使 用 手 册

The manual

TPS 2000 系列无线智能温度测量分析仪

TPS 2000 series wireless intelligent temperature measuring analyzer

拥有最快捷、稳定的无线温度曲线测量分析系统

With the most rapid and stable wireless temperature curve measurement and analysis system

TPS2000 系列无线智能温度测量分析系统是一个实时测量焊接回流、波峰设备进行温度改善的工具，通过快速温度测量，数据实时无线传输，提高测温效率、减少测温作业中间下载温度数据环节，无线数据传输避免高温对仪器损坏导致测温数据丢失，保证每一次都得到完整的曲线数据，在测试过程中，温度数据实时的呈现，有利于工程师对设备炉温质量的判定，现场即可对温度进行优化。

TPS2000 series wireless intelligent temperature measurement and analysis system is a tool for real-time measurement of welding reflow and peak equipment for temperature improvement. Through rapid temperature measurement, real-time wireless transmission of data, improving temperature measurement efficiency, reducing temperature downloading intermediate download temperature data link, wireless data Transmission avoids high temperature damage to the instrument, resulting in loss of temperature measurement data, ensuring complete curve data every time. In the test process, the temperature data is presented in real time, which is beneficial to the engineer to judge the temperature of the equipment furnace temperature, and the temperature can be performed on site. optimization.

TPS2000 系列无线智能温度测量分析仪是一个外观精致且带无线数据传输功能的温度测量精密仪器，采用 ADI 公司高精度的芯片处理，简单模块化的软件操作界面，每个界面都有文字图形说明，快速为您提供向导指引功能，只需要少许培训，就可以快速掌握操作方法。

TPS2000 series wireless intelligent temperature measurement analyzer is a delicate and appearance with the function of wireless data transmission of temperature measuring precision instruments, using ADI company high precision chip processing, simple and modular software operation interface, each interface has text graphic illustration, quick to provide you with guide function, only need a little training, can quickly master the operation method.

重要的信息

Important information

感谢您选择了温敏公司产品，了解下列安全性预防措施，请务必按照规定使用本产品， 在此，衷心谢谢您支持与厚爱。

Thank you for choosing the products of Wenmin Company, understand the following safety precautions, please be sure to use this product according to the regulations. Thank you for your support and love.

- 使用过程中请勿重压或撞击，储藏温度 25℃±3℃。
- Do not press or impact during use, storage temperature 25 ° C ± 3 ° C.

- 仪器充电电压 5V 2A，务必使用原厂配置充电线。
- The charging voltage of the instrument is 5V 2A. Be sure to use the original charging line.
- 使用环境远离电、磁等信号干扰，请勿于露天及潮湿环境下使用。
- Keep away from electrical, magnetic and other signal interference. Do not use in the open air or damp environment.
- 仪器出现故障时，请勿自行进行拆卸，联系售后人员进行检查维修。
- When the instrument fails, do not disassemble it by yourself. Contact the after-sales staff for inspection and maintenance.
- 本系列温度测量分析仪内部操作温度≥60℃，测温范围 -260 ℃~1300℃ 。
- The internal operating temperature of this series of temperature measuring analyzer is ≥60℃, and the temperature measuring range is -260 ℃~1300℃.

其它注意事项未提到的，请参照使用说明书规范操作使用。

In case of any other matters not mentioned, please refer to the operation manual for standard operation.

警告： 警告性声明指可能严重损坏产品及配件。

Warning: warning statement means that the products and accessories may be seriously damaged.

注意： 注意性声明指可能导致产品无法使用或测量结果不符。

Note: a notice statement means that the product may not be used or the measurement results may be inconsistent.



高温 The high temperature



潜在危险 Potential danger

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一、 硬件 hardware

1.1 仪器组件说明 Description of instrument components

<table>
<tr><th>名称
Name</th><th>组件
component</th><th colspan="2">说明
description</th></tr>
<tr><td rowspan="4">U-key</td><td rowspan="4"></td><td>软件加密
Software encryption</td><td>支持
support</td></tr>
<tr><td>热拔插
Hot plug</td><td>支持
support</td></tr>
<tr><td>工作电压
Working voltage</td><td>5V 0.5A</td></tr>
<tr><td>接口支持
Interface support</td><td>USB 2.0 3.0</td></tr>
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Thermometer</td><td rowspan="9"></td><td>无线传输
Wireless transmission</td><td>支持
support</td></tr>
<tr><td>离线测试
Offline test</td><td>支持
support</td></tr>
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thermocouple</td><td>K 型
K type</td></tr>
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The channel number</td><td>4--16</td></tr>
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Accuracy of measurement</td><td>±0.5℃</td></tr>
<tr><td>显示精度
Display precision</td><td>0.1℃</td></tr>
<tr><td>测量范围
Measuring range</td><td>-260℃--1300℃</td></tr>
<tr><td>采样周期
Sampling period</td><td>0.1s--10s</td></tr>
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The battery</td><td>2000mAH</td></tr>
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thermocouple</td><td></td><td colspan="2">K 型
K type</td></tr>
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<td>隔热盒

Heat insulation box</td>
<td>
</td>
<td>参数 parameter
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<tr><td>时间 Time</td><td>min</td><td>25</td><td>20</td><td>15</td><td>10</td><td>5</td></tr>
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<td>软件适用系统

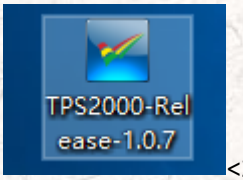
Software application system</td>
<td>Windows7/Windows8/Windows10</td>
<td>配置
<table>
<tr><td>系统内存：≥2GB</td><td>System memory: ≥2GB</td></tr>
<tr><td>CPU 最低要求：双核 2GHz</td><td>CPU: minimum required dual core 2GHz</td></tr>
<tr><td>硬盘： > 120G</td><td>Hard disk: >120G</td></tr>
<tr><td>USB 接口：≥1</td><td>USB interface: ≥1</td></tr>
<tr><td>显示器分辨率：1024X768</td><td>Display resolution: 1024X768</td></tr>
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二、 软件操作

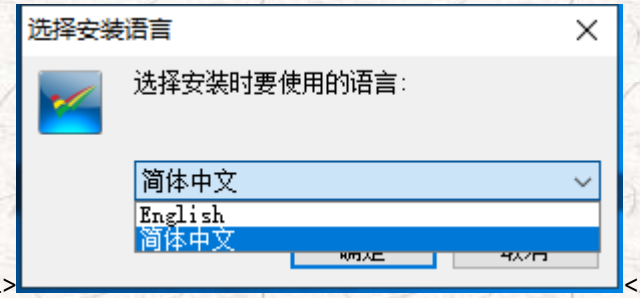
2.1 软件安装 Software installation

软件拷贝至电脑桌面；将 U-key 插入电脑 USB 接口，根据软件安装指引完成软件安装。图<2.1-1>,图<2.1-2>

Copy the software to the desktop of the computer; insert the U-key into the USB port of the computer and complete the software installation according to the software installation guide. Figure <2.1-1>, Figure <2.1-2>



<2.1-1>



<2.1-2>

2.2 选择工作模式 Select working mode

首次开启软件需要确认软件测试模式，选择对应模式。图<2.2-1>

To open the software for the first time, you need to confirm the software test mode and select the corresponding mode. Figure <2.2-1>

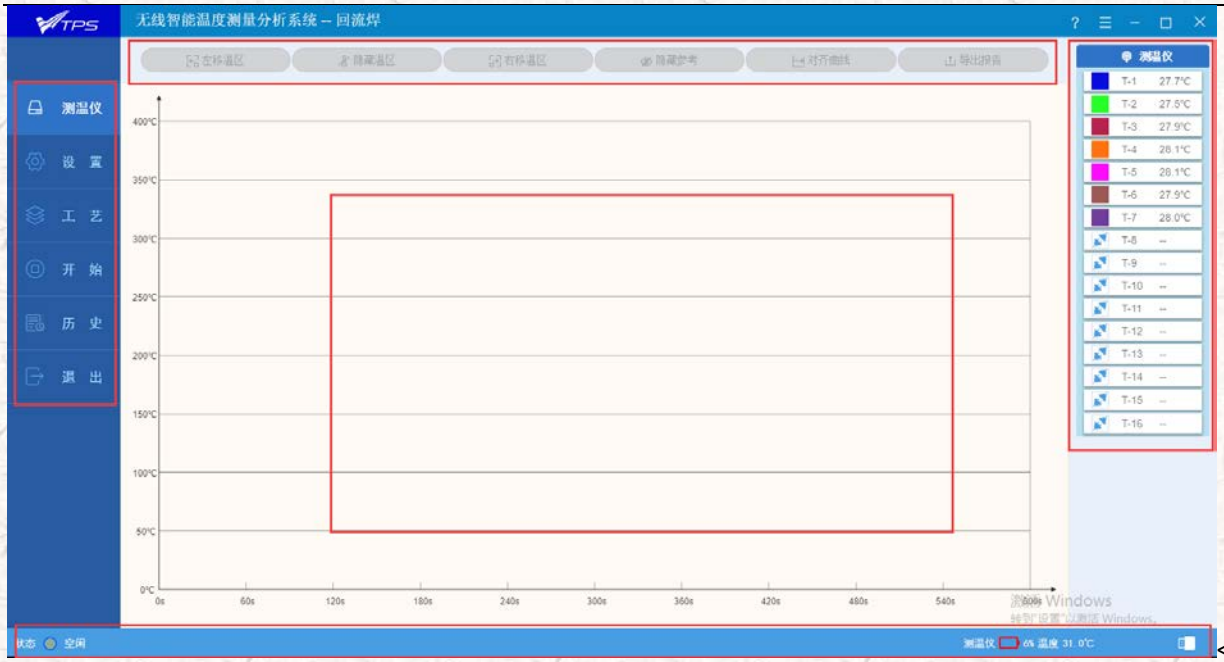


<2.2-1>

2.3 软件主界面 Software main interface

主界面主要分为左侧主功能栏，工具栏，绘图区、操作按钮，温度显示区，状态栏。图<2.3-1>

The main interface is mainly divided into the left main function bar, the toolbar, the drawing area, the operation button, the temperature display area, and the status bar. Figure <2.3-1>



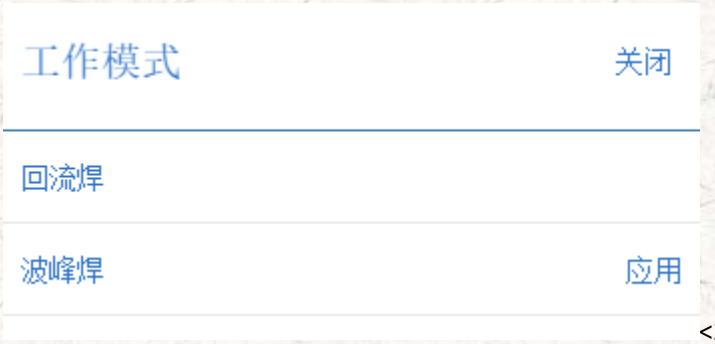
<2.3-1>

2.4 工作模式 Working mode

2.4.1 工作模式切换 Work mode switching

点击右上工具栏中的按钮，进入工作模式切换界面，根据测试对象可随意切换测试模式。图<2.4.1-1>

Click the button in the upper right toolbar to enter the working mode switching interface, and the test mode can be switched according to the test object. Figure <2.4.1-1>



<2.4.1-1>

2.4.2 添加自定义工作模式 add custom working mode

在工作模式切换界面、点击添加，根据需求输入名称，选择最大温度、最大时长、采样周期、文件保存路径，点击确定后，工作模式即添加成功。图<2.4.2-1>

In the working mode switching interface, click add, input the name according to the requirements, and select the maximum temperature, maximum duration, sampling period and file saving path. Click ok, the working mode is added successfully. Figure <2.4.2-1>



<2.4.2-1>

2.4.3 导出、导入自定义工作模式 Export, import custom working mode

勾选所需要导出的工作模式，点击导出按钮，选择文件夹，工作模式即存入对应的文件夹内；导入工作模式，选取导入文件，选中导入即可。

Check the working mode to be exported, click the export button to select the folder, and the working mode is stored in the corresponding folder; Import working mode, select import file, select import.

