亿　昇　达

Yi ShengDa

回馈型电池检测系统

Feed-back battery test system

中压测试系列

Medium Pressure test Series

技术规格书

Technical Specification

型号（Model）：	EST-BT60V20A-04CH
版本（Versions）：	V3.1
编制（Preparation）：	韩春鹏
审核（Audit）：	曾强
生效日期（Effective Date）：	2023-6-25

目 录

I、命名规则（Naming Rules）

EST-BT60V20A-04CH	
EST	公司名称（Company Name）
BT	设备系列编号（Equipment series number）： 能量回馈型电池测试系统（Energy feedback battery test system）
60V20A	单通道电压等级（Single Channel Voltage Rating）：60V 单通道电流等级（Single Channel Current Rating）：20A
04CH	通道数（Number of channels）：4CH

II、外观（Appearance）

设备外观/MM：宽×深×高：740×710×1150（仅供参考，请以实物为准）

Equipment appearance/MM：width×depth×height：740×710×1150

（For reference only, please refer to the actual product）

III、概述（Overview）

EST 回馈型电池测试系统由 **广东亿昇达科技有限公司** 自主研发，本产品用于电池模组在生产或实验中的寿命老化测试和质量控制，系统模块化设计，通道单点独立，支持多通道并联，独立风道热稳定性高。充电时，设备通过 PWM 技术给电池进行充电，提高系统效率，降低损耗。放电时，由设备将电池的能量馈入电网，实现能量回馈，给客户带来收益。

The EST feedback battery testing system is independently developed by **Guangdong Yishengda Technology Co., Ltd.** This product is used for the life aging test and quality control of battery modules in production or experiments. The system is modular in design, with single point independence of channels, support for multi-channel parallel connection, and high thermal stability of independent air ducts. When charging, the device uses PWM technology to charge the battery, improving system efficiency and reducing losses. When discharging, the device feeds the energy of the battery into the power grid, achieving energy feedback and bringing benefits to customers.

1、系统说明（System Description）

该系统由 5 部分组成，分别为 ACDC 双向电源、DCDC 双向电源、电池、中位机、上位机软件（客户端软件+BTSDA数据分析软件+服务器+调试软件）。

The system consists of 5 parts, includes ACDC bidirectional power supply, DCDC bidirectional power supply, battery, mid-level computer, and upper computer software (client software + BTSDA data analysis software + server + debugging software).

PC 电 脑：用于安装上位机软件；

PC computer: used to install upper computer software;

上位机软件：包含工步编辑、数据分析、校准和老化测试等功能；

Upper computer software: includes functions such as step editing, data analysis, calibration and aging testing;

中 位 机：数据储存、数据交换、具有掉电保护功能；

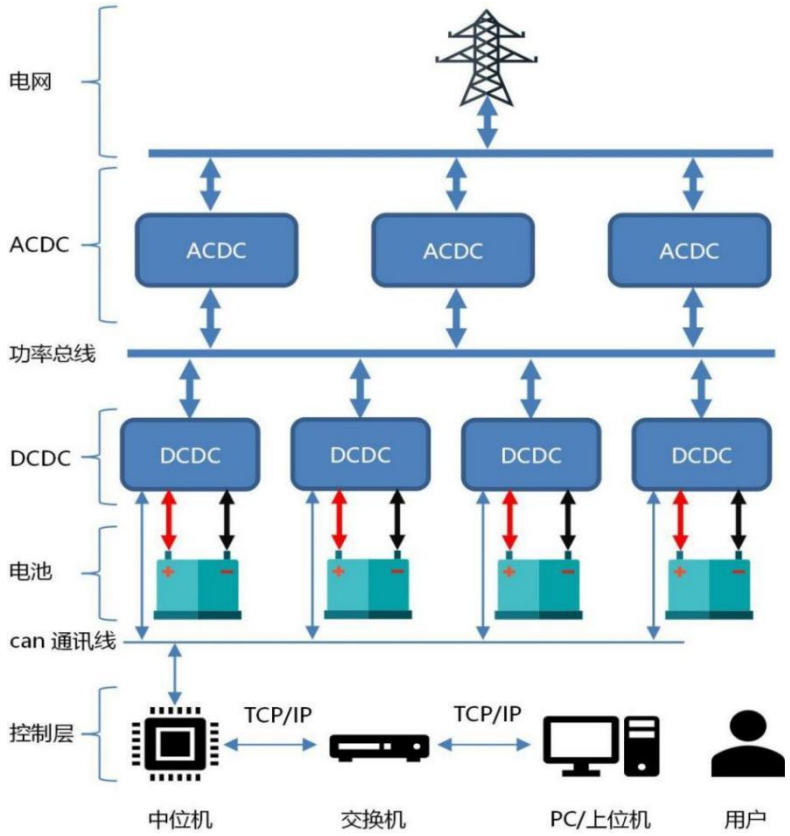
Mid-level computer: data storage, data exchange, with power-off protection function;

