation, the data can also be saved in an external U disk at the same time, and the security and reliability of the data are improved through double backup.

■ The Closed Structure Design

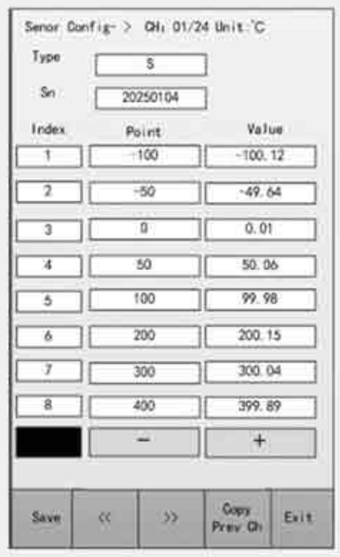
The closed structure design adopts aluminum alloy shell, and the safety protection level reaches IP64, which can be used for a long time in harsh environments such as dust and vibration.

■ Internet of Things (IoT) Functionality

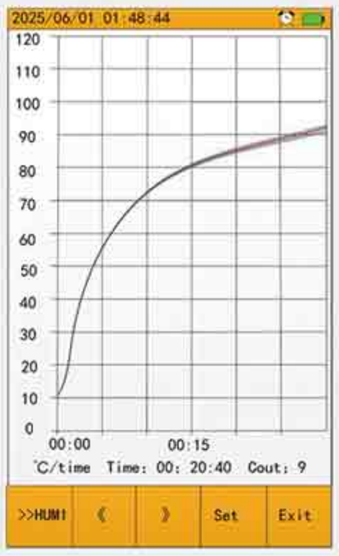
The Internet of Things function. It has the built-in Bluetooth and WiFi modules, and can be used in conjunction with the PANRAN Smart Metrology Mobile APP to realize remote real-time monitoring, recording, data output, alarm and other functions of networked devices; historical data is stored in the cloud for easy query and data processing; the software has rich permission configuration modules, and the user units can independently manage the account of the unit, support the simultaneous online access of multiple users and the configuration of different user permission levels.



▲ Main interface



▲ Sensor management interface



▲ Curve interface

▲ Task interface

■ It Uses a Detachable Intelligent Lithium Battery Pack

It uses a detachable intelligent lithium battery pack, which can run continuously for more than 12 hours when fully charged. The built-in battery management system can accurately estimate the remaining usage time based on the real-time power consumption, and can provide diagnostic information including battery cycle number, charge and discharge status, etc.

2.Technical Parameters

■ General Technical Parameters

Function \ Model	PR201AS	PR201AC	PR201BS	PR201BC
RS232	●	●	●	●
Bluetooth		●		●
Wifi		●		●
Number of TC channels	30		20	
Number of RTD channels	30		20	
Number of humidity channels	90		60	
Weight	1.7kg (without charger)		1.5kg (without charger)	
Dimension	310mm×165mm×50mm		290mm×165mm×50mm	
Working temperature	-5°C～45°C			
Working humidity	(0～80) %RH, Non-condensing			
Battery type	PR2038 7.4V 3000mAh Smart lithium battery pack			
Battery duration	⩾14h	⩾12h	⩾14h	⩾12h
Warming-up time	Effective after 10 minutes warm-up			
Calibration period	1 year			

■ Electrical Technical Parameters

Range	Measuring range	Resolution	Accuracy	Max difference between channels	Acquisition speed
70mV	-5mV～70 mV	0.1μV	0.01%RD+7μV	4μV	High speed：0.2 s/channel Medium speed：0.5 s/channel Low speed：1.0 s/channel
400Ω	0Ω～400Ω	1mΩ	0.01%RD+20mΩ	5mΩ	High speed：0.5 s/channel Medium speed：1.0 s/channel Low speed：2.0 s/channel
1V	0V～1V	0.1mV	0.5mV	0.2mV	High speed：0.2 s/channel Medium speed：0.5 s/channel Low speed：1.0 s/channel

Note 1: The above parameters are tested in an environment of 23±5°C, and the maximum difference between channels is measured in the inspection state.
Note 2: The input impedance of the voltage-related range is ⩾50MΩ, and the output excitation current of the resistance measurement is ⩽1mA.

■ Temperature Technical Parameters

Range	Measuring range	Resolution	Accuracy	Remarks
S	0°C～1760.0°C	0.01°C	@ 600°C, 0.9°C @ 1000°C, 0.9°C	Conforms to ITS-90 temperature scale Including reference end compensation error
R				
B	300.0°C～1800.0°C		@ 1300°C, 1.0°C	
K	-100.0°C～1300.0°C		⩽600°C, 0.6°C ＞600°C, 0.1%RD	
N	-200.0°C～1300.0°C			
J	-100.0°C～900.0°C			
E	-90.0°C～700.0°C			
T	-150.0°C～400.0°C			
Pt100	-200.00°C～800.00°C	0.001°C	@ 0°C, 0.08°C @ 300°C, 0.11°C @ 600°C, 0.16°C	Output 1mA excitation current
Humidity	1.00%RH～99.00%RH	0.01%RH	0.1%RH	Transmitter error is not included

■ Regulations and Specifications

Implementation standard/specification code	Standard/specification name
JJF 1101-2019	Calibration specification for environmental testing equipment for temperature and humidity parameters
JJF 1376-2012	Calibration specification for box-type resistance furnace
JJF 2019-2022	Measurement specification for temperature performance of liquid constant temperature testing equipment
JJF 2168-2024	Calibration specification for salt mist testing chambers
JJF 1564-2016	Calibration specification for temperature and humidity standard chambers
GB/T 9452-2023	Test method for qualified work zone of heat treatment furnace
GB/T 5170.1-2016	Inspection methods for environmental testing equipment for electric and electronic products -- part 1: General
GB/T 5170.2-2017	Inspection methods for environmental testing equipment -- part 2: Temperature testing equipment
GB/T 5170.5-2016	Inspection methods for environmental testing equipment for electric and electronic products -- part 5: Damp heat testing equipment
GB/T 5170.8-2017	Inspection methods for environmental testing equipment -- part 8: Salt mist testing equipment
HB 5425-2012	Testing method for working zone of heat treatment furnace for aviation
HB 6783.3-93	Verification method for climate environment test chamber (room) for military airborne equipment
GJB 509B-2008	Quality control for heat treatment process
QJ 1428A-2012	Heat treatment furnace temperature control and measurement
JB/T 5520-91	Specification for drying oven
AMS2750	Aerospace materials pecification(r)pyrometry

PR203 Series Temperature and Humidity Data Acquisitor

—— Remote Monitoring/Operation, Smart Metrology APP Makes It Easier

PR203 series temperature and humidity acquisitors, with accuracy of 0.01%, and can connect up to 72 thermocouples, 24 thermal resistances, and 15 humidity transmitters. With rich human-computer interaction functions, it can display the electric data and temperature data of each channel at the same time. It is a dedicated portable instrument for temperature and humidity field testing. This series of products can be connected to a PC or a cloud server by wired or wireless means, enabling automatic testing and analysis of temperature control deviation, temperature field, humidity field, uniformity, and volatility of heat treatment furnaces, temperature (humidity) environmental experimental equipment, etc. At the same time, this series of products adopts a closed design, which can work for a long time in the harsh environment with many dusts such as workshops.

1.Features

■ Acquisition Speed of 0.1s / channel

Under the premise of ensuring the accuracy of 0.01%, data acquisition can be performed at a speed of 0.1 S/channel. In the RTD acquisition mode, data acquisition can be performed at a speed of 0.5 S /channel.

■ Sensor Correction Function

The correction value management function can automatically correct the data of all temperature and humidity channels according to the existing user configuration. Multiple sets of correction value data can be pre-stored to match different batches of test sensors.

■ Professional Processing of TC Reference Junction

The aluminum alloy thermostatic block with the built-in high-precision temperature sensor can provide CJ compensation with an accuracy better than 0.2°C for the thermocouple measurement channel.

■ Channel Detection Function

Before the acquisition, it will automatically detect whether all channels are connected to sensors. During the acquisition, the channels that are not connected to sensors will be automatically closed according to the detection results.

■ Optional Wet and Dry Ball Method to Measure Humidity

When measuring a high humidity environment for a long time, the wet and dry bulb method can be used for humidity measurement.

■ Channel Expansion Function

Channel expansion is realized by connecting supporting modules, and the connection between the module and the host only needs to be connected through the special connector to complete the operation of adding modules.

▲ PR2056 RTD expansion module

■ Built-in Storage Function,Support Double Backup of Original Data

The built-in large-capacity FLASH memory supports double backup of original data. The original data in FLASH can be viewed in real time and can be copied to a U disk by one-key export, which further enhances the safety and reliability of the data.

■ Detachable High-capacity Lithium Battery

A detachable large-capacity lithium battery is used for power supply and a low-power consumption design is adopted. It can work continuously for more than 14 hours, and can avoid the measurement disturbance caused by the use of AC power.

■ Wireless Communication Function

PR203 can be connected to other peripherals through 2.4G wireless local area network, support multiple acquisitors to carry out temperature field testing at the same time, which effectively improve work efficiency and simplify the wiring process.

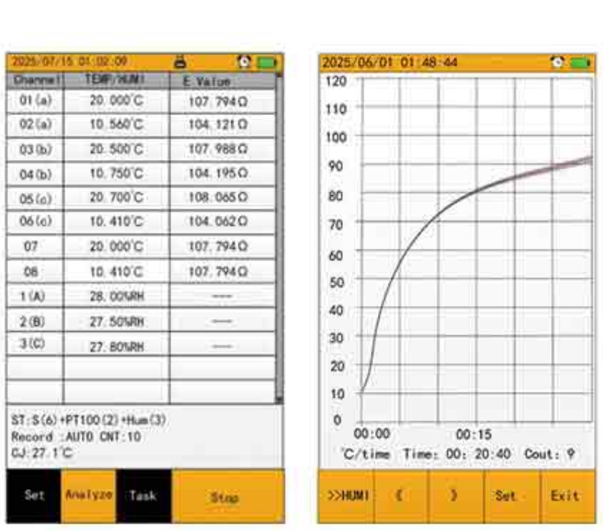
▲ Wireless communication diagram

■ Support Panran Smart Metrology APP

Temperature and humidity acquisitors are used in conjunction with the PANRAN smart metrology APP to realize remote real-time monitoring, recording, data output, alarm and other functions of networked devices; historical data is stored in the cloud, which is convenient for query and data processing.

■ Powerful Human-computer Interaction Functions

The human-computer interaction interface composed of color touch screen and mechanical buttons can provide a rich operation interface, including: channel setting, acquisition setting, system setting, curve drawing, data analysis, historical data viewing and data calibration, etc.



▲ PR203 working interface

■ Support Panran Smart Metrology APP

Temperature and humidity acquisitors are used in conjunction with the PANRAN smart metrology APP to realize remote real-time monitoring, recording, data output, alarm and other functions of networked devices; historical data is stored in the cloud, which is convenient for query and data processing.

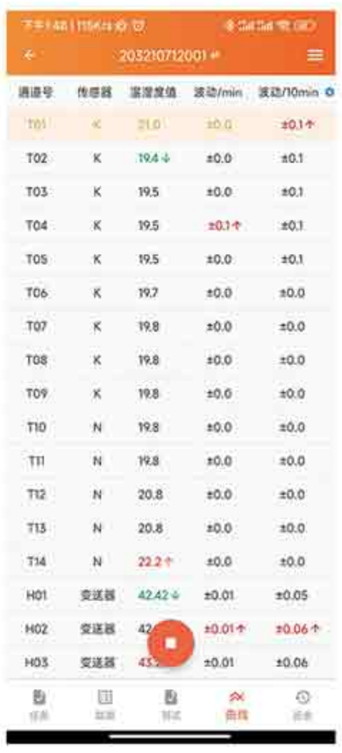
2.Introduction to the Temperature and Humidity Acquisition Module of Panran Smart Metrology APP

■ Remotely View the Status and Data of The Acquisitor, and Monitor the Data

Through the mobile APP, you can remotely view the acquisition tasks, monitor the inspection data, curves, fluctuations and other information of the temperature and humidity acquisitors in real time, and timely alarm reminder when data is abnormal.

■ Support for Custom Configuration Test Tasks

By configuring test items, constant temperature assessment conditions, data sampling strategies, data correction methods, and test report output content, etc., test solutions that conform to various regulations and specifications can be configured, which are suitable for more application.



▲ Real-time monitoring of acquisitor information

▲ Binding the sensors

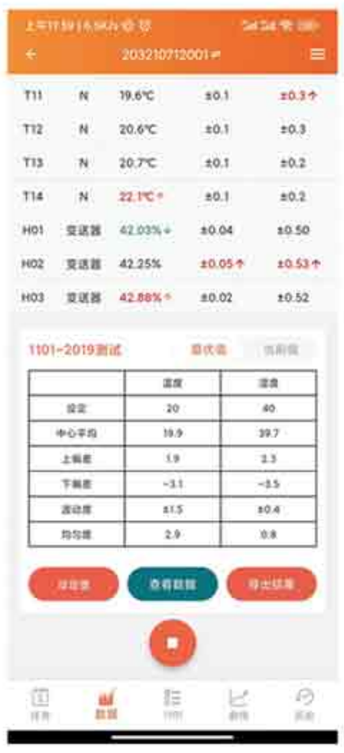
■ Support the Configuration of the Correction Value of the Acquisitor and the Correction Value of the Sensor

The APP supports configuration of sensor and acquisitor correction data through file import or manual input. Various correction algorithms are optional to realize automatic correction of test data.

■ Support JJF 1101-2019 Calibration test and Display the Best Record in Real Time

The APP supports the configuration of JJF 1101-2019 calibration tasks, which can display the optimal and current calibration result data of the acquisition process in real time. The calibration results and corresponding inspection data can be quickly exported through the App or Web.

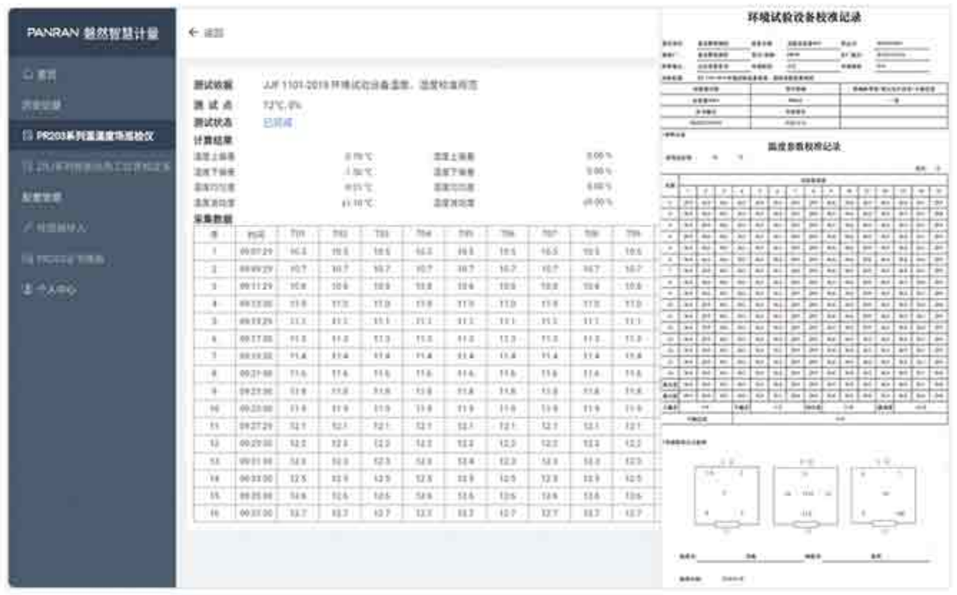
▲ Test task details



▲ JJF 1101-2019 best record

■ Web Terminal (www.panran.vip) Device Management, Data Viewing and Output

The web terminal supports online device management and viewing of real-time and historical data. The test historical data can be quickly exported to Excel or PDF format reports. The record and report formats support user-defined templates and support batch import and management of device-matching sensors.



▲ Web terminal: device management, data viewing and output

3.Technical Parameter

■ Model Selection

Function \ Model	PR203AS	PR203AF	PR203AC
Communication method	RS232	2.4G local area network	Internet of things
Support PANRAN Smart Metrology APP			●
Battery duration	14h	12h	10h
Number of TC channels	32		
Number of RTD channels	16		
Number of humidity channels	5		
Number of additional channel expansions	40 TC channels/8 RTD channels/10 humidity channels		
Advanced data analysis capabilities	●		
Screen dimensions	TFT color screen of industrial grade 5.0 inch		
Dimensions	300mm×185mm×50mm		
Weight	1.5kg(without charger)		
Working environment	Working temperature:：-5°C～45°C； Working humidity：0～80%RH, non-condensing		
Warming-up time	Valid after 10 minutes of warm-up		
Calibration period	1 year		

■ Electrical Parameters

Range	Measurement range	Resolution	Accuracy	Numbers of channels	Maximum difference between channels
70mV	-5mV～70mV	0.1μV	0.01%RD+5μV	32	1μV
400Ω	0Ω～400Ω	1mΩ	0.01%RD+7mΩ	16	1mΩ
1V	0V～1V	0.1mV	0.2mV	5	0.1mV

Note 1: The above parameters are tested in an environment of 23±5°C, and the maximum difference between channels is measured in the inspection state.
Note 2: The input impedance of the voltage-related range is ⩾50MΩ, and the output excitation current of the resistance measurement is ⩽1mA.

■ Temperature Parameters

Range	Measurement range	Resolution	Accuracy	Sampling speed	Remarks
S	0°C～1760°C	0.01°C	@ 600°C, 0.8°C @ 1000°C, 0.8°C	0.1sec/channel	Complies with ITS-90 temperature scale Including reference end compensation error
R					
B	300°C～1800°C		@ 1300°C, 0.8°C		
K	-100°C～1300°C		⩽600°C, 0.5°C >600°C, 0.1%RD		
N	-200°C～1300°C				
J	-100°C～900°C				
E	-90°C～700°C				
T	-150°C～400°C				
WRe3/25	0°C～2300°C				
WRe5/26					
Pt100	-200°C～800°C	0.001°C	@ 0°C, 0.05°C @ 300°C, 0.08°C @ 600°C, 0.12°C	0.5sec/channel	Output 1mA excitation current
Humidity	1%RH～99%RH	0.01%RH	0.1%RH	1.0sec/channel	Does not include humidity transmitter error

※ For the implementation and referenced regulations, specifications and standards, please refer to page 16 of the PR201 series intelligent temperature and humidity acquisitor.

PR204 Series
Intelligent Temperature and Humidity Acquisitor

PR204 Series intelligent temperature and humidity acquisitor uses intelligent connector to connect various thermocouples, thermal resistors and humidity transmitters. The intelligent connector integrates reference end temperature sensor and memory, and can be used as a whole after being combined with the sensor, so as to realize the functions of intelligent identification, classification and editing of sensors, which greatly improves the intelligence level of the acquisitor.
In addition, the acquisitor uses an embedded operating system, which can realize inspection configuration, data viewing, sensor correction, data statistics, curve display and other operations without other peripherals. After using the cloud metrology function, the temperature control deviation, temperature field, humidity field, uniformity, volatility and other parameters of heat treatment furnaces and temperature (humidity) environment experimental equipment can be automatically tested and analyzed online.

1.Features

■ Self-locking Intelligent Connector

using PR2046 intelligent connector to connect with thermocouple, thermal resistor, humidity sensor to form intelligent sensor. The intelligent connector has a self-locking jack, which can quickly and reliably connect the sensor test line. The internal integrated temperature sensor and memory can be used for the measurement of the thermocouple reference end and the storage of sensor number, correction value and other data.

■ Intelligent Sensor Recognition

After the intelligent sensor is inserted into any channel of the acquisitor, the acquisitor automatically loads the sensor data and automatically classifies and sorts the channels by type and connection order without the need for additional configuration.

■ With 24 Multi-function Channels

It has 24 multi-function channels, any channel supports the measurement of 11 types of thermocouples, four-wire Pt100 and 0~1V output humidity or other types of transmitter measurement. The measurement channels can be divided into up to four groups for operation, management and storage, which is convenient for the measure of multiple devices being calibrated simultaneously.

■ The Sampling Data is Highly Reliable

The sampling data is highly reliable, and the built-in industrial-grade FLASH memory is used to save the original data of each inspection operation, The data can be viewed and copied, but cannot be changed. During the inspection operation, the data can also be saved in an external U disk at the same time, and the security and reliability of the data are improved through double backup.

▲ PR2046 intelligent connector

▲ PR2047 transmitter conditioner

▲ Back display

■ The Channel Switching Uses a Mechanical Relay Array

The channel switching uses a mechanical relay array, which does not cause additional electrical measurement errors due to leakage current, thereby achieving excellent channel consistency. Another advantage of the relay structure is that the signal loop can withstand 250V AC voltage accidentally entering and can effectively suppress surge voltage impacts under harsh working conditions.

■ Internet of Things (IoT) Functionality

The Internet of Things function. It has the built-in Bluetooth and WiFi modules, and can be used in conjunction with the PANRAN Smart Metrology Mobile APP to realize remote real-time monitoring, recording, data output, alarm and other functions of networked devices; historical data is stored in the cloud for easy query and data processing; the software has rich permission configuration modules, and the user units can independently manage the account of the unit, support the simultaneous online access of multiple users and the configuration of different user permission levels.

■ It Uses a Detachable Intelligent Lithium Battery Pack

It uses a detachable intelligent lithium battery pack, which can run continuously for more than 12 hours when fully charged. The built-in battery management system can accurately estimate the remaining usage time based on the real-time power consumption, and can provide diagnostic information including battery cycle number, charge and discharge status, etc.

■ The Closed Structure Design

The closed structure design adopts aluminum alloy shell, and the safety protection level reaches IP64, which can be used for a long time in harsh environments such as dust and vibration.

2.Technical Parameters

■ General Technical Parameters

Weight	1.6kg (without charger)	Working temperature	-5°C～45°C
Dimension	300mm×185mm×50mm	Working humidity	(0～80) %RH, Non-condensing
Battery type	PR2038 7.4V 3000mAh Smart lithium battery pack	Warming-up time	Effective after 10 minutes warm-up
Battery duration	⩾12h	Calibration period	1year

■ Electrical Technical Parameters

Range	Measuring range	Resolution	Accuracy	Max difference between channels	Acquisition speed
70mV	-5mV～70 mV	0.1μV	0.01%RD+7μV	4μV	High speed: 0.2 s/channel Medium speed: 0.5 s/channel Low speed: 1.0 s/channel
400Ω	0Ω～400Ω	1mΩ	0.01%RD+7mΩ	2mΩ	High speed: 0.5 s/channel Medium speed: 1.0 s/channel Low speed: 2.0 s/channel
1V	0V～1V	0.1mV	0.2mV	0.1mV	High speed: 0.2 s/channel Medium speed: 0.5 s/channel Low speed: 1.0 s/channel

Note 1: The above parameters are tested in an environment of 23±5°C, and the maximum difference between channels is measured in inspection state.
Note 2: The input impedance of the voltage-related range is ⩾50MΩ, and the output excitation current of the resistance measurement is ⩽1mA.

■ Temperature Technical Parameters

Range	Measuring range	Resolution	Accuracy	Remarks
S	0°C～1760.0°C	0.01°C	@ 600°C, 0.9°C @ 1000°C, 0.9°C	Conforms to ITS-90 temperature scale Including reference end compensation error
R				
B	300.0°C～1800.0°C		@ 1300°C, 1.0°C	
K	-100.0°C～1300.0°C		⩽600°C, 0.6°C >600°C, 0.1%RD	
N	-200.0°C～1300.0°C			
J	-100.0°C～900.0°C			
E	-90.0°C～700.0°C			
T	-150.0°C～400.0°C			
Pt100	-200.00°C～800.00°C	0.001°C	@ 0°C, 0.05°C @ 300°C, 0.08°C @ 600°C, 0.12°C	Output 1mA excitation current
Humidity	1.00%RH～99.00%RH	0.01%RH	0.1%RH	Transmitter error is not included

3.Model Selection

Function \ Model	PR204AS	PR204AC
RS232	●	●
Bluetooth		●
Wifi		●
Cloud metrology Function		●

※ For the implementation and referenced regulations, specifications and standards, please refer to page 16 of the PR201 series intelligent temperature and humidity acquisitor.

PR205 Series Temperature and Humidity Data Acquisitor

PR205 series products with accuracy of 0.01%, and can connect up to 64 thermocouples, 20 RTDs, and 13 humidity transmitters. With rich human-computer interaction functions, it can display the electric data and temperature data of each channel at the same time. After connecting to the host computer, it can realize automatic testing and analysis of temperature control deviation, temperature field, humidity field, uniformity and fluctuation of heat treatment furnace and temperature (humidity) environmental experimental equipment. It adopts a closed design, which can work for a long time in the harsh environment.

I.Features

■ Acquisition Speed of 0.1s / channel

While ensuring 0.01% accuracy, data acquisition can be performed at a speed of 0.1 S/channel. In the RTD acquisition mode, data acquisition can be performed at a speed of 0.5 S /channel.

■ Flexible Connection Method

Using standard connectors as connecting parts makes the connection of thermocouples and RTDs easier and faster.

■ Professional Processing of TC reference Junction

The aluminum alloy isothermal block with the built-in high-precision temperature sensor can provide CJ compensation with an accuracy better than 0.2°C for the thermocouple measurement channel.

■ Channel Expansion Function

Channel expansion is realized by connecting supporting modules. The connection between module and host only needs to be connected by special connector to complete the operation of adding modules.

■ Powerful human-computer Interaction Functions

The human-computer interaction interface composed of touch screen and mechanical buttons can not only provide convenient operation, but also meet the reliability requirements in the actual operation. Displays: channel setting, acquisition data, system setting, curve drawing, etc.

■ Channel Detection Function

Before the acquisition, it will automatically detect whether all channels are connected to sensors. During the acquisition, the channels that are not connected to sensors will be automatically closed according to the detection results.

■ Optional Wet and Dry Ball Method to Measure Humidity

PR205 series acquisitors can measure humidity by using the wet and dry bulb method through simple configuration, and can measure high humidity environments for a long time.

■ USB Disk Storage Function

PR205 series acquisitors can store acquisition data in a U disk during the independent operation. The stored data in the U disk can be browsed or processed by Excel and other tools, or imported into special software for data analysis and output as reports and certificates.

■ Sensor Correction Function

The data of all temperature and humidity channels can be automatically corrected according to the existing user configuration through the host computer software.

■ Detachable High-capacity Lithium Battery

The large-capacity lithium battery can work continuously ⩾20hours, and can avoid measurement disturbance caused by the use of AC power.

