DMMGeneral PC User Manual

Ver 2.0 / 2020-03-29 by ZDD

Applicable host computer version:2020-01-20and later versions
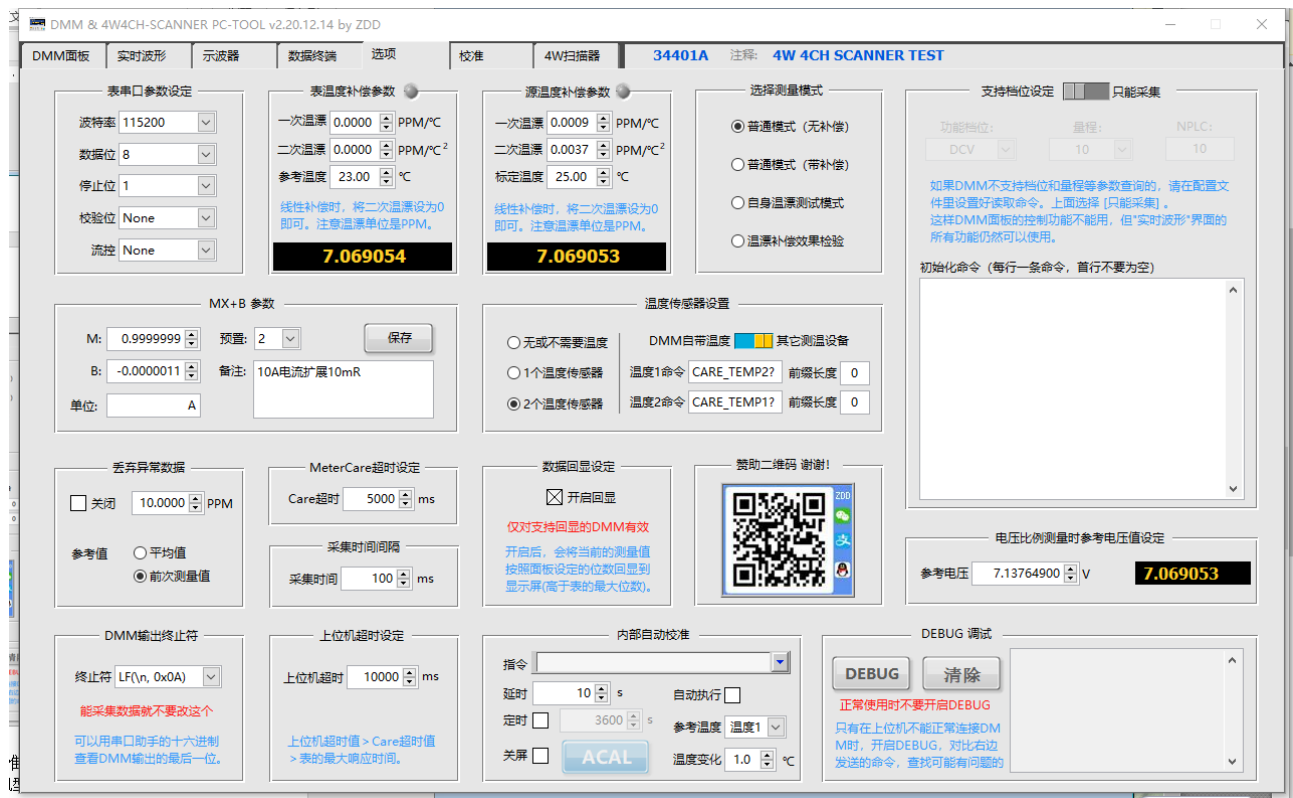
1. Main interface of the host computer:

If the DMM is not connected via MeterCare's GPIB, only use**direct connection**.

If you use the serial port to connect directly, you need to set the serial port parameters in the options interface.

The settings of the option interface will be introduced in detail later.

The calibration function is currently only available for 34401A and 34420A. If the calibration command of the compatible machine is exactly the same as that of 34401A,

It should be possible. In this case, please select "34401A" to connect and calibrate. If you select another model, all calibration-related operations on this interface will be automatically ignored. Calibration information and the number of calibrations should be visible for the 344xx series.
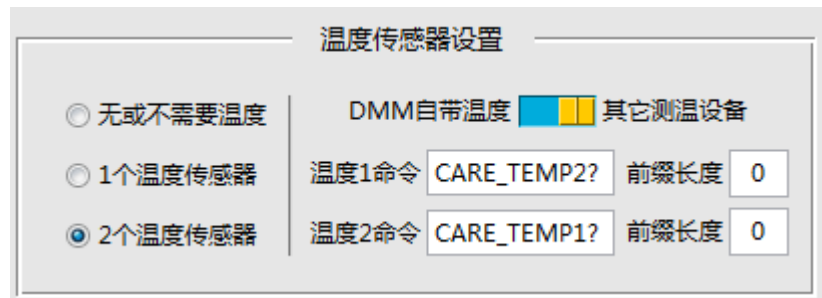
2. Connection:

Temperature sensor settings:

Depending on whether there is a temperature sensor or not, the "Options"Select OK. New versionMeterCareIf so, you can choose 0, 1, or 2. Other temperature sensor equipment should be selected according to actual conditions. One host computer instance only supports one temperature sensor device (one communication port) and two temperature channels.

