新威设备校准原理及操作Neware equipment calibration principle and operation

Calibration principle and operation of Neware equipment

目录
catalogue

- 设备为何需要校准？Why calibrate?
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设备为何需要校准？why calibration? Why calibrate?

✓ 设备精度、稳定度出现偏差，现象表现为：设置值、采样值（显示值）之间超出设备规定的精度和稳定度范围；Equipment accuracy, stability deviation phenomenon as follows: the deviation exceeds the precision and stability of the range of the device between specified sample value (displayed value); Accuracy and stability of the equipment appear deviation and the results is that the setting value and sampling value exceeds the defined range of the accuracy and the stability

- 设置值：用户自定义设置设备输出的值Set values: User-defined device output values
  Output values of the device set by the users
- 采样值：设备下位机采集后上传给上位机的实时数据，BTS客户端上进行实时显示（该值为实际采样值）
  Sample values: the data bottom machine collected uploaded to the PC in real-time, real-time display (which is the actual sample values) on the BTS Client
  Sample values:Real-time data uploaded to the PC by the bottom machine after sampling and displayed on the client(It's the actual sample values)

✓ 影响设备精度、稳定度偏差的原因Reasons affect the accuracy and stability of the device

设备老化
device aging

设备在测试使用过程中，受到温度、湿度等环境影响，设备相关的一些元器件发生老化现象导致设备的稳定性出现偏差问题During the testing, due to the environmental impact of temperature, humidity and some other factors, some components of the device aging occurs, which causes the accuracy and stability problems
Due to the effect of the temperature,and humidity etc.during the testing,some components of the device get aging ,whcin causes the deviation of the device's stability .

电子元器件温漂
Electronic Component drift

温漂即温度漂移，温度漂移一般是指，环境温度变化时会引起晶体管参数的变化，这样会造成静态工作点的不稳定，使电路动态参数不稳定，甚至使电路无法正常工作；常规现象即造成测试设备输出精度出现超出设备技术规格。Temperature drift is often refferred to the parameter varity of the transistor caused by the change of the environmental temperature,which will futher lead to the unstablity of the static working point.As a result,the danamic parameter of the circuit becomes unstable and what's worse,the circuit may not work properly;And regular phenomenon is that the output accuracy of the device exceeds the technical specifications.

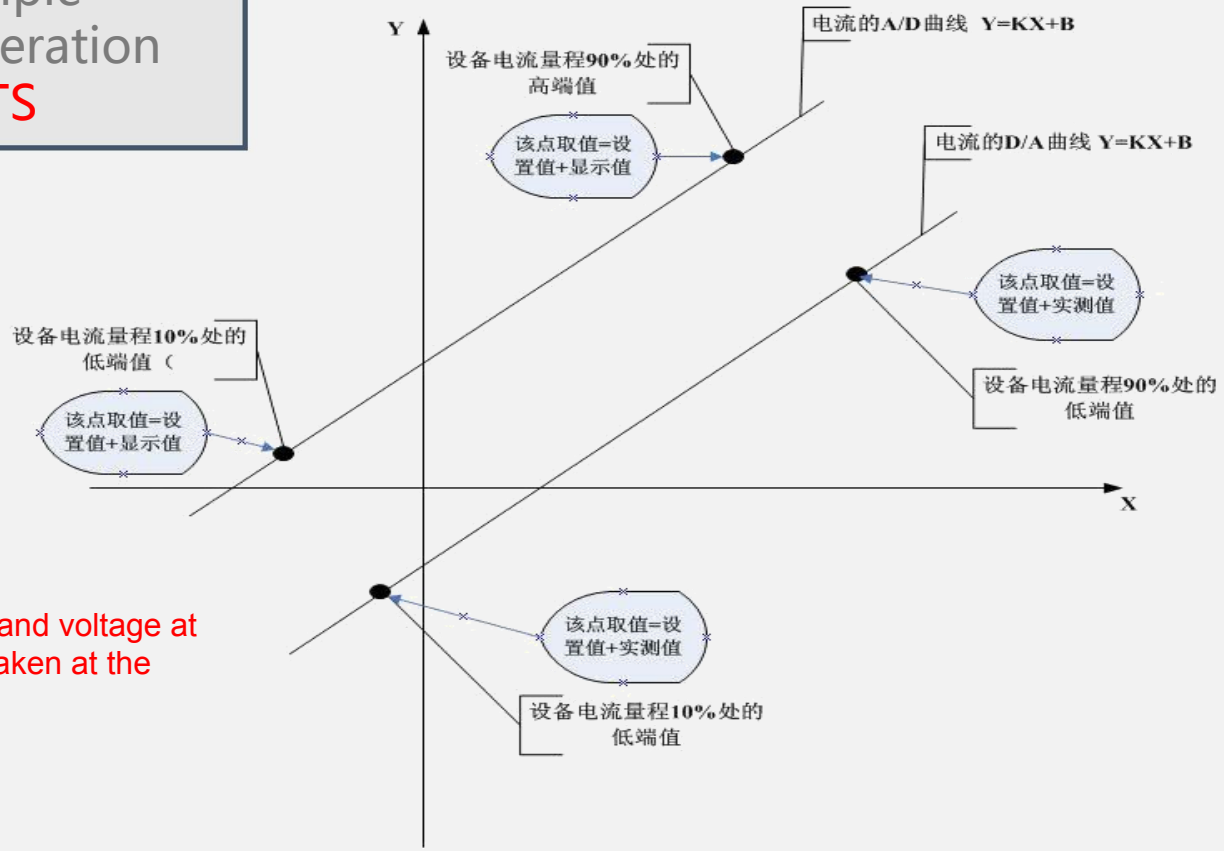
设备如何进行校准？How to calibrate

✓ BTS测试仪设备校准原理简介calibration principle introduction of battery testing systemand operation