2.Model Selection

Function \ Model	PR205AF	PR205AS
Communication method	2.4G local area network	RS232
Battery duration	17h	20h
Number of host channels	24 thermocouple channels / 12 resistance thermometers channels / 3 humidity channels	
Number of additional channel expansions	40 TC channels/8 RTD channels/10 humidity channels	
Basic data analysis functions	●	
Screen dimensions	Industrial-grade 3.5-inch monochrome screen	
Dimensions	300mmX165mmX50mm	
Weight	1.2kg(without charger)	
Working environment	Working temperature: -5°C~45°C; Working humidity: 0~80%RH, non-condensing	
Warming-up time	Valid after 10 minutes of warm-up	
Calibration period	1 year	

※ For the implementation and referenced regulations, specifications and standards, please refer to page 16 of the PR201 series intelligent temperature and humidity acquisitor; Relevant technical parameters can be obtained by visiting www.panran.com or calling Panran.

PR206 Series
Micro Temperature and Humidity Acquisitor

new!

The PR206 series micro temperature and humidity acquisitor has an extremely light appearance. The self-locking connector integrated on the top can quickly connect various thermocouples, thermal resistors and humidity transmitters, and together with various sensors, it forms a wireless temperature and humidity test unit that does not require frequent disassembly. This series of acquisitors can be connected to mobile phones, PCs or dedicated portable data servers via Bluetooth communication to realize rich human-computer interaction functions, and can flexibly form a 12~120 channels distributed wireless temperature and humidity test system according to different test requirements.

The PR206 series acquisitor is not just a temperature and humidity collection module or unit. Despite its limited size, the acquisitor still has a screen and several function buttons, which can display a number of basic information and data during the inspection process. It can also manually switch channels, set inspections, start and stop inspections, etc. through the function buttons. These functions make the preparation work before the test more convenient. At the same time, the mobile APP, PC and cloud platform provide many software functions including inspection configuration, sensor correction, data statistics, curve display, etc., and can automatically test and analyze the temperature control deviation, temperature field, humidity field, uniformity, volatility and other parameters of heat treatment furnaces and temperature (humidity) environment experimental equipment online.

1.Features

■ Excellent Electrical Test Performance

With 0.01 level electrical measurement accuracy. The channel switching of type A products adopts a mechanical relay array to avoid additional electrical measurement errors due to leakage current, thereby achieving excellent channel consistency.

■ Input Protection Function

When the thermocouple function is in place, all measurement ports can withstand 220V high voltage accidentally entering, effectively avoiding hardware damage caused by AC leakage during the heat treatment furnace temperature measurement process.

■ Multifunctional and Small Size

It can independently complete inspection and data storage without connecting other peripherals, and the palm-sized size makes it easy to carry.

■ Self-locking Connector

12-channel self-locking connector can quickly connect the temperature and humidity sensors for testing without using other tools, greatly simplifying the wiring work.

▲ Connect to platinum resistance sensor

■ Flexible Combination

After connecting to a mobile phone or other terminal via Bluetooth function, a variety of parameter configuration and data processing can be performed through rich APP functions. The APP can connect multiple PR206 series acquisitors at the same time, thus forming a large wireless temperature and humidity test system.

■ Convenient Connection

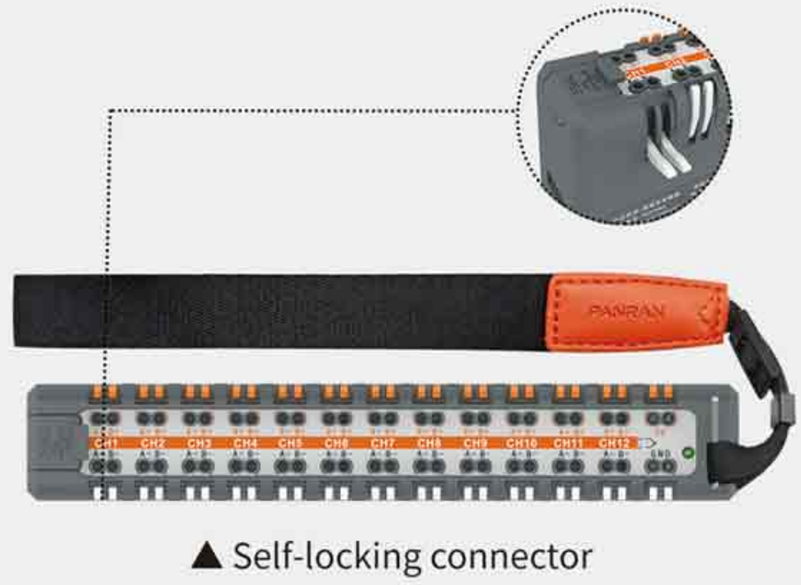
You can quickly identify and connect the acquisitor by touching the NFC area with your phone or using the APP to scan the QR code on the body, simplifying the on-site networking process.

■ In U disk Mode

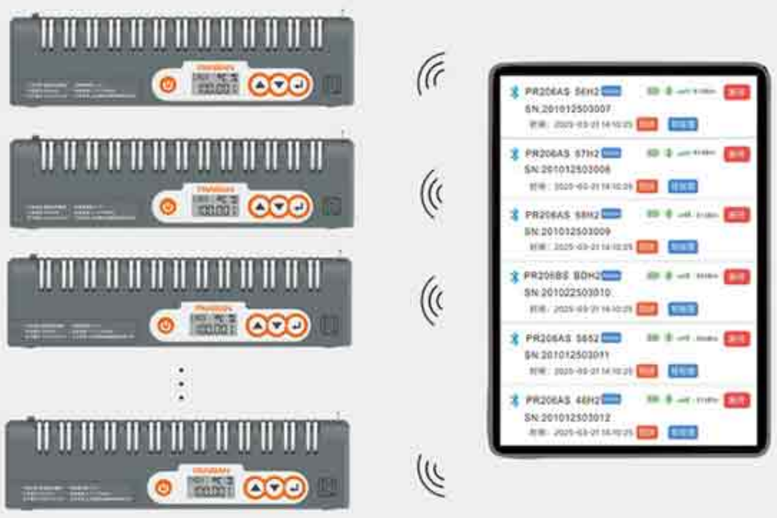
You can charge or transmit data with the host computer through the TYPE-C interface. When data transfer is selected, the acquisitor will enter into U disk mode, which is convenient for copying and deleting recorded files.

■ Reference End Compensation

The A-type acquisitor can perform independent reference compensation for each measurement channel, and the compensation error is better than 0.3°C.



▲ Self-locking connector



▲ Bluetooth connectivity for up to 10 simultaneous devices

2.Introduction to the Functions of PANRAN Smart Metrology APP

Smart metrology APP can run on Android or IOS systems, and can interconnect data with many types of instruments and equipment of PANRAN through wifi, Bluetooth, etc. The functions that can be realized include three categories:

●Conventional control functions, remote/local real-time control, monitoring, recording, alarm and other functions.

●Data processing functions, supports real-time processing of calibration data, historical data query, and cloud storage. It can generate reports and certificates according to various regulations or custom calibration rules.

●Permission management function, with rich permission configuration modules, support the simultaneous online access of multiple users and the configuration of different user permission levels.

The PR206 micro temperature and humidity acquisitor can perform basic operations such as viewing measurement data, starting and stopping inspections, single-channel tracking, and setting inspection cycles through its own screen and buttons. If you want to realize more complex human-computer interaction, you need to use the PANRAN Smart Metrology APP. By connecting a mobile phone or tablet computer with the Smart Metrology APP installed, a single or multiple PR206 temperature and humidity acquisitors can form a powerful distributed temperature and humidity measurement system, which can realize complex operations such as inspection configuration, data viewing, sensorcorrection, data statistics, and curve display. The cloud metrology function can also be used to automatically test and analyze parameters such as temperature control deviation, temperature field, humidity field, uniformity, and volatility of heat treatment furnaces and temperature (humidity) environment experimental equipment online.

▲ Living inspecting data

▲ Data curve

▲ Inspection data

▲ Channel configuration

3.Technical Parameters

■ General Technical Parameters

Item \ Model	PR206AS	PR206BS
TC measurement function	●	
Switch type	Relay switch	Analog switch
Weight	280g	210g
Number of multi-function channels	12	
Dimension	180mm×45mm×30mm	
Working temperature	-5°C～45°C	
Working humidity	(0～80) %RH,Non-condensing	
Wireless communications	Bluetooth 5.2, effective communication distance ⩾ 20 meters	
Battery type	3.7V 1000mAh rechargeable lithium battery	
Charging port	Type-C	
Battery duration	⩾14h	⩾11h
Warm-up time	Effective after 10 minutes warm-up	
Calibration period	1 year	

■ Electrical Technical Parameters

Range	Measuring range	Resolution	Accuracy	Max. difference between channels	Acquisition speed
60mV	-5mV～60mV	0.1μV	0.01%RD+6μV	2μV	High speed: 0.2 s/channel Medium speed: 0.5 s/channel Low speed: 1.0 s/channel
400Ω(PR206A)	0Ω～400Ω	1mΩ	0.01%RD+12mΩ	3mΩ	High speed: 0.5 s/channel Medium speed: 1.0 s/channel Low speed: 2.0 s/channel
400Ω(PR206B)			0.01%RD+20mΩ	10mΩ	
1V	0V～1V	0.01mV	0.2mV	0.1mV	High speed: 0.5 s/channel Medium speed: 1.0 s/channel Low speed: 2.0 s/channel

Note 1: The above parameters are tested in an environment of 23±5°C, and the maximum difference between channels is measured in the inspection state.
Note 2: The input impedance of the voltage-related range is ⩾50MΩ, and the output excitation current of the resistance measurement is ⩽1mA.

■ Temperature Technical Parameters

Range	Measuring range	Resolution	Accuracy	Remarks
S	0°C～1760.0°C	0.01°C	@ 600°C, 0.9°C @ 1000°C, 0.9°C	Conforms to ITS-90 temperature scale Including reference end compensation error
R				
B	300.0°C～1800.0°C		@ 1300°C, 0.9°C	
K	-100.0°C～1300.0°C		⩽600°C, 0.6°C ＞600°C, 0.1%RD	
N	-200.0°C～1300.0°C			
J	-100.0°C～900.0°C			
E	-90.0°C～700.0°C			
T	-150.0°C～400.0°C			
Pt100 (PR206A)	-200.00°C～800.00°C	0.001°C	@ 0°C, 0.06°C @ 300°C, 0.09°C @ 600°C, 0.13°C	Output 0.5mA excitation current
Pt100 (PR206B)			@ 0°C, 0.08°C @ 300°C, 0.11°C @ 600°C, 0.16°C	
Humidity	1.00%RH～99.00%RH	0.01%RH	0.1%RH	Transmitter error is not included

PR293 Series
Nanovolt & Microhm Thermometer

- 10nV/10μΩ Resolution
- 30 ppm Measurement Accuracy
- Automatic Reset of Parasitic Potential
- Multiple Full-function Measurement Channels

The PR291/PR293 series nanovolt & microhm thermometers are high-precision measuring instruments specifically designed for the field of temperature metrology. The key features include measurement resolutions of 10 nV/10 μΩ and optimal measurement accuracy up to 30 ppm/year. Combining excellent high precision and high resolution with a portable design, they provide a more flexible and efficient measurement solution for temperature metrology.

Compared to general-purpose high-precision digital multimeters (DMMs), the PR291/PR293 series thermometers are better suited for temperature metrology in terms of range, functionality, accuracy, and ease of use. They incorporate 2 or 5 fully-functional rear-panel measurement channels. The range options are expanded to include 20mV and 400Ω specifically to match standard thermocouples and Pt100 sensors. Additionally, they offer three operational modes – patrol inspection, single-channel tracking, and temperature difference measurement – for ease of operation.

1.Features

■ Measurement Resolution 10nV/10μΩ

The breakthrough design of the ultra-low-noise amplifier and the miniature low-ripple power supply module significantly reduces reading noise in the thermometer's signal path. Combined with the application of novel digital filtering technology, 8-digit resolution is achievable in certain measurement ranges.

■ Excellent Annual Stability

The instrument incorporates built-in reference-grade standard resistors and an oven-controlled reference, featuring an extremely low temperature coefficient (TC) and excellent long-term stability, with accuracy reaching 30ppm. Even when operating in field environments between -5°C to 35°C, it maintains excellent measurement accuracy.

■ Integrated Multi-Channel Low Noise Scanner

In addition to the front channel, depending on the model, the rear panel integrates 2 or 5 groups of independent full-function test terminals. Each group of channels can independently set the test signal type, and has extremely high consistency between channels, without any external switch, it can carry out multi-channel data acquisition.

■ Parasitic EMF Auto-Nulling

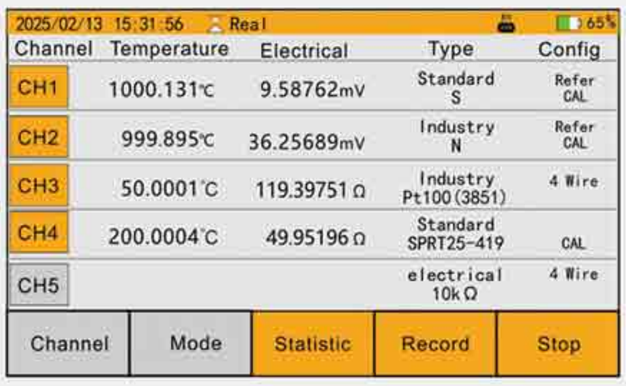
All measurement channels incorporate independent hardware zero self-calibration. This enables real-time elimination of range errors caused by parasitic EMFs (electromotive forces) or drift within the measurement loop, eliminating the need for additional polarity reversal switches.

■ Multifunctional Tellurium Copper Terminals

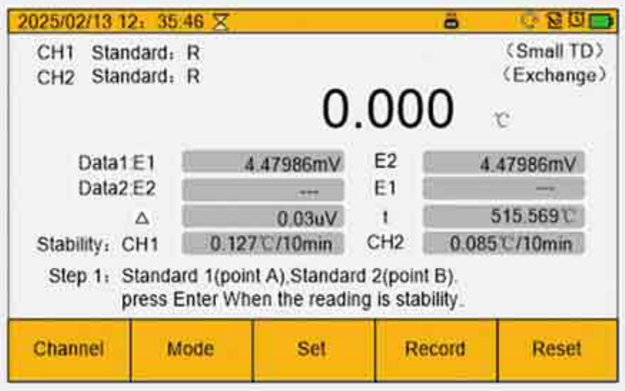
The rear channels all use push-type multi-functional tellurium copper terminals, which are gold-plated with tellurium copper, which has excellent electrical connection performance and can provide a variety of wire connection methods.

■ Three Working Modes

It has three working modes: patrol inspection, single-channel tracking, and temperature difference measurement. When the single-channel tracking mode working, the thermometer is used in a similar manner to a conventional digital multimeter. The temperature difference measurement mode can analyze the temperature field uniformity of various constant temperature equipment.



▲ Multi-channel acquisition mode



▲ Temperature difference measurement mode

■ Rich Temperature Metrology Functions

Compared with the traditional digital multimeter, the 20mV range for measuring S-type thermocouples and the 400Ω range for PT100 platinum resistance measurement are added. At the same time, conversion programs for various temperature sensors are built-in, the certificate value or the corrected value can be quoted to carry out temperature traceability of the test results. Simultaneously, all measurement channels feature dedicated thermocouple (TC) jacks with accuracy better than 0.2°C.

■ Data Analysis Function

In addition to displaying various test data, curves and data storage functions, the thermometer can also perform maximum/minimum/average calculations for real-time data, and perform various calculations of temperature fluctuations.

■ Portable Design

Compared with the thermometers of the same level, it has a smaller volume and weight, which is convenient for high-level temperature testing in various field environments. The design of the built-in high-capacity lithium battery also makes it easier to use.

2.Model Selection

Model	PR291BP	PR293AP	PR293BP
Device Type	Microhm Thermometer	Nanovolt & Microhm Thermometer	
Resistance Measurement	●		
Full Function Measurement		●	●
Number of Rear Channels	2	5	2
Weight	2.4kg	2.7kg	2.4kg
Battery Type	11.1V 6800mAh, Rechargeable Lithium Battery		
Battery Duration	⩾13 hours		
Dimensions	230mm×220mm×120mm		
Display Screen Size	Industrial Grade 7.0-Inch TFT Color Screen		
Working Environment	-5°C～35°C, ⩽80%RH		

3.Electrical Technical Parameters

Range	Measurement Range	Resolution	One Year Accuracy(ppm RD+ppm Range)
20mV	-5.00000mV～25.00000mV	10nV	40+25
100mV	-20.00000mV～110.00000mV	10nV	40+7
1V	-0.2000000V～1.1000000V	0.1μV	30+2
50V	-10.00000V～55.00000V	10μV	100+20
100Ω	0.00000Ω～105.00000Ω	10μΩ	30+2
400Ω	0.00000Ω～410.00000Ω	10μΩ	30+1.5
1KΩ	0.0000000kΩ～1.1000000kΩ	0.1mΩ	30+1
10KΩ	0.000000kΩ～11.000000kΩ	1mΩ	30+1
50mA	-10.000000mA～55.000000mA	1nA	100+20

Note1:The resistance uses the four-wire measurement method, the excitation current of the 10KΩ range is 0.1mA, and the excitation current of other resistance ranges is 1mA.
Note2:For 10k range 2-wire and 3-wire resistance measurements, an additional compensation of 30mΩ is required on top of the base 4-wire accuracy.For all other resistance ranges, 2-wire and 3-wire resistance measurements require an additional compensation of 10mΩ on top of the base 4-wire accuracy.
Note3:The ambient temperature during the test is 23°C±3°C.

Range	Reading Noise	Temperature Coefficient(ppm RD+ppm Range)
20mV	50nV	3+1.5
100mV	60nV	3+0.5
1V	0.4μV	3+0.5
50V	60μV	3+1.0
100Ω	30μΩ	2+0.1
400Ω	100μΩ	2+0.1
1KΩ	0.2mΩ	2+0.1
10KΩ	2mΩ	2+0.1
50mA	80nA	3+0.5
Note: Reading noise is defined as the difference between the maximum and minimum measured reading observed within a 1-minute period, with the input shorted or open.		

4.Technical Parameters

■ Temperature Measurement with Platinum Resistor(RTD)

Sensor	Measurement Range	Accuracy
SPRT25	-189°C～660°C	0.003°C@-189°C;0.009°C+0.0035%RD@(0～660)°C
SPRT100	-189°C～660°C	0.003°C@-189°C;0.009°C+0.0035%RD@(0～660)°C
Pt10	-200°C～850°C	0.006°C@-200°C;0.010°C@-100°C;0.013°C+0.004%RD@(0～850)°C
Pt100	-200°C～850°C	0.003°C@-200°C;0.006°C@-100°C;0.009°C+0.0035%RD@(0～850)°C
Pt200	-200°C～850°C	0.002°C@-200°C;0.005°C@-100°C;0.009°C+0.0036%RD@(0～850)°C
Pt500	-200°C～850°C	0.006°C@-200°C;0.010°C@-100°C;0.012°C+0.004%RD@(0～850)°C
Pt1000	-200°C～850°C	0.004°C@-200°C;0.007°C@-100°C;0.010°C+0.004%RD@(0～850)°C
Cu50	-50°C～150°C	0.006°C@-50°C;0.008°C@0°C;0.011°C@100°C
Cu100	-50°C～150°C	0.007°C@-50°C;0.008°C@0°C;0.011°C@100°C

■ Temperature Measurement for Thermocouples

Sensor	Measurement Range	Accuracy
S	-50°C～1768°C	0.09°C@0°C;0.06°C@300°C;0.07°C@600°C;0.08°C@1000°C;0.1°C@1700°C
R	-50°C～1768°C	0.1°C@0°C;0.06°C@300°C;0.06°C@600°C;0.07°C@1000°C;0.1°C@1700°C
B	300°C～1820°C	0.02°C@300°C;0.1°C@600°C; 0.08°C@1000°C;0.07°C@1200°C;0.09°C@1800°C
K	-200°C～1372°C	0.02°C@0°C;0.03°C@300°C;0.04°C@600°C;0.06°C@1000°C;0.08°C@1300°C
N	-200°C～1300°C	0.03°C@0°C;0.03°C@300°C;0.04°C@600°C;0.06°C@1000°C;0.07°C@1300°C
J	-210°C～1200°C	0.01°C@0°C;0.02°C@300°C;0.03°C@600°C;0.05°C@1000°C;0.06°C@1200°C
E	-200°C～1000°C	0.01°C@0°C;0.02°C@100°C;0.02°C@300°C;0.03°C@600°C;0.05°C@1000°C
T	-200°C～400°C	0.05°C@-200°C;0.01°C@0°C;0.02°C@200°C;0.02°C@400°C
Wre3-25	0°C～2315°C	0.05°C@300°C;0.06°C@600°C;0.07°C@1000°C;0.13°C@1800°C;0.25°C@2300°C
Wre5-26	0°C～2315°C	0.05°C@300°C;0.06°C@600°C;0.08°C@1000°C;0.15°C@1800°C;0.25°C@2300°C
EA2	-45°C～800°C	0.01°C@0°C;0.02°C@200°C;0.02°C@400°C;0.03°C@600°C;0.04°C@800°C
Note:The above results do not include CJ compensation errors		

■ Built-in Thermocouple Reference Junction Technical Parameters

Item	PR293AP	PR293BP
Measurement Range	-10°C～40°C	
One Year Accuracy	0.2°C	
Resolution	0.01°C	
Max. Diff. Between the Channels	0.1°C	

PR235 Series Multi-Function Calibrator

new!

The PR235 series multi-function calibrator can measure and output a variety of electrical and temperature values, with a built-in isolated LOOP power supply. It adopts an intelligent operating system and combines touch screen and mechanical buttons operations, featuring rich functions and easy operation. In terms of hardware, it uses a new port protection technology to achieve 300V over-voltage protection for measurement and output ports, bringing more excellent safety and convenient operability for on-site calibration work.

1.Technical Features

■ Excellent Port Protection Performance

Both the output and measurement terminals can withstand up to 300V AC high voltage mis-connection without causing hardware damage.

■ Humanized Design

Adopts an embedded intelligent operating system and a human-machine interaction method combining touch screen and mechanical buttons.In addition, the calibrator is also designed with a flashlight function to provide lighting for low-light environments.

■ Three Reference Junction Modes

Three reference junction modes can be selected: built-in, external, and custom. In the external mode, the intelligent reference junction can be automatically matched.

■ Measurement Intelligence

Electrical measurement has automatic range, and automatically recognizes the connection mode when measuring resistance or thermal resistance, eliminating the cumbersome operation of selecting range and wiring mode during measurement.

■ Diversified Output Setting Methods

Values can be input via the touchscreen or set digit-by-digit using buttons. It also features three stepping modes: ramp, step, and sine, the step cycle and step length can be freely set.

■ Measurement Toolbox

With multiple built-in applets, can perform forward and reverse conversions of temperature values and electrical values of thermocouples and thermal resistors, and supports mutual conversions of more than 20 physical quantities in different units.

■ Curve Display and Data Analysis Functions

Can be used as a data recorder to record and display measurement curves in real time, and perform diverse data analysis on the recorded data, such as standard deviation, maximum, minimum, and average values.

▲ Range selection

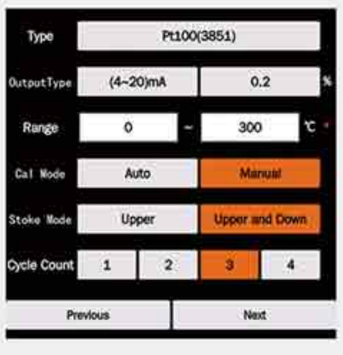
▲Drop-down menu

▲ Curve interface

▲Step parameter setting

▲ Metering toolbox

▲ HART process variable



▲ Task setup

▲ Thermal response time

■ HART Communication Function (Model A)

With a built-in 250Ω resistor, combined with the built-in isolated LOOP power supply, it can communicate with HART type transmitter without other peripherals, and can set or adjust its internal parameters.

■ Expansion Functions (Model A, Model B)

Supporting pressure measurement, humidity measurement and other modules. Without affecting the original measurement and output functions, the calibrator automatically recognizes the module after it is inserted into the port and enters the three-screen mode.

■ Task Functions (Model A, Model B)

Built-in calibration task applications for temperature transmitters, temperature switches, temperature instruments, and thermal response time, can quickly create tasks or select templates on site, automatically perform error judgment, and output calibration process and result data after task completion. Among them, the thermal response time calibration function can automatically judge the start and end points of the step response, calculate the step response time and time constant, and export test data and step curves.