2.4.4 删除工作模式 Delete working mode

自定义添加的测试模式，可删除该工作模式。

Customize the added test mode to remove the work mode.

三、 无线智能温度测量分析系统--回流焊 Wireless intelligent temperature measurement and analysis system - reflow welding

3.1 测温仪 thermometer

3.1.1 配对 pairing

测温仪与测温软件建立数据交换通道，点击软件界面配对按钮，轻按测温仪电源按钮开机，MOD 绿灯闪烁时，长按电源按钮，等待 3s--5s 后，软件提示配对是否成功，如配对失败，再次配对即可，可根据软件界面文字提示信息进行操作。 图<3.1.1-1>、图<3.1.1-2>

The thermometer and the temperature measurement software establish a data exchange channel, click the software interface pairing button, press the thermometer power button to turn on the light, when the MOD green light flashes, press and hold the power button, wait for 3s--5s, the software prompts whether the pairing is successful. If the pairing fails, you can pair it again. You can operate according to the text prompt message on the software interface. Figure <3.1.1-1>, Figure <3.1.1-1>

报警温度：默认为 55℃，测试过程中测温仪内部温度超出设定温度，测温软件将自动报警提示。

Alarm temperature: The default is 55 °C. During the test, the internal temperature of the thermometer exceeds the set temperature, and the temperature measurement software will automatically alarm.

采样周期：仪器温度数据采样频率。

Sampling period: Instrument temperature data sampling frequency.



<3.1.1-1>



<3.1.1-2>

3.1.2 进入离线模式 Enter offline mode

测温仪 MOD 绿灯长亮，仪器处于在线测试状态，长按电源按钮，MOD 橙色灯长亮进入离线模式。

The MOD green light of the thermometer is long, the instrument is in the online test state, long press the power button, the MOD orange light is on and enters the offline mode.

3.1.3 离线模式测试 Offline mode test

开始测试：测温仪进入离线模式后，双击测温仪电源按钮，测温仪蜂鸣器响一声、MOD 橙色灯闪烁，开始测试成功。

Start the test: After the thermometer enters the offline mode, double-click the thermometer power button, the thermometer buzzer will sound, the MOD orange light will flash, and the test will start successfully.

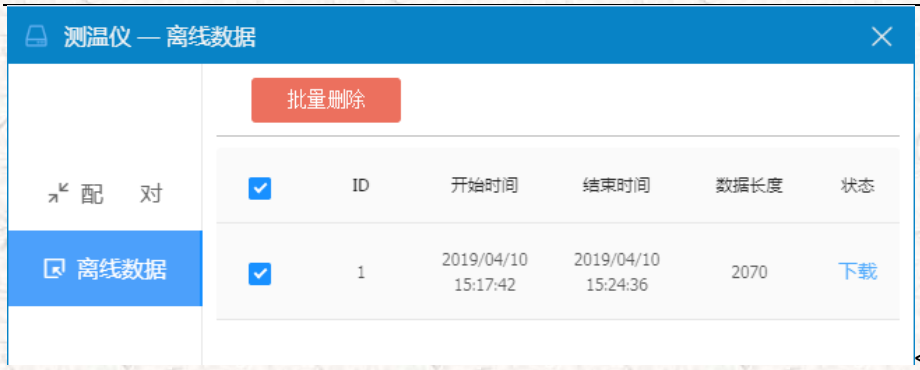
结束测试：测试完成后，双击测温仪电源按钮，测温仪蜂鸣器响两声、MOD 橙色灯长亮，结束测试。

End test: After the test is completed, double-click the thermometer power button, the thermometer buzzer sounds twice, the MOD orange light is on, and the test ends.

3.1.4 离线数据 Offline data

点击软件界面离线数据，根据测试时间选定数据、点击下载，无线数据下载，数据下载后将存储至历史数据中。点击查看按钮，跳转到历史数据界面，即可对该条数据进行操作，生成报告或者数据查看删除。图<3.1.4-1>、图<3.1.4-2>

Click the software interface offline data, select the data according to the test time, click to download, wireless data download, the data will be stored in the historical data after downloading. Click the View button to jump to the historical data interface, you can operate the data, generate a report or view the data to delete. Figure <3.1.4-1>, Figure <3.1.4-2>



<3.1.4-1>



<3.1.4-2>

3.1.5 退出离线模式 Exit offline mode

离线模式下，长按开机按钮，测温仪蜂鸣器响 2 声，MOD 灯由橙色变为绿色长亮即可。5s—8s 后软件界面右侧将实时显示当前温度数据，切换为在线模式。

In offline mode, press and hold the power button, the thermometer buzzer sounds 2 times, and the MOD light changes from orange to green. After 5s-8s, the right side of the software interface will display the current temperature data in real time and switch to online mode.

3.2 设置 Setting

3.2.1 炉子 stove

填写炉子出厂信息。注：炉子型号不得重复，可对已有的炉子信息修改或删除。修改时，炉子型号无法修改，确保炉子型号不变。温区最高温度、温区长度请根据设备厂商提供的参数填写，不可以随意填写。图<3.2.1-1>，图<3.2.1-2>

Fill in the furnace factory information. Note: The furnace model must not be repeated, and the existing furnace information can be modified or deleted. When the modification is made, the furnace model cannot be modified to ensure that the furnace model remains unchanged. The maximum temperature and length of the temperature zone should be filled in according to the parameters provided by the equipment manufacturer. Figure <3.2.1-1>, Figure <3.2.1-2>



<3.2.1-1>



<3.2.1-2>

3.2.2 工程师 engineer

填写工程师信息。注：工号不得重复，可对已有的工程师信息修改或删除。图<3.2.2-1>

Fill in the engineer information. Note: The work number must not be duplicated, and the existing engineer information can be modified or deleted. Figure <3.2.2-1>

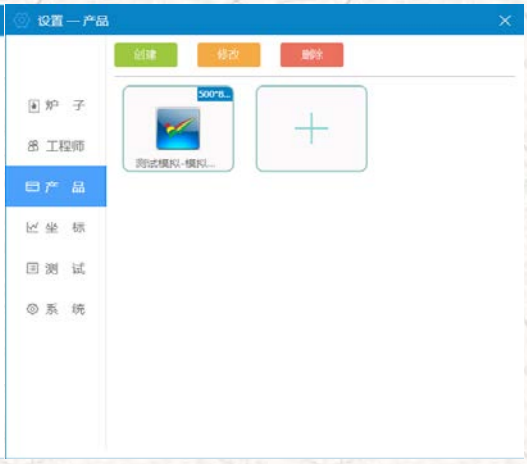
3.2.3 产品 product

填写产品信息。注：规格型号不得重复，可对已有的产品信息修改或删除。图<3..2.3-1>

Fill in the product information. Note: Specifications and models must not be duplicated, and existing product information can be modified or deleted. Figure <3.2.3-1>



<3.2.2-1>



<3.2.3-1>

3.2.4 坐标 coordinate

调整软件界面绘图区域显示精度，根据测试环境的温度高低和时间长短合理设置；横轴为时间轴（单位：S），纵轴为温度轴（单位：℃）。图<3.2.4-1>

Adjust the display accuracy of the drawing area of the software interface, and set it according to the temperature and time of the test environment; the horizontal axis is the time axis (unit: S), and the vertical axis is the temperature axis (unit: °C). Figure <3.2.4-1>

3.2.5 测试 test

温度单位：默认为摄氏度，可选择摄氏度℃或华氏度℉作为温度单位。图<3.2.5-1>

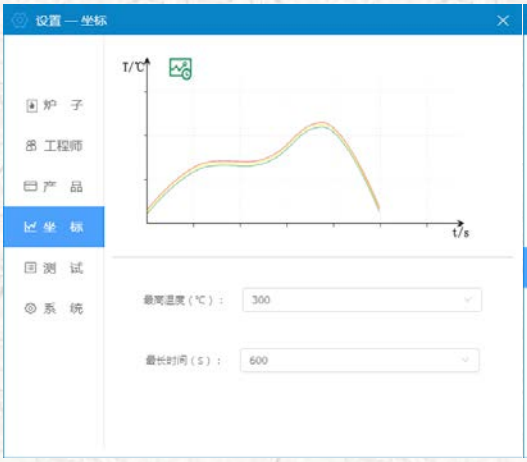
Temperature unit: The default is Celsius, and the temperature can be selected as Celsius ℃ or Fahrenheit ℉. Figure <3.2.5-1>

显示精度：温度显示精度，分为 0.1℃和 1℃，软件界面温度显示都将根据此设置的精度值而改变。图<3.2.5-1>

Display accuracy: Temperature display accuracy, divided into 0.1 ° C and 1 ° C, the software interface temperature display will be changed according to the accuracy value of this setting. Figure <3.2.5-1>

存储路径：数据存储路径，默认为软件安装目录，可更改。图<3.2.5-1>

Storage path: The data storage path, which defaults to the software installation directory and can be changed. Figure <3.2.5-1>



<3.2.4-1>



<3.2.5-1>

3.2.6 系统 System

公司名称：使用者根据需求填写，报告信息栏将显示。图<3.2.6-1>

Company Name: The user fills in according to the requirements, and the report information bar will be displayed. Figure <3.2.6-1>

语言：中文/英文/日文等语言切换

Language: Chinese/English/Japanese language switching

软件版本：测温软件版本号。图<3.2.6-1>

Software version: Temperature measurement software version number. Figure <3.2.6-1>

使用期限：软件加密期限分为试用和永久。图<3.2.6-1>

Term of use: The software encryption period is divided into trial and permanent. Figure <3.2.6-1>

配置：工程师信息、产品信息，可用外部存储器（U 盘）进行导入、导出备份。图<3.2.6-1>

Configuration: Engineer information and product information can be imported and exported by external storage (U disk). Figure <3.2.6-1>

恢复出厂：软件恢复初始状态。图<3.2.6-1>

Restore factory: The software restores the initial state. Figure <3.2.6-1>

U-key 接收器：插上 Dongle 后可查看对应序列号。图<3.2.6-1>

U-key receiver: After plugging in the Dongle, you can view the corresponding serial number. Figure <3.2.6-1>



<3.2.6-1>

3.3 工艺 Process

3.3.1 炉温设置 Furnace temperature setting

创建时首先选择对应的炉子，再根据实际设备设定的温度填写炉温参数。注：名称不得重复；可对已有的炉温设置修改或删除，修改时，名称无法修改，确保名称不变。图<3.3.1-1>、<3.3.1-2>

When creating, first select the corresponding furnace, and then fill in the furnace temperature parameters according to the temperature set by the actual equipment. Note: The name must not be repeated; the existing furnace temperature setting can be modified or deleted. When modifying, the name cannot be modified to ensure that the name does not change. Figure <3.3.1-1>, <3.3.1-2>



<3.3.1-1>



<3.3.1-2>

3.3.2 锡膏制程 Solder paste process

创建锡膏曲线。注：名称不得重复；可对已有锡膏信息修改或删除，修改时，名称无法修改，确保名称不变。（根据锡膏厂商提供的锡膏回流参数填写）图<3.3.2-1>

Create a solder paste curve. Note: The name must not be duplicated; the existing solder paste information can be modified or deleted. When modifying, the name cannot be modified to ensure that the name does not

change. (According to the solder paste reflow parameters provided by the solder paste manufacturer) Figure <3.3.2-1>

参数录入：根据锡膏厂商提供的锡膏手册，对预热区、保温区、回流区、冷却区进行时间、温度以及斜率的管控。

Parameter entry: According to the solder paste manual provided by the solder paste manufacturer, the time, temperature and slope of the preheating zone, the holding zone, the recirculation zone and the cooling zone are controlled.

