

# **PR203 Series Temperature and Humidity Data Acquisitor**

**PANRAN**

PANRAN instruments are available in South Africa from Intercal (Pty) Ltd

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PR203 series temperature and humidity acquirers, 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.

## I. 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.

#### ■ 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

#### ■ 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.

#### ■ 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.

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### ■ 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

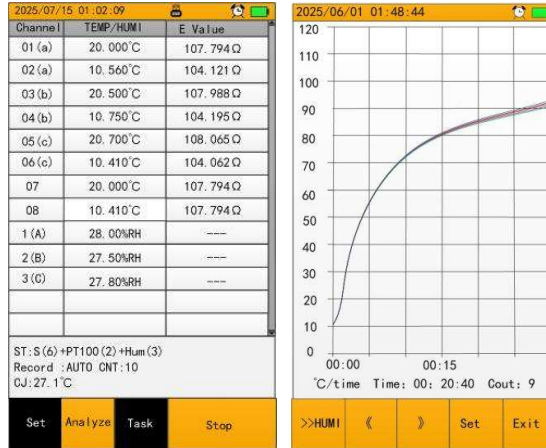
PR203 can be connected to other peripherals through 2.4G wireless local area network, support multiple acquirers to carry out temperature field testing at the same time, which effectively improve work efficiency and simplify the wiring process.



▲ Wireless communication diagram

### ■ 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.

II. 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.

| 通道号 | 传感器 | 测量值   | 波动/min | 波动/0min |
|-----|-----|-------|--------|---------|
| T01 | K   | 21.0  | ±0.0   | ±0.1    |
| T02 | K   | 19.4  | ±0.0   | ±0.1    |
| T03 | K   | 19.5  | ±0.0   | ±0.1    |
| T04 | K   | 19.5  | ±0.1   | ±0.1    |
| T05 | K   | 19.5  | ±0.0   | ±0.1    |
| T06 | K   | 19.7  | ±0.0   | ±0.0    |
| T07 | K   | 19.8  | ±0.0   | ±0.0    |
| T08 | K   | 19.8  | ±0.0   | ±0.0    |
| T09 | K   | 19.8  | ±0.0   | ±0.0    |
| T10 | N   | 19.8  | ±0.0   | ±0.0    |
| T11 | N   | 19.8  | ±0.0   | ±0.0    |
| T12 | N   | 20.8  | ±0.0   | ±0.0    |
| T13 | N   | 20.8  | ±0.0   | ±0.0    |
| T14 | N   | 22.2  | ±0.0   | ±0.0    |
| H01 | 变送器 | 42.42 | ±0.01  | ±0.05   |
| H02 | 变送器 | 42.5  | ±0.01  | ±0.06   |
| H03 | 变送器 | 43.5  | ±0.01  | ±0.06   |

■ 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.

| 修正算法      | 二次修正法 |
|-----------|-------|
| T01 K-K17 | X + 0 |
| T02 K-K18 | X + 0 |
| T03 K-11  | X + 0 |
| T04 K-10  | X + 0 |
| T05 K-9   | X + 0 |
| T06 K-8   | X + 0 |
| T07 K-7   | X + 0 |
| T08 K-6   | X + 0 |
| T09 K-5   | X + 0 |
| T10 N-N1  | X + 0 |
| T11 N-ND1 | X + 0 |
| T12 N-1   | X + 0 |
| T13 N-2   | X + 0 |
| T14 N-    | X + 0 |

Binding the sensors

■ 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.

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下午7:02 15.3K/s 4G

← 测试详情

计算依据 JJF 1101-2019 环境试验设备温度、湿度校...

任务详情

测试点 20°C, 40%

测试状态 已完成

计算结果

|       |          |       |         |
|-------|----------|-------|---------|
| 温度上偏差 | 2.30 °C  | 湿度上偏差 | 3.32 %  |
| 温度下偏差 | -0.60 °C | 湿度下偏差 | 2.40 %  |
| 温度均匀度 | 2.80 °C  | 湿度均匀度 | 0.82 %  |
| 温度波动度 | ±0.05 °C | 湿度波动度 | ±0.05 % |