2.Main Function List

Software features	Hardware features
■ Automatic switching of measurement range and automatic matching of measurement resistance wire system ■ Optional built-in/external/custom reference terminal compensation ■ Supports intelligent reference terminal ■ Supports multi-point temperature correction for temperature sensor measurement (Model A, Model B) ■ Supports certificate value traceability for standard temperature sensor measurement (Model A, Model B) ■ Multiple sets of parameters can be set for thermistor measurement, and Steinhart-Hart and B mode temperature coefficient calculation are supported ■ Manual/automatic ramp, step, sine output, parameters can be set ■ Measurement data curve display ■ Real-time analysis of measurement data ■ Optional °C, °F, K ■ Task functions (temperature transmitter, temperature switch, temperature instrument, thermal response time) (Model A, Model B) ■ HART communication function. (Model A) ■ Bluetooth communication function (Model A, Model B) ■ Battery life, health and remaining usage time estimation ■ Chinese and English interface ■ Screenshot function ■ Firmware upgrade ■ Help function	■ Measurement and output of voltage, current, resistance and frequency functions ■ Measurement and output of 11 types of thermocouples and 11 types of thermal resistor signals ■ Measurement of standard platinum resistance and standard thermocouple signals (Model A, Model B) ■ Measurement of two-wire, three-wire and four-wire thermal resistors ■ Measurement of thermistor ■ Measurement of switch quantity and ρ value ■ Real-time monitoring of internal multi-position temperature ■ Monitoring of abnormal load of output function ■ Support external module expansion(Model A, Model B) ■ Low potential tellurium copper terminal ■ Isolated LOOP power supply ■ Built-in 250Ω resistor (Model A) ■ Support TF card storage ■ Flashlight function ■ Intelligent lithium battery ■ Dust proof and waterproof level IP63

3.Technical Parameters

■ General Technical Parameters

Item \ Model	PR235A	PR235B	PR235C
Task function	●	●	
Standard temperature measurement	●	●	
Extended function	●	●	
Measuring temperature sensor supports multi-point temperature correction	●	●	
Bluetooth communication	●	●	
HART function	●		
Built-in 250Ω resistor	●		
Appearance dimension	200mm×110mm×55mm		
Weight	790g		
Screen specification	4.0-inch industrial touch screen, resolution 720×720 pixels		
Battery capacity	11.1V 2600mAh rechargeable lithium battery		
Continuous working time	⩾13hours		
Work environment	Operating temperature range: (5～35) °C, non-condensing		
Power supply	220VAC±10%, 50Hz		
Calibration period	1 year		

■ Electrical Technical Parameters

Measurement function

Function	Range	Measuring range	Resolution	Accuracy	Remarks
Voltage	100mV	-120.0000mV～120.0000mV	0.1μV	0.015%RD+0.005mV	Input Impedance ⩾500MΩ
	1V	-1.200000V～1.200000V	1.0μV	0.015%RD+0.00005V	
	50V	-5.0000V～50.0000V	0.1mV	0.015%RD+0.002V	Input Impedance ⩾1MΩ
Current	50mA	-50.0000mA～50.0000mA	0.1μA	0.015%RD+0.003mA	10Ω Current sensing resistor
Four-wire resistance	100Ω	0.0000Ω～120.0000Ω	0.1mΩ	0.01%RD+0.007Ω	1.0mA Excitation current
	1kΩ	0.000000kΩ～1.200000kΩ	1.0mΩ	0.015%RD+0.00002kΩ	
	10kΩ	0.00000kΩ～12.00000kΩ	10mΩ	0.015%RD+0.0002kΩ	0.1mA Excitation current
Three-wire resistance	The range, scope and resolution are the same as those of the four-wire resistance, the accuracy of the 100Ω range is increased by 0.01%FS on the basis of the four-wire resistance. The accuracy of the 1kΩ and 10kΩ ranges is increased by 0.005%FS on the basis of the four-wire resistance				Note 1
Two-wire resistance	The range, scope and resolution are the same as those of the four-wire resistance, the accuracy of the 100Ω range is increased by 0.02%FS on the basis of the four-wire resistance. The accuracy of the 1kΩ and 10kΩ ranges is increased by 0.01%FS on the basis of the four-wire resistance				Note 2
Standard temperature	SPRT25、SPRT100, resolution 0.001°C, see Table 1 for details.				
Thermocouple	S, R, B, K, N, J, E, T, EA2, Wre3-25, Wre5-26, resolution 0.01°C, see Table 3 for details.				
Thermal resistor	Pt10, Pt100, Pt200, Cu50, Cu100, Pt500, Pt1000, Ni100 (617)、Ni100 (618)、Ni120、Ni1000, resolution 0.001°C, see Table 1 for details.				
Frequency	100Hz	0.050Hz～120.000Hz	0.001Hz	0.005%FS	Input voltage range: 3.0V～36V
	1kHz	0.00050kHz～1.20000kHz	0.01Hz	0.01%FS	
	10kHz	0.0500Hz～12.0000kHz	0.1Hz	0.01%FS	
	100kHz	0.050kHz～120.000kHz	1.0Hz	0.1%FS	
	ρ value	1.0%～99.0%	0.1%	0.5%	100Hz、1kHz are effective
Switch measurement	/	ON/OFF	/	/	Trigger delay ⩽20mS

Note 1: The three test wires should better use the same specifications to ensure that the test wires have the same wire resistance.
Note 2: The influence of the test wire resistance on the measurement results should be noted. The influence of the test wire resistance on the measurement results can be reduced by connecting the test wires in parallel.
Note 3: The above technical parameters are based on an ambient temperature of 23°C±5°C.

Output function

Function	Range	Measuring range	Resolution	Accuracy	Remarks
Voltage	100mV	-20.0000mV～120.0000mV	0.1μV	0.015%RD+0.005mV	Maximum load current 10mA
	1V	-0.20000V～1.20000V	1.0μV	0.015%RD+0.00005V	
	10V	-2.0000V～12.0000V	0.1mV	0.015%RD+0.0005V	
Current	30mA	-0.000mA～31.000mA	1.0μA	0.015%RD+0.002mA	Powered by built - in LOOP
Resistance	400Ω	0.000Ω～400.000Ω	1mΩ	0.015%RD+0.1Ω	(0.1～0.4)mA excitation
				0.015%RD+0.05Ω	(0.4～0.8)mA excitation
				0.015%RD+0.02Ω	(0.8～1.2)mA excitation
				0.015%RD+0.02Ω	(1.2～5.0)mA excitation
	4kΩ	0.00000kΩ～4.00000kΩ	10mΩ	0.015%RD+0.002kΩ	(0.05～0.08)mA excitation
				0.015%RD+0.0003kΩ	(0.08～0.12)mA excitation
				0.015%RD+0.0005kΩ	(0.12～0.3)mA excitation
Thermocouple	S、R、B、K、N、J、E、T、EA2、Wre3-25、Wre5-26, resolution 0.01°C, see Table 3 for details				
Thermal resistor	Pt10、Pt100、Pt200、Cu50、Cu100、Pt500、Pt1000、 Ni100 (617)、Ni100 (618)、Ni120、Ni1000, resolution 0.001°C, see Table 2 for details.				
Frequency [Note 1]	1kHz	0.000050kHz～1.200000kHz	0.001Hz	0.015%RD+0.00005kHz	Support pulse counting function
	100kHz	0.005kHz～120.000kHz	1.0Hz	0.04%RD+0.05kHz	Settings ⩽50kHz
				0.07%RD+0.05kHz	Settings >
LOOP	Isolated power supply, output voltage 24V±0.5V, load capacity 30mA, ripple <20mVp-p				50kHz

Note 1: Duty cycle setting range: 0.1%~99.9%, amplitude setting range: 0V~12V, pulse function maximum count value 99999.
Note 2: The above technical parameters are based on an ambient temperature of 23°C±5°C.

■ Temperature Parameters

Table 1 Thermal resistance measurement function

Range	Measuring range	Accuracy[Note 1][Note 2]
SPRT25	-189.344°C～660.323°C	0.08°C@-100°C;0.1°C+0.012%RD@(0～660.323)°C
SPRT100	-189.344°C～660.323°C	0.07°C@-100°C;0.09°C+0.02%RD@(0～660.323)°C
Pt100(3851/3916)	-200°C～850°C	0.05°C@-200°C;0.07°C@-100°C;0.09°C+0.02%RD@(0～850)°C
Pt200	-200°C～850°C	0.03°C@-200°C;0.05°C@-100°C;0.07°C+0.02%RD@(0～850)°C
Pt500	-200°C～370°C	0.02°C@-200°C;0.04°C@-100°C;0.05°C+0.018%RD@(0～370)°C
Pt1000	-200°C～850°C	0.05°C@-200°C;0.07°C@-100°C;0.09°C+0.02%RD@(0～850)°C
Cu50	-50°C～150°C	0.05°C@-50°C;0.06°C+0.01%RD@(0～150)°C
Cu100	-50°C～150°C	0.07°C@-50°C;0.09°C+0.02%RD@(0～150)°C
Ni100(617)	-60°C～180°C	0.07°C
Ni120(672)	-80°C～310°C	0.05°C@-80°C;0.06°C@(0～310)°C
Ni1000	-60°C～250°C	0.08°C
Ni100(618)	-60°C～180°C	0.07°C

Note 1: The above technical parameters are calculated based on the corresponding electrical range technical parameters.
Note 2: The four-wire measurement method is adopted.

Table 2 Output thermal resistance function

Range	Measuring range	Accuracy[Note 1][Note 2]
Pt100(3851/3916)	-200°C～850°C	0.05°C@-200°C;0.07°C@-100°C;0.09°C+0.02%RD@(0～850)°C
Pt200	-200°C～270°C	0.03°C@-200°C;0.05°C@-100°C;0.07°C+0.02%RD@(0～270)°C
Pt500	-200°C～850°C	0.15°C@-200°C;0.17°C@-100°C;0.2°C+0.025%RD@(0～850)°C
Pt1000	-200°C～850°C	0.08°C@-200°C;0.1°C@-100°C;0.12°C+0.025%RD@(0～850)°C
Cu50	-50°C～150°C	0.15°C
Cu100	-50°C～150°C	0.1°C
Ni100(617)	-60°C～180°C	0.07°C
Ni120(672)	-80°C～310°C	0.06°C
Ni1000	-60°C～250°C	0.1°C@-60°C;0.1°C-0.007%RD@(0～250)°C
Ni100(618)	-60°C～180°C	0.065°C

Note 1: The above technical parameters are calculated based on the corresponding electrical range technical parameters.
Note 2: Pt100, Pt200, Cu50, Cu100 ranges use 1.0mA excitation current, and Pt500, Pt1000 ranges use 0.1mA excitation current.

Table 3 Measurement/output thermocouple functions

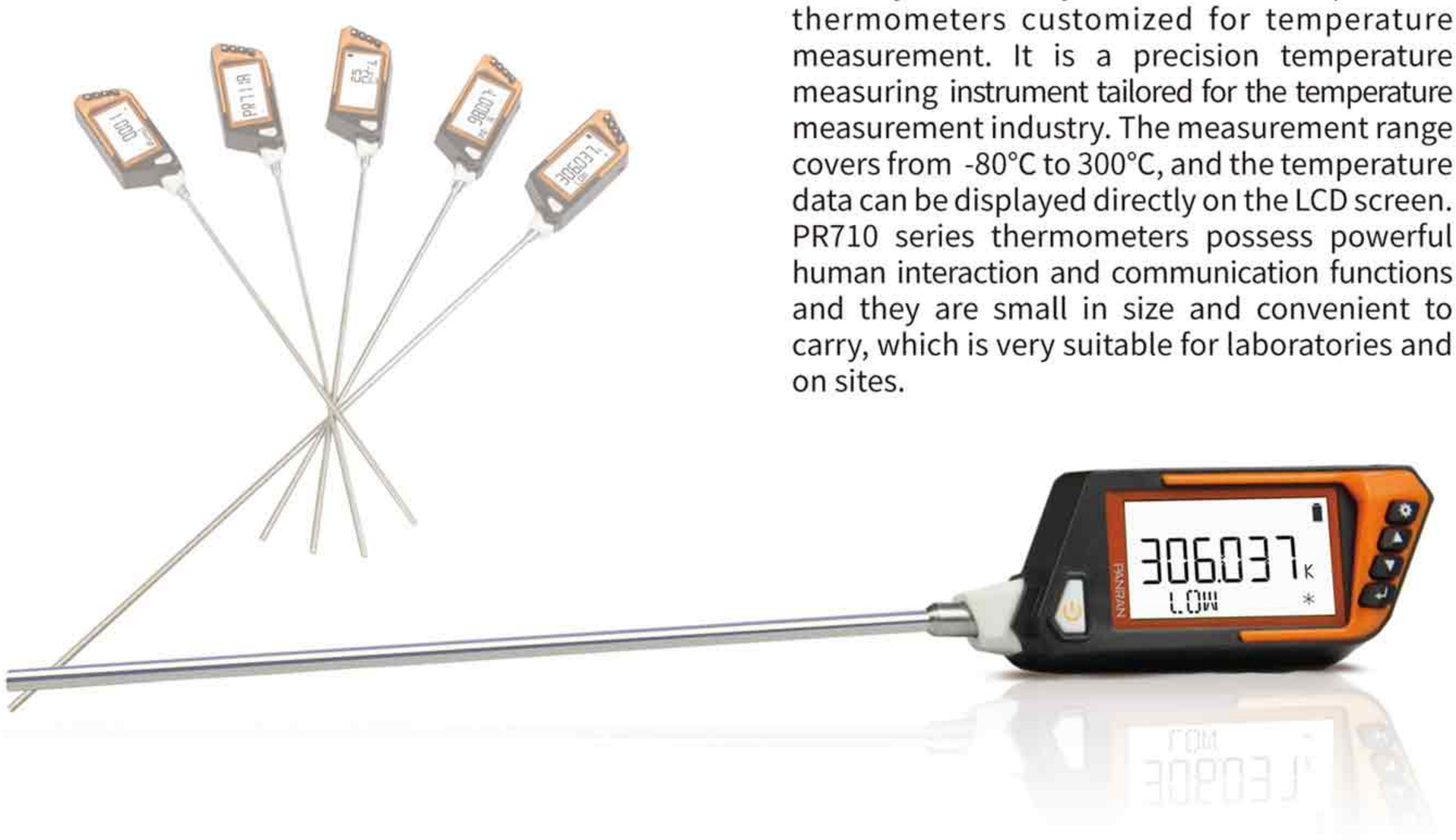
Type	Range		Accuracy[Note 1][Note 2]
	Measurement	Output	
S	-50°C～1768°C		1.0°C@(-10～200)°C;0.6°C@(200～1500)°C;0.7°C@(1500～1768)°C
R			1.2°C@(-10～100)°C;0.7°C@(100～200)°C;0.6°C@(200～1768)°C
B	0°C～1820°C		1.2°C@(400～600)°C;0.9°C@(600～800)°C;0.7°C@(800～1000)°C;0.6°C@(1000～1820)°C
K	-200°C～1372°C	-270°C～1372°C	0.2°C@(-100～700)°C;0.3°C@(700～1100)°C;0.4°C@(1100～1372)°C
N	-200°C～1300°C	-270°C～1300°C	0.3°C@(-100～0)°C;0.2°C@(0～700)°C;0.3°C@(700～1100)°C;0.4°C@(1100～1300)°C
J	-210°C～1200°C		0.3°C@(-200～-150)°C;0.2°C@(-150～900)°C;0.3°C@(900～1200)°C
E	-200°C～1000°C	-270°C～1000°C	0.3°C@(-200～-150)°C;0.2°C@(-150～1000)°C
T	-200°C～400°C	-270°C～400°C	0.4°C@(-200～-100)°C;0.2°C@(-100～400)°C
Wre3-25 Wre5-26	0°C～2315°C		0.5°C@(0～400)°C;0.4°C@(400～900)°C;0.5°C@(900～1200)°C; 0.6°C@(1200～1600)°C; 0.9°C@(1600～2100)°C;1.3°C@(2100～2315)°C
EA2	-50°C～800°C		0.1°C@(-10～300)°C;0.2°C@(300～800)°C

Note 1: The above technical parameters are calculated based on the corresponding electrical range technical parameters.
Note 2: The accuracy does not include the reference end compensation error. The built-in compensation needs to be used with the TC plug and add 0.3°C reference end compensation error.

PR710 Series Precision Digital Thermometer

—— Ideal replacement for standard mercury thermometers

The PR710 series, with characteristics of high accuracy and stability, are the hand-held precision thermometers customized for temperature measurement. It is a precision temperature measuring instrument tailored for the temperature measurement industry. The measurement range covers from -80°C to 300°C, and the temperature data can be displayed directly on the LCD screen. PR710 series thermometers possess powerful human interaction and communication functions and they are small in size and convenient to carry, which is very suitable for laboratories and on sites.



I Features

■ Excellent Measurement Accuracy

With the characteristics of self-calibration using the internal standard resistance, PR710 series thermometers offer an excellent long-term stability to ensure that the annual change of the whole series of products is better than 0.05°C. the PR712 series products annual change of full-scale is better than 0.01°C.

■ Extremely-low Temperature Coefficient

In the temperature range of -10°C～60°C, the temperature coefficient of PR710 series thermometers is as low as 1ppm/°C. When the thermometers are run above the heat source, the temperature of the heat source has little effect on its temperature indication.

■ Traceable to Other Standard Temperature Device

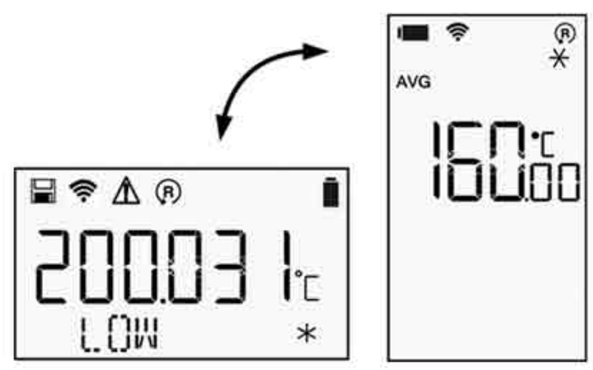
With authorization, using the software of master controller or the calibration function provided by itself, PR710 can be easily traced to standard temperature devices such as SPRTs. After tracing, the temperature measurement data can be coincide with standard devices for a long time.

■ Resolution of 0.001°C

The electrical measurement performance is comparable to the commonly used 7 1/2 multimeter. Stable readings at a resolution of 0.001°C can be achieved.

■ The Screen Can Suit the Sight with its Built-in Gravity Sensor

There are two display modes, the horizontal and the vertical, to realize automatic conversion of two display modes, making it easy to read during operation.



▲ Automatic flipping screen

■ Ultra-low Power Consumption

Under the premise of turning off the wireless communication function, they can work continuously for more than 1400 hours with only three AAA batteries.

■ Wireless Communication Function

After the PR6002 wireless communication module is connected to the master controller,can be established with multiple PR710 series thermometers, and the indication data of the thermometers can be monitored in a real-time way.Compared with other traditional standard devices, the thermometers are easier to get the temperature indication.

▲ Wireless communication module

2.Models and Specifications

PR710A	PR711A
	
PR712A	**PR713A**
	

Specification \ Model	PR710A	PR711A	PR712A	PR713A
Name	Precision digital thermometers		Standard digital thermometers	Precision digital thermometers
Temperature range	-40～160°C	-80～300°C	-5～50°C	-40°C～160°C
Accuracy	0.05°C	0.05°C+0.01%RD	0.01°C	0.05°C
Sensor length	300mm	500mm	400mm	1300mm
Sensor specifications	Metal rod	Metal rod	Metal rod	Waterproof cord
Weight	145g	160g	150g	160g
Sensor Diameter	ϕ5mm	Φ6mm	ϕ5mm	ϕ5mm
Calibration period	1 year			
Display resolution	0.01°C and 0.001°C optional			
Sampling speed	1 second and 3 seconds optional			
Number of data records	16 sets of data can be stored, a total of 16000 data points, and a single set of data has up to 8000 data points.			
Communication	2.4G wireless (Use the ZigBee protocol)			
Wireless communication distance	The straight-line distance from the transmitter in the same space is greater than 30 meters			
Duration	When wireless communication and backlight are turned off: ⩾1400 hours When wireless communication is turned on: ⩾700 hours			
Battery type	Three AAA alkaline batteries			
Device dimensions	104mm×46mm×30mm			
Operation environment	-10°C～50°C			
Warm-up time	Valid after 1 minute of warm-up			

PR721 Series Precision Digital Thermometer

China National Explosion-proof

- ✔ Intelligent Sensor
- ✔ High Accuracy
- ✔ Wireless Communication
- ✔ U Disk Mode
- ✔ Ingress Protection Rating: IP64

PR721 series precision digital thermometer adopts intelligent sensor with locking structure, which can be replaced with sensors of different specifications to meet different temperature measurement needs. The supported sensor types include wire-wound platinum resistance, thin-film platinum resistance, thermocouple and humidity sensors, which can automatically identify and load the type, temperature range and correction value of the connected sensor. The thermometer as a whole adopts an aluminum alloy structure, has obtained the national explosion-proof safety certificate (CNEx22.3596X), and has an IP64 protection rating, enabling reliable use in harsh environments.

1.Technical Features

■ Intelligent Sensor

The temperature measurement range covers -200°C to 1300°C. It uses high-temperature-resistant locking components. After the host is connected to the intelligent sensor, it can automatically load the type, temperature range and correction value of the current sensor, improving the accuracy of temperature traceability and work efficiency.

■ Low Temperature Drift

Within the range of 5°C to 50°C, the electrical measurement accuracy is better than class 0.01, and the temperature resolution is 0.001°C, which can meet high-standard temperature calibration requirements.

■ USB Flash Drive Mode

It can be charged or transfer data through the Micro USB interface, facilitating quick editing of test data.

■ Gravity Sensing

It supports automatic screen rotation, and ideal reading experience can be obtained whether placed horizontally on the left or right.

■ Supports Bluetooth or ZigBee Communication

The Panran Smart Metrology APP can be used for data synchronization or expanding other applications.

■ Protection Rating IP64

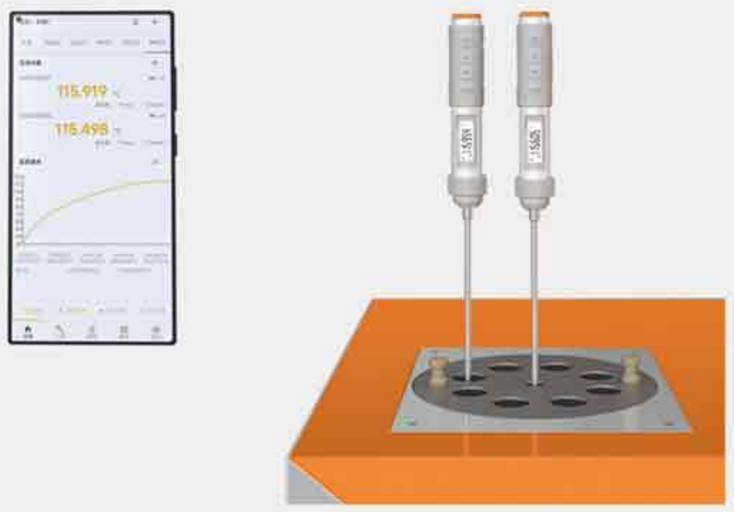
It can be used reliably in complex environments.

■ Ultra-low Power Consumption

Built-in rechargeable lithium battery, with a continuous working time of more than 80 hours.

▲ Sensor locking assembly

▲ Edit data and charging



▲ Two thermometers were connected to the mobile APP for temperature difference test

2.Other Functions

Function List

- ■ Fluctuation measurement with settable time intervals
- ■ Relative temperature measurement
- ■ Calculation of maximum, minimum and average values
- ■ Conversion between electrical values and temperature values
- ■ Editing of sensor correction values
- ■ Over-temperature alarm
- ■ Built-in high-precision real-time clock
- ■ Optional °C, °F, K

▲ Smart metrology APP interface

3.Technical Parameters

■ General Parameters

Model	PR721A PR722A	PR721B PR722B	Remark
External Dimensions	ϕ29mm×145mm		Excluding the sensor
Weight	80g		Weight including battery
Data Storage Capacity	8MB(stores 320,000 sets of data)		Including time information
External Interface	Micro USB		Charging/data
Battery Specifications	3.7V 650mAh		Rechargeable lithium battery
Charging Time	1.5hours		DC5V 2A charging
Battery Duration	⩾80hours	⩾120hours	
Wireless Communication	Bluetooth	ZigBee	Built-in communication module
Effective Communication Distance	⩾10m	⩾30m	Within the same space

■ Electrical Accuracy (1-year calibration interval)

Measuring Range	PR721 Series	PR722 Series	Remark
0.0000~400.0000Ω	0.01%RD+5mΩ	0.004%RD+3mΩ	1mA Excitation current
0.000~20.000mV	0.01%RD+3μV		Input impedance ⩾100MΩ
0.000~50.000mV	0.01%RD+5μV		
0.00000~1.00000V	0.015%RD+20μV		
Temperature Coefficient	Resistance: 5ppm/°C Voltage: 10ppm/°C	Resistance: 2ppm/°C Voltage: 5ppm/°C	5°C~50°C

■ Temperature Accuracy (1-year calibration interval)

Sensor Type	PR721 Series	PR722 Series	Resolution
Pt100	±0.04°C@0°C ±0.05°C@100°C ±0.07°C@300°C	±0.02°C@0°C ±0.02°C@100°C ±0.03°C@300°C	0.001°C
Type S Thermocouple	±0.6°C@0°C ±0.4°C@600°C	±0.5°C@1000°C	0.01°C
Type N thermocouple	±0.2°C@300°C ±0.3°C@600°C	±0.3°C@1000°C	0.01°C
Reference Junction Compensation	±0.15°C@0°C ±0.20°C@20°C	±0.30°C@50°C	0.01°C

Note 1：Temperature accuracy is converted from electrical accuracy.

4.Sensor Selection

■ Reference Sensor (Uses Pt100 wire-wound resistance elements, and is only compatible with PR722 series precision digital thermometers)

Temperature Range	Model	Specification (mm)	One Year Accuracy	Remark
-40°C~160°C	APSK1503000	ϕ5*300	0.05°C	
	APSG1500401	ϕ5*45	0.05°C	1.5m silicone wire
-80°C~300°C	APSK2605000	ϕ6*500	0.05°C+0.01%RD	

Note 1: The specifications do not include the dimensions of the connector; the overall dimensions of the sensor need an additional 40mm.
Note 2: The accuracy refers to the overall accuracy of the sensor and the thermometer.

■ Platinum Resistance Sensor (Uses Pt100 wire-wound or thin-film elements, compatible with the full range of precision digital thermometers)

Temperature Range	Model	Specification(mm)	Accuracy	Remark
-200°C~300°C	APSK0605000	ϕ6*500	0.10°C+0.07%RD	
-40°C~160°C	APPG1500403	ϕ5*40	0.07°C+0.1%RD	3m silicone wire
-80°C~260°C	APPG2400403	ϕ4*40	0.07°C+0.1%RD	3m PTFE cable, usable at 300°C for short periods
-80°C~300°C	APPK2504000	ϕ5*400	0.10°C+0.1%RD	
	APPK2505000	ϕ5*500	0.10°C+0.1%RD	
0°C~500°C	APPK3605000	ϕ6*500	0.15°C+0.1%RD	
0°C~700°C	APSK4302700	ϕ3*270	0.15°C+0.07%RD	
	APSK4304300	ϕ3*430	0.15°C+0.07%RD	
0°C~800°C	APSK5605000	ϕ6*500	0.15°C+0.07%RD	

Note 1: The specifications do not include the dimensions of the connector; the overall dimensions of the sensor need an additional 40mm.
Note 2: The accuracy refers to the overall accuracy of the sensor and the thermometer.
Note 3：APSK sensor adopts wire-wound platinum resistance.

■ Thermocouple Sensor (Type N thermocouple, compatible with the full range of precision digital thermometers)

Temperature range	Model	Specification (mm)	Accuracy	Remark
RT~800°C	ANPK5107000	ϕ1.5*700	0.6°C+0.1%RD	
RT~800°C	ANPK5307000	ϕ3*700		
RT~1250°C	ANPK8310200	ϕ3*1000		Usable at 1300°C for short periods
RT~1250°C	ANPK8320200	ϕ3*2000		
RT~1250°C	ANPK8330200	ϕ3*3000		

Note 1：The accuracy includes the reference junction compensation error.
Note 2：The accuracy refers to the overall accuracy of the sensor and the thermometer.
Note 3：Thermocouple length can be customized.