Introduction of the Calibration principle of BTS

BTS测试仪校准操作主要是校准电流、电压在输入，输出端的精度，其准确性主要是体现在各自的D/A（输入）和A/D（输出）曲线上，根据两点确定一条直线的理论，分别取直线上低端与高端两个点

What the BTS calibration does is to calibrate the accuracy of the current and voltage at the input and output ends.On the curves of D/A and A/D,two points are taken at the high and low segments to draw a curve



PS：

①为保准设备精度，公司设备均采用三段校准方式；

All device of Neware company use three-stage calibration to ensure the accuracy.

②设备校准方式分为手动校准和自动校准两种。

There are two ways of calibration:manual calibration and automatic calibration.

③以上原理均适用公司所有设备的校准

Principle above is suitable for the calibration of all device.

上图为电流输出曲线校准图（电压校准原理同样适用）

Figure above is the calibration curve of the output current(It is also suitable for the voltage calibration)

设备校准需要的工具及软件Tools and software required during the calibration?

✓ 手动校准时需要的工具及软件tools and software required during manual calibration

工具tools

- 功率电阻power resistor
- 分流器 shunt
- 万用表 multimeter
- 恒流源 constant current source / 恒压源 constant voltage source

软件software

- BTS_Cali_7.1.23
- NewCali

用于校准设备的充电电压，最小阻值不得低于以设备最大电压量程U与设备最大输出电流I的比值，最大功率不得低于设备通道输出的最大功率注意：万用表应选择测量范围大于设备电压量程的直流电压档，正极（红色）表笔应连接在电阻/电压插口；

用于校准设备的充/放电电流，当校准所使用的万用表电流量程不足以满足设备电流输出范围时，需要用到此工具，串接到电路中后，使用万用表测试分流器两端的电压值during the calibration of the charge/discharge current, when the multimeter current range is not sufficient to meet the current output range, we need to use this tool(shunt), connect in series with the circuit,then use a multimeter to test the both ends voltage of the shunt

用于设备校准时对设备输出值进行实际采样（PS：公司目前用于调式和校准的万用表型号为Agilent和FLUKE万用表，建议客户使用此类型或高精度万用表）

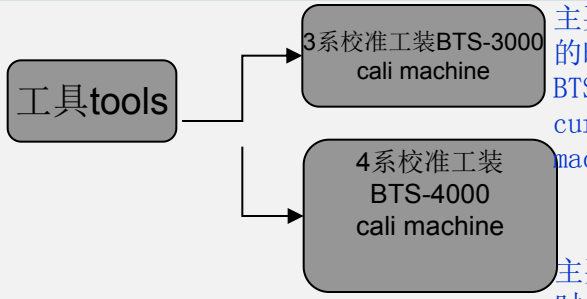
用于校准设备的放电电流和放电电压，恒流放电主要作用在设置恒流放电时的电流校准；放电电压的校准主要作用在设备运行过程中对电池电压的采集精准度上（PS：恒流源可使用电池代替）
They are used to calibrate the discharge current and voltage of the equipment.Constant current discharge is mainly used

主要用于串口版设备的校准（3系列设备校准所用）it is mainly for serial port equipmentcalibration(BTS-3000)
It is mainly used in the calibration of serial version equipment of series 3

主要用于网络版设备的校准（4系列设备所用，不支持3系列网络版）it is mainly for ethemet port equipment calibration(BTS-4000,BTS-3000ethemet port type is not included) It is mainly used in the calibration of network vesion equipment of series 4

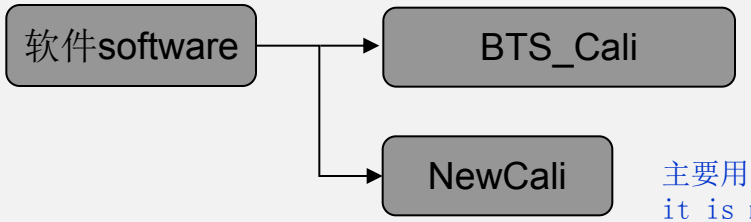
设备校准需要的工具及软件Tools and software required during the calibration?