偏移量：每个温段除了简单的输入数值管控，也可以调整偏移量来辅助管控，依据输入的时间或斜率管控范围中心值为基准点，±100%为偏移量范围；例如：保温区：温度管控范围 160℃--180℃，管控时间 60s--90s，管控时间的中心值为 75s，偏移量为 0%时，达到最佳理想管控点，偏移量为正，管控时间就偏长，反之，偏移量为负，管控时间偏短。图<3.3.2-2>

Offset: In addition to simple input value control, each temperature segment can also adjust the offset to assist the control. According to the input time or slope, the center of the control range is the reference point, and ±100% is the offset range; for example :Insulation zone: temperature control range 160 ℃--180 ℃, control time 60s--90s, the central value of control time is 75s, the offset is 0%, the best ideal control point is reached, the offset is positive, The control time is longer, on the contrary, the offset is negative and the control time is shorter. Figure <3.3.2-2>



<3.3.2-1>



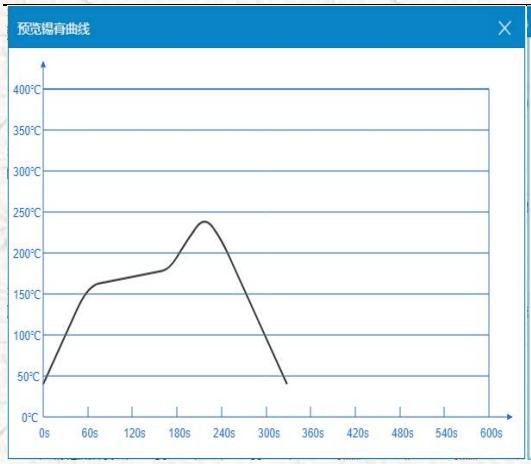
<3.3.2-2>

预览：点击预览，根据录入的参数值生成一条锡膏曲线，此曲线只能作为参考图形，可预估理想状态下的曲线模样，实际测试温度曲线会根据管控值来分析运算。图<3.3.2-3>

Preview: Click Preview to generate a solder paste curve based on the entered parameter values. This curve can only be used as a reference graph to estimate the curve shape under ideal conditions. The actual test temperature curve will be analyzed according to the control value. Figure <3.3.2-3>

探测点位置名称：输入测温线连接点的位置名称，依据制作的测温板的测温点位号，方便报告生成后更快速的找到每条温度曲线对应的测温板的测温点。图<3.3.2-4>

Detection point position name: Enter the position name of the temperature measurement line connection point. According to the temperature measurement point number of the produced temperature measurement board, it is convenient to find the temperature measurement point of the temperature measurement board corresponding to each temperature curve more quickly after the report is generated.Figure <3.3.2-4>



<3.3.2-3>



<3.3.2-4>

3.3.3 理想曲线 Ideal curve

创建理想曲线。注：名称不得重复，可对已有理想曲线参数修改或删除，修改时，名称无法修改，确保名称不变。图<3.3.3-1>

Create an ideal curve. Note: The name must not be repeated. It can modify or delete the existing ideal curve parameters. When modifying, the name cannot be modified to ensure that the name does not change. Figure <3.3.3-1>

创建理想曲线：选 1 组合格的历史曲线，挑选至少 2 条曲线数据作为参考，（软件界面右侧可进行曲线筛选）录入理想曲线名称、液相态温度、正负公差。图<3.3.3-2>

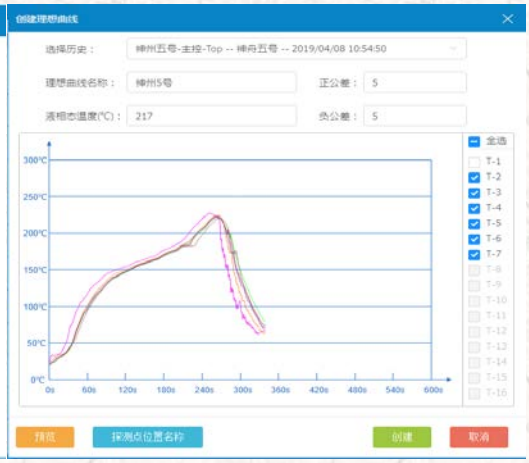
Create an ideal curve: Select the historical curve of the combination cell, select at least 2 curve data as a reference, (the curve can be screened on the right side of the software interface), enter the ideal curve name, liquid state temperature, positive and negative tolerance. Figure <3.3.3-2>

预览：设定好参数后点击软件界面左下角预览，立即查看设定的理想曲线。图<3.3.3-2>

Preview: After setting the parameters, click on the preview in the lower left corner of the software interface to immediately view the set ideal curve. Figure <3.3.3-2>



<3.3.3-1>



<3.3.3-2>

3.3.4 工艺制程 Technology process

回流焊工艺制程为常见的一种模块化组合式的管控方式，利用设定温度、时间、斜率管控范围对比实际测试温度是否达到此标准。图<3.3.4-1>

The reflow soldering process is a common modular combined control method that uses the set temperature, time, and slope control range to compare whether the actual test temperature meets this standard. Figure <3.3.4-1>

创建：输入“制程名称”，可填写备注信息，“回流工艺设置”、“处于温度的时长”、“上升和下降的时长”、“温度之间的时长”、“曲线斜率”、“传感器位置名称”，对此六项进行参数设定。图<3.3.4-2>

Create: Enter the “Process Name”, fill in the remark information, “Reflow Process Settings”, “Time in Temperature”, “Length of Rise and Fall”, “Length between Temperatures”, “Slope of Curve”, “Sensor Position” Name", parameter setting for these six items. Figure <3.3.4-2>



<3.3.4-1>



<3.3.4-2>

回流工艺设置：点击“回流工艺设置”进入回流分析设置主界面；图<3.3.4-3>，回流温度的时间管控，恒温的时间管控、斜率管控，峰值温度的管控，参数填写后需要选中启用，软件分析的时候才会进行分析。设定管控参数后，如果测试结果不在设定的管控范围内，在分析的界面（见曲线分析界面）中会有红色的底纹提示。

Reflow process setting: Click “Reflow Process Setup” to enter the main interface of reflow analysis setup; Figure <3.3.4-3>, time control of reflow temperature, constant temperature control, slope control, peak temperature control, need to select after parameter filling Enabled, analysis will only be performed when the software is analyzed. After setting the control parameters, if the test result is not within the set control range, there will be a red shading hint in the analysis interface (see curve analysis interface).

处于温度的时长：点击“处于温度的时长”进入图<3.3.4-4>所示，处于温度的时间设定是为查看多少度以上所花费的时间，可以设置 6 项，图<3.3.4-4>中为设定 240 ℃以上的时间要控制在 10 秒到 30 秒之间。

Duration of temperature: Click “Time in temperature” to enter the figure <3.3.4-4>. The time setting in temperature is the time taken to view how many degrees or more, you can set 6 items, Figure <3.3.4-4>, the time to set 240 ℃ or more should be controlled between 10 seconds and 30 seconds.



<3.3.4-3>



<3.3.4-4>

上升和下降的时长：点击“上升和下降的时长”进入， 此项是分析某个上升或下降温度之间的时间长，可以设置 6 项，如图所示为设置在 50 度到 160 度之间的时间是 30 秒到 60 秒和 240 度下降到 100 度的时间是 30 秒到 60 秒。图<3.3.4-5>

Length of rise and fall: Click on “Length of rise and fall” to enter. This is the length of time between the analysis of a rising or falling temperature. You can set 6 items, as shown in the figure, set at 50 degrees to 160 degrees. The time between 30 seconds and 60 seconds and 240 degrees down to 100 degrees is 30 seconds to 60 seconds. Figure <3.3.4-5>

温度之间的时长：点击“温度之间的时长”进入； 此项是分析某个上升或下降温度段之间的时间，计算整个温度曲线中包含此设置温度段的时间，包含升温和降温，可以设置管控的时间范围，可设置 6 项，如图所示为设置在 100 度到 180 度之间的时间是 120 秒到 180 秒。图<3.3.4-6>

时 The time between the temperatures: Click on “Time between temperatures” to enter; This is the time between analyzing a rising or falling temperature range, and calculating the time in the entire temperature curve including this set temperature range, including heating and cooling You can set the time range of the control, and you can set 6 items. As shown in the figure, the time between 100 degrees and 180 degrees is 120 seconds to 180 seconds. Figure <3.3.4-6>



<3.3.4-5>



<3.3.4-6>

曲线斜率：“曲线斜率”，计算斜率所需时间通常设定在为 10，最大正斜率、最大负斜率两项为计算整条曲线的范围管制，可单独计算某个温度区间的斜率。图<3.3.4-7> 例如：中显示为在 50 ℃到 160 ℃范围内的斜率要控制在 1 ℃/s 到 3 ℃/s 之间。

curve slope: “curve slope”, the time required to calculate the slope is usually set at 10, the maximum positive slope and the maximum negative slope are the range control for calculating the whole curve, and the slope of a certain temperature interval can be calculated separately. Figure <3.3.4-7> For example: the slope shown in the range of 50 °C to 160 °C is controlled between 1 °C/s and 3 °C/s.

传感器位置名称：输入测温线连接点的位置名称，依据制作的测温板的测温点位号，方便报告生成后更快速的找到每条温度曲线对应的测温板的测温点。图<3.3.4-8>

Sensor position name: Enter the position name of the temperature measurement line connection point. According to the temperature measurement point number of the produced temperature measurement board, it is convenient to find the temperature measurement point of the temperature measurement board corresponding to each temperature curve more quickly after the report is generated. Figure <3.3.4-8>



<3.3.4-7>



<3.3.4-8>

3.4 测试 test

点击开始，根据向导，选择测试条件。图<3.4-1>，图<3.4-1>

Click Start and follow the wizard to select the test conditions. Figure <3.4-1> , Figure <3.4-1>

选择一种管控方式作为报告分析依据；手动测试时选好测试条件和测试依据，点击确定即可测试；自动测试需要设定开始测试温度，测温仪自动侦测温度，当仪器任意通道探头检测到预设温度值时，测温仪即刻自动开始测试。

Select a management method as the basis for report analysis; select the test conditions and test basis for manual test, click OK to test; automatic test needs to set the start test temperature, the thermometer automatically detects the temperature, when the instrument detects the channel any channel When the preset temperature value is reached, the thermometer automatically starts the test immediately.



<3.4-1>



<3.4-2>

3.4.1 开始测试 start testing

软件界面绘图区将实时显示当前温度曲线，右侧温度数据也将实时显示当前温度值，软件界面左下角将显示测温的工作状态，软件底部将显示测温电量、内部温度，软件顶部在不同的测试条件下也会有不同的功能操作，温区移动、温区隐藏、参考曲线隐藏、曲线对齐、曲线截取放大等等。图<3.4.1-1>

The software interface drawing area will display the current temperature curve in real time, and the right temperature data will also display the current temperature value in real time. The lower left corner of the software interface will display the working status of the temperature measurement. The bottom of the software will display the temperature measurement and internal temperature. The top of the software is different. Under the test conditions, there will be different functional operations, temperature zone movement, temperature zone hiding, reference curve hiding, curve alignment, curve interception amplification and so on. Figure <3.4.1-1>