Fill in the correctTemperature read command andprefix length. Data returned such as temperature The format is:TMP:+23.0, then the prefix is TMP:Please fill in the length**4**. is valid data (here is+23.0) the words before number of symbols, please note+-number is valid, no Negative numbers will also be displayed as positive numbers.

ifDMMComes with temperature sensor, you can choose "DMM Comes with temperature"'.passMeterCare"If connected, you can freely combine the temperature by reading the temperature command1and temperature2. Such as temperature 1set toDMMComes with temperature (34461AifSYST:TEMP?), temperature2set toMeterCarea certain temperature (CARE_TEMP1?).

If it is not connected through TaokaDMM,DMMThe built-in temperature can only be the temperature1.

"MeterCareor temperature sensor port"Please select the actual temperature sensor device used.**serial number**and**baud rate**, in terms of network**IPaddress**and**port**.

Here's a reminder: MeterCareAnything that can be connected can be connected hereDMMor other sensor devices. It can be temperature or something else. For example, a voltage or a current, then the temperature The degree characteristic curve isVIcurve.

DMM connection method:

1. Direct connection

No MeterCare, you can only choose "direct connection"As shown on the right, select DMM in the drop-down box of the instrument port. associated port. Some DMMs may have several ports. Try to connect and select the one that can be used normally.

If it is not a serial port, such as USB, LAN, and other GPIB adapter cards, you may need to install the IVI driver to see the corresponding VISA standard port in the port drop-down box.

If you connect through the serial port, you also need to set it in the options.Serial port parameters, as shown on the right.

If it is passed 82357,E5810For direct connection, please install Keysight's IO Libraris Suite. Then check the options shown in the picture below in the settings. Connect the DMM through the GPIB card and turn it on. Then select the GPIB port number corresponding to the DMM in the DMM port drop-down box.
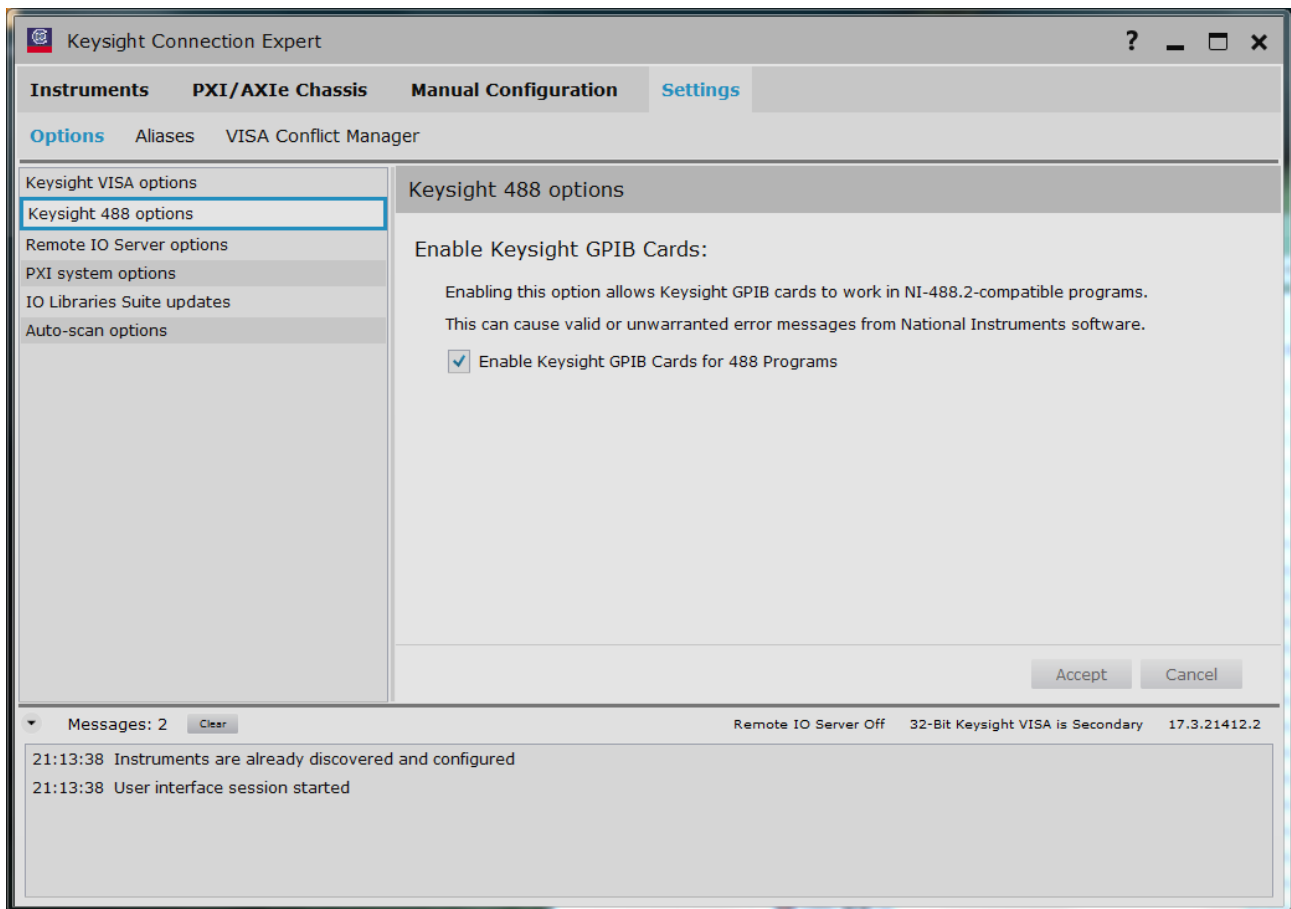
E5810If so, if you can find the device on the web page, you need to set it up as shown below to find the port address in the port drop-down box of the host computer.