采集数据

| 序  | 时间       | T01   | T02   | T03   | T04   |
|----|----------|-------|-------|-------|-------|
| 1  | 13:52:04 | 20.30 | 20.40 | 19.50 | 19.50 |
| 2  | 13:52:34 | 20.30 | 20.40 | 19.50 | 19.50 |
| 3  | 13:53:04 | 20.30 | 20.40 | 19.50 | 19.50 |
| 4  | 13:53:34 | 20.30 | 20.40 | 19.50 | 19.40 |
| 5  | 13:54:04 | 20.30 | 20.30 | 19.40 | 19.50 |
| 6  | 13:54:34 | 20.30 | 20.40 | 19.40 | 19.50 |
| 7  | 13:55:04 | 20.30 | 20.40 | 19.50 | 19.50 |
| 8  | 13:55:34 | 20.30 | 20.40 | 19.50 | 19.50 |
| 9  | 13:56:04 | 20.30 | 20.30 | 19.50 | 19.50 |
| 10 | 13:56:34 | 20.30 | 20.40 | 19.50 | 19.50 |
| 11 | 13:57:04 | 20.30 | 20.30 | 19.50 | 19.40 |
| 12 | 13:57:34 | 20.30 | 20.40 | 19.50 | 19.50 |
| 13 | 13:58:04 | 20.30 | 20.40 | 19.50 | 19.50 |
| 14 | 13:58:34 | 20.30 | 20.40 | 19.40 | 19.50 |
| 15 | 13:59:04 | 20.30 | 20.30 | 19.50 | 19.50 |
| 16 | 13:59:34 | 20.30 | 20.40 | 19.40 | 19.50 |

Test task details

■ 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.

上午11:59 16.5K/s 4G

← 203210712001

|     |     |          |         |         |
|-----|-----|----------|---------|---------|
| T11 | N   | 19.6°C   | ±0.1    | ±0.3 ↑  |
| T12 | N   | 20.6°C   | ±0.1    | ±0.3    |
| T13 | N   | 20.7°C   | ±0.1    | ±0.2    |
| T14 | N   | 22.1°C ↑ | ±0.1    | ±0.2    |
| H01 | 变送器 | 42.03% ↓ | ±0.04   | ±0.50   |
| H02 | 变送器 | 42.25%   | ±0.05 ↑ | ±0.53 ↑ |
| H03 | 变送器 | 42.88% ↑ | ±0.02   | ±0.52   |

1101-2019测试

|      | 最佳值  | 当前值  |
|------|------|------|
| 设置   | 20   | 40   |
| 中心平均 | 19.9 | 39.7 |
| 上偏差  | 1.9  | 2.3  |
| 下偏差  | -3.1 | -3.5 |
| 波动度  | ±1.5 | ±0.4 |
| 均匀度  | 2.9  | 0.8  |

设置值 查看数据 导出结果

底部导航: 首页, 数据, 1101, 测试, 设置

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.