5.Optional Accessories

The PR7200 multi-functional connector adopts a self-locking wiring method, allowing users to freely connect bare-wire or pin-type sensors with this accessory. The connector integrates a temperature sensor and a memory inside, which are used for measuring the reference junction of thermocouples and storing data such as sensor type and correction value. An intelligent sensor can be formed once connected. This accessory is applicable to PR721A/ PR722A digital thermometers with Bluetooth function. The digital thermometer connects to the smart metrology APP on the mobile phone via Bluetooth, enabling easy reading or writing of sensor type and correction value information from the mobile phone.

The PR7200 multi-functional connector supports the following sensor types: Pt100/ Pt1000/ S/R/B/T/K/E/J/N.

PR750 Series
High Precision Temperature & Humidity Recorder

PR750 series high-precision temperature and humidity recorder (hereinafter referred to as "recorder") is suitable for temperature and humidity testing and calibration of large-space environment in the range of -30°C～60°C. It integrates temperature and humidity measurement, display, storage and wireless communication. The appearance is small and portable, its use is very flexible. It can be combined with PC, PR2002 Wireless Repeaters and PR190A data server to form the various testing systems that are suitable for temperature and humidity measurement in different environment.

- ✔ Temperature&humidity measurement
- ✔ Remote data monitoring
- ✔ Built-in storage and USB flash drive mode
- ✔ High and low temperature environment temperature and humidity measurement in large space

1.Features

■ Distributed Temperature and Humidity Measurement

A 2.4G wireless LAN is established through the PR190A data server, and one wireless LAN can accommodate up to 254 temperature and humidity recorders. When using, just place or hang the recorder in the corresponding position, and the recorder will automatically collect and store temperature and humidity data at preset time intervals.

■ Signal Blind Spots can be Eliminated

If the measurement space is large or there are many obstructions in the space to cause degraded communication quality, the signal strength of WLAN can be improved by adding some repeaters (PR2002 Wireless Repeaters). which can effectively solve the problem of wireless signal coverage in large space or irregular space.

■ Software and Hardware Design to Ensure the Reliability of Test Data

In the case of abnormal or missing data sent and received by the wireless network, the system will automatically query and supplement the missing data. Even if the recorder is offline during the entire recording process, the data can be supplemented in the U disk mode later, which can be used for Users provide complete raw data.

■ Excellent Full-scale Temperature and Humidity Accuracy

In order to meet the diverse calibration needs of users, different models of recorders use temperature and humidity measuring elements with different principles, which have excellent measurement accuracy in their full range, providing reliable guarantee for temperature and humidity traceability and calibration.

▲ PR750A、PR751A/B、PR752A/B are shown from left to right

▲ Micro USB connecting with PC or dedicated tablet

▲ PR750A shown partial close-up

▲ Bottom mechanical switch close-up

■ Low Power Consumption Design

PR750A can work continuously for more than 85 hours under the setting of one minute sampling period, while PR751 series products can work continuously for more than 200 hours. The working time can be further increased by configuring longer sampling period.

■ Built in Storage and U Disk Mode

Built-in FLASH memory, can store more than 50 days of measurement data. And can charge or transfer data through Micro USB interface. After connecting to the PC, the recorder can be used as a U disk for data copying and editing, which is convenient for fast processing of test data when the local wireless network is abnormal.

■ Flexible and Easy to Operate

No other peripherals are needed to view the current temperature and humidity value, power, network number, address and other information, which is convenient for users to debug before networking. Furthermore, users can easily configure different environmental temperature and humidity calibration systems according to the actual needs.

■ Excellent Software Features

The recorder is equipped with professional temperature and humidity acquisition software. In addition to the regular display of various real-time data, curves and data storage and other basic functions, it also has visual layout configuration, real-time temperature and humidity cloud map display, data processing, and report output functions. The software can perform automated calibration of temperature and humidity parameters in constant temperature and humidity laboratories according to《JJF 2058-2023 Calibration Specification for Environmental Parameters in Constant Temperature and Humidity Laboratories》.

■ Remote Monitoring can be Realized with PANRAN Smart Metrology

All the original data in the whole test process will be sent to the cloud server through network in real time,The user can monitor the test data, test status and data quality in real time on the RANRAN smart metrology app, and can also view and output historical test data to establish a cloud data center, and provide users with long term data cloud storage, cloud computing and other services.

2.Technical Parameters

■ Basic Parameters

Item \ Model	PR750A	PR751A	PR751B	PR752A	PR752B
Name	High precision temperature and humidity recorder	High precision temperature recorder			
Sensor	Straight rod type φ12×38mm	Straight rod type φ4×38mm		Soft wire type φ4×300mm	
Dimensions	φ38×48mm (75mm including sensor height)				
Weight	80g	78g		84g	
Battery duration	85 hours (3.5days)	200 hours (8 days)			
Charging time	1.5 hours	3 hours			
Battery type	Rechargeable lithium batteries				
Battery specifications	3.7V 650mAh	3.7V 1300mAh			
Data storage capacity	2MB (store 60K sets of data)	2MB 2MB (store 80K sets of data)			
Effective communication distance	Linear distance from transmitter≧30m				
Wireless communication	2.4G (using ZIGBEE protocol)				
Charging interface	Standard Micro USB				
Calibration Cycle	1 year				

■ Measurement Parameters

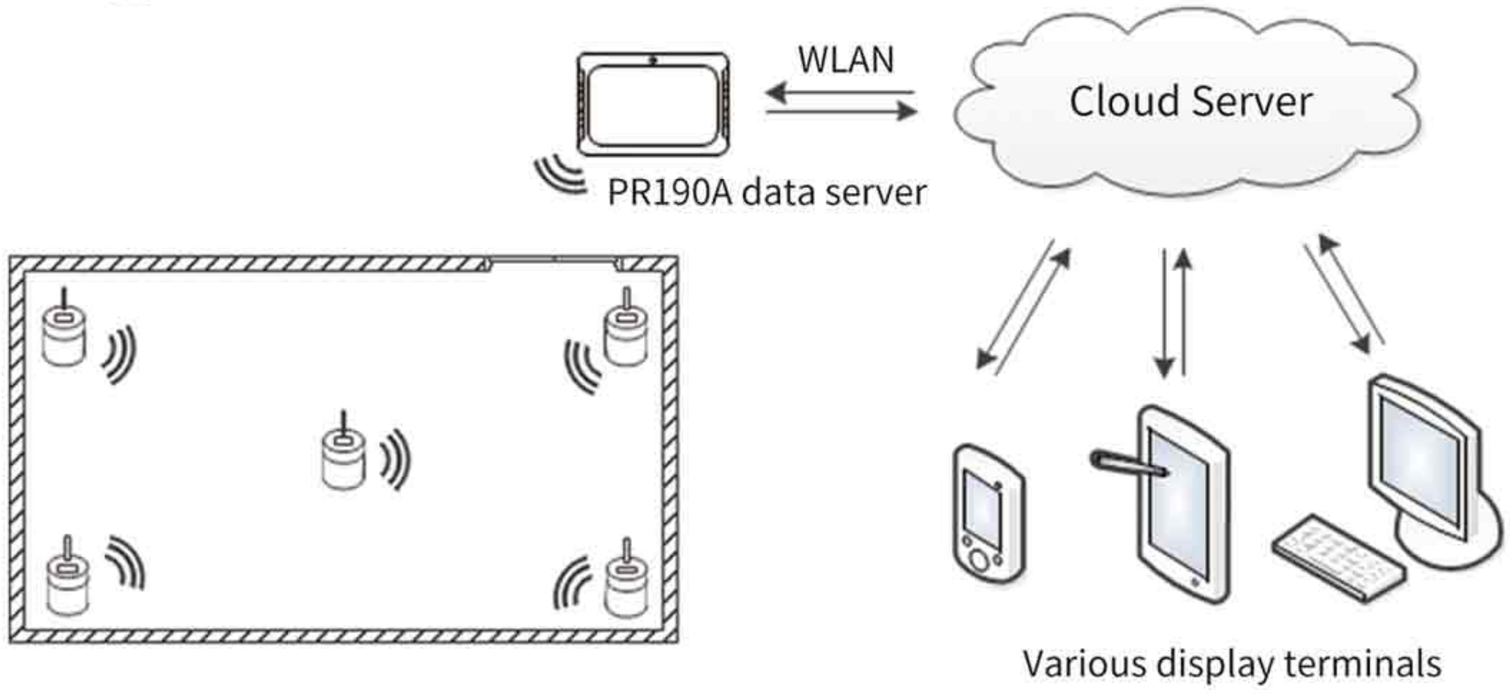
Item \ Model	PR750A	PR751A	PR752A	PR751B	PR752B
Measurement range	-30°C～60°C 0%RH～100%RH	-30°C～60°C			
Resolution	0.01°C 0.01%RH	0.01°C			
Temperature accuracy [Note 1][Note 2]	±0.1°C@(5～30)°C ±0.2°C@(-30～60)°C	±0.07°C@(5～30)°C ±0.1°C@(-30～60)°C		±0.2°C	
Humidity accuracy	±1.5%RH@(5～30)°C ±3.0%RH@(-30～60)°C	/			

Note 1: For calibration of PR750/751 recorders, the entire recorder unit must be fully immersed in a constant-temperature environment.
Note 2: PR752 recorders employ a probe immersion method in liquid bath calibration. Considering the impact of ambient temperature on the recorder mainframe, additional measurement errors may occur when operating in non-ambient conditions.

3.Components

■ PR190A Data Server

PR190A data server is a key component to realize the data interaction between recorders and cloud server, It can automatically set up a LAN without any peripherals and replace the general PC. It can also upload real-time temperature and humidity data to the cloud server through WLAN or wired network for remote data monitoring and data processing.



Model	PR190A data server
Memory	4GB
FLASH memory	128GB
Display	10.1” 1280*800 IPS/10 capacitive touch screen (glove touch can be supported)
Wireless	GPS、Bluetooth、WLAN、ZigBee
Battery	7.4V/5000mAH/Removable battery
I/O interface	TF card holder of memory cardx1、USB 3.0x1、Micro USB2.0x1、Earphone/Microphone jackx1、DC power interfacex1、Mini HDMI interface x1、Pogo Pin interface(12pin) x1、RS232 serial portx1 、RJ45x1
Power supply adapter	Input：AC 100~240VAC、50/60HZ，Output：DC 19V，2.1A
Dimension	278X186X26mm (L×W×T)
Weight	1.28kg with external AC adapters
Working/storage temperature	Working temperature：-10～60°C Storage temperature：-30°C~70°C/Humidity : 95 %RH no-condensation

■ PR2002 Wireless Repeater

PR2002 wireless repeater is used to extend the communication distance of 2.4G wireless network based on zigbee communication protocol.With built-in 6500mAh large-capacity lithium battery, the repeater can work continuously for about 7 days. PR2002 wireless repeater will automatically connect the network with the same network number, the recorder in the network will automatically connect to the repeater according to the strength of the signal.

The effective communication distance of the PR2002 wireless repeater is much longer than the transmission distance of the low-power transmission module built in the recorder.Under open conditions, the ultimate communication distance between the two PR2002 wireless repeaters can reach 500m.

Model	PR2002 wireless repeater	The charging interface	Micro USB
Radio transmitting power	23dBm	External dimensions (excluding antenna)	71×27×88mm (L×W×H)
Maximum transmission rate	250kbps	Weight	220g
The battery specification	3.7V 6800mAH	Working/storage temperature	-10～60°C, 10～90%RH non-condensing

PR381 Series
Temperature & Humidity Standard Chamber

The upgraded

Calibrating all kinds of digital and mechanical thermo-hygrometers

- Humidity is controllable within the range of 5°C~50°C
- Humidity operating range: 10%RH~95%RH
- Humidity stability: ±0.3%RH/30 minutes
- Support Panran Smart Metrology APP

PR381 series temperature & humidity standard chambers are high-performance temperature and humidity generating devices, which can be used to calibrate various digital and mechanical thermo-hygrometers. This series of products adopts the latest temperature and humidity controller developed by Panran. While expanding the temperature and humidity operating range, key technical parameters such as humidity control speed and stability have been significantly improved. In terms of structure, the product features designs such as three-side window openings, double-side wire outlet, and detachable pallets, enabling operators to carry out temperature and humidity calibration work more easily.

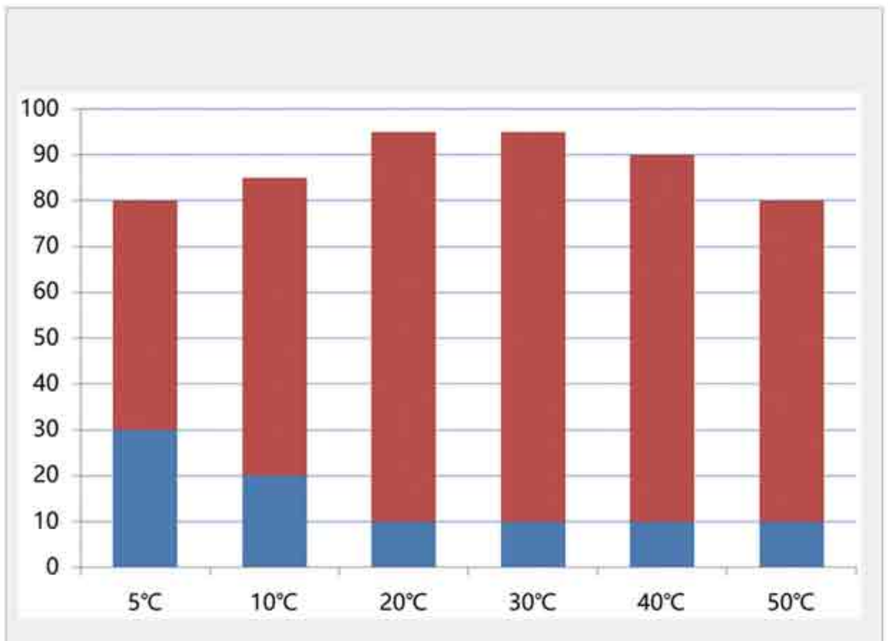
1.Product Features

■ Humidity can be Controlled Over Wide Temperature Area

In the temperature range of 20°C~30°C, humidity control of 10%RH~95%RH can be achieved, and in the temperature range of 5°C~50°C, humidity control of 30%RH~80%RH can be achieved.

■ Excellent Humidity Control Performance

The application of the new temperature and humidity control technology not only significantly expands the temperature and humidity operating range, but also greatly improves key technical parameters such as humidity control speed and stability. The humidity fluctuation is better than ±0.3%RH/30min.



▲ PR381A Effective temperature & Humidity working area (red part)

■ Dedicated Temperature and Humidity Controller

The new generation Panran PR2612 main controller is specially designed with a decoupling algorithm for temperature and humidity sources. It can automatically control physical quantities such as heating, cooling, humidification, dehumidification, and air speed according to the set temperature and humidity values as well as the ambient temperature and humidity.

■ Automatic/Manual Defrost Function

To avoid humidity control lag caused by evaporator condensation under long-term high-humidity conditions, the controller will automatically monitor the operating status and activate the rapid defrost function when necessary.

■ Powerful Environmental Adaptability

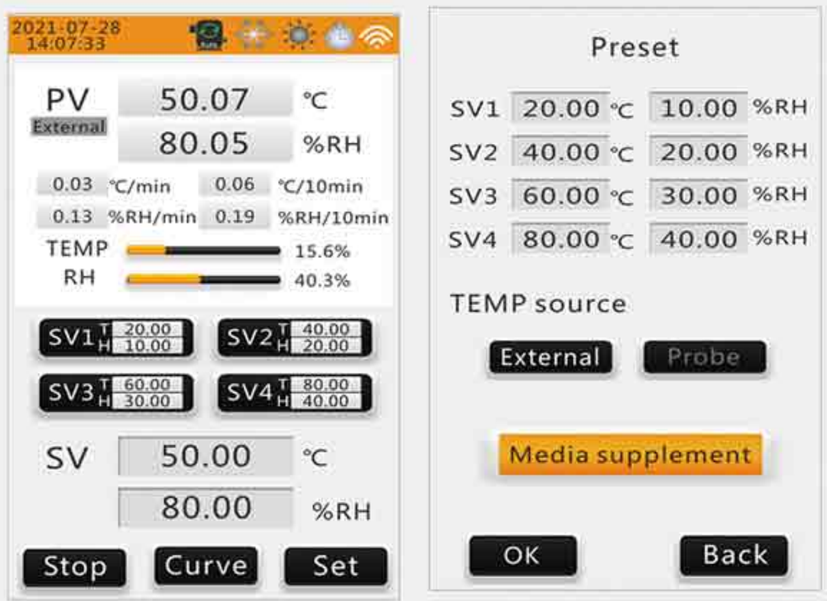
It adopts a closed cycle structure, which is not sensitive to the influence factors of environmental temperature and humidity, and has a strong inclusiveness. It can work for a long time in a normal temperature environment of 10°C~28°C.

■ Rich Human-machine Interaction Functions

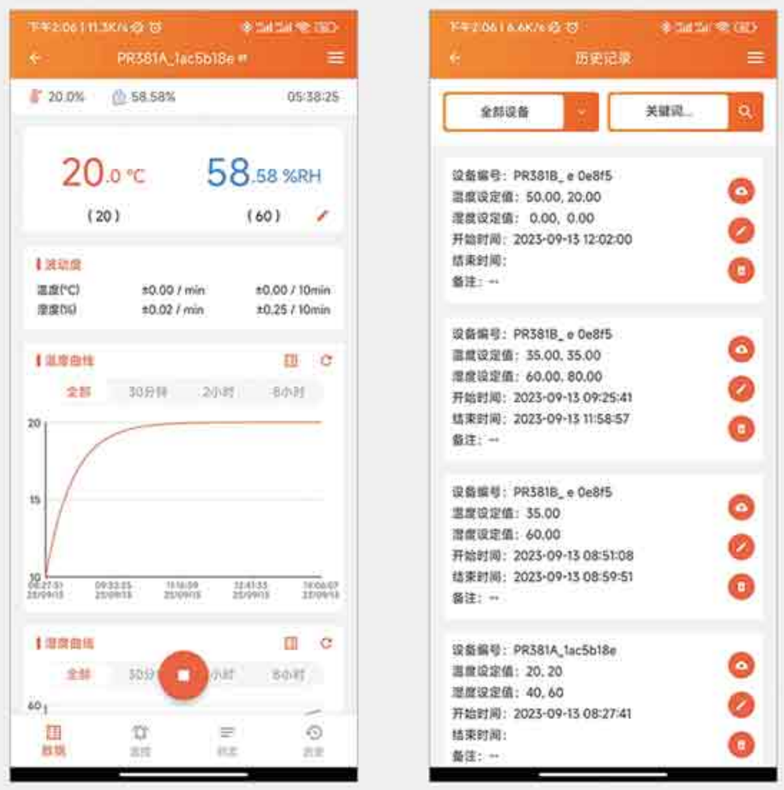
Equipped with a 7-inch color touch screen, it can display abundant process control parameters and control curves, and has auxiliary functions such as one-key start, alarm setting, SV preset, and timed start/stop.

■ Support PANRAN Smart Metrology APP

After optional WIFI module is installed, remote operation of the temperature and humidity standard chamber can be realized with Panran Smart Metrology APP, including viewing or modifying various real-time parameters, start/stop operations, etc.



▲ Color touch screen



▲ Remote operation of PANRAN smart metrology APP

2.Models and Technical Parameters

■ Basic Technical Parameters

Item \ Model	PR381 A/B	PR382 A/B	PR383 A/B	PR382C	PR382D
External Dimensions	180cm×100cm×70cm	180cm×130cm×80cm	180cm×130cm×120cm	180cm×130cm×80cm	
Working Cavity Dimensions	47cm×48cm×50cm	47cm×78cm×60cm	47cm×78cm×100cm	47cm×78cm×60cm	
Effective Volume	110L	220L	365L	220L	
Weight	300kg	400kg	500kg	400kg	
Rated Power	3kW	3kW	3kW	3.3kW	
Power Supply	220V AC, 50Hz				
Operating Environment	(10～28) °C, ≤75%RH			(10～23) °C, ≤70%RH	(10～25) °C, ≤70%RH

Note: Working cavity dimensions and external dimensions are H*D*W, and the external dimensions do not include pallet.

■ Temperature and Humidity Control Parameters

Item \ Model	PR381A/382A/383A	PR381B/382B/383B	PR382C	PR382D
Temperature Control Range	-5°C～65°C	-5°C～65°C	-20°C～80°C	-40°C～80°C
Humidity Control Range	10～95%RH@(20°C～30°C) 30～80%RH@(5°C～50°C)	10～95%RH@(20°C～30°C) 15～90%RH@(15°C～20°C)		
Auxiliary Cooling	●		●	
Temperature Resolution	0.01°C			
Temperature Uniformity	≤0.05°C@20°C(Note 4) ≤0.15°C@(15～30°C) ≤0.3°C@Other temperature ranges			
Temperature Stability	≤±0.1°C/30 minutes			
Temperature Rate of Change	≤0.02°C/minute		≤0.05°C/minute	
Temperature Accuracy	±0.1°C			
Humidity Resolution	0.01%RH			
Humidity Uniformity	≤0.8%RH			
Humidity Stability	≤±0.3%RH/30minutes			
Humidity Rate of Change	≤0.3%RH/minute			
Humidity Accuracy	±1.0%RH@ (15～30°C) ±1.5%RH @ Other temperature ranges			

Note 1: The auxiliary cooling employs air-cooling method.
Note 2: For Model D products, when the set temperature is below -20°C, anhydrous ethanol must be used as the working medium.
Note 3: Tests are based on JJF1564-2016 Calibration Specification for Temperature and Humidity Standard Chambers. Technical indicators not specifically noted in the table are valid for the full measurement range.
Note 4: When the set temperature is 20°C, the 100mm×100mm×100mm range at the center of the working chamber can meet the requirements specified in JJF1171-2024 Calibration Specification for Temperature and Humidity Itinerant Detecting Instruments.

Note: from left to right are PR382, PR381, PR383

PR611 Series Multifunctional Dry Block Calibrator

- ✔ Intelligent dual-zone temperature control
- ✔ Editable task mode
- ✔ Rapid heating and cooling
- ✔ Electrical measurement
- ✔ HART function

PR611A/PR613A dry block calibrator is a new generation of portable temperature calibration equipment that integrates advanced technologies such as intelligent dual-zone temperature control, automatic temperature calibration, and precision measurement. It has excellent static and dynamic temperature control characteristics, built-in independent full-function temperature measurement channel and standard measurement channel, and can edit complex calibration tasks. The automatic calibration of thermocouples, thermal resistances, temperature switches, and electrical signal output temperature transmitters can be realized without other peripherals, It' s very suitable for industrial field and laboratory .

1.Features

■ Dual-zone Temperature Control

The bottom and top of the dry block calibrator heating cavity have two independent temperature control, combined with temperature coupling control algorithm to ensure the uniformity of temperature field of dry block calibrator in a complex and changing environment.

■ Rapid Heating and Cooling

The heat and cooling capacity of the current working condition are adjusted in real time by intelligent control algorithm, while optimizing the control characteristics, the heating and cooling speed can be greatly increased.

■ Full-featured Flectrical Measurement Channel

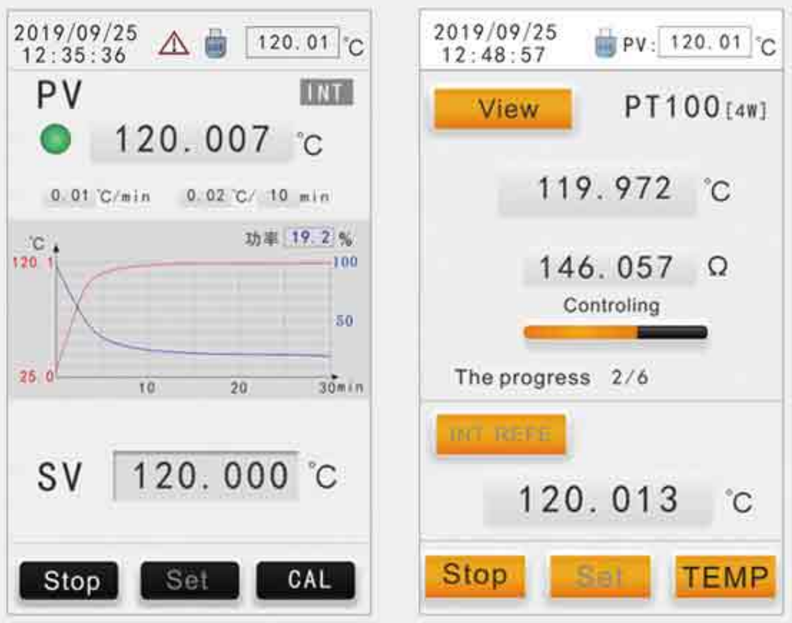
The accuracy is better than 0.02, and it can calibrate various thermal resistors, thermocouples, temperature transmitters and temperature switches.

■ Reference Measurement Channel

The standard wire-wound platinum resistance is used as the reference sensor, it supports multi-point interpolation correction algorithm to obtain better temperature traceability accuracy.

■ Editable Task Mode

Can edit and design complex task functions including temperature calibration points, stability criterion, sampling method, delay time and other multiple calibration parameters, so as to realize the automatic calibration process of multiple temperature calibration points.



▲ PR611A/H partial working interface

▲ PR613A/H partial working interface

■ Fully Automatic Temperature Switch Calibration

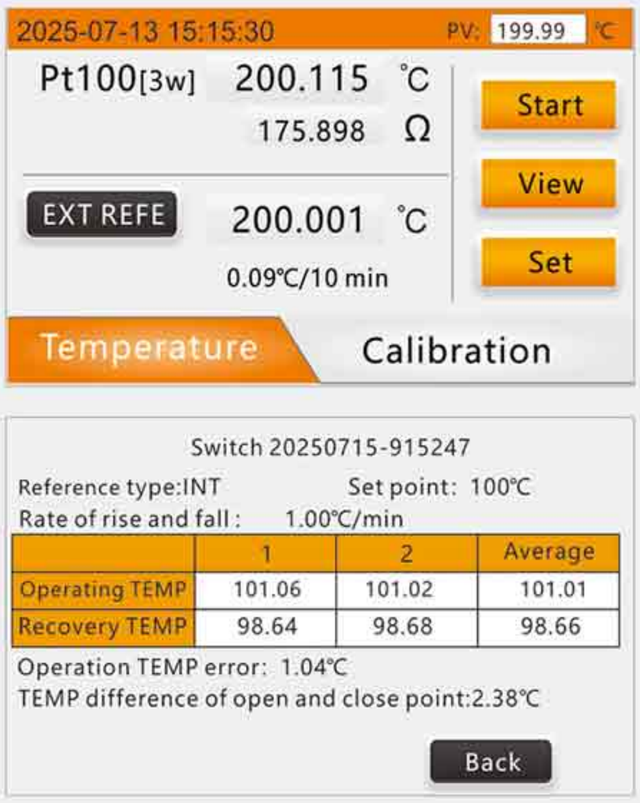
With a settable slope temperature rise and fall and switch value measurement functions, can perform fully automatic temperature switch calibration tasks through simple parameter settings.