✓ 自动校准时需要的工具及软件**tools and software required during the auto calibration?**



主要用于校准3和9系列设备的充放电电压、充放电电流的工装设备，该设备集中整合了所有需要手动校准的时用到的工具，设备校准时，使用该工装即可完成一台设备所需要校准的所有参数；it is used for BTS-3000 and BTS-9000,mainly calibrate charge and discharge voltage, charge and discharge current , this machine is with all tools which is required in manually calibrate, this cali machine is able to calibrate all premeters for BTS-3000and BTS-9000

主要用于校准4系列设备的充放电电压、充放电电流的工装设备，该设备集中整合了所有需要手动校准的时用到的工具，设备校准时，使用该工装即可完成一台设备所需要校准的所有参数；it is used for BTS-4000,mainly calibrate charge and discharge voltage, charge and discharge current , this machine is with all tools which is required in manually calibrate, this cali machine is able to calibrate all premeters for BTS-4000



主要用于3系列和9系列设备的自动校准软件
it is mainly used for BTS-3000 and BTS-9000 auto calibration
It is mainly used in the automatic calibration of equipment se

主要用于网络版设备的校准（4系列设备所用，不支持3系列网络版）
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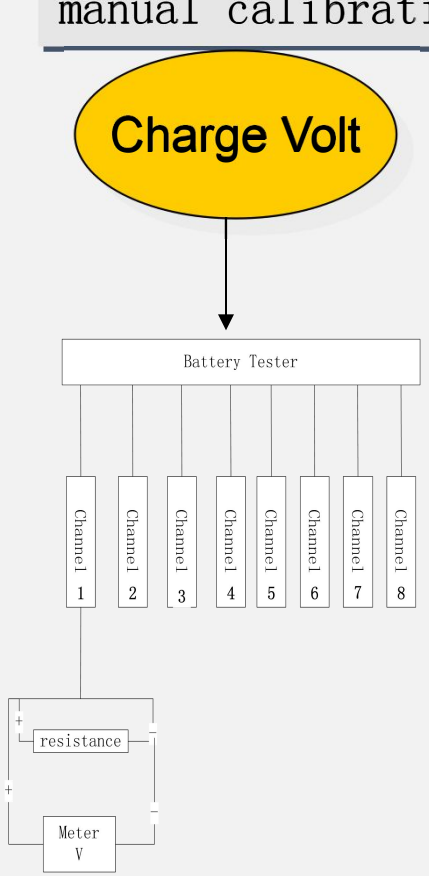
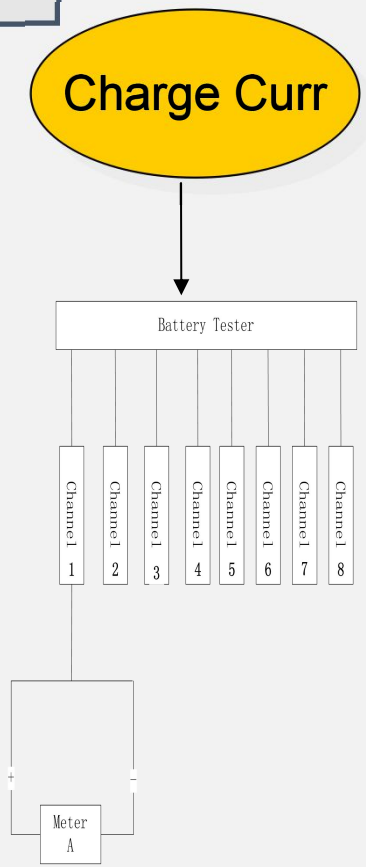
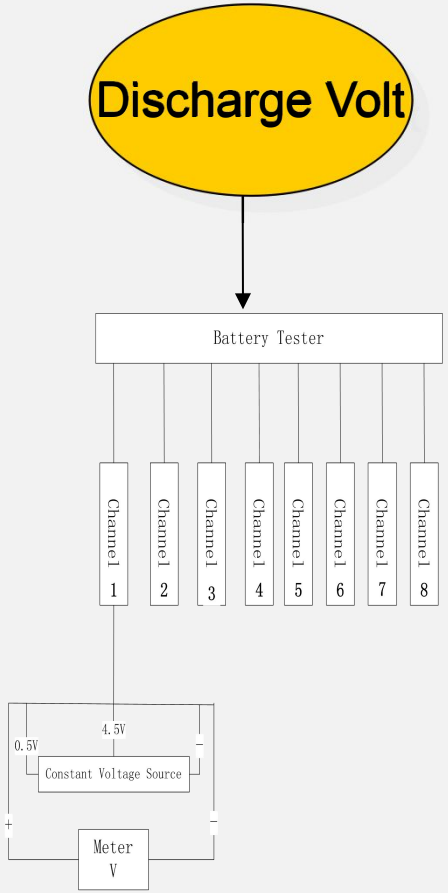
设备校准的操作方法 Operation methods of calibration