Edit settings for a remote GPIB interface

Specify Connection Addresses:

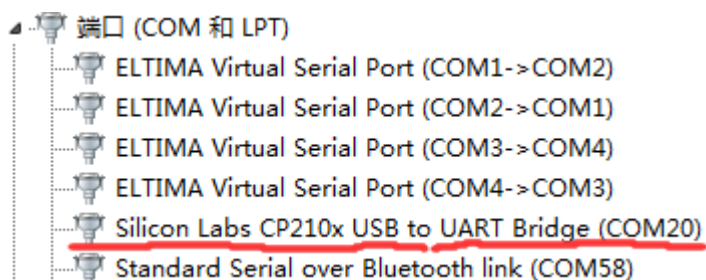|	
VISA Interface ID (Board Number):	GPIB1
TCPIP Interface ID:	TCPIP0
SICL Interface ID:	gpib1
Logical Unit:	10

Specify Connection Information:

Find Interfaces...

Hostname or IP Address:	18.8.1.39
SICL Interface Name on Remote Host:	hpib

Verify Connection:

Test Connection

显示比例：86%，双击查看原图

Configure GPIB Properties:

☑ Auto-Discover Instruments Connected to This Interface

▾ Keysight 488 Properties

OK   Cancel

NI GPIBCard needs to be installedNI-488.2Driver (domestic cards only support17.0or previous version),CONTEC GPIBCard needs to be installedGPLV (GPIB Labviewversion) runtime library and driver (andNIIncompatible, will be replacedsystem32\GPIB-32.dll, the original file was renamedGPIB-32.1, if usingNIand compatibleGPIBCard, needGPIB-32.1Change backGPIB-32.dll).

2. Connect via MeterCare

"MeterCare Port"Don't make the wrong choice. Serial port or network, be sure to choose according to your own MeterCare.

端口 (COM 和 LPT)
　　ELTIMA Virtual Serial Port (COM1->COM2)
　　ELTIMA Virtual Serial Port (COM2->COM1)
　　ELTIMA Virtual Serial Port (COM3->COM4)
　　ELTIMA Virtual Serial Port (COM4->COM3)
　　Silicon Labs CP210x USB to UART Bridge (COM20)
　　Standard Serial over Bluetooth link (COM58)

选择仪表连接方式

◉ 通过MeterCare   ○ 直接连接

MeterCare端口

◉ 串口 COM20   115200

○ 网络 192.168.1.199   5025

GPIB地址 23

建立连接

"GPIB address"Select the actual GPIB address of your DMM.