■ Support HART Transmitter Calibration

With built-in 250Ω resistance and 24V loop power supply, the HART temperature transmitter can be independently calibrated without other peripherals.

■ Supports USB Storage Devices

The calibration data generated after the calibration task is executed will be saved in the internal memory in the format of a CSV file. The data can be viewed on the dry block calibrator or exported to a USB storage device through the USB interface.



▲ PR613A/H partial working interface

2.List of Main Functions

Software function	Hardware function
■ Optional internal/external reference sensor to control temperature ■ Programmable thermocouple, thermal resistance multi-point automatic calibration ■ Automatic switch calibration with adjustable slope for temperature rise and fall ■ Internal storage of calibration data ■ Multi-point internal/external reference temperature control parameter self-tuning ■ Adaptive temperature control parameters ■ Real-time temperature and power curve display ■ Self-defined temperature fluctuation calculation ■ U disk storage ■ Self-defined the upper and lower limit of alarm temperature ■ Optional °C, °F, K	■ mV/mA/V/Ω measurement ■ Switch measurement ■ Thermocouple measurement function ■ Two-wire, three-wire, and four-wire thermal resistance measurement ■ Built-in reference compensation ■ DC24V output (80mA max)

3.Technical Parameters

■ General Parameters

Item \ Model	PR611A	PR611H	PR613A	PR613H
HART communication		●		●
External dimensions	360mm (H) *150mm (W) *350mm (D)		360mm (H) *180mm (W) *270mm (D)	
Weight	12kg		9.2kg	
Rated power	700W		1200W	
Working environment	Working temperature: (0～50)°C, Non-condensing		Working temperature: (0～50)°C, Non-condensing	
Display	4.0 inch industrial touch screen, Resolution 800×480 pixels		4.0 inch industrial touch screen, Resolution 800×480 pixels	
Power requirements	220VAC±10%, 50Hz		220VAC±10%, 50Hz	
Communication	RS232、(Optional WiFi)			
Calibration period	1 year			

■ Temperature Field Parameters

Item \ Model	PR611A/H	PR613A/H	Remark
Temperature control range	-30°C～155°C	RT+10°C～700°C	
Resolution	0.001°C	0.001°C	
Insert diameter/insertion depth	ϕ26mm/160mm	ϕ26mm/155mm	
Built-in reference accuracy	±0.15°C@0°C ±0.30°C@100°C	±0.15°C@100°C ±0.60°C@600°C	[Note 1]
Temperature fluctuation	±0.01°C@0°C,100°C	±0.03°C@100°C ±0.07°C@600°C	10 minutes
Temperature difference between holes	0.01°C@0°C,100°C	0.03°C@100°C 0.10°C@600°C	[Note 1]
40mm Axial temperature difference	0.20°C@0°C,100°C	0.20°C@100°C 0.70°C@600°C	[[Note 1][Note 2]
60mm Axial temperature difference	0.50°C@0°C,100°C	0.50°C@100°C 1.00°C@600°C	[Note 1][Note 2]
Load impact	0.01°C	0.05°C@100°C 0.20°C@600°C	Use built-in reference [Note 3]
Heating time	23°C～155°C 17min	23°C～700°C 25min	Subject to the temperature at the bottom of insert
Cooling time	23°C～-30°C 12min	700°C～100°C 35min	
Stabilization time	⩽5min	⩽10min	Use built-in reference

The above technical parameters are all measured at an ambient temperature of 23°C, and the test data is based on the test dedicated insert PR6115T (Aluminum alloy material) /PR6135T(Copper alloy material).
Note 1:Tested with 2x ϕ3mm metal rod platinum resistance; Note 2:40mm/60mm from the bottom of the insert opening;
Note 3:The test condition was inserted two ϕ7mm metal rod platinum resistors.

■ Electrical Measurement Parameters

Type	Range	Signal range	Accuracy	Resolution	Remark
Voltage measurement	15mV	0mV～15mV	±0.015%RD+2μV	0.1μV	Input impedance⩾50MΩ
	50mV	0mV～50mV	±0.015%RD+5μV	0.1μV	Input impedance⩾50MΩ
	50V	0V～50V	±0.015%RD+0.005%FS	0.1mV	Input impedance⩾1MΩ
Resistance measurement	500Ω	0Ω～500Ω	±0.015%RD+0.005%FS	1mΩ	Four-wire, output 1mA current
	5KΩ	0KΩ～5KΩ	±0.015%RD+0.005%FS	10mΩ	Four-wire, output 0.1mA current
Current measurement	50mA	0mA～50mA	±0.015%RD+0.005%FS	1μA	Internal resistance=10Ω
Temperature coefficient	2ppm/°C@(Ω、KΩ) 5ppm/°C@(mV、V) 5ppm/°C@(mA)				
Note: Wiring is done through the front panel terminals.					

■ Thermocouple Temperature Measurement Parameters

Type	Signal range	Accuracy	Resolution	Remark
S、R	0°C～1760°C	±0.8°C@600°C ±1.0°C@1000°C	0.01°C	Including reference junction compensation error
N、K	-80°C～1300°C	±0.6°C@(⩽600°C) ±0.1%RD@(＞600°C)		
WRE325、WRE526	0°C～2300°C			
B	300°C～1800°C			
T	-200°C～400°C			
E	-90°C～800°C			
J	-100°C～1090°C			
EA2	-30°C～760°C			
Note: Use the front reference terminal for connection.				

■ Thermal Resistance Temperature Measurement Parameters

Type	Signal range	Accuracy	Resolution	Remark
Pt10	-200°C～800°C	±0.7°C	0.001°C	Using four-wire measurement method
Pt100(385/392)、Pt1000		±0.08°C@100°C ±0.18°C@700°C		
Pt200		±0.25°C@100°C ±0.45°C@700°C		
Pt500		±0.19°C@100°C ±0.37°C@700°C		
Cu50	-50°C～150°C	±0.17°C@100°C		
Cu100		±0.11°C@100°C		
External reference resistance	0°C～700°C	±0.05°C@100°C ±0.07°C@300°C ±0.10°C@600°C		
Note: The calibrated thermal resistance was wired through the terminals on the front panel, the external reference resistance was connected through the REFER port.				

PR550 Series Portable Liquid Calibration Bath

new!

- ✔ Rapid Temperature Rise and Fall
- ✔ Small Volume, Light Weight
- ✔ Full-function Electrical Measurement Channel (PR552B/PR553B)
- ✔ Fully Automatic Task Calibration (PR552B/PR553B)

The PR550 Series Portable Liquid Calibration Baths while nearly identical in the compact size and weight to conventional dry block calibrators, combine the advantages of liquid thermostatic bath - such as superior uniformity, large heat capacity, and exceptional resistance to environmental interference, with excellent static and dynamic temperature control characteristics. PR552B/PR553B models feature integrated full-function temperature measurement channels and standard instrument measurement channels, supporting editable calibration tasks. This enables fully automated on-site calibration of thermocouples, RTDs, temperature switches, and electrical-output temperature transmitters without external devices.

1.Appearance

■ Excellent Heating/Cooling and Constant Temperature Characteristics

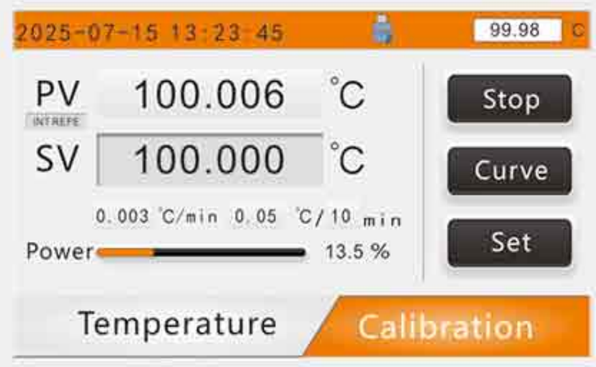
The PR550 series portable baths adopt innovative technologies including dual-zone heaters, AC/DC hybrid temperature control, and variable-speed stirring to enhance the dynamic and steady-state control performance of compact liquid constant temperature sources. Taking PR553B/C as an example: it only takes 12 minutes to heat up from ambient temperature to 100°C and reach stability, enabling fully automatic calibration of 3-4 temperature points within 1h - significantly improving on-site calibration efficiency.

■ Compact and Easy to Carry

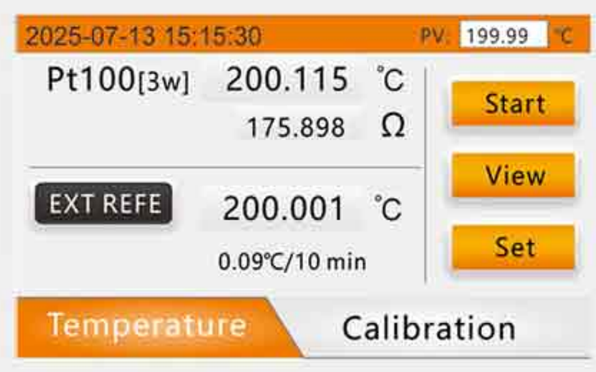
The entire product series incorporates multiple lightweight designs while ensuring structural strength meets requirements. Its compact dimensions and curb weight make it exceptionally easy to deploy at work sites. Taking the PR553B/C as an example, its total weight when filled with medium is merely 12kg, comparable to conventional dry block calibrators.

■ Sealed Design Prevents Medium Spillage During Routine Transit

The entire product series is equipped with dedicated flanges and sealing covers for the working cavity, along with a two-stage high-temperature resistant sealed bearing for the stirring motor's rotating shaft at the rear. This effectively prevents medium spillage under all circumstances except when dumping or inversion.



▲ Main temperature control interface (PR552B/PR553B)



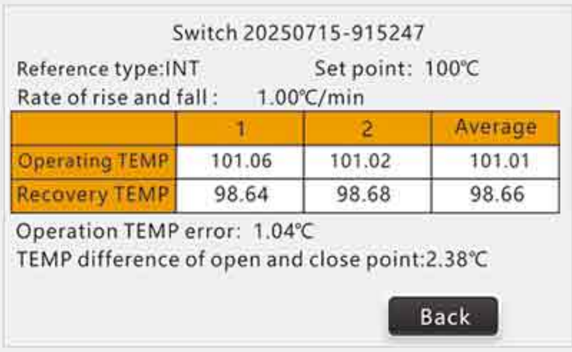
▲ Main calibration interface (PR552B/PR553B)

■ Independent Dual-channel Measurement Function (PR552B/PR553B)

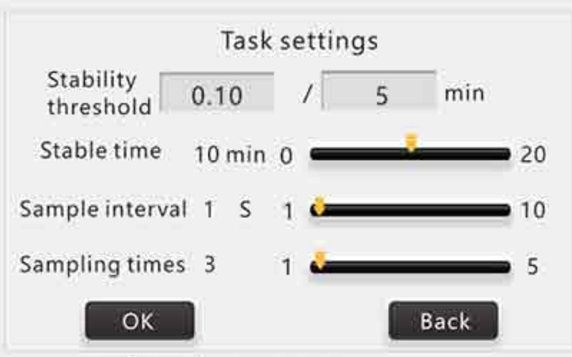
The first channel offers full-function measurement capacity, connecting to calibrated targets such as RTDs, thermocouples, temperature transmitters, and temperature switches via the terminal block on the left side of the screen. It also integrates a built-in 24V power supply. The second channel is used to connecting the standard reference temperature sensor, which employs a wire-wound platinum RTD.

■ Temperature Control Mode and Task Mode (PR552B/PR553B)

It can be switched with one-touch. In temperature control mode, users can view all real-time parameters related to temperature control. Task mode is designed for fully automatic calibration across multiple temperature points, allowing users to set key process parameters. Real-time data can be monitored during automatic calibration, and calibration results are generated upon task completion. PR552C/PR553C only support temperature control mode.



▲ Switch measurement result (PR552B/PR553B)



▲ Task rule setting (PR552B/PR553B)

2.Main Function List

Software Functions	Hardware Functions
■ Adaptive temperature control parameters ■ Real-time display of temperature & power curves ■ User-defined temperature stability calculation ■ User-defined upper and lower limits of temperature alarm ■ Selectable units: °C, °F, K ■ Selectable internal/external reference sensor for temperature control ■ Programmable multi-point automatic calibration for thermocouples & RTDs ■ Automatic calibration for switching quantities with configurable slope heating/cooling ■ Internal calibration data storage ■ Self-tuning of multi-point internal/external reference temperature control parameters ■ U-disk storage	■ Selectable WiFi communication, supporting Panran Cloud Metrology APP ■ Speed-adjustable DC stirring motor ■ Drain valve (Exclusive to PR553) ■ Removable oil tank (Exclusive to PR553) ■ mV/mA/V/Ω measurement ■ Switching measurement ■ Thermocouple measurement function ■ 2/3/4-wires RTD measurement ■ Built-in reference junction compensation ■ DC 24V output (70mA max) ■ USB 2.0 port

Note: Features marked in orange are exclusive to PR552B/PR553B models.

3.Technical Parameters

■ General Technical Parameters

Item \ Model	PR552B	PR552C	PR553B	PR553C
External Dimensions	420mm(L)×195mm(W)×380mm(H)		400mm(L)×195mm(W)×390mm(H)	
Working Cavity Dimensions	ϕ60mm×200mm		ϕ70mm×250mm	
Rated Power	500W		1700W	
Weight	No-load: 13kg; Full-load: 14kg		No-load: 10kg; Full-load: 12kg	
Operating Environment	Operating temperature range: (0~50) °C, non-condensing			
Display Screen	5.0 inches	7.0 inches	5.0 inches	7.0 inches
	Industrial touch screen | resolution: 800 × 480 pixels			
Electrical Measurement Function	●		●	
External Reference Sensor	●		●	
Task Function	●		●	
USB Storage	●		●	
Power Supply	220VAC±10%, 50Hz			
Communication Mode	RS232 (Optional WiFi)			
Calibration Cycle	1 Year			
Note: ● Indicates presence of this function				

■ Temperature Technical Parameters

Item \ Model	PR552B	PR552C	PR553B	PR553C	Remark
Setting Temperature Range	-30°C~160°C		50°C～300°C		At the ambient temperature of 23°C
Working Medium	Antifreeze [Note 3]		Methyl silicone oil		
Temperature Control Resolution	0.001°C		0.001°C		
Temperature Control Accuracy	0.1°C+0.17%RD		0.1°C+0.17%RD		
Temperature Stability	0.02°C		0.01°C@50°C 0.01°C@100°C 0.02°C@300°C		Temperature Stability/10 minutes
Temperature Uniformity	0.02°C@100°C 0.02°C@0°C 0.03°C@-30°C		0.02°C@50°C 0.02°C@100°C 0.03°C@300°C		[Note 1]
Heating and Cooling Rate	40min@RT~100°C 35min@RT~0°C 45min@0°C~-30°C		30min@RT~300°C 12min@100°C~200°C 15min@200°C~300°C		[Note 2]

All above technical parameters were measured at 23°C ambient temperature using specified working medium.
Note 1: Tests conducted with 6mm outer diameter metal-sheathed platinum RTDs. For the PR552B, the effective temperature zone is 20mm~120mm from bottom; for the PR553B, the effective temperature zone is 20mm~160mm from bottom.
Note 2: Indicates typical stabilization time required.
Note 3: For PR552B operations above 100°C, low-temperature heat transfer oil must be used as working medium.

■ Electrical Measurement Technical Parameters

Type	Range	Signal Range	Accuracy	Resolution	Remark
Voltage Measurement	15mV	0mV～15mV	±0.015%RD+2μV	0.1μV	Input impedance ⩾50 MΩ
	50mV	0mV～50mV	±0.015%RD+5μV	0.1μV	Input impedance ⩾50 MΩ
	50V	0V～50V	±0.015%RD+0.005%FS	0.1mV	Input impedance ⩾1 MΩ
Resistance Measurement	500Ω	0Ω～500Ω	±0.015%RD+0.005%FS	1mΩ	4-wires, outputting 1 mA current
	5kΩ	0kΩ～5kΩ	±0.015%RD+0.005%FS	10mΩ	4-wires, outputting 0.1 mA current
Current Measurement	50mA	0mA～50mA	±0.015%RD+0.005%FS	1μA	Internal resistance: 10 Ω
Temperature Coefficient	2ppm/°C@(Ω、KΩ)　5ppm /°C@(mV、V)　5ppm /°C@(mA)				
24V Output	Maximum Voltage Error: 0.3 V; Maximum Load Current: 70 mA				
Note: Connect via front-panel terminals.					

■ Thermocouple Measurement Parameters

Type	Signal Range	Accuracy	Resolution	Remark
S、R	0°C～1760°C	±0.8°C@600°C　±1.0°C@1000°C	0.01°C	Including reference junction compensation error
N、K	-80°C～1300°C	±0.6°C@(⩽600°C) ±0.1%RD@(＞600°C)		
WRE325、WRE526	0°C～2300°C			
B	300°C～1800°C			
T	-200°C～400°C			
E	-90°C～800°C			
J	-100°C～1090°C			
EA2	-30°C～760°C			
Note: Connect using the reference junction socket on the front panel.				

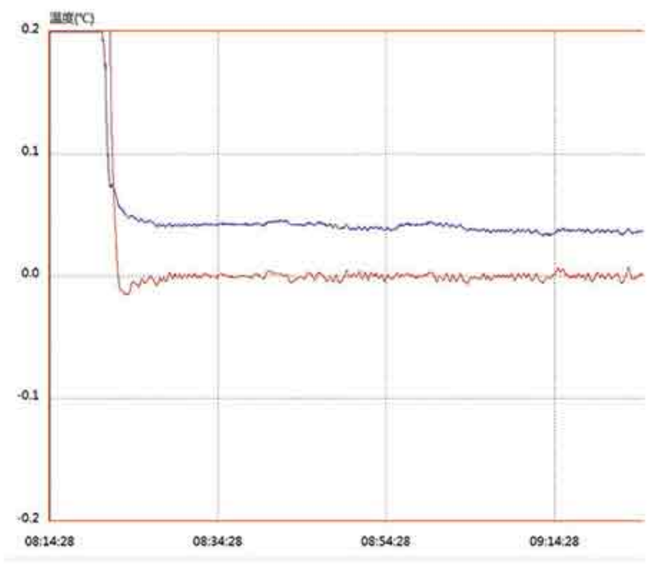
■ RTDs Measurement Parameters

Type	Signal Range	Accuracy	Resolution	Remark
Pt10	-200°C～800°C	±0.7°C	0.001°C	Employs 4-wires measurement method
Pt100(385/392)、Pt1000		±0.08°C@100°C　±0.18°C@700°C		
Pt200		±0.25°C@100°C　±0.45°C@700°C		
Pt500		±0.19°C@100°C　±0.37°C@700°C		
Cu50	-50°C～150°C	±0.17°C@100°C		
Cu100		±0.11°C@100°C		
External Reference RTD	0°C～700°C	±0.05°C@100°C　±0.07°C@300°C　±0.10°C@600°C		
Note: Connect the RTD under calibration to the front-panel terminals, while the external reference RTD must be connected to the dedicated REFER port.				

PR540 Series Ice-Point Reference Dry-Well

▲ Optional working cavity sizes

PR540 Series Ice-Point Reference Dry-Well is an excellent fixed-point temperature device. It can provide a stable and precise reference junction thermostatic environment for extended periods during the verification and calibration of noble or base metal thermocouples. As an ideal replacement for traditional ice point devices, it is the preferred equipment for conducting thermocouple verification and calibration work.



▲ Temperature control curve
(Blue represents the power curve, red represents the temperature curve)

1.Feature

■ Excellent Temperature Stability

Maintains a consistent 0°C environment for extended periods, impervious to external environmental fluctuations. The built-in temperature control system of the PR540 Series exhibits an annual variation of less than 0.03°C and features an ambient temperature compensation algorithm for real-time correction of the working cavity temperature.

■ Rapid Cooling

Achieves a peak cooling rate of 6°C/minute, stabilizing to the verification-required 0°C point in just 15 minutes from room temperature.

■ Insulated Jacks

Model B feature 0.5mm-thick insulation layers on the inner walls and bottoms of the jacks, enabling direct insertion of bare metal wires without additional insulation measures.

■ Manual Adjustment of Temperature Correction Values is Supported

The constant temperature correction value can be manually adjusted by the mechanical button.

2.Technical Parameters

Item \ Model	PR540A	PR540B	Remark
Hole Dimensions	ϕ8mm×7pcs	ϕ4mm×10pcs + ϕ8mm×1pcs	Insertion Depth: 200mm
Display Resolution	0.001°C		
Accuracy	0°C±0.03°C		Any test hole
Max Temperature Difference Between Holes	0.01°C		
Temperature Fluctuation	0.02°C/10 minutes		Ambient temp: 10°C~35°C
Temperature Stability	0.04°C/5h		Ambient temp: 23°C±5°C
Maximum Cooling Rate	6°C/minute		
Operating Environment	10°C~35°C, Non-condensing		
External Dimensions	320 mm×120mm×370mm		
Weight	8.5kg		
Power	300W		

PR570 Series
Standard Thermostatic Bath

PR570 Series Standard Thermostatic Bath adopts the Panran's new-generation temperature control technology, with the PR2602 temperature controller as its core. By integrating novel thermostatic and logic control algorithms with an innovative medium circulation structure, it demonstrates exceptional temperature metrological characteristics and an outstanding intelligent operation experience. The entire series includes four temperature-range models, covering a temperature range of -80°C to 300°C. Compared with traditional thermostatic baths, it has significant advantages in metrological performance, usability, networking capabilities, and intelligence.

Applied Patent Technology:ZL 2017 1 1055504.3

1.Technical Features

■ Compact Volume with Expanded Capacity

All models adopt a square working cavity that increases effective workspace by 30% versus circular cavity of equivalent size. Compact and innovative structural design reduces external dimensions by 40% volume and 30% footprint compared to traditional thermostatic baths.

■ Superior Temperature Uniformity

By designing an innovative high-torque DC stirring system and optimized internal structure, the working medium achieves more thorough homogenization during circulation, thus forming a more uniform and stable temperature field within the working cavity.

■ Wider Temperature Range

The PR573 Series Standard Thermostatic Bath is equipped with an auxiliary heat dissipation system, enabling adjustment of thermal insulation and heat dissipation capabilities of the working cavity under different operating conditions. This allows thermal equilibrium to be achieved over a broader temperature range. Using a universal working medium, the controllable temperature range reaches 50°C~300°C.

▲PR573A/B optional accessories installation visualization

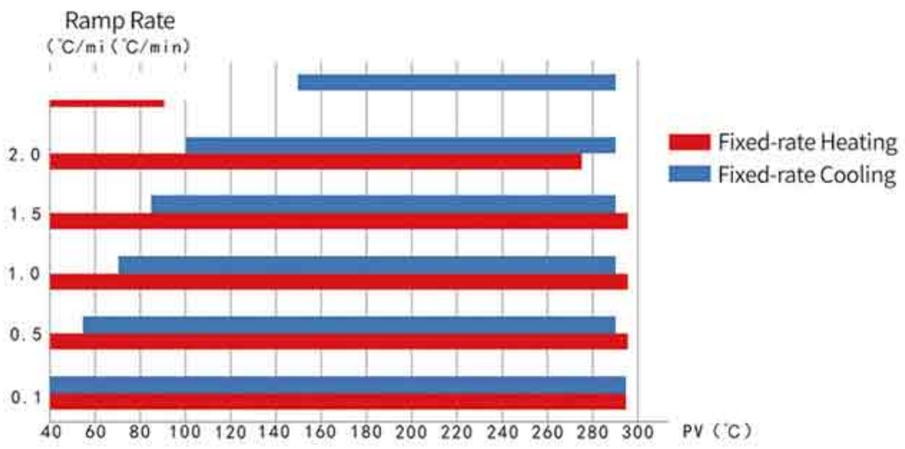
▲ Fume extraction kit operation demo

▲ PR571A standard thermostatic bath and cooling module Kit

▲ PR571B standard thermostatic bath

■ Fixed-rate Heating/Cooling Function

All models in the series feature fixed-rate heating function. Model A additionally support fixed-rate cooling, enabled by the use of precision mechanical pumps and auxiliary cooling circuits. Take the PR573A series products as an example, Fixed-rate heating/cooling are configurable from 0.1°C/min to 3.0°C/min, and the temperature range supporting 1.0°C/min rate can cover 70°C~290°C.



▲ PR573A standard thermostatic bath ramp rate temperature working range

■ The Intelligent Control and Safety

The intelligent control and safety system features Panran's self-developed fourth-generation PR2602 temperature controller as its core. This controller Intelligently controls components based on operating conditions to achieve optimal temperature control. By monitoring multiple sensors distributed at key locations and continuously calculating whether all input parameters remain within normal ranges, the controller ensures the thermostatic bath remains in a safe operating state at all times.

■ Rich Software Functions

In addition to displaying and setting real-time temperature, curves, fluctuations, and temperature control parameters, the software offers multiple practical features,such as full-screen display function, and cloud metrology function.

▲ Cable organizer bracket, aluminum tri-axis fixture

▲ Aluminum folding workbench

▲ Fume extraction kit

▲ Four-grid thermometer calibration flange

▲ Refrigeration bath square flange

▲ Refrigeration bath round flange

▲ Oil bath round flange

▲ Triple point of water cells fixing flange

■ Rich Optional Accessories for Users' Differentiated Needs

A sensor turnover rack is designed on the left side of the working cavity for temporary placement of calibrated sensors. Additionally, a variety of flange types are included as standard to accommodate different calibrated sensors.