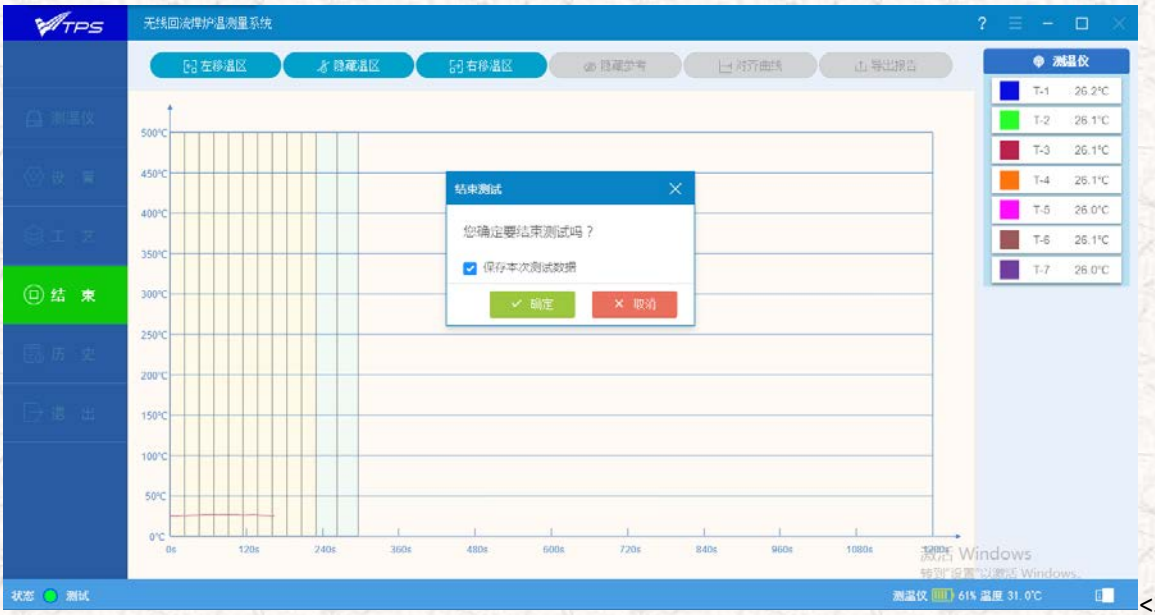


<3.4.1-1>

3.4.2 结束测试 End test

直接点击软件左侧《结束》按钮，保存，确定；如测试有误，无需保存。图<3.4.2-1>

Simply click the "End" button on the left side of the software to save and confirm; if the test is incorrect, you do not need to save. Figure <3.4.2-1>



<3.4.2-1>

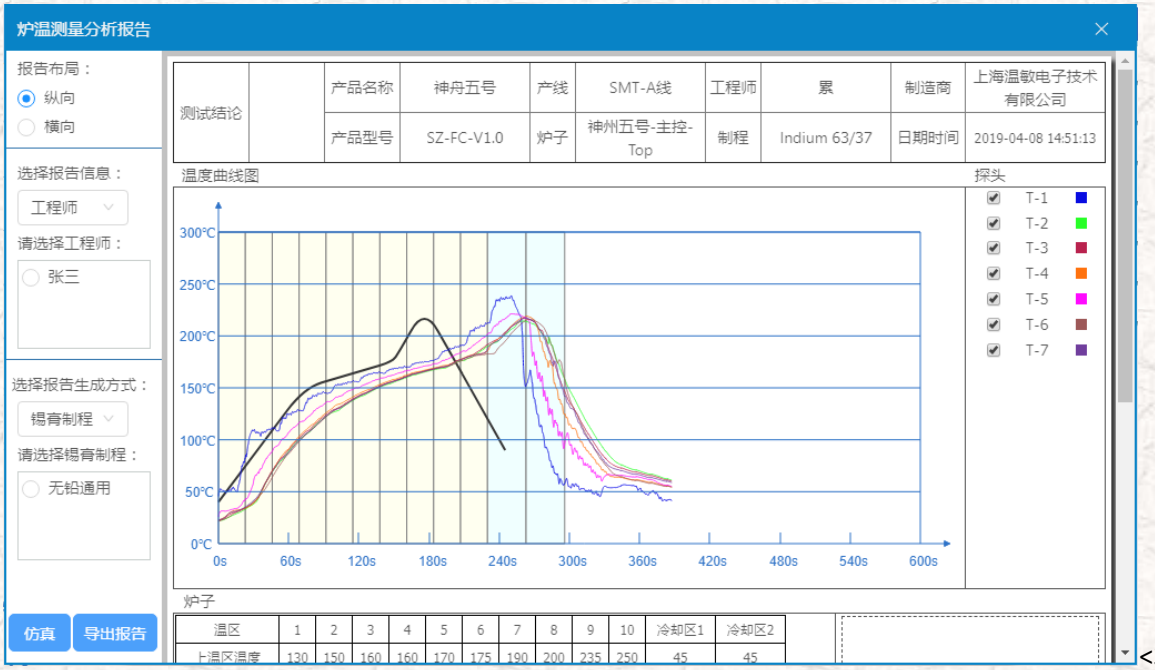
3.4.3 导出报告 Export report

数据保存后可直接点击“导出报告”，测温数据报告立即生成。图<3.4.3-1>报告生成后报告界面左侧可勾选报告的打印方向，修改报告的信息（包括工程师、产品、炉子），也可选择分析报告所用的制程管控。

After saving the data, you can directly click “Export Report” and the temperature measurement data report will be generated immediately. Figure <3.4.3-1> after the report is generated, the left side of the report interface can be checked to print the report direction, modify the report information (including engineers, products, furnaces), or select the process control used for the analysis report.

如出现选择错误，可返回在历史数据中找到此次测试曲线，重新生成报告，有更多信息可做选择，更正；右侧测温通道也可以根据实际需求选择关闭或开启。图<3.4.3-1>

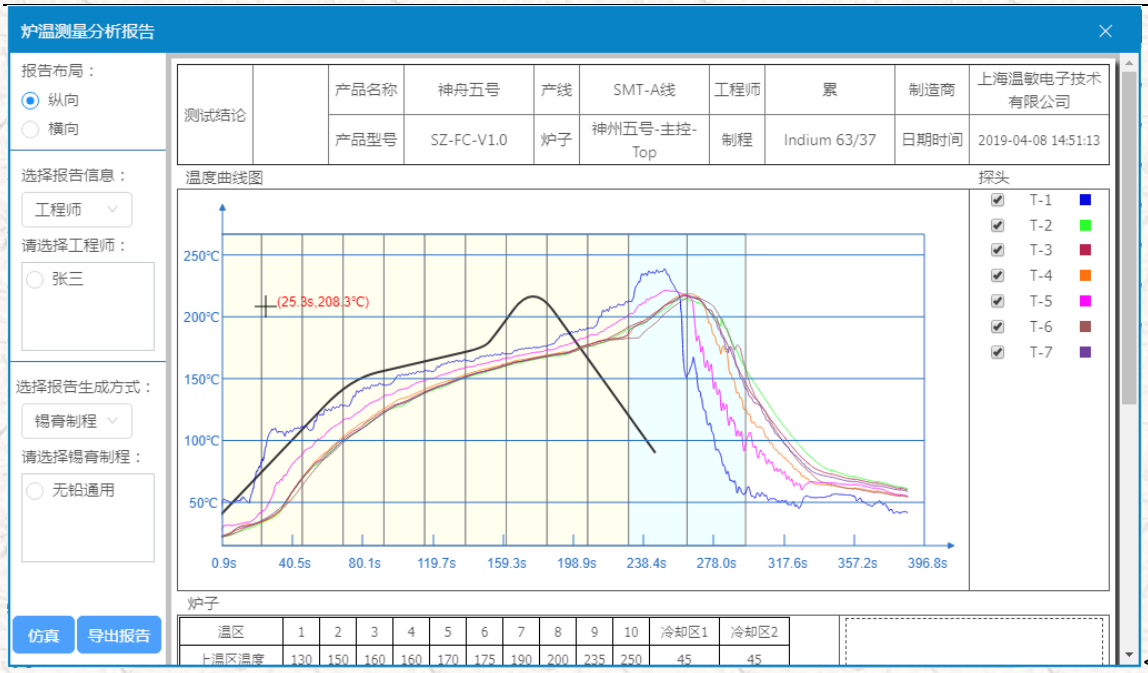
For example, if there is a selection error, you can return to find the test curve in the historical data, regenerate the report, there is more information to choose and correct; the right temperature measurement channel can also be turned off or on according to actual needs. Figure <3.4.3-1>



<3.4.3-1>

曲线截选：使用者可根据需求截选报告中需要的温度曲线段生成报告，框选所需曲线区域即可，截选后曲线图自动放大。图<3.4.3-2>

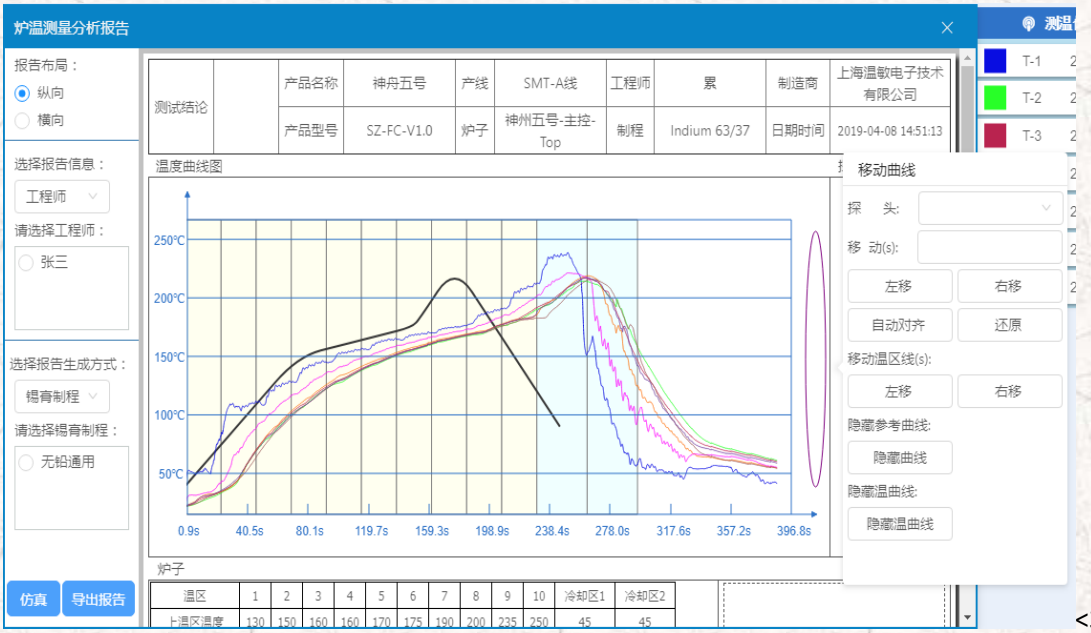
Cut off the curve: The user can generate a report according to the required temperature curve segment in the report, and select the desired curve area. The cut chart is automatically enlarged after the cut. Figure <3.4.3-2>



<3.4.3-2>

报告微调：双击报告中曲线部分右下侧（紫色圆圈内），将弹出微调窗口。可进行某一条曲线单独移动、曲线对齐功能、温曲线的隐藏、曲线还原、温区移动。图<3.4.3-3>

Report fine-tuning: Double-click the lower right side of the curve section in the report (within the purple circle), and the fine-tuning window will pop up. It can perform a single movement of a curve, a curve alignment function, a hidden temperature curve, a curve reduction, and a temperature zone movement. Figure <3.4.3-3>



<3.4.3-3>

上传产品图片：可上传现场实际测试温度产品图片。图<3.4.3-4>

Upload product image: Upload the actual test temperature product image on site. Figure <3.4.3-4>

报告分析：报告底部将会分栏显示每个管控数据的分析值，不良将显示红色。图<3.4.3-4>

Report Analysis: At the bottom of the report, the analysis value of each control data will be displayed in columns, and the bad will be displayed in red. Figure <3.4.3-4>

PWI 分析：需要时可开启 PWI 分析项。图<3.4.3-4>

PWI analysis: PWI analysis items can be turned on when needed. Figure <3.4.3-4>

导出报告：确认报告无误后可点击“导出报告”直接进行打印或下载。图<3.4.3-4>

Export report: After confirming the report is correct, you can click “Export Report” to print or download directly. Figure <3.4.3-4>



<3.4.3-4>

3.5 仿真 simulation

根据一次测试的数据，软件会结合测试数据和炉子温度、链速、温区长度信息以及所使用的制程，通过独有算法，预测炉子温度和链速更改之后，温度曲线的变化和管控参数的变化，具体如下操作：

According to the data of one test, the software combines the test data with the furnace temperature, chain speed, temperature zone length information and the process used, and predicts the change of the temperature curve and the control parameters after the furnace temperature and chain speed change by a unique algorithm. Change, as follows:

第一步：进入历史数据界面，选择所需要进行温度仿真的曲线，点击生成报告。图<3.5-1>

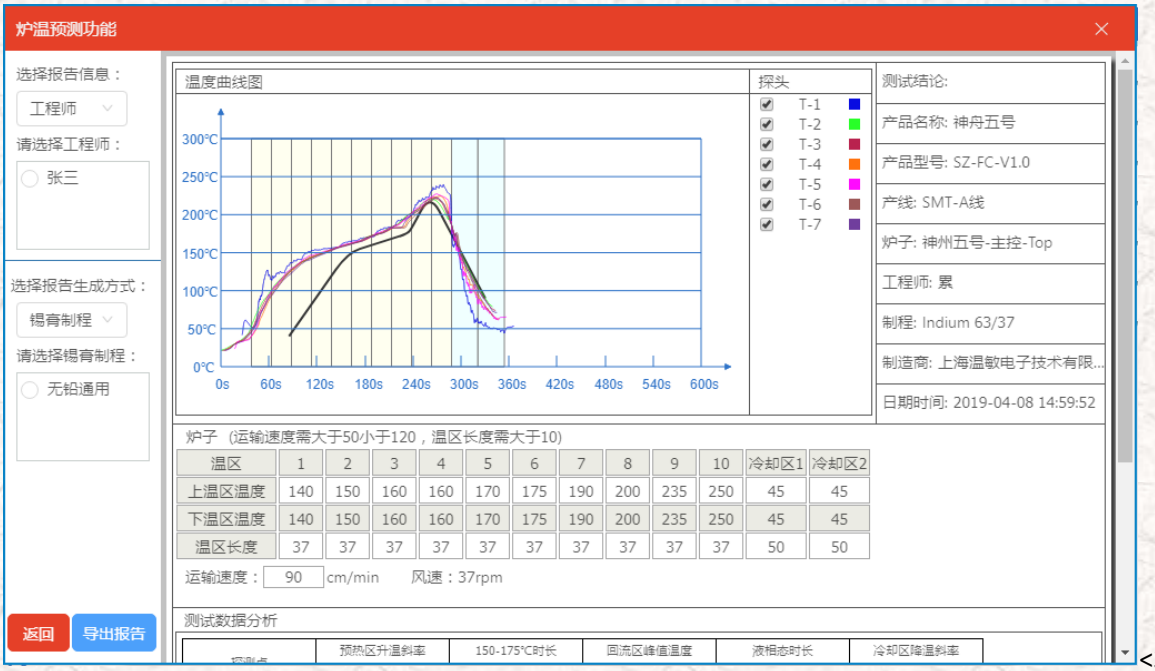
Step 1: Enter the historical data interface, select the curve for which temperature simulation is required, and click Generate Report. Figure <3.5-1>



<3.5-1>

第二步：进入报告生成界面，点击左下角的仿真，切换到仿真界面，仿真页面标题栏会变为橙色。图<3.5-2>

Step 2: Enter the report generation interface, click the simulation in the lower left corner, switch to the simulation interface, and the simulation page title bar will turn orange. Figure <3.5-2>



<3.5-2>

第三步：如果您是第一次使用新的回流焊炉，则您可以根据空气曲线的走势，先调整温区长度（最好拿到设备原厂提供的温区长度数据填写）；温区长度越精准，则仿真数据越接近真实值。图<3.5-3>

Step 3: If you are using the new reflow oven for the first time, you can adjust the length of the temperature zone according to the trend of the air curve (preferably get the length data of the temperature zone provided by the original equipment); The more precise the length, the closer the simulation data is to the true value. Figure <3.5-3>



<3.5-3>

第四步：现在您可以更改炉子链速和设置温度，软件会给你计算出预判的温度曲线走势和管控参数结果，报告分析项数据可作为调整参考依据。

Step 4: Now you can change the furnace chain speed and set the temperature. The software will calculate the predicted temperature curve trend and the control parameter results. The report analysis data can be used as the adjustment reference.

完整的温度曲线才能进行仿真；

The complete temperature curve can be simulated;

想要仿真结果接近实际值，则需要您的炉子的温区长度接近真实值（可以在仿真中，根据空气曲线的走势，调整温区长度，无需测量）。

If you want the simulation result to be close to the actual value, you need the temperature range of your furnace to be close to the real value (you can adjust the length of the temperature zone according to the trend of the air curve in the simulation, no need to measure).

3.6 历史 history

3.6.1 历史数据 historical data

数据根据测试时间排序，测试完成的数据只要保存后都将在能此处查找到，并且可调出查看或生成报告。图<3.6.1-1>

The data is sorted according to the test time, and the data completed by the test will be found here as long as it is saved, and can be viewed or generated. Figure <3.6.1-1>

3.6.2 历史数据查找 Historical data search

根据测试时间、产线名称、产品型号、测试模式查找历史数据，也可以手动直接翻页查找。图<3.6.1-1>

Find historical data based on test time, line name, product model, and test mode. You can also manually page through the page. Figure <3.6.1-1>

3.6.3 历史数据查看、删除 View and delete historical data

历史数据可点击查看，可再次生成测试报告，也可以生成理想曲线。图<3.6.3-1>

Historical data can be clicked to view, and test reports can be generated again, or ideal curves can be generated. Figure <3.6.3-1>



<3.6.1-1>



<3.6.3-1>

3.6.4 历史数据导入、导出 Import and export of historical data

历史数据可进行导入、导出操作，数据导出后可备份管理，当其他 Windows 电脑安装有 TPS2000 测温软件时可识别导出的数据。

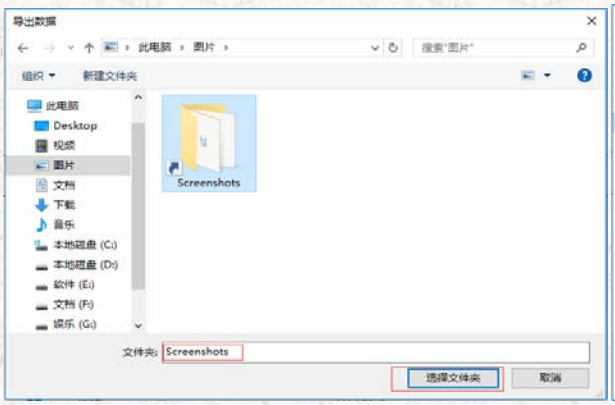
Historical data can be imported and exported. After the data is exported, it can be backed up and managed. When other Windows computers have TPS2000 temperature measurement software installed, the exported data can be identified.

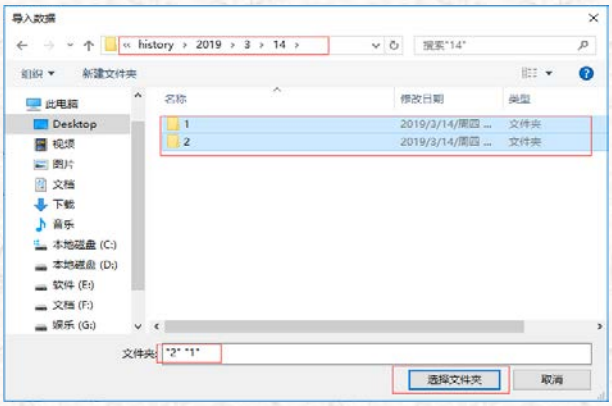
导出：勾选需要导出的数据，点击导出按钮，根据路径选择文件夹导出。图<2.4.6.4-1>

Export: Select the data to be exported, click the Export button, and select the folder to export according to the path. Figure <3.6.4-1>

导入：点击导入按钮，根据路径选择最里层的文件夹，点击选择文件夹即可导入数据。图<2.4.6.4-2>

Import: Click the Import button, select the folder with the innermost layer according to the path, and click the Select folder to import the data. Figure <3.6.4-2>





<3.6.4-1> <3.6.4-2>

注：回流焊、波峰焊、自定义系统数据不可混淆导入。

Note: Reflow, wave soldering, custom system data cannot be confused for import.

3.6.5 CPK

过程能力指数是指过程能力满足产品质量标准要求（规格范围等）的程度。也称工序能力指数，是指工序在一定时间里，处于控制状态（稳定状态）下的实际加工能力。

Process capability index refers to the extent to which process capability meets product quality standards (specification scope, etc.). Also referred to as the process capability index, it refers to the actual processing capability of the process under a controlled state (steady state) for a certain period of time.

Cpk 评级标准表 Rating standard table	A++级 Cpk≥2.0 特优 可考虑成本的降低 A++ level Cpk ≥ 2.0 excellent, can consider the cost reduction
	A+ 级 2.0 > Cpk ≥ 1.67 优 应当保持之 A+ level 2.0 > Cpk ≥ 1.67 Excellent should be maintained
	A 级 1.67 > Cpk ≥ 1.33 良 能力良好，状态稳定，但应尽力提升为 A+级 Class A 1.67 > Cpk ≥ 1.33 Good ability, stable condition, but should be promoted to A+ level
	B 级 1.33 > Cpk ≥ 1.0 一般 状态一般，制程因素稍有变异即有产生不良的危险，应利用各种资源及方法将其提升为 A 级 Class B 1.33 > Cpk ≥ 1.0 General In general, the process factor is slightly mutated, which may cause adverse risks. It should be promoted to Class A by various resources and methods.
	C 级 1.0 > Cpk ≥ 0.67 差 制程不良较多，必须提升其能力 Class C 1.0 > Cpk ≥ 0.67 Poor Process is more bad, must improve its ability
	D 级 0.67 > Cpk 不可接受 其能力太差，应考虑重新整改设计制程 Class D 0.67 > Cpk Unacceptable The ability is too poor, should consider re-engineering the design process

3.6.6 CPK 的运算 CPK operation

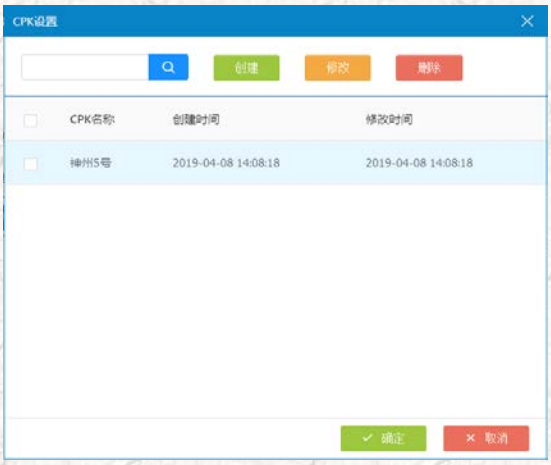
回流焊温度的 CPK 运算，将通过选定温度数据组，确定管控的温度段或某个温度点，拿取不同时间段的历史测温数据做分析。图<3.6.6-1>

The CPK operation of the reflow temperature will determine the temperature range or a certain temperature point of the control by selecting the temperature data set, and take historical temperature data of different time periods for analysis. Figure <3.6.6-1>

新建 CPK：TPS2000 软件 CPK 运算支持五项数据统计，预热区、恒温区、回流区、冷却区、斜率，通过对这几项的管控，可得到最终 CPK 值，根据实际管控数据，对应录入管控参数。图<3.6.6-2>

New CPK: TPS2000 software CPK operation supports five data statistics, preheating zone, constant temperature zone, recirculation zone, cooling zone and slope. Through the control of these items, the final CPK

value can be obtained. According to the actual control data, the corresponding entry Control parameters. Figure <3.6.6-2>