| 环境试验设备校准记录 |                                 |      |      |      |        |            |      |      |      |                   |              |      |      |      |        |
|------------|---------------------------------|------|------|------|--------|------------|------|------|------|-------------------|--------------|------|------|------|--------|
| 委托单位:      | 泰安磐然测控                          |      |      |      | 设备名称:  | 实验室设备#01   |      |      |      | 登记号:              | 20240308001  |      |      |      |        |
| 制造厂:       | 泰安磐然测控                          |      |      |      | 型号/规格: | PR001      |      |      |      | 出厂编号:             | 202231005136 |      |      |      |        |
| 校准地点:      | 山东省泰安市                          |      |      |      | 环境温度:  | 23℃        |      |      |      | 环境湿度:             | 45%          |      |      |      |        |
| 校准依据:      | JJF 1101-2019 环境试验设备温度、湿度参数校准规范 |      |      |      |        |            |      |      |      |                   |              |      |      |      |        |
| 标准器名称      | 标准器#001                         |      |      |      | 型号规格   | PR002      |      |      |      | 准确的等级/最大允许误差/不确定度 | 一等           |      |      |      |        |
| 证书编号       | PR20231015001                   |      |      |      | 有效期至   | 2024.10.14 |      |      |      |                   |              |      |      |      |        |
| 1.校准记录     |                                 |      |      |      |        |            |      |      |      |                   |              |      |      |      |        |
| 温度参数校准记录   |                                 |      |      |      |        |            |      |      |      |                   |              |      |      |      |        |
| 温度设定值      | 30                              |      |      |      | ℃      |            |      |      |      |                   |              |      |      |      | 单位: °C |
| 次数         | 实际温度值                           |      |      |      |        |            |      |      |      |                   |              |      |      |      |        |
|            | 1                               | 2    | 3    | 4    | 5      | 6          | 7    | 8    | 9    | 10                | 11           | 12   | 13   | 14   | 15     |
| 1          | 29.9                            | 30.0 | 30.1 | 30.1 | 30.0   | 30.1       | 29.9 | 29.9 | 30.8 | 30.8              | 30.1         | 30.1 | 30.8 | 30.1 | 29.9   |
| 2          | 30.0                            | 30.0 | 30.1 | 30.1 | 30.1   | 30.2       | 29.9 | 29.8 | 30.9 | 30.8              | 30.2         | 30.1 | 30.9 | 30.1 | 29.8   |
| 3          | 30.0                            | 29.9 | 30.0 | 30.1 | 30.1   | 30.1       | 29.9 | 29.9 | 30.9 | 30.8              | 30.1         | 30.1 | 30.9 | 30.1 | 29.9   |
| 4          | 29.9                            | 30.0 | 30.0 | 30.1 | 30.1   | 30.1       | 29.9 | 29.9 | 30.8 | 30.8              | 30.1         | 30.1 | 30.8 | 30.1 | 29.9   |
| 5          | 30.0                            | 30.0 | 30.0 | 30.1 | 30.1   | 30.1       | 29.9 | 29.9 | 30.8 | 30.8              | 29.9         | 30.1 | 30.8 | 30.1 | 29.9   |
| 6          | 30.0                            | 30.0 | 30.0 | 30.0 | 30.1   | 30.2       | 29.9 | 29.9 | 30.8 | 30.8              | 29.8         | 30.0 | 30.8 | 30.0 | 29.9   |
| 7          | 30.0                            | 29.9 | 30.1 | 30.1 | 30.1   | 30.1       | 29.8 | 29.9 | 30.8 | 30.9              | 29.9         | 30.1 | 30.8 | 30.1 | 29.9   |
| 8          | 30.0                            | 30.0 | 30.0 | 30.0 | 30.1   | 30.2       | 29.9 | 29.9 | 30.9 | 30.8              | 29.9         | 30.0 | 30.9 | 30.0 | 29.9   |
| 9          | 30.0                            | 30.0 | 30.1 | 30.1 | 30.1   | 30.1       | 29.9 | 29.9 | 30.8 | 30.8              | 29.9         | 30.1 | 30.8 | 30.1 | 29.9   |
| 10         | 30.0                            | 29.9 | 30.1 | 30.1 | 30.1   | 30.2       | 29.9 | 29.9 | 30.8 | 30.9              | 29.9         | 30.1 | 30.8 | 30.0 | 29.8   |
| 11         | 30.0                            | 29.9 | 30.1 | 30.1 | 30.1   | 30.1       | 29.9 | 29.9 | 30.8 | 30.8              | 29.9         | 30.1 | 30.9 | 30.1 | 29.9   |
| 12         | 30.0                            | 29.9 | 30.0 | 30.1 | 30.1   | 30.2       | 29.9 | 29.9 | 30.9 | 30.9              | 29.9         | 30.1 | 30.8 | 30.0 | 29.9   |
| 13         | 30.0                            | 29.9 | 30.1 | 30.1 | 30.1   | 30.2       | 29.9 | 29.9 | 30.8 | 30.9              | 30.2         | 30.1 | 30.8 | 30.1 | 29.9   |
| 14         | 30.0                            | 30.0 | 30.1 | 30.1 | 30.1   | 30.1       | 29.9 | 29.9 | 30.8 | 30.8              | 30.1         | 30.1 | 30.9 | 30.1 | 29.9   |
| 15         | 30.0                            | 29.9 | 30.1 | 30.1 | 30.1   | 30.2       | 29.9 | 29.9 | 30.8 | 30.9              | 30.2         | 30.1 | 30.8 | 30.1 | 29.9   |
| 16         | 30.0                            | 30.0 | 30.1 | 30.1 | 30.1   | 30.2       | 29.9 | 29.9 | 30.8 | 30.8              | 30.2         | 30.1 | 30.9 | 30.1 | 30.8   |
| 最大值        | 30.0                            | 30.0 | 30.1 | 30.1 | 30.1   | 30.2       | 29.9 | 29.9 | 30.9 | 30.9              | 30.2         | 30.1 | 30.9 | 30.1 | 30.8   |
| 最小值        | 29.9                            | 29.9 | 30.0 | 30.0 | 30.0   | 30.1       | 29.8 | 29.8 | 30.8 | 30.8              | 29.8         | 30.0 | 30.8 | 30.0 | 29.8   |
| 上偏差        | 0.9                             |      |      |      | 下偏差    | -0.2       |      |      |      | 均匀度               | 0.18         |      | 波动度  | ±0.2 |        |
| 不确定度       |                                 |      |      |      |        |            |      |      | 0.12 |                   |              |      |      |      |        |
| 2.传感器布点示意图 |                                 |      |      |      |        |            |      |      |      |                   |              |      |      |      |        |
| 上层         |                                 |      |      |      | 中层     |            |      |      |      | 下层                |              |      |      |      |        |
|            |                                 |      |      |      |        |            |      |      |      |                   |              |      |      |      |        |
| 校准员:       | 李强                              |      |      |      | 核验员:   | 张明         |      |      |      |                   |              |      |      |      |        |
| 校准日期:      | 2024.03.18                      |      |      |      |        |            |      |      |      |                   |              |      |      |      |        |