2.Main Function List

Software Functions	Hardware Functions
■ Setting and display of temperature control parameters (PV, SV, etc.) ■ Auto-tuning function for temperature control parameters ■ Real-time temperature and power curve display ■ Temperature fluctuation calculation ■ User-defined upper and lower limits of temperature alarm ■ Automatic/manually medium refill ■ Full-screen display mode ■ Safety alarms based on temperature and power ■ Triple Point of Water Cells Frozen (PR571, PR572)	■ Square working cavity ■ Self-priming gear pump for medium refill ■ DC speed-Regulated motor for stirring ■ Auxiliary heat dissipation system ■ Sensor turnover rack ■ Multiple flange types ■ Over-temperature protection switches for stirring motor and oil tank ■ Optional components

3.Technical Parameters

■ General Technical Parameters

Item \ Model	PR570B	PR571A	PR571B	PR572B	PR573A	PR573B
Fixed-rate Heating	●	●	●	●	●	●
Fixed-rate Cooling	(Note 5)	●			●	
Cloud Metrology Function	○	○	○	○	○	○
RS232 Communication	●	●	●	●	●	●
Temperature Control Range	-80°C~100°C	-40°C~100°C (Note 3)		-10°C~100°C(Note 3)	(RT+20°C)~300°C (Note 1)	
Working Medium	Anhydrous ethanol / soft water(Antifreeze)	Antifreeze		Antifreeze	Methyl silicone oil	
Volume	20L(注2)				20L+10L(oil storage tank)	
External Dimensions (H×L×W)	1138×856×617(mm)	1150×516×516(mm)(Note 2)		1130×516×516(mm)	1150×516×516(mm)	
Weight (excluding medium)	200kg	120kg(Note 2)	105kg	100kg	115 kg	100kg
Rated Power	5.2kW	3.6kW		3.1kW	2.3kW	
Working Cavity Dimensions (H×L×W)	450mm×130mm×130mm(Maximum height at center position: 530mm)					
Display Screen	6.8-inch industrial-grade touch screen | resolution: 1280 × 480 pixels					
Operating Environment	Operating temperature range: (5~30) °C, non-condensing					
Power Supply	220VAC±10%, 50Hz					

Note 1: The minimum settable temperature for PR573 is 35°C.
Note 2: Dimensions/weight/volume are exclusive of PR5711 Cooling Module Kit.
Note 3: PR571/PR572 can be customized with an extended temperature range up to 160°C. For temperatures exceeding 100°C, low-temperature heat transfer oil must be used as the working medium.
Note 4: ● Standard accessory, ○ Optional accessory.
Note 5: When the room temperature is below 23°C, PR570B can achieve a constant cooling rate of (0.1~1)°C/min in the range of (room temperature~-25)°C.

■ Temperature Technical Parameters (Note 1)

Item \ Model	PR570B	PR571A/B	PR572B	PR573A/B
Temperature Control Accuracy	0.05°C+0.07%RD			
Temperature Uniformity(Note 2)	⩽0.01°C	0.006°C@ -40°C 0.006°C@ 0°C 0.008°C@ 100°C	0.004°C	0.003°C@ 50°C 0.005°C@100°C 0.010°C@300°C
Temperature Stability /10min	⩽0.01°C	0.008°C@ -40°C 0.008°C@ 0°C 0.006°C@ 100°C	0.006°C	0.003°C@ 50°C 0.005°C@100°C 0.010°C@300°C
Fixed-rate Heating/Cooling Rate	(0.1~1.0) °C/min	(0.1~1.0) °C/min	/	(0.1~3.0) °C/min
Heating Time	0°C~50°C 25min -80°C~0°C 40min	0°C~50°C 25min -40°C~0°C 20min	0°C~50°C 25min	23°C~100°C 30min 100°C~300°C 90min
Model A Cooling Time	/	90°C~50°C 21min 50°C~0°C 38min 0°C~-40°C 80min	/	300°C~200°C 12min 200°C~100°C 28min 100°C~50°C 23min
Model B Cooling Time (Note 3)	23°C~-80°C：120min	45°C~0°C 35min 0°C~-40°C 80min	45°C~0°C 40min	300°C~200°C 15min 300°C~100°C 85min 300°C~50°C 195min

Note 1: The test environment temperature for the above technical parameters is 23°C.
Note 2: The maximum value of vertical and horizontal temperature uniformity includes the four corners of the working cavity. Uniformity may vary slightly due to external environment and power supply stability.
Note 3: For PR573B cooling, maintain auxiliary oil tank level ⩾ minimum mark, and ensure media temperature equals ambient temperature before initiation. No manual intervention is required during the cooling process.

PR500 Series Liquid Thermostatic Bath

The PR500 series liquid thermostatic bath uses liquid as the working medium,the medium is heated or cooled by the PR2601 temperature controller,and supplemented by mechanical forced stirring form a uniform and stable temperature environment in the working area for verification and calibration of various temperature instruments (Such as: RTDs, glass liquid thermometer, pressure thermometer, bimetal thermometer, low temperature thermocouple, etc.)

All PR500 series products are designed with touch screens, which makes the operation simple and intuitive, and provides a wealth of information such as temperature stabilities, heating and power curves.

1.Features

■ Resolution of 0.001°C and Accuracy of 0.01% level

Conventional liquid baths typically use a general temperature regulator as the core component of temperature control, but the general temperature regulator can achieve a only 0.1 level accuracy at best. The PR500 series liquid thermostatic bath can achieve a measurement accuracy of 0.01% level by using the PR2601 temperature controller independently developed by Panran and the resolution is up to 0.001°C. In addition, its temperature stability is far better than other bath which used general temperature controller.

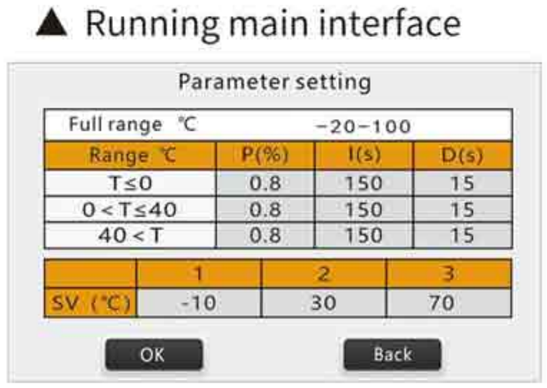
■ Highly Intelligent and Easy Operation

Conventional cooling bath rely on manual experience to determine when to switch compressors or cooling cycle valves. The operation process is complicated,and incorrect operation can result in damage to the equipment hardware. However, the PR530 series only needs to manually set the required temperature value, which can automatically control the operation of heating, compressor and cooling channels, greatly reducing the operational complexity.

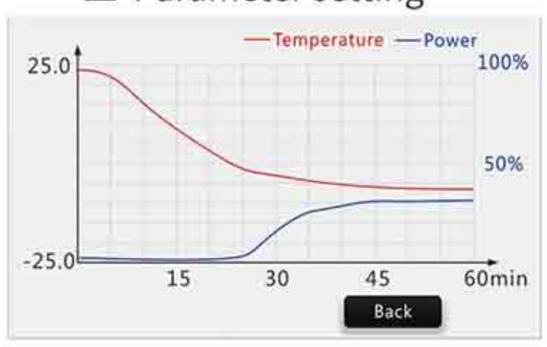
■ Constant Speed Heating and Cooling Function

PR500 series liquid thermostatic bath can automatically realize heating or cooling at a constant speed according to the set rate.

▲ Running main interface



▲ Parameter setting



▲ Curve interface

2.Product Selection and Technical Parameters

Name	Model	Working medium	Temperature range(℃)	Temperature uniformity (℃)		Temperature stability (℃/10min)	Work area (mm)	Volume (L)	Dimension (L*W*H mm)	Weight (kg)	Power (kW)
				Horizontal	Vertical						
Oil bath	PR512-300	Silicone oil	90～300	0.01	0.01	0.007	150x480	23	650x590x1335	130	3
Water bath	PR522-095	Soft water	RT+10～95	0.005	0.01	0.007	130x480	18	650x600x1280	150	1.5
Cooling thermostatic bath	PR532-N00	Antifreeze	0～100	0.01	0.01	0.01	130x480	18	650x590x1280	122	2
	PR532-N10		-10～100						650x590x1280	122	2
	PR532-N20		-20～100						650x590x1280	139	2
	PR532-N30		-30～100						650x590x1280	139	2
	PR532-N40	Low temp. heat transfer oil	-40～100						650x590x1280	139	2
	PR532-N60	Absolute ethanol / soft water	-60～95						810x590x1280	187	3
	PR532-N80		-80～95						810x590x1280	187	4

PR600 Series Heat Pipe Calibration Bath

PR600 series heat pipe thermostatic bath is a new generation of special thermostatic equipment for temperature measurement independently developed and produced by Panran.Based on the heat pipe technology, this series of products have a series of characteristics such as a wide temperature range, a excellent temperature field uniformity, fast temperature heating and cooling, no fumes. They are very suitable for verification and calibration of industrial resistance thermometers, working thermocouple, bimetal thermometers, pressure thermometers and glass thermometers and other temperature instruments.

1.Features

■ Green Environmental Protection, Pollution-free

The medium is sealed in the core, that subjected to the air tightness test of pressure above 5MPa, so the environmental pollution caused by medium volatilization is avoided in principle.

■ Working Temperature up to 400°C

The PR600 working temperature can be extended to 400°C by PR631-400 bath, and a temperature uniformity that is not more than 0.04°C is guaranteed, so the heat pipe calibration bath is very ideal thermostatic equipment when the range within the 200~400°C.

■ No Need to Change Medium

The inside of the PR600 series is highly vacuumed, and there is no aging or deterioration of the medium, so there is no need to replace the medium.

■ Suppression of Sudden Change of Grid Voltage

PR600 series heat pipe calibration bath has the function of grid voltage feedback, which can effectively suppress the temperature control disturbance caused by the sudden change of grid voltage.

■ Dual over Temperature Protection

In addition to the over-temperature protection of the main controller, there is also a completely independent temperature monitoring loop in the PR600 series, which makes over-temperature protection be still achieved in case the first-level protection fails.

■ Resolution of 0.001°C

By using the PR2601 temperature controller, the temperature control resolution of the PR600 series products can reach 0.001°C, and the temperature stability can reach 0.01°C/10 minutes optimally.

■ Powerful Human-computer Interaction Functions

Adopting the powerful human-computer interaction interface, multiple common calibration points can be preset, and the information such as stability, temperature curve and power curve can be displayed in real time. Through the temperature calibration interface, the device can be traced to any temperature standard.

■ Excellent Temperature Field Uniformity

As a "superconductor" of heat, the phase change process is the source of power for the medium to circulate inside the heat pipe. The fast internal circulation makes the heat exchange inside the heat pipe very fast, which gives the PR600 series heat pipe products an excellent temperature filed uniformity, so even at an operating temperature of 400°C, a temperature filed uniformity of no more than 0.04°C can be guaranteed.

■ Simple Structure and Reliable Operation

The PR600 series, without the need for a mechanical motion unit, relies on the cyclic operation of the medium phase change to improve the reliability of the operation.

2.Product Selection and Technical Parameters

Model	Temperature range(°C)	Temperature field uniformity		Temperature stability (°C/10min)	Effective working depth (mm)	Dimensions (mm)	Weight (kg)	Power (kW)	Optional	
		Horizontal	Vertical							
PR632-400SN	80～200	0.02	0.03	0.04	100～450	715×650×1015	121	3.3	S: Standard jack F: Non-standard jack	N: No communication C: RS-485
	At 100°C	0.01	0.02	0.03						
	200～400	0.03	0.04	0.04	150～450					
PR631-200SN	80～200	0.02	0.03	0.04	100～450	615×630×1015	90	1.0		
PR631-400SN	200～400	0.03	0.04	0.04	150～450	615×630×1015	90	2.3		

PR543 Triple-Point of Water Maintenance Bath

PR543 Triple-Point of Water Maintenance Bath uses antifreeze or ethanol as the working medium, and controls the medium for refrigeration or insulation via the PR2602 control module to realize the freezing and storage process of triple-point of water cells. Featuring a touch screen design with a clear and aesthetically pleasing interface, making it easy to operate. It can automatically complete the cooling, freezing, and insulation processes according to user-set programs.

1.Product Features

■ Simple and Easy to Operate

Featuring an intuitive touchscreen interface, the freezing process is completed by simply agitate the triple-point of water cell once as prompted by the screen. Additionally, the PR543 has a power-off memory function. If the device unexpectedly loses power during operation, users can choose to resume or restart the process after power restoration.

■ Timer Function

Supports pre-setting start/stop times to minimize waiting during the freezing process.

■ Over-Time and Over-Temperature Protection

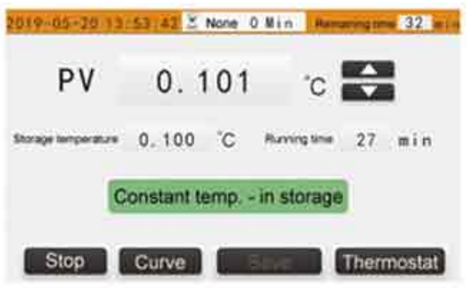
A variety of protection measures can protect the triple point of water cell from freezing for too long or too low temperature.

■ Extensive Applications

Can be used not only for freezing triple-point of water cells but also as a standard refrigeration bath.

■ Fine-Tuning Function for Working State of The Triple Point of Water Cell

During long-term storage, if there is a change in the state of the triple-point of water, users can manually fine-tune the temperature of the maintenance bath based on the actual situation to maintain the triple-point of water cell in optimal working condition.



▲ Touch screen

2.Technical Parameters

Item	Technical parameters	Optional
Temperature Control Range	-10°C~100°C	 Triple Point of Water Cell
Temperature Sensor	Wire-wound PT100 platinum resistor with an annual stability of 0.02°C	
Temperature Stability	0.01°C/10min	
Temperature Uniformity	0.01°C	
Quantity of Single Freezing & Storage	1	
Temperature Control Resolution	0.001°C	
Medium	Antifreeze/Ethanol	
External Dimensions	500mm×426mm×885mm	
Weight	59.8kg	
Power	1.8 kW	
Working Cavity Volume	18L	

PR1160 Series Blackbody Radiation Cavity

The PR1161 and PR1162 blackbody radiation cavities are used to calibrate infrared ear thermometers and infrared forehead thermometers respectively.

The outside metal coating of the blackbody cavity can effectively block the oxidation of the outer wall of the external environment, and the inside coating is made with high emissivity, which meets the requirements of specifications such as JJF1107-2003, JJG1164-2019 and meets the calibration requirements of most infrared ear thermometers and infrared forehead thermometers.

Item \ Model	PR1161	PR1162
Application	calibration of infrared ear thermometers	calibration of infrared forehead thermometers
Emissivity (8~14μm wavelength)	⩾0.999	⩾0.997
Hole specification	10mm	50mm
Maximum immersion depth	150mm	300mm
Flange diameter	130mm	

Thermocouple Calibration Furnace Overview

With over 20 years of dedicated R&D and manufacturing expertise in Thermocouple verification/calibration furnaces, Panran possesses leading technological capabilities and industry experience. We offer a comprehensive product lineup to meet diverse calibration needs, ranging from conventional thermocouple calibration furnaces to technologically advanced multi-zone calibration furnaces. These products support the calibration of nearly all types of thermocouples, including base/noble metal thermocouples, tungsten-rhenium thermocouples, thin-film thermocouples, as well as short and special-shaped thermocouples.

The comparison of technical parameters for some conventional series products as follows:

Item/ Product Series	PR320	PR325	PR330	PR331	PR322	PR332
Product Image						
Heating Method	AC Single-Zone Heating	AC Single-Zone Heating	DC Triple-Zone Heating	DC Triple-Zone Heating	AC Single-Zone Heating	AC Triple-Zone Heating
Controller Features	No Controller	Integrated Controller	Integrated Controller; Triple-Zone Decoupling Algorithm	Integrated Controller; Triple-Zone Decoupling Algorithm	Integrated Controller	Integrated Controller; Triple-Zone Decoupling & Non-Overshooting Control Algorithm
Temperature Range	300°C～1200°C (1300°C Optional)	300°C～1200°C	100°C～1300°C	300°C～1200°C	800°C～1500°C (1600°C Optional)	600°C～1600°C
Matched Heat Isothermal Block	Required	Not Required	Not Required	Not Required	Not Required	Not Required
Axial Temperature Uniformity	Complies with the requirements for furnace temperature uniformity specified in JJG 141-2013, JJF 1262-2010, and JJF 1637-2017	400°C, 1000°C (Additional temperature points can be added) 60mm ⩽1.0°C; 30mm ⩽0.5°C.	Guarantees 100mm ⩽1.0°C, 60mm ⩽0.5°C at any temperature setpoint	Guarantees 60mm ⩽1.5°C, 40mm ⩽0.8°C at any temperature setpoint	/	Guarantees 60mm ⩽1°C(or ±0.5°C) at any temperature setpoint
Temperature Stability	/	⩽0.1°C/min ⩽0.3°C/10min	⩽0.05°C/min ⩽0.15°C/10min	⩽0.06°C/min ⩽0.2°C/10min	⩽0.1°C/min ⩽0.5°C/6min	⩽0.1°C/min ⩽0.5°C/6min
Working Cavity Dimensions (mm)	Φ40×600	ϕ40×600	ϕ40×600	ϕ40×300	ϕ25×750	Φ50×1120
Overall Dimensions (mm)	680×380×520	705×385×490	720×373×500	370×250×500	1020×720×1560	1230×790×1660
Weight	25kg	46kg	58kg	22kg	200kg	405kg
Rated Power	220V/3kW	220V/3kW	220V/3kW	220V/1.5kW	220V/3.5kW	Three-phase 220V/8 kW
Communication Method	/	RS232, Optional Cloud Service	RS232, Optional Cloud Service	RS232, Optional Cloud Service	RS232, Optional Cloud Service	RS232, Optional Cloud Service
Applicable Scope	Calibrate conventional thermocouples in accordance with relevant specifications	For users who have high requirements for calibration efficiency and quality, or who prefer not to use heat equalizing blocks	For users in aerospace, military industry, equipment manufacturing and other fields with high requirements for thermocouple calibration results	Calibration of short thermocouples with a length of 15cm~40cm	Verification or calibration of conventional Type B thermocouples (for standard/ working use)	Verification and calibration of Type B thermocouples /tungsten-rhenium thermocouples with high requirements for calibration results
Advantages	High cost performance	The temperature field distribution can be adjusted within a certain range; heat Isothermal block is required, and the furnace body has a long service life	Temperature range: 100°C～1300°C. Temperature uniformity across the full range without an isothermal block. DC heating prevents high-temperature electric leakage	It achieves temperature uniformity over the entire temperature range without using a heat Isothermal block. DC heating ensures no electric leakage at high temperatures	Soft-start protection, multiple hardware protections, and high cost performance	Wide temperature range, temperature uniformity over the entire temperature range, and stable and fast heating speed

PR320 Series Thermocouple Calibration Furnace

new!

The PR320 series thermocouple calibration furnaces incorporate different furnace isothermal block to accommodate the verification/calibration needs of various thermocouple types. Compliant with the JJF1184-2024 Testing Specification for Temperature Uniformity in Thermocouple Calibration Furnaces , this unit features a wide temperature range, rapid heating/cooling rates, and excellent long-term stability.

1.Technical Parameters

■ General Technical Parameters

Item	Parameters
Furnace cavity dimension	Φ40mm×600mm
Dimensions	680mm×380mm×520mm
Weight	25kg
Rated power	3kW
Working environment	(-5～35)℃, (0～80)%RH, non-condensing

■ Temperature Field Specification

Model	PR320A	PR320B	PR320C	PR320H
Applicable scope	S/R working thermocouple verification/calibration	Sheathed thermocouple calibration	Base metal thermocouple calibration	Thermocouple calibration
Temperature range(°C)	300°C～1200°C			300°C～1300°C
Control thermocouple type	S	N	N	Optional S/N
Matching isothermal block	Concentric, contamination-resistant ceramic insulator tube (nominal ID: Φ20mm)	Optional PR1142A/B isothermal block	Optional PR1145A/B isothermal block	Optional concentric, contamination-resistant ceramic insulator tube / PR1142A / PR1145A
Regulations/ specifications	JJG141-2013	JJF1262-2010	JJF1637-2017	Customized product - configurable with selected isothermal block to comply with regulatory specifications
Test temperature point	420°C、1000°C、1085°C	400°C、1000°C	400°C、1000°C	
Temperature field specification	The point of maximum temperature in the furnace shall not deviate from the geometric center by more than 20 mm, with a homogeneous zone of ≤0.4 °C/10 mm temperature gradient within ±20 mm of this peak point.	The axial temperature deviation within 30 mm from the well bottom shall not exceed 0.5°C, while the radial temperature difference between any two wells at the same cross-section shall be ≤0.25°C.	Axially, the absolute temperature difference between any two points within 30 mm shall not exceed 0.5°C;Radially, at any cross-section orthogonal to the axis, the absolute temperature difference between any two points within a radius ≥14 mm shall be ≤0.25°C.	

■ Matching Isothermal Block

▲ Concentric, contamination-resistant ceramic insulator tube

▲ PR1142 isothermal block

▲ PR1145 isothermal block

■ Basic Parameters of Isothermal Block

Model	PR1142A	PR1142B	PR1145A	PR1145B
Material	Nickel-based alloy	High-temperature alloy	Nickel-based alloy	High-temperature alloy
Temperature resistance	1300°C	1100°C	1300°C	1100°C
Length	100mm		154mm	
Insertion depth	90mm		135mm	
Opening	ϕ8mm×7 pcs		ϕ28mm	

2. Additional Thermocouple Calibration Equipment

■ Short Thermocouple Calibration Furnace

Model	PR321A	PR321E
Applicable scope	Short thermocouple	Short base metal thermocouple
Temperature range	300°C～1200°C	300°C～1200°C
Furnace cavity dimension	Φ40×300mm	Φ40×300mm Isothermal block inner diameter: Φ28mm, insert depth: 70mm
Temperature field specification	The temperature difference within 40mm is ⩽1°C	Built-in isothermal block: within 30mm of the axial direction from the bottom of the hole, the absolute value of the temperature difference between any two points is ⩽1°C; the absolute value of the temperature difference between any two points on the same section at the bottom of the hole is ⩽0.5°C

■ Thermocouple Annealing Furnace

Model	PR323
Applicable scope	Working noble metal thermocouple
Temperature range	300°C～1100°C
Furnace cavity dimension	Φ40×1000mm
Temperature field specification (1100°C)	The furnace operates at a common temperature of 1100°C, featuring a uniform temperature zone of ±20°C. The length of the uniform temperature zone exceeds 400 mm, with one end positioned within 100 mm from the furnace opening
Regulations/ specifications	JJG 141-2013 Verification Regulation of Working Noble Metal Thermocouples

Note: Please specify sealing test or opening test when ordering

■ SPRT Annealing Furnace

Model	PR340
Applicable scope	Standard platinum resistance thermometer
Temperature range	200°C～700°C
Opening size	Φ8mm×3
Temperature field specification	When the furnace temperature is stable, the deviation from the set point temperature is less than 5°C, and the fluctuation is ⩽ 0.5°C/min; the length of the uniform temperature field is not less than 60mm, and the temperature difference between any two points in the temperature field is not greater than 1°C
Regulations/ specifications	JJG 160-2007 Verification Regulation of Standard Platinum Resistance Thermometer

PR325 Series Thermocouple Calibration Furnace

PR325 series Thermocouple Calibration Furnace has excellent performance and rich functions. It adopts a new structural design, has a longer service life, and solves the problems of furnace positioning and high temperature electric leakage through the built-in metal positioner.

The control part uses part of the technology of the PR330 Multi-zone Temperature Calibration Furnace, which has the ability to adjust the axial temperature uniformity slightly. Compared with the traditional thermocouple calibration furnace, better verification or calibration results can be obtained without an isothermal block.

1.Features

■ The Axial Temperature Uniformity Over the Full Range is Better than 1°C/6cm

The controller can automatically adjust the balance power at both ends, and can obtain 1°C/6cm axial temperature uniformity in the temperature range of 300°C~1200°C, which can effectively reduce the uncertainty of the verification or calibration process.

■ Integrated High-accuracy Temperature Controller and Reference end Compensator

Using PR2601 temperature controller, it has a measurement accuracy of 0.01. With the special reference end compensator, the accuracy is better than 0.6°C+0.1%RD when using type N 、type S master thermocouple.

■ Built-in Positioner for Easy Sensor Positioning

The bottom of the built-in metal positioner is 32cm away from the test end of the furnace opening, and the sensor positoining can be completed by simply inserting the sensor into the bottom of the positioner.

■ Longer Service Life

Under the same operating conditions, by increasing the load capacity of the internal heating wire, the service life can be several times longer than that of traditional calibration furnaces.

■ Rich Software and Hardware Functions

Using the front color touch screen, it can display and set general measurement and control parameters, and can also perform operations such as timed power on and off, temperature stability settings, and WIFI settings.

▲ Front view

▲ Rear aerial view

2.Other Functions

Other Functions	
■ Temperature control sensor multi-temperature point correction ■ Adaptive temperature control parameters ■ Real-time temperature, power curve display ■ Built-in reference junction compensation	■ Custom temperature fluctuation calculation ■ Custom alarm temperature upper and lower limits ■ WIFI expandable ■ Optional units °C, °F, K

3.Technical Parameters

■ Model Selection and Technical Parameters

Model	PR325A	PR325B	PR325C	PR325D
Application	Working TC calibration	Type S、R working TC verification/calibration	Base metal TC calibration	
Master TC type	Type N (optional type S)	Type S	Type N	
Temperature range	300°C～1200°C			
Standard Configuration	/	Coaxial cleaning porcelain tube (ID about ϕ20mm)	Armored TC calibration isothermal block (opening ϕ8mm×7, length 100mm)	Base metal TC calibration isothermal block (ID ϕ28mm, length 150mm)
Temperature field parameter	400°C、1000°C：within the axial 60mm of the effective working area, the absolute value of the temperature difference between any two points is not greater than 1.0°C; within the axial 30mm, the absolute value of the temperature difference between any two points is not greater than 0.5°C.	420°C、1000°C、1085°C：The highest temperature point in the furnace deviates from the geometric center of the furnace by no more than 20mm, and there is a uniform temperature field with a temperature change gradient of ⩽0.4°C/10mm within ±20mm of the highest temperature point.	00°C、1000°C：The temperature difference within 30mm axial direction from the bottom of the isothermal block hole is not greater than 0.5°C; the absolute value of the temperature difference between any holes in the same section at the bottom of the hole is not greater than 0.25°C.	400°C、1000°C：Within the axial 30mm of the effective working area, the absolute value of the temperature difference between any two points is not greater than 0.5°C; within the radial radius of not less than 14mm, the absolute value of the temperature difference between any two points on the same cross section is not greater than 0.25°C.
Temperature stability	⩽0.1°C/min, ⩽0.3°C/10min			
Specification	/	JJG 141-2013	JJF 1262-2010	JJF 1637-2017

■ General Technical Parameters

Item	Parameters
Furnace cavity dimension	ϕ40mm×600mm
Dimensions	705×385×490mm (L×W×H)
Display screen	5.0-inch industrial touch screen with a resolution of 800×480 pixels
Communication method	RS232 (Standard), WiFi
Weight	46kg
Rated power	3kW
Power supply	220VAC±10%
Working environment	-5~35°C, 0~80%RH, Non-condensing
Storage environment	-20~70°C, 0~80%RH, Non-condensing

PR330 Series
Multi-zone Temperature Calibration Furnace

Hidden TC measuring scale

Rear secondary display

- ✔ The full-scale 100mm axial temperature field is better than 0.6 °C
- ✔ The working temperature range: 100°C~1300°C
- ✔ Temperature fluctuation is better than 0.15°C/10min

The verification furnace / calibration furnace is an important part of the medium and high temperature traceability system. In general, the traditional verification furnace / calibration furnace is a horizontal electric furnace with simple structure. The temperature uniformity of the effective working area of the furnace can not be well controlled, and the temperature uniformity of the furnace is prone to deviation after the furnace has been used for a long time. Even if the temperature uniformity of the furnace is improved to a certain extent by adding metal isothermal block, its overall technical performance is still not ideal, which is the main source of uncertainty in the process of thermocouple verification and calibration. Therefore, the traditional verification furnace / calibration furnace cannot meet the requirements of high-precision temperature traceability in terms of structure. The PR330 series multi-zone temperature calibration furnace adopts a subversive design scheme from the internal structure to the control method, and has made a qualitative leap in key technical parameters.