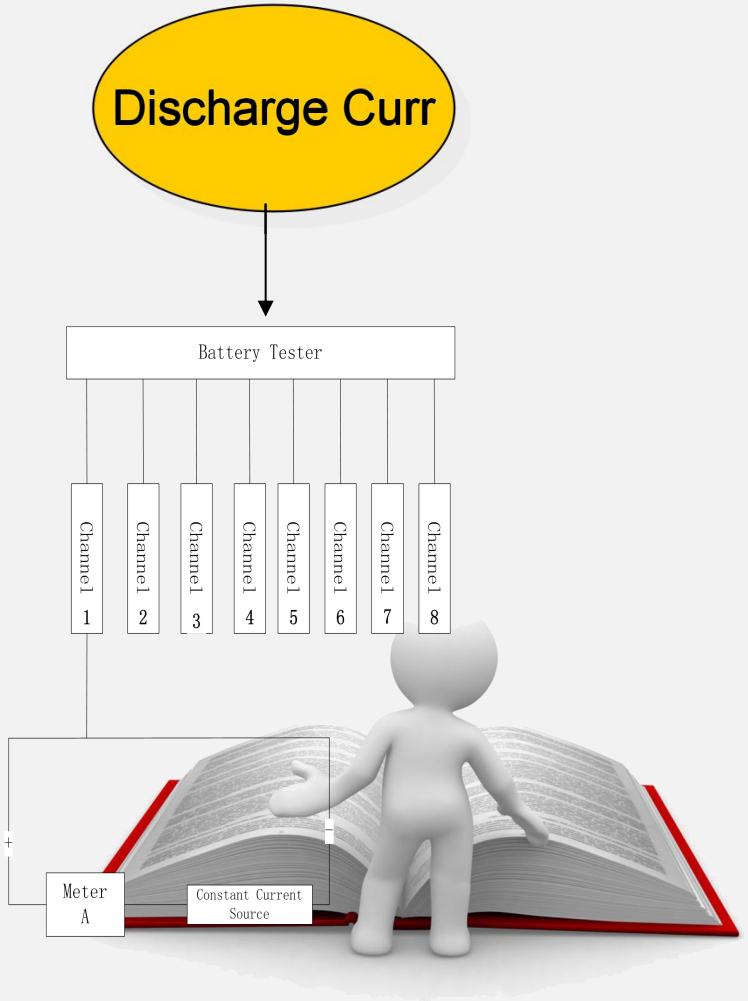
✓ 手动校准设备的方法
operation method of manual calibration

@ 接线篇
connection tutorial









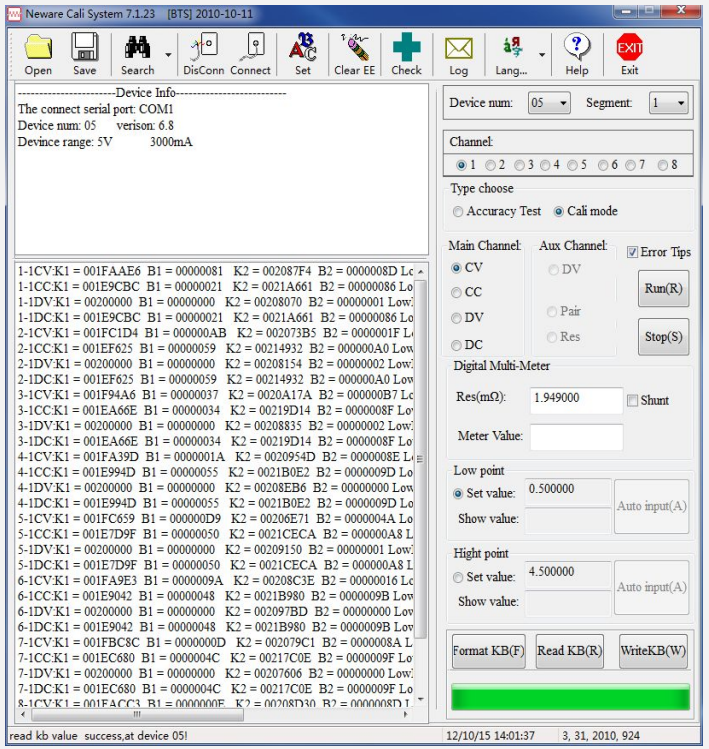
设备校准的操作方法how to calibrate the equipment Operation methods of cal