3. Model selection:

If the DMM's remote command supports gear setting command, you can select "Support gear setting". Otherwise select "Can only collect".

choose"Other models", if you need to enter first

For remote mode, please add it in the initialization command. Such as skewers

port connection, if SYST: REM is required, enter

CARE_NULL:SYST:REM. If the screen off command of some DMM is DISP OFF, enter CARE_NULL: DISP OFF. Note that it is not connected through Taoka, so there is no need for the CARE_NULL: prefix. There is no need to enter remote mode in advance when connecting via GPIB. Please refer to the DMM manual for details.

choose"Can only collect"hour,Function gear,NPLC,Measuring rangePlease make the correct selection according to the current actual settings of the DMM, otherwise the host computer will display abnormally.

read commandandData prefix lengthPlease refer to the DMM manual. For example, DMM returns data:"DCV9.99999", then the prefix length is3.

Notice: If no data is received after connecting, please check whether the end character of the returned data in the table is "line feed (LF,0x0A)" or "Enter and line feed (CR LF:0x0D 0x0A)". You can use the serial port assistant to view it (hexadecimal display). If not, please refer to the manual of the table and change it to "Newline (LF,0x0A)" or "Enter and line feed (CR LF:0x0D 0x0A)   ".

KEITHLEYThe table seems to be0x0DEnd, it is recommended to set it to0x0AFinish.

4. MeterCare timeout, collection time, and host computer timeout settings:

"MeterCare timeout" is the maximum time to wait for DMM to return data after sending the DMM query command. If the DMM return data is not received after this time, MeterCare will generate a timeout error. Therefore, this timeout value must be greater than the maximum conversion time of DMM. For example, DMM is in AZ When ON + 100PLC, the conversion time is about 4s, so it is appropriate to set the timeout to 5s.

"Collection time" is the time interval for collecting data. This value is valid only if it is greater than the actual conversion time of DMM. Otherwise, the actual conversion time of DMM shall prevail.

"Host computer timeout"Similar to above"MeterCare timeout" , just the host computer, etc. Maximum time to wait for MeterCare or DMM to return data. If the return data is not received after this time, a timeout error will occur. So this timeout value must be greater than or equal to "MeterCare timeout" value.

 It is recommended that the timeout value be larger, because when the timeout value is close to the response time of the DMM, a timeout may occur more easily due to certain uncertain factors.

## 5. Waveform export and import

In the waveform window, right-click to export the waveform data to an Excel file. If you want to import waveforms in the future to be closer to the original waveform resolution, you can increase the number of data digits by one before exporting (right of the main panel) Lower corner "digits"   ).
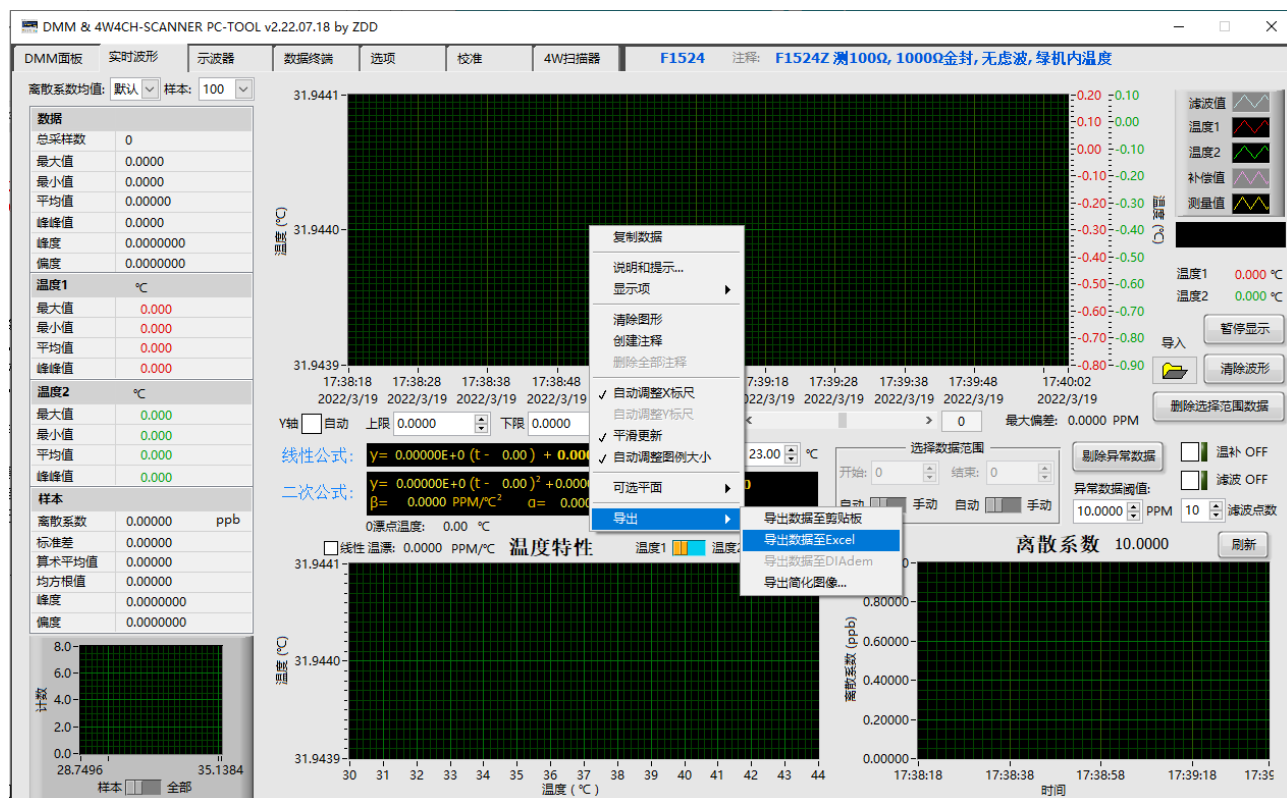
Note: When using the export and import function, the time format below the waveform must have seconds, and the date format must have /. You can refer to the figure on the right to set the data format of the system date and time.