DCDC 模块：将电池信息上传到中位机，实现对电池的充电、放电及检测功能；

DCDC module: uploads battery information to the Mid-level computer, achieving the functions of charging, discharging and detecting the battery;

ACDC 模块：实现交直流能量双向转换。

ACDC module: achieving bidirectional conversion of AC and DC energy.



如图所示，电池检测系统主要由交流配电、ACDC、DCDC 模块等组成，ACDC-DCDC 和 DCDC-ACDC 模块实现交直流转换，DCDC 模块主要对不同的电池进行充放电。支持通道并联，使系统功率配置更灵活。

As shown in the figure, the battery detection system mainly consists of AC distribution, ACDC, DCDC modules, etc. The ACDC-DCDC and DCDC-ACDC modules achieve AC/DC conversion, while the DCDC module mainly charges and discharges for different batteries. Support channel parallel connection, making system power configuration more flexible.

2、产品特点（Product Features）

※ 高可靠（More reliable）

1. 采用前进风后抽风的方式，延长风扇寿命；
   Adopting the method of forward and backward ventilation to extend the lifespan of the fan;
2. 优良的风道设计，提高散热性能；
   Excellent air duct design to improve heat dissipation performance;
3. 高性能 DSP 控制器，高精度控制；
   High performance DSP controller, high-precision control;
4. 高效的控制算法，降低损耗，提高系统稳定性；
   Efficient control algorithms to reduce losses and improve system stability;
5. 设备输出响应快、纹波小、功率密度高、稳定性高；
   The device has fast output response, small ripple, high power density, and high stability;

※ 更经济（more economical）

1. 支持高品质能量双向流动，节能绿色；

   Supporting high-quality energy bidirectional flow, achieving energy-saving.

2. 智能风扇控制，高效节能；

   Intelligent fan control, efficient and energy-saving.

3. 模块化并联设计，可满足各种定制需求；

   Modular parallel design, which can meet various customization needs.

4. 单通道独立控制。

   Single channel independent control.

3、软件特点（Software Features）

1. 上位机系统软件：界面简洁，图形数据一体化，测试过程直观高效。可以查看操作日志、通道日志、故障日志等，对数据具有全面的监控能力，对电池有多重保护的能力。

   Upper computer system software: Simple interface, integrated graphics and data, intuitive and efficient in testing process. It can view operation logs, channel logs, fault logs, etc. It has comprehensive monitoring capabilities for data and multiple protection for batteries.

2. 软件界面：实时显示电池测试信息，包括电流、电压、容量、时间、状态等信息，使用户对每个通道的工作状态一目了然，并提供方便、快捷的通道控制和操作界面。

   Software interface: Real time display of battery testing information, which includes current, voltage, capacity, time, status, etc., allowing users to have a clear understanding of the working status of each channel at a glance, and providing a convenient and fast channel control and operation interface.