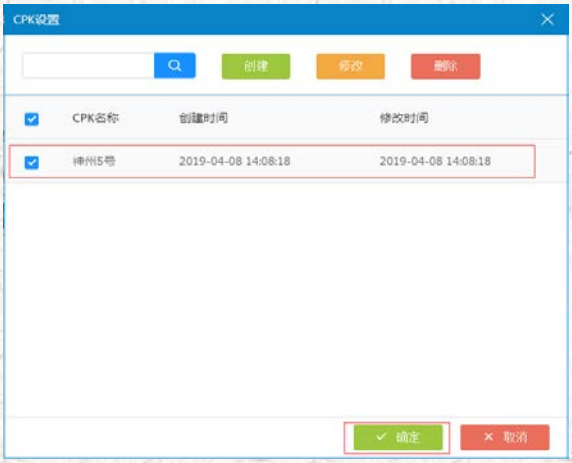
<3.6.6-1>



<3.6.6-2>

新建好 CPK 管控，选中确定。图<3.6.6-3>

Create a new CPK control and check OK. Figure <3.6.6-3>



<3.6.6-3>

筛选数据：软件会根据您的测试历史数据归类同一产线、同一炉子、同一产品的温度曲线，选中其中一条数据，对应的历史数据信息将会提取出来，软件界面底部也将会根据提取的信息在整个历史数据库中找到对应的同类测试历史数据。图<3.6.6-4>、图<3.6.6-5>

Filter data: The software will classify the temperature curve of the same production line, the same furnace and the same product according to your test history data, select one of the data, the corresponding historical data information will be extracted, and the bottom of the software interface will also be extracted according to The information is found in the entire historical database corresponding to the same type of test history data. Figure <3.6.6-4>, Figure <3.6.6-5>



<3.6.6-4>



<3.6.6-5>

CPK 分析报告：最终将会算出 CPK 值，对应 CPK 判定标准可得到制程能力优良。图<3.6.6-6>

CPK analysis report: The CPK value will be calculated finally, and the process capability is excellent corresponding to the CPK judgment standard. Figure <3.6.6-6>



<3.6.6-6>

四、 无线智能温度测量分析系统--波峰焊 Wireless intelligent temperature measurement and analysis system - wave soldering

4.1 测温仪 thermometer

4.1.1 配对 pairing

测温仪与测温软件建立数据交换通道，点击软件界面配对按钮，轻按测温仪电源按钮开机，MOD 绿灯闪烁时，长按电源按钮，等待 3s--5s 后，软件提示配对是否成功，如配对失败，再次配对即可，可根据软件界面文字提示信息进行操作。 图<4.1.1-1>、图<4.1.1-2>

The thermometer and the temperature measurement software establish a data exchange channel, click the software interface pairing button, press the thermometer power button to turn on the light, when the MOD green light flashes, press and hold the power button, wait for 3s--5s, the software prompts whether the pairing is successful. If the pairing fails, you can pair it again. You can operate according to the text prompt message on the software interface. Figure <4.1.1-1>, Figure <4.1.1-2>

报警温度：默认为 55℃，测试过程中测温仪内部温度超出设定温度，测温软件将自动报警提示。

Alarm temperature: The default is 55 ℃. During the test, the internal temperature of the thermometer exceeds the set temperature, and the temperature measurement software will automatically alarm.

采样周期：仪器温度数据采样频率。

Sampling period: Instrument temperature data sampling frequency.



<4.1.1-1>



<4.1.1-2>

4.1.2 进入离线模式 Enter offline mode

测温仪 MOD 绿灯长亮，仪器处于在线测试状态，长按电源按钮，MOD 橙色灯长亮进入离线模式

The MOD green light of the thermometer is long, the instrument is in the online test state, long press the power button, the MOD orange light is on and enters the offline mode.

4.1.3 离线模式测试 Offline mode test

开始测试：测温仪进入离线模式后，双击测温仪电源按钮，测温仪蜂鸣器响一声、MOD 橙色灯闪烁，开始测试成功。

Start the test: After the thermometer enters the offline mode, double-click the thermometer power button, the thermometer buzzer will sound, the MOD orange light will flash, and the test will start successfully.

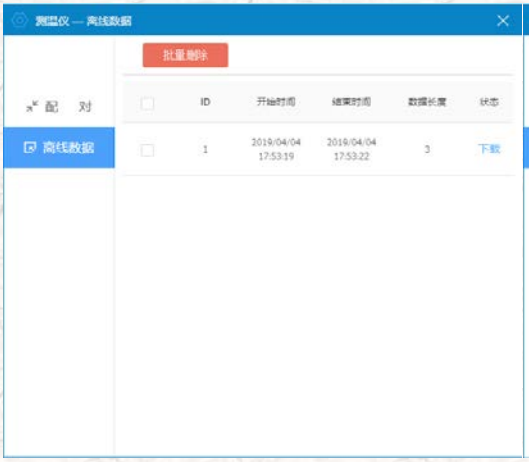
结束测试：测试完成后，双击测温仪电源按钮，测温仪蜂鸣器响两声、MOD 橙色灯长亮，结束测试。

End test: After the test is completed, double-click the thermometer power button, the thermometer buzzer sounds twice, the MOD orange light is on, and the test ends.

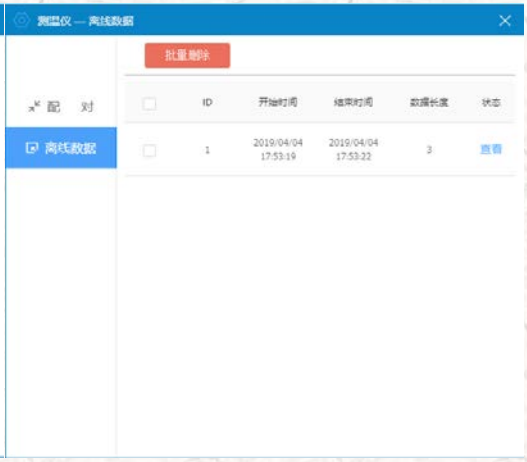
4.1.4 离线数据 Offline data

点击软件界面离线数据，根据测试时间选定数据、点击下载，无线数据下载，数据下载后将存储至历史数据中。点击查看按钮，跳转到历史数据界面，即可对该条数据进行操作，生成报告或者数据查看删除。图<4.1.4-1>、图<4.1.4-2>

Click the software interface offline data, select the data according to the test time, click to download, wireless data download, the data will be stored in the historical data after downloading. Click the View button to jump to the historical data interface, you can operate the data, generate a report or view the data to delete. Figure <4.1.4-1>, Figure <4.1.4-2>



<4.1.4-1>



<4.1.4-2>

4.1.5 退出离线模式 Exit offline mode

离线模式下，长按开机按钮，测温仪蜂鸣器响 2 声，MOD 灯由橙色变为绿色长亮即可。5s—8s 后软件界面右侧将实时显示当前温度数据，切换为在线模式。

In offline mode, press and hold the power button, the thermometer buzzer sounds 2 times, and the MOD light changes from orange to green. After 5s-8s, the right side of the software interface will display the current temperature data in real time and switch to online mode.

4.2 设置 Setting

4.2.1 炉子 stove

填写炉子出厂信息。注：炉子型号不得重复，可对已有的炉子信息修改或删除。修改时，炉子型号无法修改，确保炉子型号不变。温区最高温度、温区长度请根据设备厂商提供的参数填写，不可以随意填写。图<4.2.1-1>，图<4.2.1-2>

Fill in the furnace factory information. Note: The furnace model must not be repeated, and the existing furnace information can be modified or deleted. When the modification is made, the furnace model cannot be modified to ensure that the furnace model remains unchanged. The maximum temperature and length of the temperature zone should be filled in according to the parameters provided by the equipment manufacturer. Figure <4.2.1-1>, Figure <4.2.1-2>



<4.2.1-1>



<4.2.1-2>

4.2.2 工程师 engineer

填写工程师信息。注：工号不得重复，可对已有的工程师信息修改或删除。图<4.2.2-1>

Fill in the engineer information. Note: The work number must not be duplicated, and the existing engineer information can be modified or deleted. Figure <4.2.2-1>

4.2.3 产品 product

填写产品信息。注：规格型号不得重复，可对已有的产品信息修改或删除。图<4.2.3-1>

Fill in the product information. Note: Specifications and models must not be duplicated, and existing product information can be modified or deleted. Figure <4.2.3-1>



<4.2.2-1>



<4.2.3-1>

4.2.4 坐标 coordinate

调整软件界面绘图区域显示精度，根据测试环境的温度高低和时间长短合理设置；横轴为时间轴（单位：S），纵轴为温度轴（单位：℃）。图<4.2.4-1>

Adjust the display accuracy of the drawing area of the software interface, and set it according to the temperature and time of the test environment; the horizontal axis is the time axis (unit: S), and the vertical axis is the temperature axis (unit: ℃). Figure <4.2.4-1>

4.2.5 测试 test

温度单位：默认为摄氏度，可选择摄氏度℃或华氏度℉作为温度单位。图<4.2.5-1>

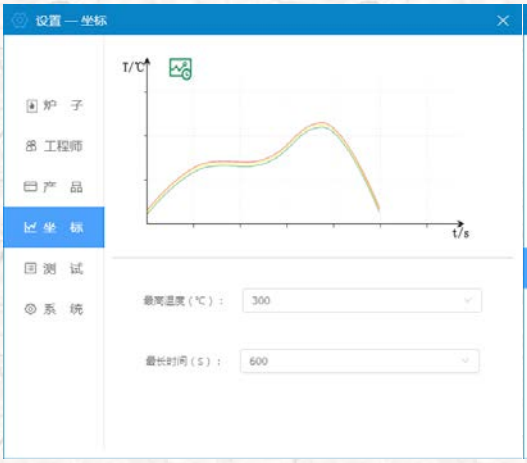
Temperature unit: The default is Celsius, and the temperature can be selected as Celsius ℃ or Fahrenheit ℉. Figure <4.2.5-1>

显示精度：温度显示精度，分为 0.1℃和 1℃，软件界面温度显示都将根据此设置的精度值而改变。图<4.2.5-1>

Display accuracy: Temperature display accuracy, divided into 0.1 ° C and 1 ° C, the software interface temperature display will be changed according to the accuracy value of this setting. Figure <4.2.5-1>

存储路径：数据存储路径，默认为软件安装目录，可更改。图<4.2.5-1>

Storage path: The data storage path, which defaults to the software installation directory and can be changed. Figure <4.2.5-1>



<4.2.4-1>



<4.2.5-1>

4.2.6 系统 System

公司名称：使用者根据需求填写，报告信息栏将显示。图<4.2.6-1>

Company Name: The user fills in according to the requirements, and the report information bar will be displayed. Figure <4.2.6-1>

语言：中文/英文/日文等语言切换

Language: Chinese/English/Japanese language switching

软件版本：测温软件版本号。图<4.2.6-1>

Software version: Temperature measurement software version number. Figure <4.2.6-1>

使用期限：软件加密期限分为试用和永久。图<4.2.6-1>

Term of use: The software encryption period is divided into trial and permanent. Figure <4.2.6-1>

配置：工程师信息、产品信息，可用外部存储器（U 盘）进行导入、导出备份。图<4.2.6-1>

Configuration: Engineer information and product information can be imported and exported by external storage (U disk). Figure <4.2.6-1>

恢复出厂：软件恢复初始状态。图<4.2.6-1>

Restore factory: The software restores the initial state. Figure <4.2.6-1>

USB 接收器：插上 Dongle 后可查看对应序列号。图<4.2.6-1>

USB receiver: After plugging in the Dongle, you can view the corresponding serial number. Figure <4.2.6-1>



<4.2.6-1>

4.3 工艺 Process

4.3.1 炉温设置 Furnace temperature setting

创建时首先选择对应的炉子，再根据实际设备设定的温度填写炉温参数。注：名称不得重复；可对已有的炉温设置修改或删除，修改时，名称无法修改，确保名称不变。图<4.3.1-1>、<4.3.1-2>

When creating, first select the corresponding furnace, and then fill in the furnace temperature parameters according to the temperature set by the actual equipment. Note: The name must not be repeated; the existing furnace temperature setting can be modified or deleted. When modifying, the name cannot be modified to ensure that the name does not change. Figure <4.3.1-1>, <4.3.1-2>



<4.3.1-1>



<4.3.1-2>

4.3.2 工艺制程 Technology process

波峰焊工艺制程为常见的一种模块化组合式的管控方式，利用设定温度、时间、斜率管控范围对比实际测试温度是否达到制程工艺温度的标准。工艺制程包括：创建、修改或查看、删除功能。图<4.3.2-1>

The wave soldering process is a common modular combined control method that uses the set temperature, time, and slope control range to compare whether the actual test temperature meets the process temperature. Processes include: creating, modifying, or viewing, and deleting features. Figure <4.3.2-1>

创建：在图<4.3.2-2>输入制程名称（劲拓）如果需要对工艺制程进行备注的，可以在下面的备注栏里面填写备注信息。在“工艺制程分析”下面有五个选项，分别为预热区、波峰、冷却区、处于温度的时长、传感器位置名称，可依次对此五项进行参数设定。

Create: Enter the process name (Jintuo) in Figure <4.3.2-2>. If you need to remark the process, you can fill in the remarks in the remarks column below. There are five options under “Process Process Analysis”, which are preheating zone, wave crest, cooling zone, duration of temperature, and sensor location name. The five items can be parameterized in turn.