PR330 series Multi-zone Temperature Calibration Furnaces adopt innovative technologies such as multi-zone control, DC heating, automatic heat dissipation to extend its working temperature to 100°C~1300°C. and it has excellent temperature field uniformity and temperature fluctuation covering the full temperature range, which greatly reduces the uncertainty in the process of temperature traceability. In addition, the PR330 series multi-zone temperature calibration furnace has rich human-computer interaction functions, communication functions, and many user-friendly designs including front and rear dual display screens and hidden scales.

1.Features

■ Wide Temperature Field Characteristics Covering the Full Temperature Ranges

Adopting multi-zone heating technology, the power distribution ratio of different parts of the furnace heating cavity can be calculated in real time according to the current set temperature and heat dissipation conditions, and the ideal temperature field can be achieved at any temperature point without using a isothermal block.

■ The Temperature Stability is Better than 0.15°C / 10min

Integrated Panran's new generation PR2601 master controller,with 0.01-level electrical measurement accuracy, and according to the control requirements of the calibration furnace, targeted optimizations has been made in terms of measurement speed, reading noise, control logic, its full-scale temperature stability is better than 0.15°C/10min.

■ Wider Working Temperature Range

With many new designs in the furnace structure and materials, the working temperature range of the calibration furnace is extended to 100 °C ~ 1300 °C. The calibration furnace can be operated at 1300°C for a short time or 1250°C for a long time. The minimum control temperature can be as low as 100 °C, which further widens the temperature calibration range of thermocouples.

■ Rich Software and Hardware Functions

The front touch screen can display general measurement and control parameters, and can perform operations such as timing switch, temperature fluctuation setting, and WIFI setting. In order to facilitate the observation of real-time temperature from multiple angles, a secondary display with stability indication is also installed at the rear of the calibration furnace.

■ High Security

The power components of the PR330 series calibration furnace are driven by full DC,which avoids the disturbance caused by electric leakage at high temperature and other high-voltage safety hazards from the source.The shell has an independent heat dissipation air duct, which can effectively reduce the temperature of the furnace surface during high temperature operation and avoid scalding caused by misoperation.

2.Other Functions

Other Functions	
■ Temperature control sensor multi-temperature point correction ■ Adaptive temperature control parameters ■ Real-time temperature, power curve display ■ Built-in reference junction compensation	■ Custom temperature fluctuation calculation ■ Custom alarm temperature upper and lower limits ■ WIFI expandable ■ Optional units °C, °F, K

3.Technical Parameters

■ Temperature Technical Parameters (100°C - 1300°C)

Item \ Model	PR330B	Remarks
Working temperature range	100°C～1300°C	The upper limit of temperature is 1250 °C during continuous operation
Temperature fluctuation	≤0.15°C/10min	/
Temperature control accuracy	0.5°C, when ≤500°C 0.1%RD, when >500°C	Geometric center point temperature of the furnace cavity
Radial temperature field uniformity	≤0.25°C	Furnace geometric center
60mm axial temperature field uniformity	≤0.5°C	Furnace cavity geometric center ±30mm
100mm axial temperature field uniformity	≤1.0°C	Furnace cavity geometric center ±50mm
200mm axial temperature field uniformity	≤3.0°C	Furnace cavity geometric center ±100mm
60mm axial temperature gradient	≤0.2°C/10mm	Furnace cavity geometric center ±30mm
100mm axial temperature gradient	≤0.3°C/10mm	Furnace cavity geometric center ±50mm
Note: The parameters marked with * are valid within the temperature range of 100°C to 1200°C.		

■ General Technical Parameters

Item	Parameters
Furnace cavity dimension	ϕ40mm×600mm
Dimensions	720×373×500mm (L×W×H)
Weight	58kg
Rated power	3kW
Power supply	220VAC±10%
Working environment	-5～35°C, 0～80%RH, Non-condensing
Storage environment	-20～70°C, 0～80%RH, Non-condensing

PR331 Short Multi-zone Temperature Calibration Furnace

PR331 series Short-type Temperature Calibration Furnace using innovative technologies such as multi-zone coupling control, DC heating, automatic heat dissipation, etc., It has the function of adjusting the position of the uniform temperature field and the uniformity of the temperature field covering the full temperature range, which greatly reduces the uncertainty caused by the constant temperature source during the traceability of the short thermocouple.

- ✔ Short precious metal thermocouple verification
- ✔ Short base metal, thin film thermocouple calibration
- ✔ Uniform temperature field position adjustable
- ✔ No isothermal block is required

Typical Applications:

- Short precious metal thermocouple verification
- Short base metal thermocouple calibration
- Thin film thermocouple calibration

I. Features

■ The Position of Uniform Temperature Field is Adjustable

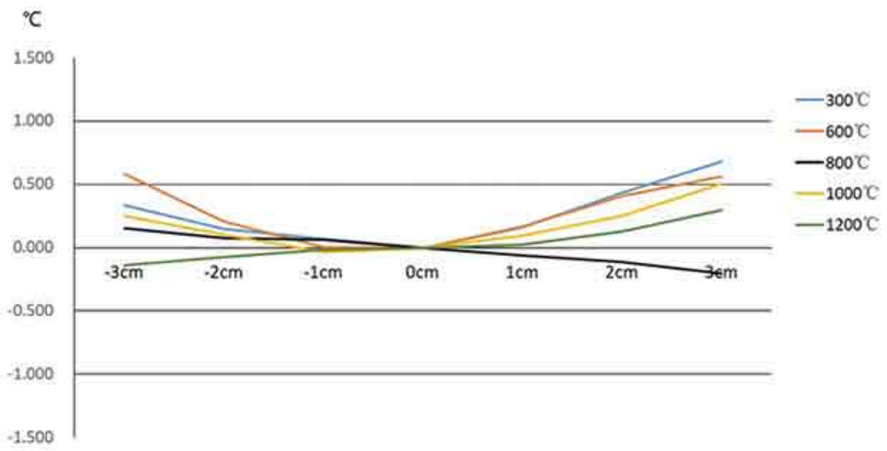
The three-zone heating technology is adopted, which is convenient to adjust the position of the uniform temperature field.In order to better match thermocouples of different lengths,Two temperature field positions, 100mm and 150mm away from the furnace mouth, are preset in the program to correspond to the sensors being calibrated with different lengths.

■ The Full Range Temperature Stability is Better than 0.2°C/10min

Integrated Panran's new generation PR2601 master controller,with 0.01-class electrical measurement accuracy, and according to the control requirements of the calibration furnace,targeted optimizations has been made in terms of measurement speed, reading noise, control logic, its full-scale temperature stability is better than 0.2°C/10min.

■ Temperature Field Uniformity Covering the Full Range

Excellent temperature field distribution characteristics can be obtained in the range of 300°C～1200°C without using a isothermal block. The maximum temperature difference in the 40mm axial space in the central area ⩽ 0.8°C, and the temperature gradient ⩽ 0.3°C/10mm.



▲ Distribution characteristics of typical central temperature field at different temperature points

■ Full DC Drive with Automatic Heat Dissipation

The power components are driven by full DC,which avoids the disturbance caused by electric leakage at high temperature and other high-voltage safety hazards from the source. At the same time, the controller will automatically adjust the heat dissipation according to the current working conditions, so that the temperature balance in the furnace cavity can be achieved as soon as possible.

■ Various Types of Thermocouples are Available for Temperature Control

Short thermocouples vary greatly in size and shape.In order to more flexibly adapt to different thermocouples to be calibrated, a thermocouple socket with integrated reference end compensation is designed, which can quickly connect various types of temperature-controlled thermocouples.

2.Other Functions

Other Functions	
■ Temperature control sensor multi-temperature points correction ■ Adaptive temperature control parameters ■ Real-time temperature, power curve display ■ Built-in reference junction compensation	■ Custom temperature fluctuation calculation ■ Custom alarm temperature upper and lower limits ■ WIFI expandable ■ Optional units °C, °F, K

3.Technical Parameters

■ Product Selection and Technical Parameters (300°C~1200°C)

Item \ Model	PR331A	PR331B	Remarks
Front 100mm temperature field	●		Temperature upper limit 1000°C
Working temperature range	300°C～1200°C		/
Temperature stability	⩽0.2°C/10min		/
Temperature control accuracy	0.6°C, when ⩽600°C 0.1%RD, when ＞600°C		Center point temperature
Radial temperature field uniformity	⩽0.5°C		Furnace cavity geometric center
40mm axial temperature field	Uniformity ⩽0.8°C Gradient ⩽0.3°C/10mm		300°C～1200°C Furnace cavity geometric center ±20mm
60mm axial temperature field	Uniformity ⩽1.5°C Gradient ⩽0.6°C/10mm		300°C～1200°C Furnace cavity geometric center ±30mm

■ General Technical Parameters

Item	Parameters
Furnace cavity dimension	ϕ40mm×300mm
Dimensions	370×250×500mm (L×W×H)
Weight	22kg
Rated power	1.5kW
Power supply	220VAC±10%
Working environment	-5～35°C, 0～80%RH Non-condensing
Storage environment	-20～70°C, 0～80%RH Non-condensing

PR322 Series
High Temperature Thermocouple Calibration Furnace

Note: From left to right, in order: PR354C, PR322A, PR322C

The PR322 series high-temperature thermocouple calibration furnaces operate in the temperature range of 800°C～1600°C. They are mainly used as temperature sources for calibrating secondary standard Type B thermocouples and various working Type B thermocouples. Their temperature field indicators meet the requirements of the current JJF 1184-2024 Testing Specification for Temperature Uniformity in Thermocouple Calibration Furnaces.

The PR322A high-temperature thermocouple calibration furnace is used in conjunction with the PR354 series high-temperature furnace control cabinet. The control cabinet features high-precision temperature measurement, a dedicated intelligent constant temperature algorithm, and multiple protection functions (including power-on slow start, upper limit restrictions on heating power and heating current, self-locking tripping of the main heating circuit, freewheeling protection, etc.). It has excellent power supply voltage adaptability, eliminating the need for an additional high-power AC regulated power supply for the high-temperature furnace. It can be used with the ZRJ series calibration software to realize functions such as remote start/stop, real-time recording, and parameter query and setting.

Technical Parameters

Item	PR322A	PR322C	Remark
Working Temperature Range	800°C～1500°C	800°C～1600°C	/
Heating Material	Silicon Molybdenum Rod		/
Power Supply	220VAC		No need for a stabilized power supply
Maximum Current of Furnace Body	65A	70A	Low-voltage side of the control cabinet
Maximum Heating Power	3kW	3.5kW	/
Furnace Cavity Dimension	ϕ25mm×600mm	ϕ25mm×750mm	/
External Dimensions	620mm×330mm×460mm(Furnace) 910mm×550mm×500mm(Cabinet)	1020mm×720mm×1560mm	/
Weight	45kg(Furnace) 82kg(Cabinet)	200kg	/
Axial Temperature Field	The highest temperature point inside the furnace deviates from the geometric center of the furnace ⩽ 20mm, and within ±20mm of the highest temperature point, there is a uniform temperature field with a temperature change gradient ⩽0.5°C/10mm		/
Control Cabinet Model	PR354C	/	/
Constant Temperature Capability	⩽0.1°C/min ⩽0.5°C/6min		/

PR332 Series Multi-Zone High Temperature Thermocouple Calibration Furnace

Note: The left side is PR332L, and the right side from top to bottom are PR332W and PR332A

PR332 series calibration furnace is a new-generation product developed by Panran. It consists of a furnace body and a matching control cabinet. Provides high-quality temperature source for the verification and calibration of Type B /tungsten-rhenium thermocouples in the temperature range of 600°C～1600°C. PR332 series adopt three-zone temperature control technology, and the temperature field indicators meet and exceed the current JJF 1184-2024 "Testing Specification for Temperature Uniformity in Thermocouple Calibration Furnaces" and JJF 1176-2024 "Calibration Specification for (0～2300) °C Tungsten Rhenium Thermocouples". It has the characteristics of fast heating speed, good constant temperature performance, and excellent temperature field indicators. It can be used independently and can also be used as an ideal supporting equipment for the company's ZRJ series intelligent thermal instrument calibration system.

1. Features

■ Large Furnace Cavity

The inner diameter of the furnace cavity is ϕ50mm, which is convenient for verification and calibration of type B thermocouples with protection tubes. It is suitable for the situation that the used Type B thermocouple wire cannot be removed from the protection tube. For the PR332W and PR332L tungsten-rhenium thermocouple calibration furnaces, the large furnace cavity is conducive to the sealing of the argon protection device.

■ Wider Working Temperature Range, Better Temperature Field Uniformity

The introduction of multi-zone temperature control technology, on one hand, effectively enhances the flexibility in adjusting the temperature field indicators of high-temperature furnaces. It allows flexible adjustment of temperature distribution inside the furnace cavity via software (parameters) to meet various operating conditions (The length of calibrated thermocouples, load capacity, etc.). On the other hand, it ensures that the calibration furnace meets requirements like temperature gradients specified in relevant standards over its entire operating temperature range. Moreover, according to the specific shape/quantity of calibrated thermocouples, it can eliminate the impact of thermal load on the temperature field of the calibration furnace by modifying zone parameters, thus achieving ideal calibration results under loaded conditions.

▲ Main interface

■ High Precision Smart Thermostat

It adopts high-precision multi-temperature zone constant temperature regulation circuit and algorithm, with a temperature measurement resolution of 0.01°C, fast heating, monotonic and stable temperature, and good constant temperature effect. The actual controllable (stable) minimum temperature of the high-temperature furnace by this constant temperature regulator can reach 300°C.

■ Strong Power Adaptability

There is no need to configure an additional three-phase AC regulated power supply for the high temperature furnace.

■ Complete Protection Measures

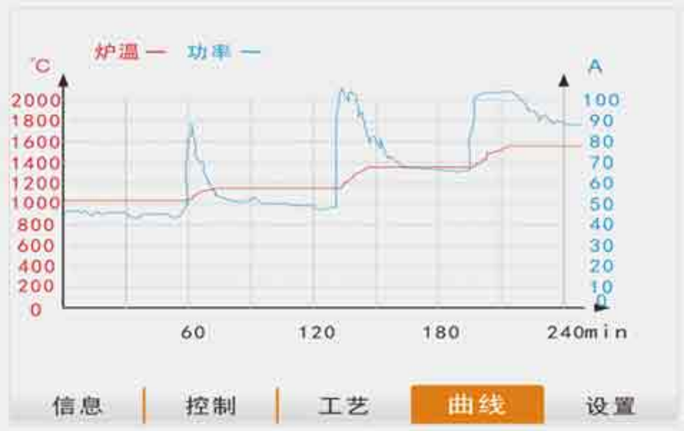
- Slow start: prevents a sudden increase in heating power and effectively suppresses current shock during cold start of the equipment.
- Main circuit protection: each phase of the three-phase load implements overpower protection and overcurrent protection.
- Temperature protection: including over-temperature protection, broken thermocouple protection, etc.

■ Built-in Operation Recorder

It has functions such as cumulative running time in different temperature zones.

■ Compatibility

PR332 series products can be used independently or as supporting equipment for our company's ZRJ series intelligent thermal instrument calibration system, realizing functions such as remote control start/stop, real-time recording, parameter query setting, etc.



▲ Curve interface

▲ Temperature difference test results

2. Model Selection & Technical Parameters

Item	PR332A	PR332W	PR332L	Remarks
Product name	Multi-zone high temperature thermocouple calibration furnace	Multi-zone tungsten-rhenium thermocouple calibration furnace		/
Working temperature range	600°C～1500°C	600°C～1500°C	600°C～1600°C	/
Heating material	Silicon Molybdenum Rod			/
Power supply	220VAC Three-phase five-wire			No voltage regulator required
Furnace maximum current	70A (three-phase)	70A (three-phase)	80A (three-phase)	Control cabinet low voltage side
Max. heating power	6kW	6kW	8kW	/
Furnace cavity dimension	Φ50mm×675mm	Φ50mm×960mm	Φ50mm×1120mm	/
Dimensions	1105×610×1490mm	1105×610×1520mm	1230×790×1660mm	/
Weight	270kg	276kg	405kg	/
Axial temperature field	The highest temperature point in the furnace deviates from the geometric center of the furnace by no more than 20mm. Within ±20mm of the highest temperature point, there is a uniform temperature field with a temperature gradient of ⩽0.5°C/10mm. Within 60mm, the maximum temperature difference is ⩽1°C (±0.5°C). The highest temperature point can be adjusted left (or right) by 50mm			The temperature field index refers to the index that can be achieved in the full temperature range when the thermocouple to be tested is loaded. The specification stipulates that the index is 1000°C, 1300°C, 1500°C no-load conditions
Temperature control deviation	⩽±1°C			/
Constant temperature capability	⩽0.1°C/min ⩽0.5°C/6min			/
Supporting equipment	/	Argon protection device, including sealing components, water cooling components, vacuum pump, vacuum gauge, micro pressure gauge Note: Customers should prepare their own high purity argon		/

PR362A Noble Metal Thermocouple Electrified Annealing Device Overview

new!

The Noble Metal Thermocouple Electrified Annealing Device adopts a DC drive mode, replacing traditional AC voltage regulation with high-power DC constant-current control. With four independent cleaning and annealing units, each centered on a high-power DC constant current source, enable simultaneous processing of four thermocouples. It is equipped with multiple current-limiting and protection functions, which significantly enhance the safety and reliability of the thermocouple cleaning and annealing process. The thermocouple fixing platform inside the working cavity features an innovative design, which can be electrically lifted and rotated to adapt to and accommodate thermocouples of different lengths and positions. Meanwhile, the working cavity adopts a negative pressure design to prevent volatile gases from affecting operators, making the thermocouple cleaning and annealing process truly intelligent and user-friendly.

1. Product Features

■ Replaces the Traditional AC Voltage Regulator With a High-power DC Constant Current Source

and incorporates multiple groups of independently operable DC constant current sources. The type of cleaning and annealing can be selected via the touch screen in accordance with regulations and standards, and parameters such as annealing current and annealing time for any channel can also be set through a custom mode.

■ Based on the Hardware Platform of the DC Constant Current Source

multiple protection mechanisms have been designed, including hardware feedback, independent monitoring loops, and fast-acting fuses, to prevent the occurrence of abnormal conditions such as overvoltage and overcurrent, thereby preventing noble thermocouple fuse-off incidents during the cleaning and annealing processes.

▲Joystick & right-side operation hole

■ A brand-new Thermocouple Fixing Structure

The traditional solution uses platinum hooks to hang the thermocouple, which lacks stability and reliability. Slight shaking may lead to potential risks such as poor contact of thermocouple wires and abnormal sparking. However, the new thermocouple fixing structure adopts high-purity platinum sheets as the base, and externally designed corundum pressing sheets to apply a certain pressure on the thermocouple wires. On the premise of preventing contamination of the thermocouple wires, it realizes reliable connection of the thermocouple and effectively eliminates the risk of poor contact of the thermocouple wires.

■ Four-way Electric Lifting and Rotating Platform

The four-way joystick can control the electric platform to lift up and down within a 40cm range to adapt to thermocouples of different lengths. Meanwhile, the platform can achieve 360° continuous rotation during the energized operation of the thermocouple. Through lifting and rotating operations, users can easily clean the thermocouples one by one using the joystick and the operation hole on the right side without opening the safety door.

■ The Safety Door is Equipped with an Electromagnetic Locking Structure

During annealing operations, there may be high voltage at both ends of the thermocouple wire. To avoid potential electric shock risks, the safety door will automatically remain locked during operation, enhancing operational safety.

■ The Working Cavity Adopts a Negative Pressure Design

with an automatically controlled exhaust device installed on its top. Since there is no need to open the safety door during the cleaning and annealing process of thermocouples, the fumes generated by the volatilization of borax when exposed to high temperatures cannot escape into the working environment, thus improving the comfort of operators.

▲ Electric lifting and rotating platform

▲ Thermocouple fixing clip

▲ Main operation interface, mechanical buttons & knobs

2. Technical Parameters

Item \ Model	PR362A
Maximum Number of Annealed Thermocouples	4 pcs
Weight	100kg
Rated Power	4kW
Current Setting Range	0.1A~12.0A
Current Indication Error	0.1A (Calibrated using DC ammeters, recommended calibration interval: one year.)
Thermocouple Energization Voltage	≤140V DC
Length of Annealed Thermocouple	≤1600mm
External Dimensions(L×W×H)	1100mm×750mm×2050mm
Effective Workspace Dimensions (L×W×H)	750mm×700mm×1800mm
Display Screen	10.4-inch industrial-grade touch screen, resolution: 1024×768 pixels
Operating Environment	5°C～35°C, ≤80%RH
Power Supply	380VAC±10%, 50Hz

PR9120 Series Full-Automatic Pressure Generator

PR9120Q Full-Automatic Pneumatic Generator

PR9120Q is specially designed for calibrating micro-differential pressure gauges and small range pressure gauges. This machine is developed with a dual-piston supercharging structure combined with software control technologies using the latest algorithms. The pressure stabilization speed is fast and the control precision is high, which is very suitable for the needs of periodic, large-scale, and repetitive measurement and calibration work in industries and enterprises.

PR9120Y Full-Automatic Hydraulic Generator

PR9120Y adopts the unique preloading technology, which can realize cyclic preloading, and can calibrate 2 or 5 pressure instruments at one time (expanded through pressure connection manifold platform). The pressure control adopts the advanced pressure following technology, the feedback is fast, and the novel software control technology makes the pressure control more accurate and the stability faster.

1. Features

- Pressure generated quickly, stably, without overshoot, which conforms to the relevant pressure instrument calibration regulations;
- Full protection functions: when the set pressure is higher than the standard gauge, the software system will prompt input error; When the system pressure unexpectedly exceeds 10% of the standard gauge scale, the generator will immediately stop pressurizing and release the pressure immediately to protect the safety of the gauge;
- The generator is equipped with an emergency stop button for quick pressure relief;
- The control error and stabilization time can be customized to improve the calibration accuracy;
- The generator can replace multiple ranges of PR9112 intelligent pressure calibrators to improve the measurement precision and facilitate periodic calibration;
- PR9120Q/Y: Equipped with a 14-inch touchscreen, integrated Windows 10 operating system, and proprietary control software. PR9120D: Features a brand-name industrial PC, integrated Windows 11 operating system, and proprietary control software.This architecture enhances operational stability and supports remote maintenance, debugging, and software upgrades.

2. Technical Parameter

Item	PR9120Q Full-Automatic Barometric Generator	PR9120Y Full-Automatic Hydraulic Generator
Pressure range①	(-40～40) kPa、(-0.095～1) MPa	(-0.06~0~100)MPa
Accuracy	0.05%F.S　0.02%F.S	0.05%F.S　0.02%F.S
Working medium	Air	Transformer oil or purified water
Pressure control stability	＜0.005%F.S	＜0.005%F.S
Time for pressure to reach set point	＜10 seconds	＜20 seconds
Communication interface	RS232, USB, Network port	RS232, USB, Network port
Pressure connector	M20×1.5(2pcs)φ4mm, φ6mm Quick plug(2pcs/each)	M20×1.5(3 pcs)
Dimensions	540mm×380mm×340mm	660mm×380mm×400mm
Weight	28kg	35kg
Ambient temperature of operation	(-20～50) °C	(-20～50) °C
Relative humidity of operation	<95%	<95%
Power supply	AC220V	AC220V

① When the ambient atmospheric pressure is 100kPa.a (a : Absolute)

PR9120C Intelligent Pressure Controller

PR9120C intelligent pressure controller combines high speed, high precision and high stability, provides a wide range of -95kPa to 10MPa, and is a multi-functional fully automatic pressure controller; built-in applications: Hart function, pressure transmitter verification, leak test, switch test, automatic step, etc.

1. Product Feature

- Adopt high-quality materials, advanced manufacturing technology and strict testing standards;
- Equipped with high-precision sensors and precise control algorithms to achieve accurate measurement and control of pressure;
- The design focuses on stability and reliability to ensure stable operation under various working conditions;
- Built-in diversified applications to facilitate the calibration of different types of pressure equipment;
- Pressure control is fast and stable, in line with relevant pressure instrument calibration regulations;

▲ Main Interface

2.Technical Indicators

Order code	PR9120C Model I	PR9120C Model II	PR9120C Model III
Pressure control range①	(-0.095～4) MPa	(-0.095～6) MPa	(-0.095～10) MPa
Accuracy	0.05%F.S 0.02%F.S	0.05%F.S 0.02%F.S	0.05%F.S 0.02%F.S
Standards②	Can be built-in 5 standard modules External PR9112	Can be built-in 3 standard modules External PR9112	Can be built-in 3 standard modules External PR9112
Working medium③	Gas	Gas	Gas
Display	7-inch touch screen Resolution 1024×600	7-inch touch screen Resolution 1024×600	7-inch touch screen Resolution 1024×600
Pressure control fluctuation	＜0.005%F.S	＜0.005%F.S	＜0.005%F.S
Controlling response time	＜10s	＜10s	＜10s
Host computer interface	USB-A	USB-A	USB-A
Pressure port	Φ4mm Quick twist or lock holder	ϕ4mm Lock holder	ϕ4mm Lock holder
External standard interface	RS-232	RS-232	RS-232
Type of pressure source	External gas source	External gas source	External gas source
Pressure source pressure	High pressure ≤4.2MPa Vacuum ≤0.4MPa	High pressure ≤6.2MPa Vacuum ≤0.4MPa	High pressure ≤10.2MPa Vacuum ≤0.4MPa
Dimension	430mm×350mm×130mm	430mm×350mm×130mm	430mm×350mm×130mm
Weight	10kg	9.4kg	9.4kg
Operating ambient temperature	(10～50) °C	(10～50) °C	(10～50) °C
Operating relative humidity	5%～90%RH	5%～90%RH	5%～90%RH
Power supply	Power: AC220V Max. power consumption：100W	Power: AC220V Max. power consumption：100W	Power: AC220V Max. power consumption：100W

①When the ambient atmospheric pressure is 100kPa.a;
②For the measuring range, refer to the PR9112 measuring range selection table;
③Gas refers to clean and dry nitrogen or air.