3. 工步编辑：可实现恒流充电、恒压充电、恒功率充电、恒流恒压充电、恒流放电、恒压放电、循环、延时保护等功能。同时可以任意组合各种模式对电池进行充放电，并可手动快速跳转到任意已设定的工步。不同的工步以不同颜色来区分。

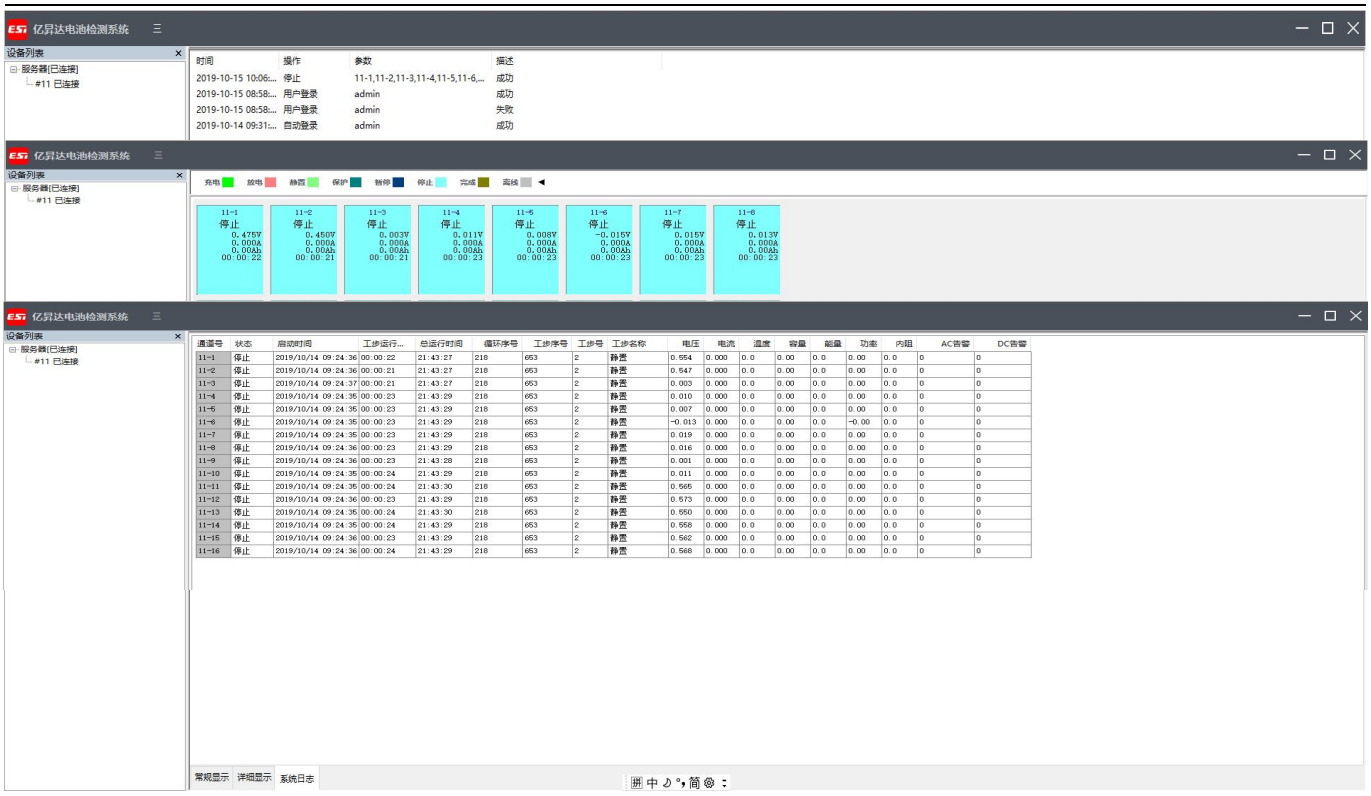
   Step editing: It can achieve functions such as constant current charging, constant voltage charging, constant power charging, constant current constant voltage charging, constant current discharge, constant voltage discharge, cycling, and delay protection. At the same time, various modes can be combined to charge and discharge the battery, and it can manually and quickly jump to any set step. Different steps are distinguished by different colors.