Web terminal: device management, data viewing and output

### III. Technical Parameter

#### ■ Model selection

| Function                           | Model                | PR203AS | PR203AF | PR203AC                 |
|------------------------------------|----------------------|---------|---------|-------------------------|
|                                    | Communication method |         | RS232   | 2.4G local area network |
| Support PANRAN Smart Metrology APP |                      |         |         | ●                       |
| Battery duration                   |                      | 14h     | 12h     | 10h                     |
| Number of TC channels              |                      | 32      |         |                         |

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|                                         |                                                                              |
|-----------------------------------------|------------------------------------------------------------------------------|
| 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;<br>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 | Accuracy        | Resolution | Sampling speed | Remarks                                |
|-------|-------------------|-----------------|------------|----------------|----------------------------------------|
| S     | 0°C~1760.0°C      | @ 600°C, 0.8°C  | 0.01°C     | 0.1sec/channel | Complies with ITS-90 temperature scale |
| R     |                   | @ 1000°C, 0.8°C |            |                |                                        |

PR203 Series Temperature and Humidity Data Acquisitor

|          |                    |                                                     |                                  |                |                                             |
|----------|--------------------|-----------------------------------------------------|----------------------------------|----------------|---------------------------------------------|
| B        | 300.0°C~1800.0°C   | @ 1300°C, 0.8°C                                     | ≤600°C, 0.5°C<br>> 600°C, 0.1%RD | 0.01°C         | Including reference end compensation error  |
| K        | -100.0°C~1300.0°C  |                                                     |                                  |                |                                             |
| 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   |                                                     |                                  |                |                                             |
| WRe3/25  | 0°C~2300°C         |                                                     |                                  |                |                                             |
| WRe3/26  |                    |                                                     |                                  |                |                                             |
| Pt100    | -200.00°C~800.00°C | @ 0°C, 0.05°C<br>@ 300°C, 0.08°C<br>@ 600°C, 0.12°C | 0.001°C                          | 0.5sec/channel | Output 1mA excitation current               |
| Humidity | 1.00%RH~99.00%RH   | 0.1%RH                                              | 0.01%RH                          | 1.0sec/channel | Does not include humidity transmitter error |

■ Regulations , Specifications , Standards that are implemented and referenced

| No | Implementation standard/specification code | Standard/Specification Name                                                                                    |
|----|--------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| 1  | JJF 1101-2019                              | Calibration Specification for Environmental Testing Equipment for Temperature and Humidity Parameters          |
| 2  | JJF 1376-2012                              | Calibration Specification for Box-type Resistance Furnace                                                      |
| 3  | JJF 2019-2022                              | Measurement Specification for Temperature Performance of Liquid Constant Temperature Testing Equipment         |
| 4  | JJF 2168-2024                              | Calibration Specification for Salt Mist Testing Chambers                                                       |
| 5  | JJF 1564-2016                              | Calibration Specification for Temperature and Humidity Standard Chambers                                       |
| 6  | GB/T 9452-2023                             | Test method for qualified work zone of heat treatment furnace                                                  |
| 7  | GB/T 5170.1-2016                           | Inspection methods for environmental testing equipment for electric and electronic products -- Part 1: General |
| 8  | GB/T 5170.2-2017                           | Inspection methods for environmental testing equipment -- Part 2:                                              |

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|    |                  |                                                                                                                                    |
|----|------------------|------------------------------------------------------------------------------------------------------------------------------------|
|    |                  | Temperature testing equipment                                                                                                      |
| 9  | GB/T 5170.5-2016 | Inspection methods for environmental testing equipment for electric and electronic products -- Part 5: Damp heat testing equipment |
| 10 | GB/T 5170.8-2017 | Inspection methods for environmental testing equipment -- Part 8: Salt mist testing equipment                                      |
| 11 | HB 5425-2012     | Determination method of effective heating area of heat treatment furnace for aviation parts                                        |
| 12 | HB 6783.3-93     | Verification method for climate environment test chamber (room) for military airborne equipment                                    |
| 13 | GJB 509B-2008    | Heat treatment process quality control                                                                                             |
| 14 | QJ 1428A-2012    | Heat treatment furnace temperature control and measurement                                                                         |
| 15 | JB/T 5520-91     | Drying oven technical conditions                                                                                                   |
| 16 | AMS2750          | AEROSPACE MATERIAL SPECIFICATION(R) Pyrometry                                                                                      |