PR9123 Current Acquisition Device

PR9123 Current Acquisition Device supports DC 24V loop power supply and can achieve high-precision measurement of DC current. Designed to use with the PR9120C Intelligent Pressure Controller for critical calibration and testing tasks on pressure transmitters and other instruments.

1.Product Features

- Supports 8-channels data acquisition (can customizable for expansion);
- Each channel is equipped with an independent 24-bit ADC, with an accuracy of ±0.02% F.S and a resolution down to μA class;
- Built-in electromagnetic shielding design, combined with low-temperature drift resistors and high-performance operational amplifiers, to suppress environmental noise;
- Equipped with over-current protection, reverse connection protection and isolation design to ensure long-term stable operation.

2.Technical Parameters

Item	Parameters
Measuring Range	(0~25)mA
Accuracy	0.02% F.S
Output Power Supply	24V±0.5V
Connection Mode for the Device under be Calibrated	Alligator clip
Communication Mode	USB2.0
Supply Voltage	AC220V
External Dimensions	180mm×100mm×55mm
Weight	0.7kg

PR9120S Full-Automatic Pressure Calibration System

The PR9120S fully automatic pressure calibration system software is the the supporting software of our company's digital pressure gauge series products, which can record data, automatically generate tables, automatically perform error calculation, and print certificates. This software greatly promotes the metrological management work of enterprises and institutions..
The software is compatible with all digital pressure gauges produced by our company. The software operating environment is: Microsoft Windows 7/8/10 platform, with Chinese/English operation interface.

1. Features

- The software verification process, data calculation and issued certificates are all in compliance with national verification regulations.
- It supports the simultaneous calibration of multiple pressure gauges with the same range, the issuance of multiple calibration records, and the generation of multiple calibration certificates, greatly improving work efficiency.
- The data of the pointer pressure gauge under inspection can be selected through indication value, which improves the input efficiency and reduces the probability of error in recording.
- With the pressure gauge intelligent identification tool, it can intelligently identify the readings of the pointer pressure gauge and digital pressure gauge being tested, and control the pressure and collect data in one go.

2. Regulations and Specifications

No.	Code of Regulations	Name of Regulations
1	JJG 52-2013	Verification Ragulation of Elastic Element Pressure Gauges, Pressure. Vacuum Gauges and Vacuum Gauges for General Use
2	JJG 49-2013	Verification Regulation of Elastic Element Precise Pressure Gauges and Vacuum Gauges
3	JJG 882-2019	Pressure Transmitters
4	JJG 875-2019	Digital Pressure Gauges
5	JJG 544-2011	Verification Regulation of Pressure Controllers

Pressure Gauge Intelligent Identification Tool

The latest smart pressure gauge identification tool based on smartphones (only for Android systems) can accurately identify the indications of digital pressure gauges, electronic sphygmomanometers, pointer-type general pressure gauges and precision pressure gauges. Available in two versions:

1. Manually Verification Version

This version supports all manually verification equipment. It identifies the indicated value of the device under verification by sending instructions via a "remote controller", and can calculate the identified data in accordance with verification regulations to provide judgment results. With the help of PC-side software, it can automatically generate verification reports and records. It can also generate QR codes containing the basic information, verification results, and validity period of the instrument under verification, which can be printed and affixed to the pressure gauge as a verification mark, facilitating direct scanning and entry of the gauge's information during re-verification.

2. Full-Automatic Verification Version

This version needs to be used with a fully automatic pressure generator or an intelligent pressure controller (communication protocols can be provided for third-party products). It can automatically and accurately identify digital/pointer-type/ precision pressure gauges without any manual intervention throughout the process. When verifying pointer-type general pressure gauges and precision pressure gauges, a pressure connection platform is required.

Main Features:

- Applicable to all smartphones with Android system;
- No additional light source required, with high recognition rate;
- Intelligently identifies the indicated values of digital pressure gauges, electronic sphygmomanometers, pointer-type general pressure gauges and precision pressure gauges, without the need for manual intervention in selection;
- Low requirement for shooting angle, no need to be vertical or directly aimed at the center.

Custom Development:

- Provide on-site remote reading equipment and software for pressure gauges, enabling real-time and off-site viewing of pressure gauge indications;
- Custom development of mobile-end software, with enterprise ERP data interfaces to meet the needs of different customers;
- Provide OEM and customization services for peers or clients engaged in the production and use of pressure metrology verification equipment;
- Provide solutions for automatic indication identification and data processing for customers calibrating digital multimeters.

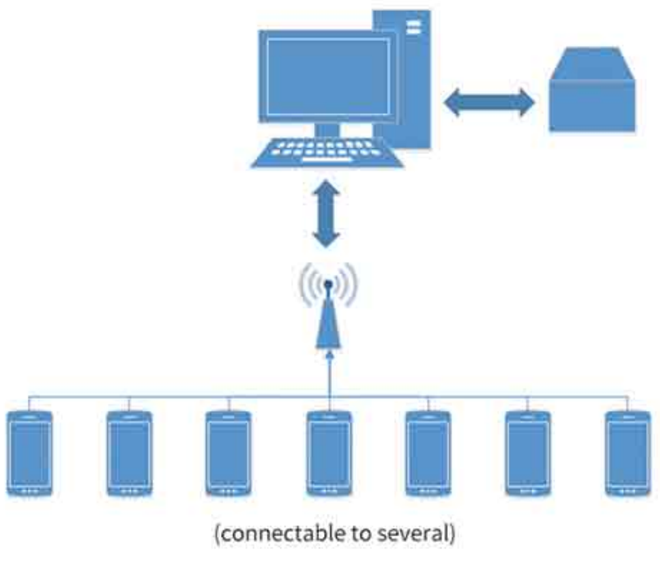
Billing Methods:

1.Pay-Per-Use

Customized user codes and passwords can be entered in the mobile app to activate the service. Under the same code, multiple mobile devices (either local or remote) can perform identification and verification via "cloud parsing". This model is suitable for customers with small verification volumes.

2.One-Time Purchase

Purchase the "Magic Decoding Box" for lifetime use with free upgrades. It supports multiple mobile devices to perform identification and verification within the LAN. The structure diagram is as follows:



PR9120X Non-invasive Sphygmomanometer Calibrator

The Non-invasive Sphygmomanometer Calibrator is a multi-purpose instrument used to verify the performance indicators of various blood pressure monitors. It provides functions such as dynamic blood pressure simulation, static calibration, indicating error measurement, and air tightness measurement. Widely applied in metrology, hospitals, research institutes, and university laboratories, it is used for sphygmomanometer verification and can also be used to verify precision pressure gauges, general pressure gauges, etc.

1. Equipment Functions

■ Dynamic Blood Pressure Simulation

For verification items of sphygmomanometers based on the oscillometric principle, the instrument has built-in standard diastolic pressure, systolic pressure, and heart rate for adults/newborns, which can be automatically processed in accordance with metrological verification regulations. The instrument also has a custom mode, allowing users to set diastolic pressure, systolic pressure, and heart rate by themselves for metrological verification.

■ Indicating Error Test

The instrument has built-in standard pressure-increasing and pressure-decreasing verification points, and verification

■ Air Tightness Measurement

The instrument can automatically calculate and display the verification results.

■ Deflation Rate Test

The instrument can automatically measure and calculate the verification results.

■ Adopts Imported Pressure Sensors and Pneumatic Components

The instrument automatically and accurately adjusts the zero point.

■ Simple and Easy to Operate

Equipped with a large touch color display screen, it is easy to operate.

2. Regulations and Specifications

No.	Code of Regulations	Name of Regulations
1	JJG270-2008	Verification Regulation of Sphygmomanometer
2	JJG692-2010	Verification Regulation of Non-invasive Automated Sphygmomanometers

3. Technical Parameters

Item	Parameter
Pressure Generation Range	0～60kPa (0～450mmHg)
Pressure Measuring Range	0～60kPa (0～450mmHg)
Accuracy	0.1% F.S, 0.05% F.S
Adult Mode	Systolic pressure: (6.7～34.0)kPa (50～255mmHg) Diastolic pressure: (4.0～26.0)kPa (30～195mmHg)
Newborn Mode	Systolic pressure: (4.0～16.0)kPa (30～120mmHg) Diastolic pressure: (1.3～13.3)kPa (10～100mmHg)
Heart Rate Range	(30～250) times/min
Blood Pressure Indicating Value Repeatability	<0.3kPa (2mmHg)
Display Unit	kPa, mmHg
Dimensions	320×300×160mm
Weight	6.8kg

PR9111 Precision Digital Pressure Gauge

1. Features

- LCD screen with backlight
- Data storage
- Automatic overpressure alarm
- Graphical pressure percentage display
- Peak valve record
- Automatic Temperature Compensation
- Communication method: RS232,Bluetooth
- CE Certificate

2. Specifications

Pressure Unit
mmH_2O, inH_2O, mmHg, inHg, psi, kPa, MPa, Pa, mbar, bar, kgf/cm^2

Pressure Measurement
Pressure Range:(-0.1~250)MPa (refer to selection table) Accuracy:±0.02% F.S, ±0.05% F.S

Data Storage Function
Storage capacity: 1200 records;
Storage mode: manual storage and automatic storage

Peak Valve Record
Automatically record the lower peak value, upper peak value, average value of upper and lower peak values, lower peak average value, and upper peak average value during pressure measurement

Display Rate
10 times/s, 5 times/s, 2 times/s, 1 times/s, adjustable

Display Digit
4, 5, 6 digits display digits, switchable

Parameters

Item	Specification
Dimensions	Φ122mm×51mm×176mm
Pressure connector	M20×1.5 male, Φ4mm quick fittings (Differential pressure type)
Communication Interface	Three-core special aviation plug
Weight	0.8kg
Power supply	Rechargeable lithium battery
Battery duration	60 hours
Charging time	About 4 hours
Ambient temperature of operation	(-20~50)°C
Relative humidity of operation	<95%
Storage temperature	(-30~80)°C

Ordering information: PR9112S pressure calibration software (optional)
Pressure range selection: refer to pressure range selection table of "PR9112 Intelligent Pressure Calibrator"

PR9112 Intelligent Pressure Calibrator

1. Features

- LCD screen with backlight
- Built-in DC24V power supply, can be used to calibrate pressure transmitters
- Automatic Temperature Compensation
- Data storage
- 6 digit display
- Graphical pressure percentage display
- Automatic over-pressure alarm
- With current, voltage measurement
- With switching value measurement
- The HART intelligent pressure transmitter can be calibrated
- Communication method: RS232
- CE Certificate

2. Specifications

■ Pressure Unit

mmH_2O, inH_2O, mmHg, inHg, psi, kPa, MPa, Pa, mbar, bar, kgf/cm^2

■ Pressure Measurement

Pressure Range:(-0.1~250)MPa (refer to selection table) Accuracy:±0.02% F.S, ±0.05% F.S

■ Data Storage Function

Storage capacity: 30 files in total, 50 records/files

■ Resolution

6 digit display, 4 or 5 digit display can be switched

■ Peak Valve Record

Automatically record the maximum and minimum values during pressure measurement

■ Others Function

Temperature measurement, countdown leak detection measurement, DC24V timing output

3. Pressure of Regular Gauges

Item	Pressure range	Medium	Accuracy
1	(-100～0) kPa	Gas	0.02/0.05
2	(0～60) Pa	Gas	0.5
3	(0～250) Pa	Gas	0.5
4	(0～1) kPa	Gas	0.05/0.1
5	(0～2) kPa	Gas	0.05/0.1
6	(0～2.5) kPa	Gas	0.05/0.1
7	(0～5) kPa	Gas	0.05/0.1
8	(0～10) kPa	Gas	0.05/0.1
9	(0～16) kPa	Gas	0.05/0.1
10	(0～25) kPa	Gas	0.05/0.1
11	(0～40) kPa	Gas	0.05/0.1
12	(0～60) kPa	Gas	0.05/0.1
13	(0～100) kPa	Gas	0.02/0.05
14	(0～160) kPa	Gas / liquid	0.02/0.05
15	(0～250) kPa	Gas / liquid	0.02/0.05
16	(0～400) kPa	Gas / liquid	0.02/0.05
17	(0～600) kPa	Gas / liquid	0.02/0.05
18	(0～1) MPa	Gas / liquid	0.02/0.05
19	(0～1.6) MPa	Gas / liquid	0.02/0.05
20	(0～2.5) MPa	Gas / liquid	0.02/0.05
21	(0～4) MPa	Gas / liquid	0.02/0.05
22	(0～6) MPa	Gas / liquid	0.02/0.05
23	(0～10) MPa	Gas / liquid	0.02/0.05
24	(0～16) MPa	Gas / liquid	0.02/0.05
25	(0～25) MPa	Gas / liquid	0.02/0.05
26	(0～40) MPa	Gas / liquid	0.02/0.05
27	(0～60) MPa	Gas / liquid	0.02/0.05
28	(0～100) MPa	Gas / liquid	0.02/0.05
29	(0～160) MPa	Gas / liquid	0.1
30	(0～250) MPa	Gas / liquid	0.1

■ Electrical Measurement Specifications

Item	Range	Resolution	Accuracy
Current measurement	(-30～30) mA	0.1μA	± (0.01%R.D+0.003%F.S)
Voltage measurement	(-30～30) V	0.1mV	± (0.01%R.D +0.003%F.S)
Voltage output	DC24V	/	±0.5V
Switch value	A group of on-off measurements		

■ Parameter

Item	Specification
Dimensions	Φ120mm×50mm×183mm
Communication Interface	Three-core special aviation plug
Weight	0.8kg
Pressure connector	M20×1.5 male, Φ4mm quick fittings (Differential pressure type)
Electrical measurement connector	Φ2mm banana plug
Power supply	Rechargeable lithium battery
Working time of battery	60 hours(24V without load)
Charging time	About 4 hours
Ambient temperature of operation	(-20～50)°C
Relative humidity of operation	<95%
Storage temperature	(-30～80)°C

Ordering information: PR9112S pressure calibration software (optional)
Pressure range selection: refer to pressure range selection table of "PR9112 Intelligent Pressure Calibrator"

4. Pressure of Compound Gauges

Item	Pressure range	Medium	Accuracy
1	±60Pa	Gas	0.5
2	±160Pa	Gas	0.5
3	±250Pa	Gas	0.2/0.5
4	±500Pa	Gas	0.1/0.2
5	±1kPa	Gas	0.05/0.1
6	±2kPa	Gas	0.05/0.1
7	±2.5kPa	Gas	0.05/0.1
8	±5kPa	Gas	0.05/0.1
9	±10kPa	Gas	0.05/0.1
10	±16kPa	Gas	0.05/0.1
11	±25kPa	Gas	0.05/0.1
12	±40kPa	Gas	0.05/0.1
13	±60kPa	Gas	0.05/0.1
14	±100kPa	Gas	0.02/0.05
15	(-100～160) kPa	Gas / liquid	0.02/0.05
16	(-100～250) kPa	Gas / liquid	0.02/0.05
17	(-100～400) kPa	Gas / liquid	0.02/0.05
18	(-100～600) kPa	Gas / liquid	0.02/0.05
19	(-0.1～1) MPa	Gas / liquid	0.02/0.05
20	(-0.1～1.6) MPa	Gas / liquid	0.02/0.05
21	(-0.1～2.5) MPa	Gas / liquid	0.02/0.05

(1)Absolute pressure is available for some ranges;
(2)Range of automatic temperature compensation: (-10~50)°C;
(3)The pressure transmission medium must be non-corrosive.

PR9110 Intelligent Digital Pressure Module

1. Product Features

- Compact size, light weight, and easy to carry
- LCD screen with backlight displays
- Automatic temperature compensation
- 6-digit digital displays
- Bluetooth communication
- Type-C charging

2. Technical Parameters

■ Pressure Units

Psi, bar, kPa, MPa, Pa, hPa;

■ Pressure Measurement

Range: (-0.1～250)MPa (any range within this scope is optional)Accuracy: ±0.02% F.S, ±0.05% F.S

■ Digits Displays

6-digit digital displays, switchable to 4 or 5 digits.

■ Basic Parameters

Item	Parameters
Dimensions	40mm×40mm×115mm
Communication method	Bluetooth 5.2
Weight	0.25kg
Pressure Connection	M20×1.5 Male thread, φ4mm quick-connect fitting (differential pressure type)
Power Supply Method	Rechargeable lithium battery
Battery Operating Time	About 50 hours
Battery Charging	Type-C 5V, about 3 hours
Operating Ambient Temperature	(-20～50) °C
Operating Relative Humidity	<95%
Storage Temperature	(-30～80) °C

For pressure range selection, please refer to the "PR9112 Intelligent Pressure Calibrator" pressure range selection table.

PR810 Pressure Calibrator

1. Product Features

- Touch-controlled color LCD screen;
- Built-in DC24V power supply, capable of calibrating pressure transmitters;
- Data storage and export;
- 6-digit display;
- Graphical pressure percentage display;
- Automatic over-pressure alarm;
- Bluetooth communication
- Equipped with current and voltage measurement;
- Equipped with switch quantity measurement;
- Simulated 4~20mA output;
- Capable of calibrating HART intelligent pressure transmitters;

2. Technical Parameters

■ Pressure Units

mmH_2O, inH_2O, mmHg, inHg, psi, kPa, MPa, Pa, mbar, bar, kgf/cm^2

■ Zeroing Range

Pressure zeroing range: ±1% F.S; Electrical measurement zeroing range: ±0.2% F.S;

■ Storage Function

Storage mode: Manually storage mode and automatic storage mode;Storage capacity: 20 files in total, sharing 130,000 records;Storage export: USB drive, Excel format;

■ Display Digits

Pressure: 6-digit display, switchable to 4 or 5 digits;
Electrical measurement: 6-digit display, switchable to 5 digits;

■ Pressure Statistics

Automatically records the maximum value, minimum value, fluctuation, and average value during pressure measurement;

■ Additional Functions

Real-time clock, temperature measurement, countdown leak detection measurement, DC24V timed output, low voltage alarm.

■ Electrical Measurement Specifications

Item	Range	Resolution	Accuracy
Current Measurement	(0~30) mA	0.1μA	± (0.01%R.D+1.5μA)
Voltage Measurement	(0~30) V	0.1mV	± (0.01%R.D+1.5mV)
Current Output	(4~20) mA	/	± (0.02%R.D+1.5μA)
Voltage Output	DC24V(≤30mA)	/	±0.5V
Switch Quantity	Data capture for on/off status, with 5 groups in total for cyclic capture. Supports mechanical, NPN, and PNP type switches.		

■ Basic Parameters

Item	Parameters
External Dimensions	255mm×190mm×58mm
Weight	1.15kg
Pressure Connection	Bluetooth 5.2(PR9110)
Electrical Interface	Φ4mm banana plug
Power Supply Mode	Rechargeable lithium battery
Battery Operating Time	Approximately 8 hours
Battery Charging	8.4V, approximately 3 hours
Operating Ambient Temperature	(-20~50)°C
Operating Relative Humidity	<95%
Storage Temperature	(-30~80)°C

1.Pressure display requires connection to PR9110 Intelligent Digital Pressure Module.
2.For pressure range selection, please refer to the "PR9112 Intelligent Pressure Calibrator" pressure range selection table.

PR914X series Hand-held Pressure Pump

PR9140A/B Hand-held Micro-pressure Pump

The PR9140 series handheld micro-pressure pump has heat insulation treatment on the pump body and pipeline to effectively prevent the environment from affecting the pressure stability. It has a wide micro-pressure adjustment range, high stability, portable structure design, small size, light weight, and is suitable for field and laboratory calibration.

PR9141A/B/C/D Hand-held Pneumatic Pump

The PR9141 series hand-held pneumatic pump can be used in the laboratory or on-site environment, and is characteristic of simple operation, stable in pressure boost and reduction, small adjustment fineness, convenient maintenance and highly unlikely leakage. The built-in oil and gas isolation device effectively avoids contamination of the pump body and prolongs the service life of the equipment.

PR9142A/B Hand-held Hydraulic Pump

PR9142 series hand-held hydraulic pump is compact in structure, easy to operate, stable in pressure boost and reduction, fast pressure stabilization speed. The medium adopts primary filtration to ensure the cleanliness of the oil circuit and extend the service life of the equipment. The products are small in size, has an extensive pressure regulation range, saves energy in pressure boost and reduction, making it the ideal pressure source for on-site calibration.

Technical Parameter

Item	PR9140 Hand-Held Micro-Pressure Pump	PR9141 Hand-held Pneumatic Pump	PR9142 Hand-Held Hydraulic Pump
Pressure range①	PR9140A(-40~40)kPa PR9140B(-70~70)kPa	PR9141A(-95~600)kPa PR9141B(-0.095~2.5)MPa PR9141C(-0.095~4)MPa PR9141D(-0.095~6)MPa	PR9142A(0-60)MPa PR9142B(0-100)MPa
Regulating Fineness	0.01Pa	10Pa	0.1kPa
Working medium	Air	Air	Transformer oil or purified water
Pressure connection	M20×1.5(2pcs)	M20×1.5(2pcs)	M20×1.5(2pcs)
Dimension	220mm×200mm×170mm	265mm×175mm×135mm	360mm×220mm×180mm
Weight	2.4kg	2.6kg	3kg
Operational environment	On-sites or laboratories		

①When the ambient atmospheric pressure is 100kPa.a (a : Absolute)

PR914X series High Pressure Pump

PR9143A Manual High-pressure Pneumatic Pump

The new high-pressure pneumatic pressure pump features easy operation, extensive in pressure regulation range, smooth in pressure boost and reduction, and labor-saving. The secondary pressure regulating pump adopts a unique design, making pressurization more labor-saving. The system increases the oil and gas separation device to avoid oil clogging the one-way valve and prolong the service life of the equipment.

PR9143B Manual High-pressure Pneumatic Pump

Adopts two-stage rapid pre-pressurization and pressure boosting adjustment, with a highly integrated all-in-one design. A quick sewage discharge and cleaning interface is designed on the bottom surface. It features a simple structure, high reliability, easy operation and maintenance, and low leakage tendency. The pressure boosting adjustment adopts a unique design, enabling easy adjustment to the pressure required by users. It has a wide pressure adjustment range and ensures stable pressure boost and reduction.

PR9144A/B Manual High-pressure Hydraulic Oil Pump

This product adopts 304 full-stainless steel components, featuring high reliability, easy operation and maintenance, and low leakage tendency. Equipped with a customized filter, it ensures the cleanliness of the medium in the pipeline, reducing issues such as clogging and failure to build pressure. The product has a wide pressure adjustment range, with stable pressure boost and reduction and labor-saving operation.

PR9144C Manual High-pressure Hydraulic Oil Pump

This product abandons the traditional one-way valve structural design, making the pipeline less prone to clogging. Meanwhile, it adopts a special sealing method with high pressure resistance, enabling it to achieve very high pressure. Additionally, this product can generate a vacuum degree of -80kPa and is capable of calibrating vacuum pressure instruments.

PR9145A/B Manual High-pressure Hydraulic Water Pump

This product adopts 316L full-stainless steel components, featuring high reliability, easy operation and maintenance, and low leakage tendency. Equipped with a customized filter, it ensures the cleanliness of the medium in the pipeline, reducing issues such as clogging and failure to build pressure. The product has a wide pressure adjustment range, with stable pressure boost and reduction and labor-saving operation.

Technical Parameter

Item	Manual High-pressure Pneumatic Pump	Manual High-pressure Pneumatic Pump	Manual High-pressure Hydraulic Oil Pump	Manual High-pressure Hydraulic Oil Pump	Manual High-pressure Hydraulic Water Pump
Pressure range①	PR9143A (-0.095～6)MPa	PR9143B (-0.095~16)MPa	PR9144A (0~60)MPa PR9144B (0~100)MPa	PR9144C (-0.08~280)MPa	PR9145A(0~60)MPa PR9145B(0~100)MPa
Regulating fineness	10Pa	10Pa	0.1kPa	0.1kPa	0.1kPa
Working medium	Air	Air	Transformer oil	Mixed liquid	Purified water
Pressure connection	M20×1.5(3pcs)	M20×1.5(2pcs)	M20×1.5(3pcs)	M20×1.5(3pcs)	M20×1.5(3pcs)
Dimension	430mm×360mm×190mm	540mm×290mm×170mm	490mm×400mm×190mm	500mm×300mm×260mm	490mm×400mm×190mm
Weight	11kg	7.7kg	15kg	14kg	15kg
Operational environment	Laboratories				

① When the ambient atmospheric pressure is 100kPa.a (a : Absolute)

PR9148B Electro-Pneumatic Pressure Source

Built-in high-pressure air compressor. Pressure upper and lower limits can be set through the 7-inch color screen, enabling the device to automatically generate pressure up to 25 MPa. Replaces traditional gas cylinders as the air source, it is the preferred equipment for calibrating large-range air pressure instruments.

1.Primary Applications

- Provides high-pressure gas sources for calibrating gas regulators(such as O_2, N_2, Ar, He, H_2, CO_2, C_2H_2, C_3H_8).
- The intelligent pressure controller supplies high-pressure gas sources.

2.Features

- The gas source use a 7-inch touchscreen displays for digital control, allowing arbitrary setting of the pressure range;
- Equipped with over-pressure protection, including a built-in mechanical safety valve for dual-layer protection;
- Built-in an imported high-pressure air compressor, offering long service life and low noise;
- Built-in 0.7L high-pressure gas storage tank;

  Compact design for easy move.

3.Technical Specifications

Item	Specifications
Pressure Range	(0~25)MPa
Working Medium	Air
Output Interface	M20×1.5 female
Power Supply	AC220V/400W
Dimension	460mm×345mm×375mm
Weight	23kg

Pressure Equipment Accessories

PR9149A Adapter Assembly	PR9149A	PR9149B High Pressure Connection Hose	PR9149B	PR9149C Oil-Water Isolator	PR9149C	PR9149D Oil-Gas Separator	PR9149D
Liquid Filter	PR9149F	Micro-differential Pressure Gauge Calibration Stand	PR9149H	Adjustable Pressure Calibration Bench	PR9149K	Pressure Interface Bench	PR9149E

PR9149G Aneroid Barometer Calibration Chamber	(Illustration of calibration process) PR9149G

PRODUCT CATALOGUE

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PANRAN is committed to providing you with comprehensive professional temperature and pressure metrology solutions!

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