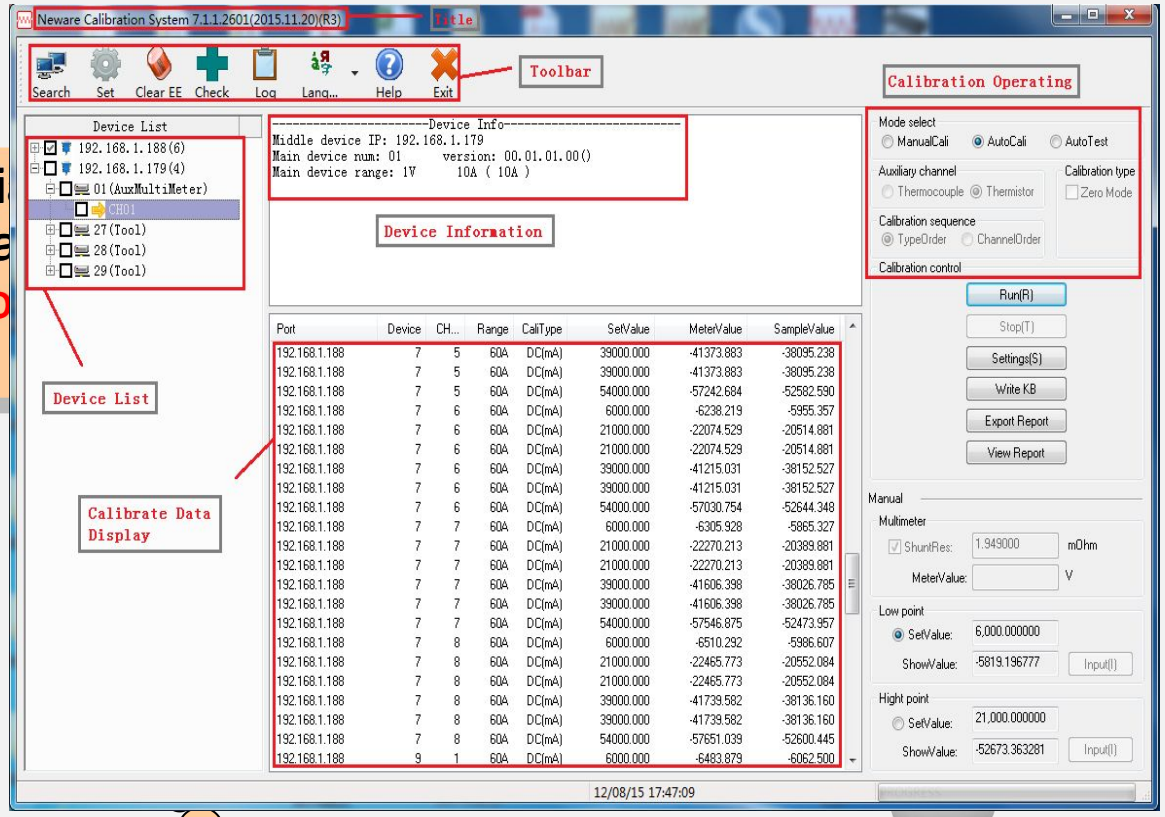
✓ 手动校准设备的方法how to calibrate manually
manual calibration

@ 软件篇 software

串口版软件界面seri
port software interfa
software interface o
serial version

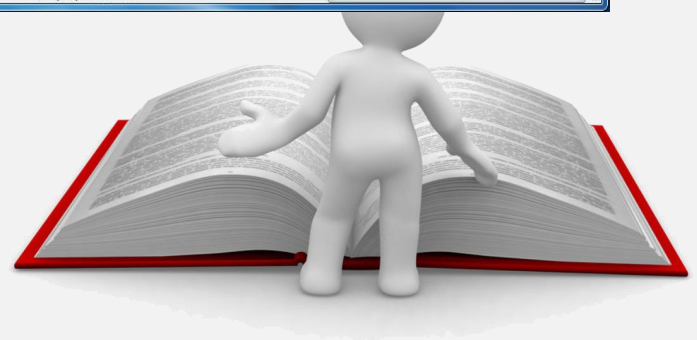
网络版软件界面ethernet software interface software interface of network version





RS232串口通讯
RS232 serial port communication

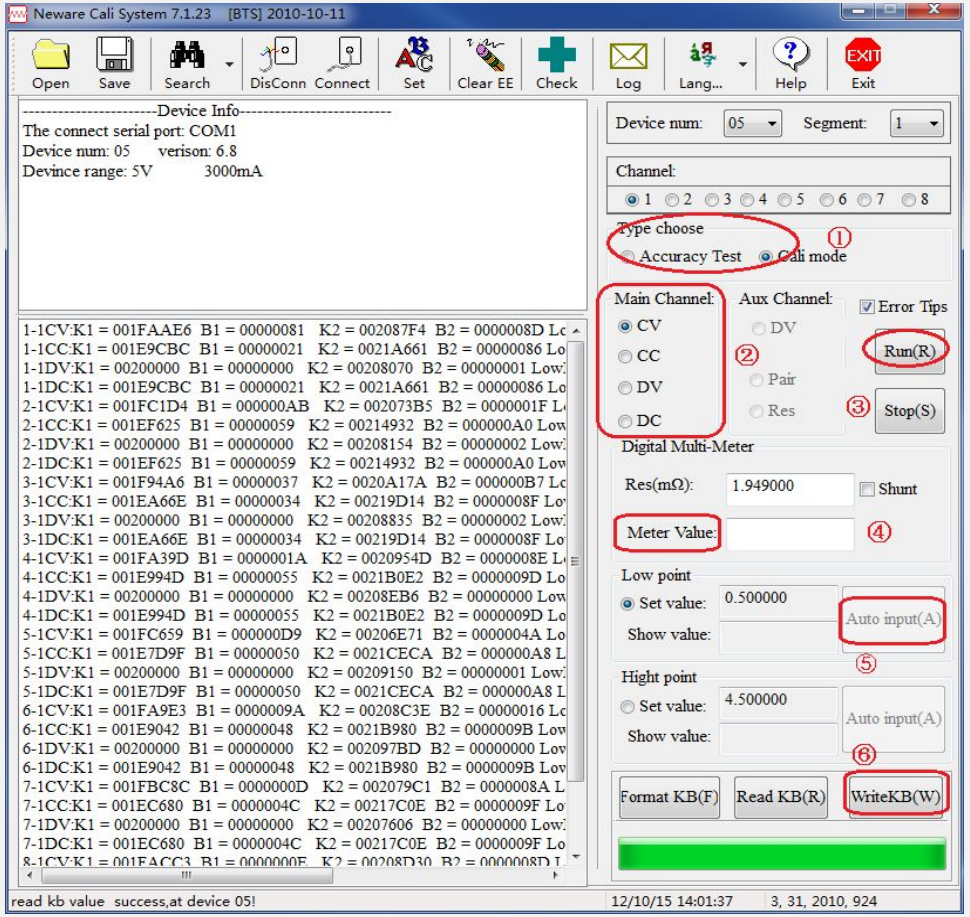
配合4系中位机使用
work with BTS-4000 median machine