When importing, click the "Import" button in the lower corner of the waveform and select Just the Excel file you want to import.

If you want to continue collecting data after previously collected data, you can When opening the host computer, first import the previous data in the waveform interface, then establish the connection and continue collecting.
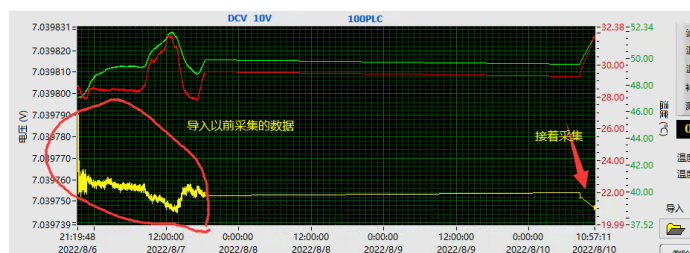
6. Measurement mode and temperature compensation:

1. Normal mode (no compensation)   It is a direct measurement, and all data does not undergo any temperature compensation processing.

表温度补偿参数 ⚪   源温度补偿参数 ⚪   选择测量模式

一次温漂 -0.0150 PPM/°C   一次温漂 -0.1080 PPM/°C   ⦿ 普通模式（无补偿）

二次温漂 0.0025 PPM/°C²   二次温漂 0.0272 PPM/°C²   ◯ 普通模式（带补偿）

参考温度 40.00 °C   标定温度 23.00 °C   ◯ 自身温漂测试模式

线性补偿时，将二次温漂设为0   线性补偿时，将二次温漂设为0   ◯ 温漂补偿效果检验
即可。注意温漂单位是PPM。   即可。注意温漂单位是PPM。

NaN   **NaN**

2. Normal mode (with compensation) It means to perform temperature compensation on the measured data according to the temperature drift coefficient of the meter and the actual temperature data of the meter. Note that if the temperature coefficient of the table is quadratic, then the temperature drift coefficient of the first term must correspond to the reference temperature. That is to say, the first-term temperature drift coefficient of the quadratic temperature drift curve is different at different temperatures.

The temperature drift of the watch must be measured in advance. You can follow the following "Self temperature drift test mode"To measure.

表温度补偿参数 🟢   源温度补偿参数 ⚪   选择测量模式

一次温漂 -0.0150 PPM/°C   一次温漂 -0.1080 PPM/°C   ◯ 普通模式（无补偿）

二次温漂 0.0025 PPM/°C²   二次温漂 0.0272 PPM/°C²   ⦿ 普通模式（带补偿）

参考温度 40.00 °C   标定温度 23.00 °C   ◯ 自身温漂测试模式

线性补偿时，将二次温漂设为0   线性补偿时，将二次温漂设为0   ◯ 温漂补偿效果检验
即可。注意温漂单位是PPM。   即可。注意温漂单位是PPM。

NaN   **NaN**

3. Self-temperature drift test mode   It's the temperature drift of the meter. Be sure to choose 2 temperature sensors. It is necessary to use the temperature transmission corresponding to temperature 2

It is best to fix the temperature of the sensor meter somewhere inside the meter. Otherwise, if the position changes, the temperature coefficient will be different and compensation will not be possible.