<4.3.2-1>



<4.3.2-2>

预热区：管控预热区的参数。设置起始温度为 60℃后，表示预热区从温度达到 60℃后开始计算；时长表示预热区总时长，温度之间时长，表示在预热区中，温度之间的总时长。图<4.3.2-3>

Preheating zone: The parameters of the preheating zone. After the initial temperature is set to 60 ° C, it means that the preheating zone starts from the temperature of 60 ° C; the duration represents the total length of the preheating zone, and the duration between the temperatures, indicating the total length of time between the temperatures in the preheating zone. Figure <4.3.2-3>

波峰：峰值类型为单波和双波，默认双波峰，锡炉类型为有铅和无铅，选择单波时，波峰二和波谷处不允许填写。图<4.3.2-4>

Crest: The peak type is single wave and double wave, the default double wave peak, the tin furnace type is leaded and unleaded, and when single wave is selected, the peak 2 and trough are not allowed to be filled. Figure <4.3.2-4>



<4.3.4-3>



<4.3.4-4>

冷却区：管控冷却区降温斜率。图<4.3.2-5>

Cooling zone: The cooling slope of the cooling zone. Figure <4.3.2-5>

处于温度时长：管控处于某个温度以上的时间。图<4.3.2-6>

Temperature duration: The time that the control is above a certain temperature. Figure <4.3.2-6>



<4.3.4-5>



<4.3.4-6>

传感器位置名称：输入测温线连接点的位置名称，依据制作的测温板的测温点位号，方便报告生成后更快速的找到每条温度曲线对应的测温板的测温点。图<4.3.4-7>

Sensor position name: Enter the position name of the temperature measurement line connection point. According to the temperature measurement point number of the produced temperature measurement board, it is convenient to find the temperature measurement point of the temperature measurement board corresponding to each temperature curve more quickly after the report is generated. Figure <4.3.4-7>



<4.3.4-7>

4.4 测试 test

点击开始，根据向导，选择测试条件。图<4.4-1>

Click Start and follow the wizard to select the test conditions. Figure <4.4-1>

选择一种管控方式作为报告分析依据；手动测试时选好测试条件和测试依据，点击确定即可测试；自动测试需要设定开始测试温度，测温仪自动侦测温度，当仪器任意通道探头检测到预设温度值时，测温仪即刻自动开始测试。

Select a management method as the basis for report analysis; select the test conditions and test basis for manual test, click OK to test; automatic test needs to set the start test temperature, the thermometer automatically detects the temperature, when the instrument detects the channel any channel When the preset temperature value is reached, the thermometer automatically starts the test immediately.



<4.4-1>

4.4.1 开始测试 start testing

软件界面绘图区将实时显示当前温度曲线，右侧温度数据也将实时显示当前温度值，软件界面左下角将显示测温的工作状态，软件底部将显示测温电量、内部温度，软件顶部在不同的测试条件下也会有不同的功能操作，温区移动、温区隐藏、参考曲线隐藏、曲线对齐、曲线截取放大等等。图<4.4.1-1>

The software interface drawing area will display the current temperature curve in real time, and the right temperature data will also display the current temperature value in real time. The lower left corner of the software interface will display the working status of the temperature measurement. The bottom of the software

will display the temperature measurement and internal temperature. The top of the software is different. Under the test conditions, there will be different functional operations, temperature zone movement, temperature zone hiding, reference curve hiding, curve alignment, curve interception amplification and so on. Figure <4.4.1-1>



<4.4.1-1>

4.4.2 结束测试 End test

直接点击软件左侧《结束》按钮，保存，确定；如测试有误，无需保存。图<4.4.2-1>

Simply click the "End" button on the left side of the software to save and confirm; if the test is incorrect, you do not need to save. Figure <4.4.2-1>



<4.4.2-1>

4.4.3 导出报告 Export report

数据保存后可直接点击“导出报告”，测温数据报告立即生成。图<4.4.3-1>报告生成后报告界面左侧可勾选报告的打印方向，修改报告的信息（包括工程师、产品、炉子），也可选择分析报告所用的制程管控。

After saving the data, you can directly click “Export Report” and the temperature measurement data report will be generated immediately. Figure <4.4.3-1> After the report is generated, the left side of the report interface can be checked to print the report direction, modify the report information (including engineers, products, furnaces), or select the process control used for the analysis report.

如出现选择错误，可返回在历史数据中找到此次测试曲线，重新生成报告，有更多信息可做选择，更正；右侧测温通道也可以根据实际需求选择关闭或开启。图<4.4.3-1>

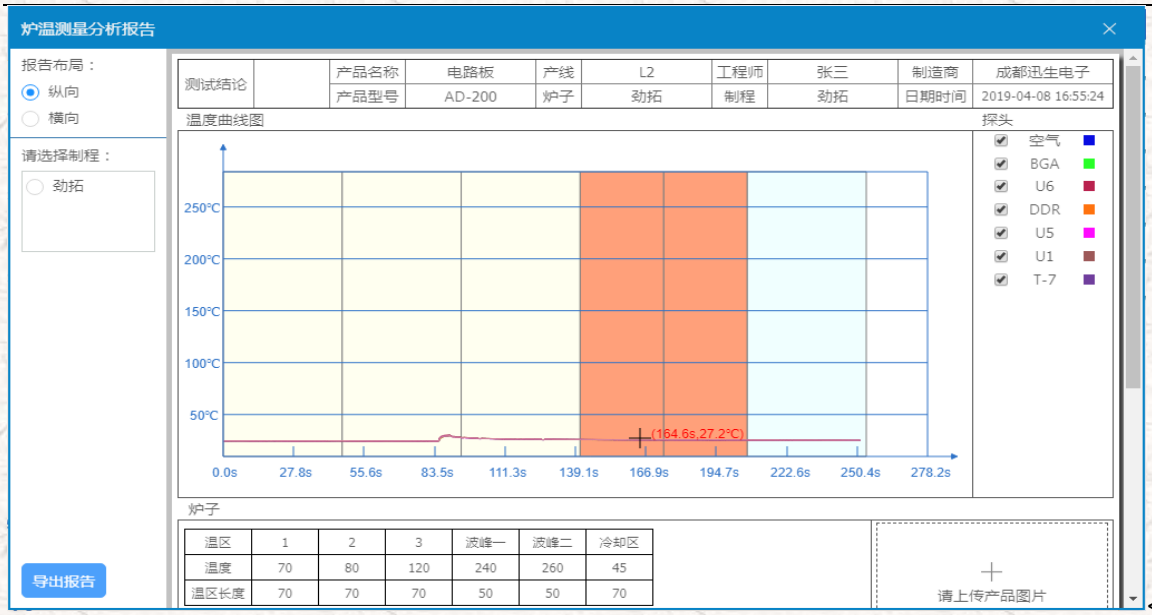
For example, if there is a selection error, you can return to find the test curve in the historical data, regenerate the report, there is more information to choose and correct; the right temperature measurement channel can also be turned off or on according to actual needs. Figure <4.4.3-1>



<4.4.3-1>

曲线截选：使用者可根据需求截选报告中需要的温度曲线段生成报告，框选所需曲线区域即可，截选后曲线图自动放大。图<4.4.3-2>

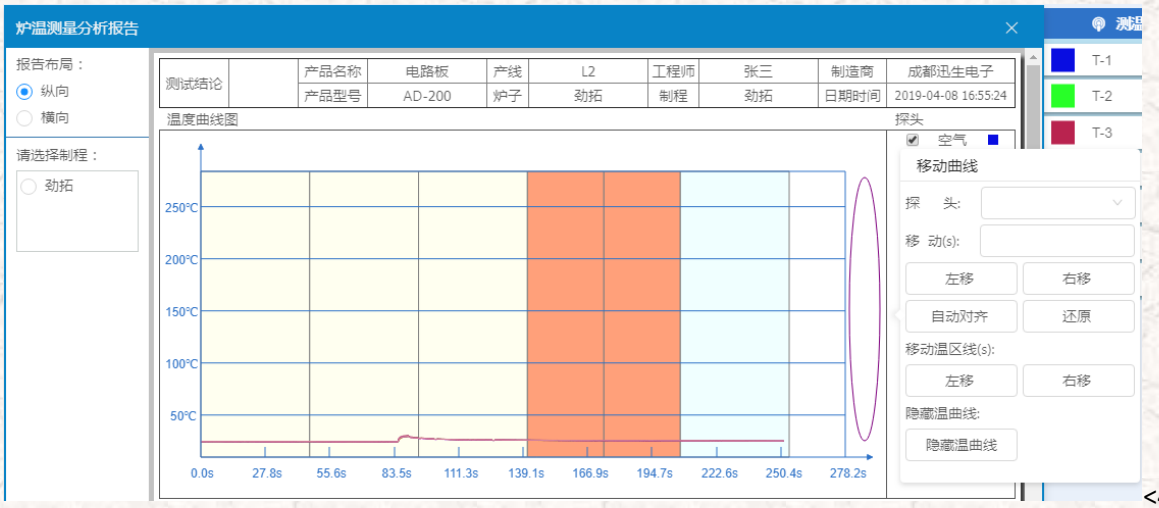
Cut off the curve: The user can generate a report according to the required temperature curve segment in the report, and select the desired curve area. The cut chart is automatically enlarged after the cut. Figure <4.4.3-2>



<4.4.3-2>

报告微调：双击报告中曲线部分右下侧（紫色圆圈内），将弹出微调窗口。可进行某一条曲线单独移动、曲线对齐功能、温曲线的隐藏、曲线还原、温区移动。图<4.4.3-3>

Report fine-tuning: Double-click the lower right side of the curve section in the report (within the purple circle), and the fine-tuning window will pop up. It can perform a single movement of a curve, a curve alignment function, a hidden temperature curve, a curve reduction, and a temperature zone movement. Figure <4.4.3-3>



<4.4.3-3>

上传产品图片：可上传现场实际测试温度产品图片。图<4.4.3-4>

Upload product image: Upload the actual test temperature product image on site. Figure <4.4.3-4>

报告分析：报告底部将会分栏显示每个管控数据的分析值，不良将显示红色。图<4.4.3-4>

Report Analysis: At the bottom of the report, the analysis value of each control data will be displayed in columns, and the bad will be displayed in red. Figure <4.4.3-4>

PWI 分析：需要时可开启 PWI 分析项。图<4.4.3-4>

PWI analysis: PWI analysis items can be turned on when needed. Figure <4.4.3-4>

导出报告：确认报告无误后可点击“导出报告”直接进行打印或下载。图<4.4.3-4>

Export report: After confirming the report is correct, you can click “Export Report” to print or download directly. Figure <4.4.3-4>



<4.4.3-4>

4.5 历史 history

4.5.1 历史数据 historical data

数据根据测试时间排序，测试完成的数据只要保存后都将在能此处查找到，并且可调出查看或生成报告。图<4.5.1-1>

The data is sorted according to the test time, and the data completed by the test will be found here as long as it is saved, and can be viewed or generated. Figure <4.5.1-1>