设备校准的操作方法how to calibrate Operation methods of calibration

✓ 手动校准软件使用方法how to calitrate manually with the software manual calibration

@ 软件篇 software



搜索到设备后，双击打开BTS_Cali软件，软件进入自动搜索模式，搜索到设备后如左图所示：Double click the software BTS_Cali after searching the device and the software will search the device automatically.Figure on the left shows the interface after searching the device .

① --模式选择：分为校准、精度测试两种模式，软件打开默认模式为校准模式；
② --主通道：供用户自定义校准的类型，默认顺序从充电电压开始；
③ --执行：校准前期准备工作完毕后，点击执行开始后软件开始进入校准；
④ --万用表值：在校准过程中，是用万用表对设备输出的值进行实际采样，并将采集到的万用表值填入；
⑤ --自动填入：在填入万用表值后，将万用表值写入软件中；
⑥ --写入KB（W）：万用表值写入后，有校准软件自动转化为K、B值，点击此项由软件将KB值写入设备芯片中

设备校准的操作方法methods to calibrate Operation methods of calibration

✓ 手动校准设备的方法
methods to calibrate manually

@ 注意事项
attention

manual calibration

➢ 电压校准时，校准用的电阻功率一定不能过小
during the voltage calibration,resistor power can not be too lower
Power of the resistance used in the vlotage calibration can not be too samll

➢ 电流校准时，设备输出电流大于万用表量程必须使用分流器，此时万用表打到电压档；直接校准电流时，不可将万用表打到电压档位。during the current calibration, if the equipment output current is higher than the multimeter range,you have to use the splitter, then switch the multimeter to the voltage position; when you calibrate the current directly, can not leave the multimeter on voltage position.

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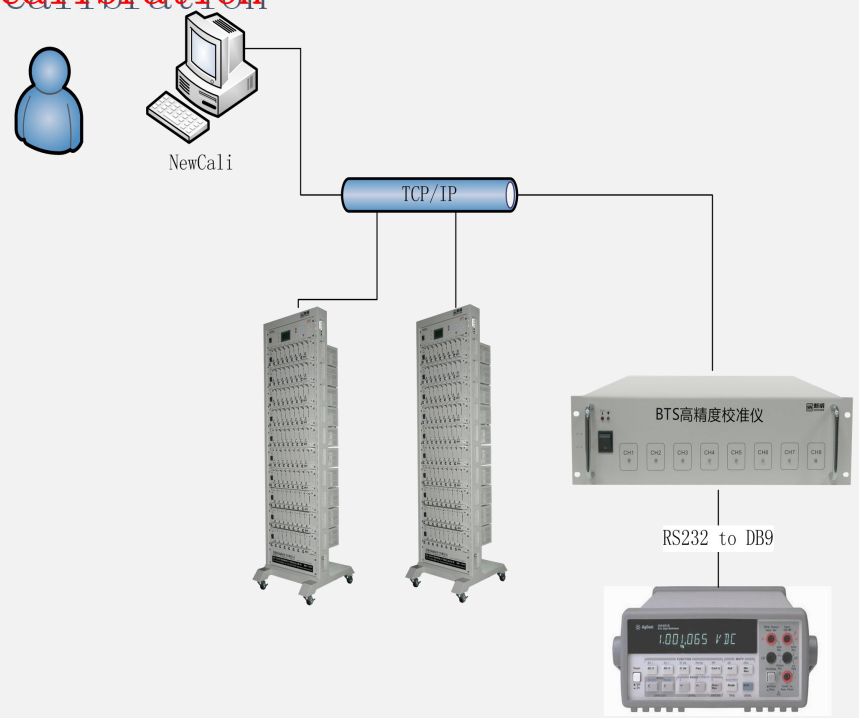
这两点是一模一样的

设备校准的操作方法methods to calibrate Operation methods of calibration

✓ 自动校准设备的方法
methods to calibrate autoly
automatical calibration

@ 接线篇
connection tutorial



➢ 如左图连接示意图进行计算机、设备、工装、万用表的连接
PC, equipment,cali machine,multimeter's connection as shown on the left
Connect the PC、equipment、calibration machine and the multimeter as shown on the left

