# PR611 Series Multifunctional Dry Block Calibrator

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Keywords:

- 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

# I. 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 Electrical 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.

### 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.

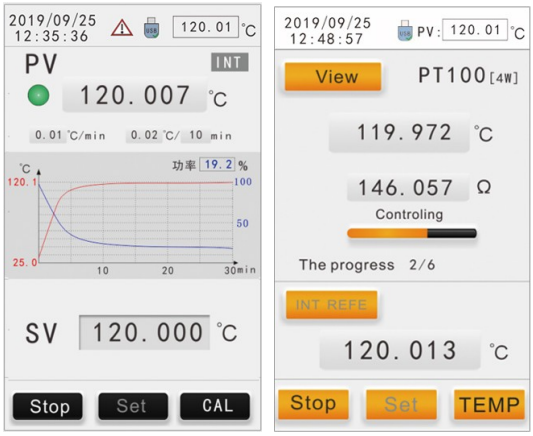
### Support HART Transmitter Calibration

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

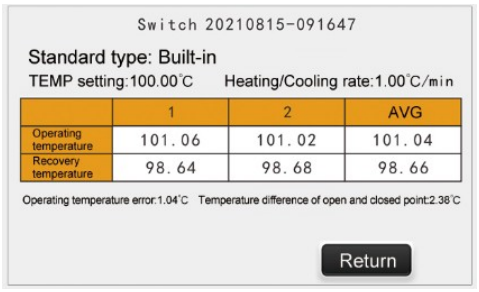
### Supports USB Storage Devices

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.




▲ PR611A/H Partial Working Interface


▲ PR613A/H Partial Working Interface

## II. List of Main Functions

| Software Function | Hardware Function |
|---|---|
| ■ Optional internal/external reference sensor to control temperature<br>■ Programmable thermocouple, thermal resistance multi-point automatic calibration<br>■ Automatic switch calibration with adjustable slope for temperature rise and fall<br>■ Internal storage of calibration data<br>■ Multi-point internal/external reference temperature control | ■ mV/mA/V/Ω measurement<br>■ Switch measurement<br>■ Thermocouple measurement function<br>■ Two-wire, three-wire, and four-wire thermal resistance measurement<br>■ Built-in reference compensation<br>■ DC24V output (80mA max) |

| | |
|---|---|
| parameter self-tuning<br>■ Adaptive temperature control parameters<br>■ Real-time temperature and power curve display<br>■ Self-defined temperature fluctuation calculation<br>■ U disk storage<br>■ Self-defined the upper and lower limit of alarm temperature<br>■ Optional ℃, ℉, K | |

# III. 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)℃, Non-condensing | | Working temperature: (0～50)℃, 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℃～155℃ | RT+10℃～700℃ | |
| Resolution | 0.001℃ | 0.001℃ | |
| Insert Diameter/Insertion Depth | φ26mm/160mm | φ26mm/155mm | |
| Built-in Reference Accuracy | ±0.15℃@0℃<br>±0.30℃@100℃ | ±0.15℃@100℃<br>±0.60℃@600℃ | [Note 1] |
| Temperature Fluctuation | ±0.01℃@0℃,100℃ | ±0.03℃@100℃<br>±0.07℃@600℃ | 10 minutes |
| Temperature Difference Between Holes | 0.01℃@0℃,100℃ | 0.03℃@100℃<br>0.10℃@600℃ | [Note 1] |
| 40mm Axial Temperature Difference | 0.20℃@0℃,100℃ | 0.20℃@100℃<br>0.70℃@600℃ | [Note 1][Note 2] |
| 60mm Axial Temperature Difference | 0.50℃@0℃,100℃ | 0.50℃@100℃<br>1.00℃@600℃ | [Note 1][Note 2] |
| Load Impact | 0.01℃ | 0.05℃@100℃<br>0.20℃@600℃ | Use built-in reference [Note 3] |
| Heating Time | 23℃～155℃ 17min | 23℃～700℃ 25min | Subject to the |

| | | | |
|---|---|---|---|
| Cooling Time | 23℃～-30℃ 12min | 700℃～100℃ 35min | temperature at the bottom of insert |
| Stabilization Time | ≤5min | ≤10min | Use built-in reference |

The above technical parameters are all measured at an ambient temperature of 23℃， 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+2uV | 0.1μV | Input impedance≥50MΩ |
| | 50mV | 0mV～50mV | ±0.015%RD+5uV | 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/℃@(Ω, KΩ) 5ppm/℃@(mV, V) 5ppm/℃@(mA) | | | | |
| Note: Wiring is done through the front panel terminals. | | | | | |

## ■ Thermocouple Temperature Measurement Parameters

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

## ■ Thermal Resistance Temperature Measurement Parameters

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