<4.5.1-1>

4.5.2 历史数据查找 Historical data search

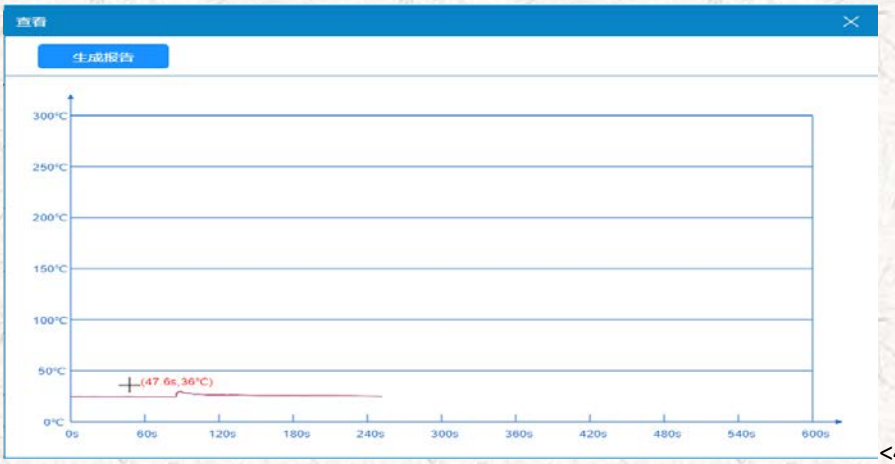
根据测试时间、产线名称、产品型号、测试模式查找历史数据，也可以手动直接翻页查找。图<4.5.1-1>

Find historical data based on test time, line name, product model, and test mode. You can also manually page through the page. Figure <4.5.1-1>

4.5.3 历史数据查看、删除 View and delete historical data

历史数据可点击查看，可再次生成测试报告，也可以生成理想曲线。图<4.5.3-1>

Historical data can be clicked to view, and test reports can be generated again, or ideal curves can be generated. Figure <4.5.3-1>



<4.5.3-1>

4.5.4 历史数据导入、导出 Import and export of historical data

历史数据可进行导入、导出操作，数据导出后可备份管理，当其他 Windows 电脑安装有 TPS2000 测温软件时可识别导出的数据。

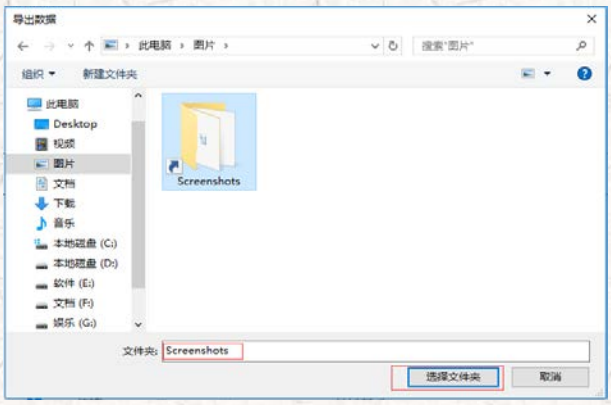
Historical data can be imported and exported. After the data is exported, it can be backed up and managed. When other Windows computers have TPS2000 temperature measurement software installed, the exported data can be identified.

导出：勾选需要导出的数据，点击导出按钮，根据路径选择文件夹导出。图<4.5.4-1>

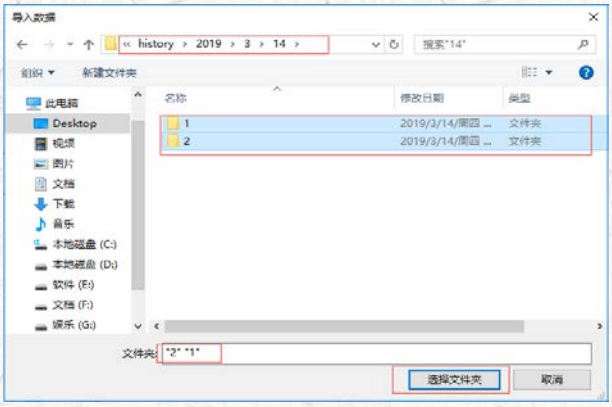
Export: Select the data to be exported, click the Export button, and select the folder to export according to the path. Figure <4.5.4-1>

导入：点击导入按钮，根据路径选择最里层的文件夹，点击选择文件夹即可导入数据。图<4.5.4-2>

Import: Click the Import button, select the folder with the innermost layer according to the path, and click the Select folder to import the data. Figure <4.5.4-2>



<4.5.4-1>



<4.5.4-2>

注：回流焊、波峰焊、自定义系统数据不可混淆导入。

Note: Reflow, wave soldering, custom system data cannot be confused for import.

4.5.5 CPK

过程能力指数是指过程能力满足产品质量标准要求（规格范围等）的程度。也称工序能力指数，是指工序在一定时间里，处于控制状态（稳定状态）下的实际加工能力。

Process capability index refers to the extent to which process capability meets product quality standards (specification scope, etc.). Also referred to as the process capability index, it refers to the actual processing capability of the process under a controlled state (steady state) for a certain period of time.

Cpk 评级标准表 Rating standard table	A++级 Cpk≥2.0 特优 可考虑成本的降低 A++ level Cpk ≥ 2.0 excellent, can consider the cost reduction
	A+ 级 2.0 > Cpk ≥ 1.67 优 应当保持之 A+ level 2.0 > Cpk ≥ 1.67 Excellent should be maintained
	A 级 1.67 > Cpk ≥ 1.33 良 能力良好，状态稳定，但应尽力提升为 A+级 Class A 1.67 > Cpk ≥ 1.33 Good ability, stable condition, but should be promoted to A+ level
	B 级 1.33 > Cpk ≥ 1.0 一般 状态一般，制程因素稍有变异即有产生不良的危险，应利用各种资源及方法将其提升为 A 级 Class B 1.33 > Cpk ≥ 1.0 General In general, the process factor is slightly mutated, which may cause adverse risks. It should be promoted to Class A by various resources and methods.
	C 级 1.0 > Cpk ≥ 0.67 差 制程不良较多，必须提升其能力 Class C 1.0 > Cpk ≥ 0.67 Poor Process is more bad, must improve its ability
	D 级 0.67 > Cpk 不可接受 其能力太差，应考虑重新整改设计制程 Class D 0.67 > Cpk Unacceptable The ability is too poor, should consider re-engineering the design process

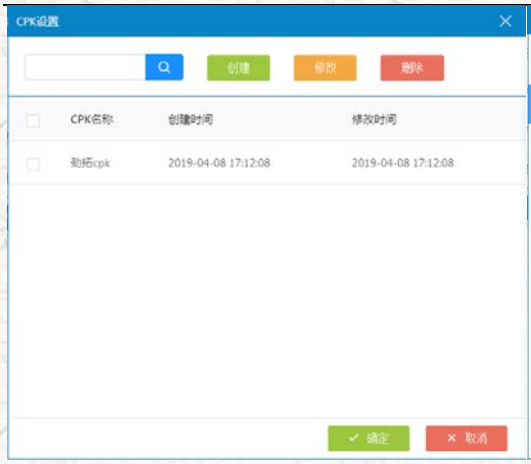
4.5.6 CPK 的运算 CPK operation

波峰焊温度的 CPK 运算，将通过选定温度数据组，确定管控的温度段或某个温度点，拿取不同时间段的历史测温数据做分析。图<4.5.6-1>

The CPK calculation of the wave soldering temperature will determine the temperature range or a certain temperature point of the control by selecting the temperature data set, and take the historical temperature data of different time periods for analysis. Figure <4.5.6-1>

新建 CPK：软件 CPK 运算支持四项数据统计，预热区、波峰、冷却区、处于温度的时长，通过对这几项的管控，可得到最终 CPK 值，根据实际管控数据，对应录入管控参数。图<4.5.6-2>

New CPK: The software CPK operation supports four data statistics, preheating zone, peak, cooling zone, and duration of temperature. Through the control of these items, the final CPK value can be obtained. According to the actual control data, the control parameters are correspondingly entered. Figure <4.5.6-2>



<4.5.6-1>



<4.5.6-2>

预热区：管控预热区的参数。设置起始温度为 60℃后，表示预热区从温度达到 60℃后开始计算；时长表示预热区总时长。图<4.5.6-3>

Preheating zone: The parameters of the preheating zone. After the initial temperature is set to 60 ° C, it means that the preheating zone starts counting after the temperature reaches 60 ° C; the duration represents the total length of the preheating zone. Figure <4.5.6-3>

波峰：峰值类型为单波和双波，默认双波峰，锡炉类型为有铅和无铅，选择单波时，波峰二和波谷处不允许填写。图<4.5.6-4>

Crest: The peak type is single wave and double wave, the default double wave peak, the tin furnace type is leaded and unleaded, and when single wave is selected, the peak 2 and trough are not allowed to be filled. Figure <4.5.6-4>

冷却区：管控冷却区降温斜率。

Cooling zone: The cooling slope of the cooling zone.

处于温度时长：管控处于某个温度以上的时间。

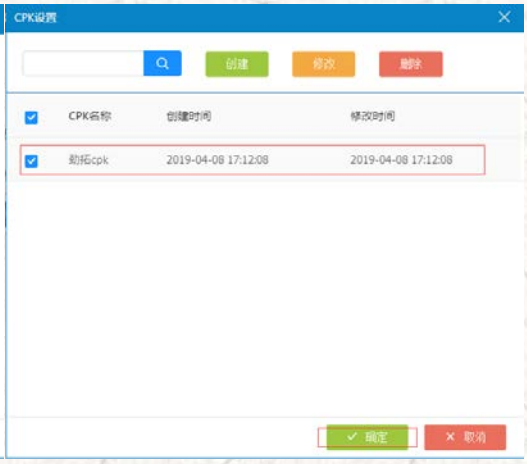
Temperature duration: The time that the control is above a certain temperature.

新建好 CPK 管控，选中确定。

Create a new CPK control and check OK.



<4.5.6-3>



<4.5.6-4>

筛选数据：软件会根据您的测试历史数据归类同一产线、同一炉子、同一产品的温度曲线，选中其中一条数据，对应的历史数据信息将会提取出来，软件界面底部也将会根据提取的信息在整个历史数据库中找到对应的同类测试历史数据。图<2.4.6.6-5>、图<2.4.6.6-6>

Filter data: The software will classify the temperature curve of the same production line, the same furnace and the same product according to your test history data, select one of the data, the corresponding historical data information will be extracted, and the bottom of the software interface will also be extracted according to The information is found in the entire historical database corresponding to the same type of test history data. Figure <4.5.6-5>, Figure <4.5.6-6>



<4.5.6-5>



<4.5.6-6>

CPK 分析报告：最终将会算出 CPK 值，对应 CPK 判定标准可得到制程能力优良。图<4.5.6-7>

CPK analysis report: The CPK value will be calculated finally, and the process capability is excellent corresponding to the CPK judgment standard. Figure <4.5.6-7>



<4.5.6-7>

4.6 退出 exit

温度测试完成后，即可退出软件。

After the temperature test is completed, exit the software.



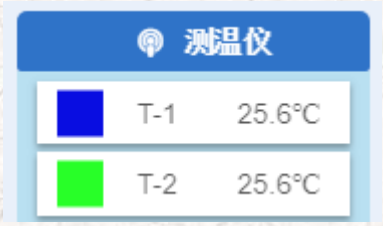
帮助：使用手册内置在软件，需要浏览时打开软件主界面右上角帮助即可。

Help: The manual is built into the software. You need to open the upper right corner of the main interface of the software to browse.



测温仪通道实时显示，测温时可点击颜色区域进行通道屏蔽或开启，也能实时查看当前温度数据。

The temperature of the thermometer channel is displayed in real time. When measuring the temperature, you can click the color area to block or open the channel, and you can also view the current temperature data in real time.



测温仪状态显示：电量、温度。

The status of the thermometer shows: electricity, temperature.



U-key 信息：软件版本、硬件版本、序列号。

V-U-key information: software version, hardware version, serial number.



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