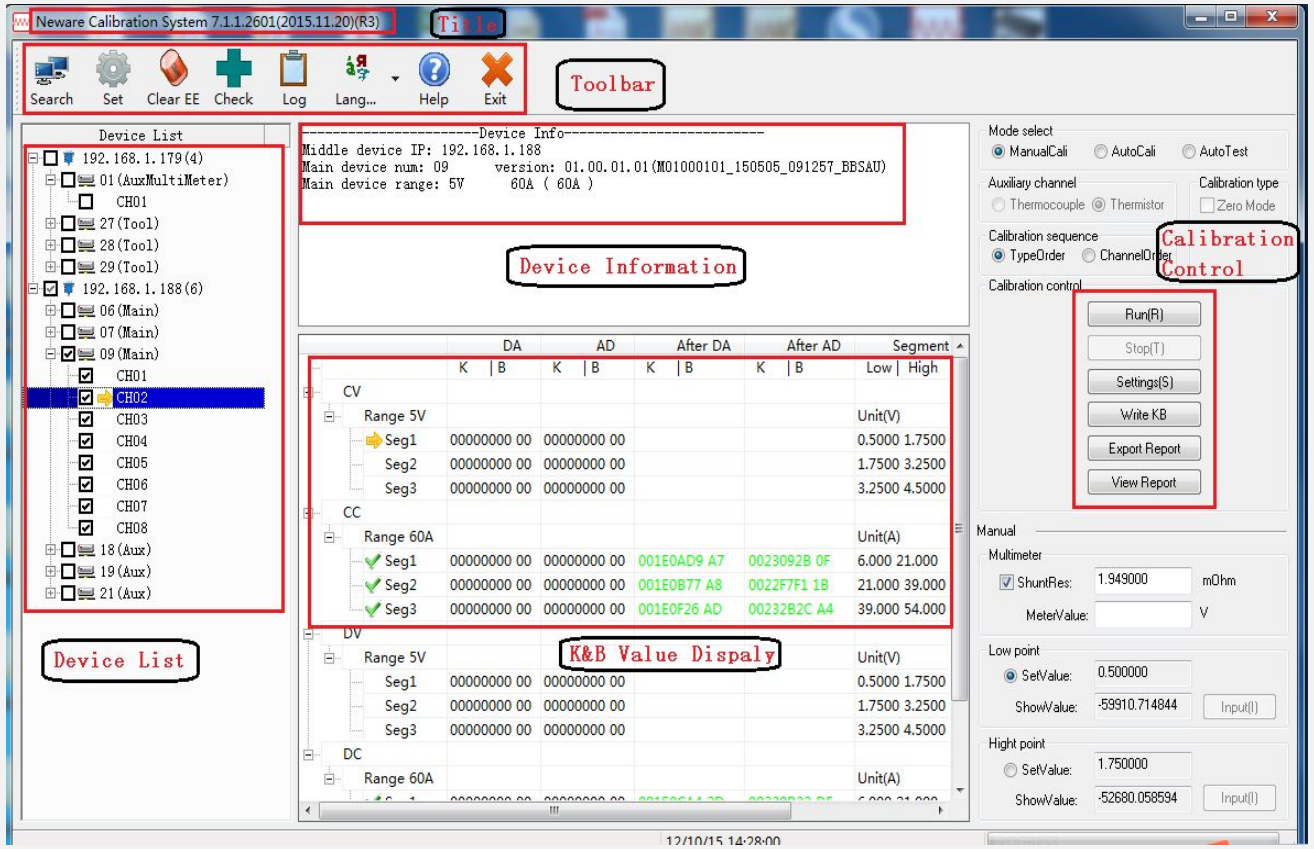
➢ 校准工装连接的万用表型号有两种，Agilent 34410A和Agilent 34461,其中连接34410A万用表需要使用到485转接板
there are two types of multimeters for calibration machine,Agilent 34410A and Agilent 34461,34410A must work with 485 transform plate.
there are two types of multimeters used in calibration : Agilent 34410A and Agilent 34461 and a 485 transfer board is required when using the multimeter 34410A

➢ 工装（常规配置8CH校准点）与设备通道间采用定制连接线进行连接，如对5V6A设备（16航插）进行连接，如下图所示：

设备校准的操作方法methods to calibrate Operation methods of calibration

✓ 自动校准设备的方法methods to calibrate autoly automatic calibration

@ 软件篇 software



① --设备列表显示区：打开校准软件后，软件自动进行设备搜索，设备前的复选框供用户选择需要校准的设备和用于校准的工装编号。

Display area of the equipment list: the software will search the equipment automatically after being opened.Users can select the equipment need to be calibrated and number the calibration machine used in calibrating through the check box ahead of the equipment .

① --模式选择：校准的模式选择，用户可选择手动校准、自动校准和自动精度测试；

Mode selection: there are three modes to choose from:manual calibration、automatic calibration and accuracy test.