The temperature compensation of the source is turned on, and the temperature sensor corresponding to temperature 1 measures the temperature of the source. If the temperature drift of the source can be ignored during the measurement process (for example, the temperature change is very small or the temperature drift itself is very small), you can fill in the primary and secondary temperature drift coefficients of the source with 0. at this time and

Normal mode (no compensation)it's the same.

If there is only one temperature sensor, use the same read command for both temperature 1 and temperature 2, and only measure the temperature of the meter. Fill in the primary and secondary temperature drift coefficients of the source with 0, or useNormal mode (no compensation)Come test.

Under normal circumstances, the temperature drift of the meter can be measured by cold starting the machine, and the temperature drift of the meter can be measured from cold starting to stable.10For temperature rises above °C, some previous data can be removed during fitting.

表温度补偿参数 ⚪   源温度补偿参数 🟢   选择测量模式

一次温漂 -0.0150 PPM/°C   一次温漂 -0.1080 PPM/°C   ◯ 普通模式（无补偿）

二次温漂 0.0025 PPM/°C²   二次温漂 0.0272 PPM/°C²   ◯ 普通模式（带补偿）

参考温度 40.00 °C   标定温度 23.00 °C   ⦿ 自身温漂测试模式

线性补偿时，将二次温漂设为0   线性补偿时，将二次温漂设为0   ◯ 温漂补偿效果检验
即可。注意温漂单位是PPM。   即可。注意温漂单位是PPM。

NaN   **NaN**

**4. Temperature drift compensation effect inspection** Be sure to choose 2 temperature sensors. Temperature 1 is the measurement source, Temperature 2 is the temperature of the meter. If table and source

If the temperature drift coefficients are correct, the compensated curve should be a horizontal straight line with a temperature drift coefficient close to 0.00. If you do not know the temperature drift of the source, you can fill it all

with 0. At this time, the temperature drift of the compensated curve with respect to temperature 1 is the temperature drift of the source.

If there is only one temperature sensor, use the same read command for both temperature 1 and temperature 2, and only measure the temperature of the meter. Fill in the primary and secondary

temperature drift coefficients of the source with 0, or use Normal mode (with compensation)Come test. If the temperature drift coefficient in the table is correct, you can judge whether the source has

temperature drift based on the compensated curve.

The following is the temperature compensation effect of 34401A + LM399.greenis the internal temperature of the watch,blueis the actual measured data before compensation, pinkThis is the curve after temperature

compensation has been performed on the meter, and the source has not been compensated. It can be seen that the temperature in the meter changes by 4.6°C before compensation. The measurement results The change is

14uV, and after compensation it only changes about 4uV (from the waveform point of view, it can basically be regarded as noise, and the temperature drift compensation effect is very good).
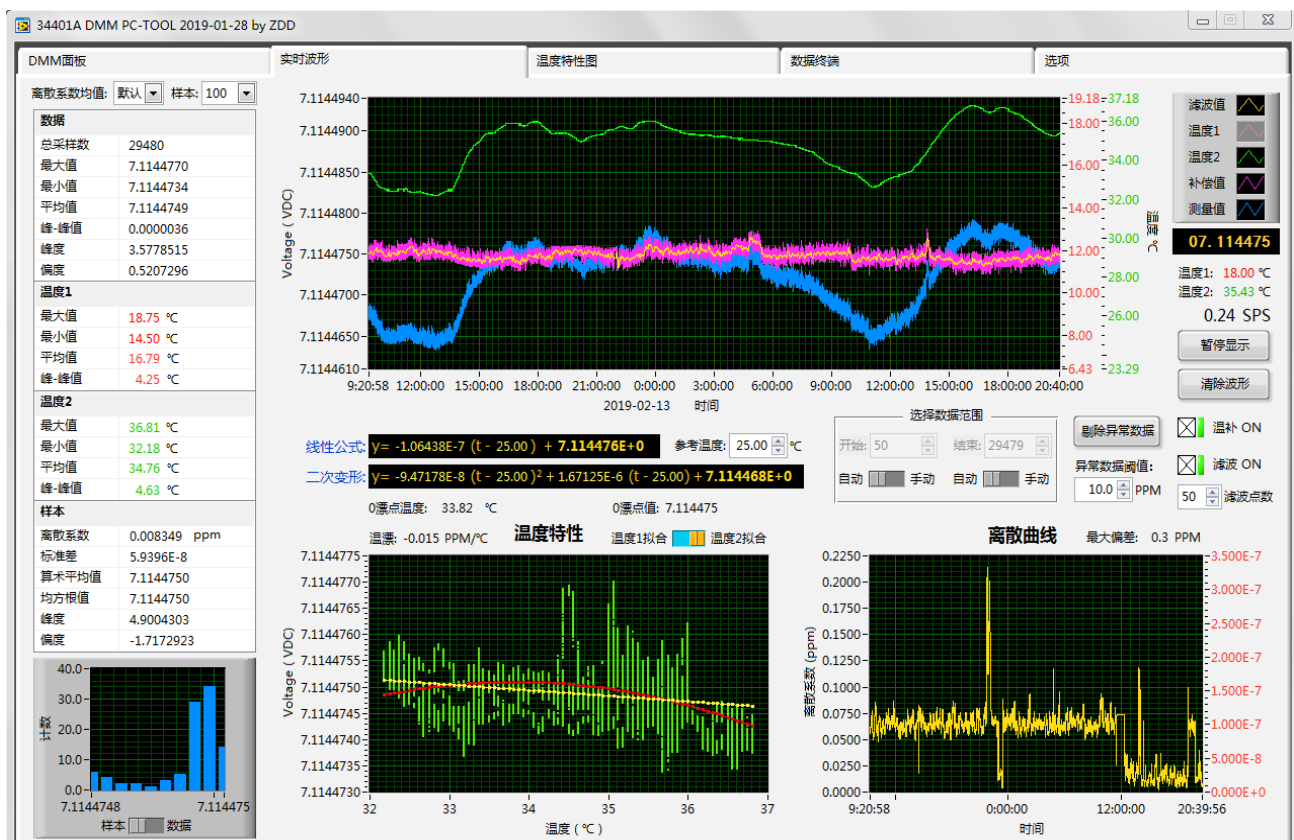
The picture below is34461Acold start and temperature compensation curves.green is the internal (near reference) temperature of the watch, yellow is the actual value before compensation