① --开始：开始按钮，用户完成模式的选择后，点击开始按钮，软件进入相应的模式

Start: Click this button after selecting the mode and the software enters the selected mode.

① --校准写入KB值后，如右图所示，成功写入KB值后，KB值显示颜色为绿色字体

After the K and B being written successfully,the value are displayed on the interface in green words as shown on the left.

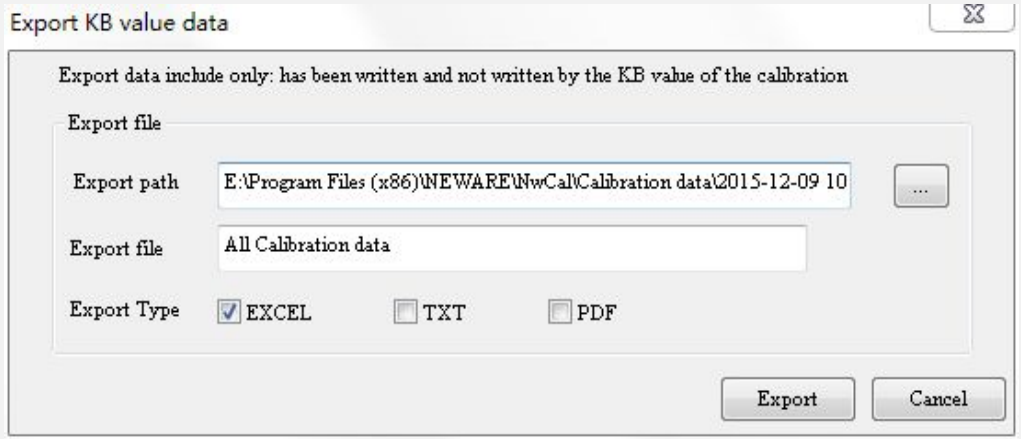
设备校准的操作方法operation of the equipment calibration Operation methods of calibration

✓ 自动校准设备的方法
methods to calibrate autoly
automatic calibration

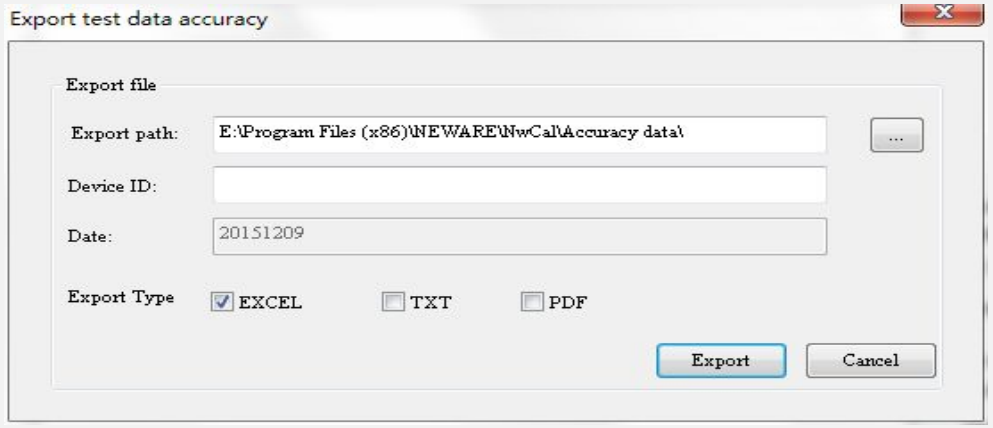
@ 软件篇--测试数据报表software-test result report Test data report

软件提供了三种方式导出报表，分别为通过导出报表按钮导出、通过查看报表导出，通过选中通道右键导出。通过这三种方式都可以导出KB值数据和精度检测数据。查看报表还具有导入数据的功能。Software provides three ways to export a report, through export button to export the report ,check the data and export the report, select channel and right click export report. Through these three methods you can exported KB value data and the accuracy test data. you can also import the data through view report.There are three ways of exporting report :through the export report button、through viewing report and through right clicking the

导出KB值数据对话框 windows when you export KB data dialoge box when exportinfg KB



导出精度数据对话框 windows when you export accucy data dialoge box when exporting accuracy data



校准软件版本及功能简介Version and function introduction of calibration software

序号 No	版本 Version	功能特点 functions
1	BTS_Cali_7.1.23(10月11)	① 与设备连接方便，使用RS232串口连接 Easy to be connected to the equipment via RS232 serial port
		② 无需安装，校准文件解压即可使用 It can be used after descompression without installation
		③ 功能简单，易于操作 Easy to operate
2	NwCal_setup_2013_10_14	① 采用TCP/IP方式通讯，实现远程控制校准 Remote calibration is available by using TCP/IP as the communication
		② 功能强大，除支持主设备的校准外还支持辅助通道设备校准 Powerful sofeware supports not only the calibration of the main channels but also the auxiliary ones
		③ 支持下位机升级操作，支持GUID写入
		④ 支持自动校准功能，校准工装使设备的校准更加简便、迅速可靠Making it easier and more reliable to calibrate the equipment because of the automatic calibration mode

THANKS
谢 谢 聆 听