measurement data,pink is the curve after temperature compensation is performed on the table,red is the temperature of the source, and the source is not compensated.
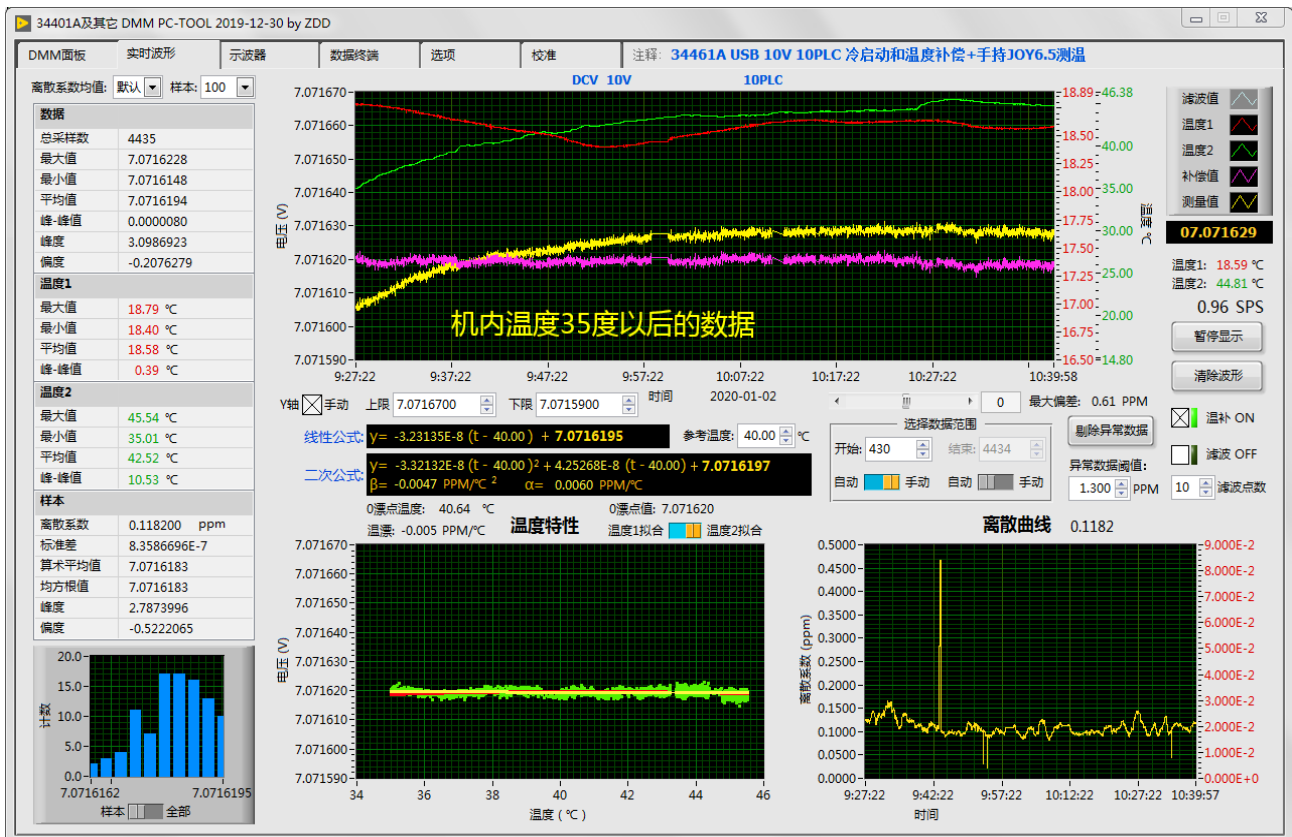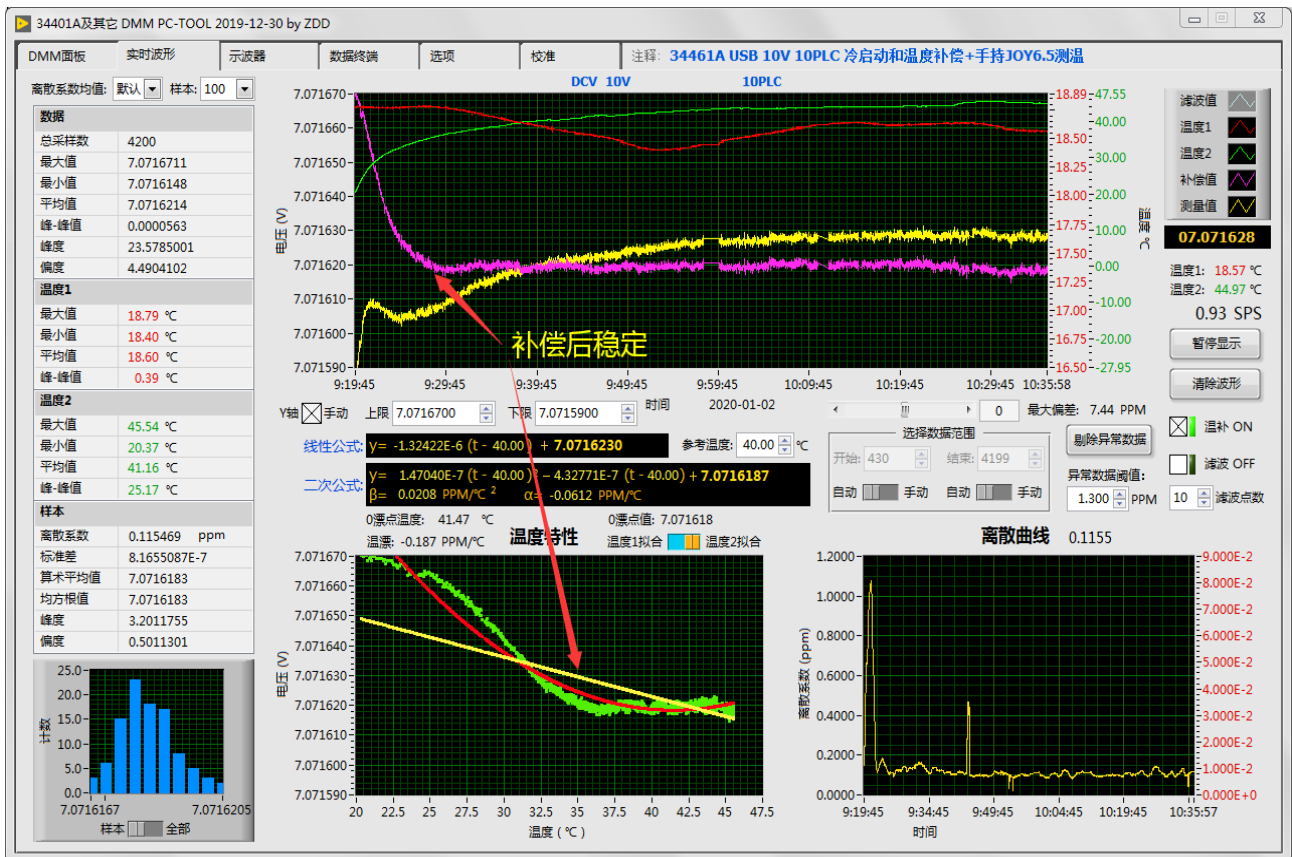
7. Real-time waveform:

Supports arbitrary interval waveform display, customizable upper and lower limits of the vertical axis, elimination of abnormal data, deletion of data within the selected range, smoothing filtering, DMM temperature compensation, fitting temperature selection, relative position adjustment of main measurement data and temperature data, etc. Find out for yourself.