4. BTSDA数据软件：用户可自定义X轴、Y轴，任意组合的曲线展现功能，方便用户分析各种参数的相互关系；数据含循环层、工步层、记录层，多层数据展示，数据观看清晰明了；含工艺文件、通道日志、快速导出Excel格式文件，可全面分析数据。

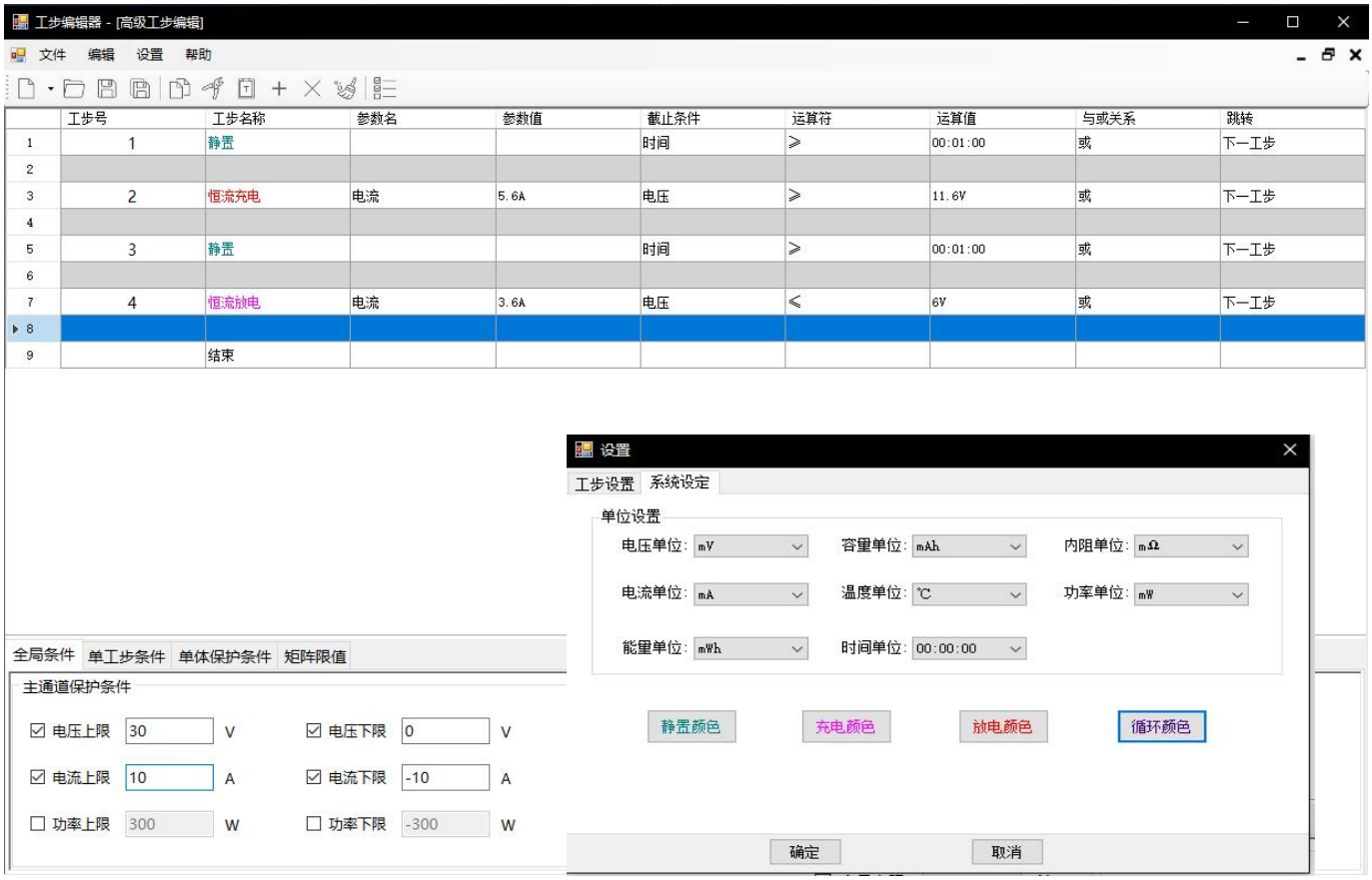
   BTSDA data software: Users can customize the X-axis, Y-axis, and any combination of curve display functions, making it is convenient for users to analyze the interrelationships of various parameters; The data includes a loop layer, a work step layer, and a recording layer, with multiple layers of data display and clear data viewing; It includes process files, channel logs, and quick export of Excel format files, it can comprehensively analyze data.

5. 曲线拟合：具备（充放电电压-容量曲线拟合、电池容量、平台时间(可自定义平台电压范围)、平台容量、DCIR、容量中值电压等）多个条件分选方法，有效提升同级别电池一致性，提高电池组循环寿命。

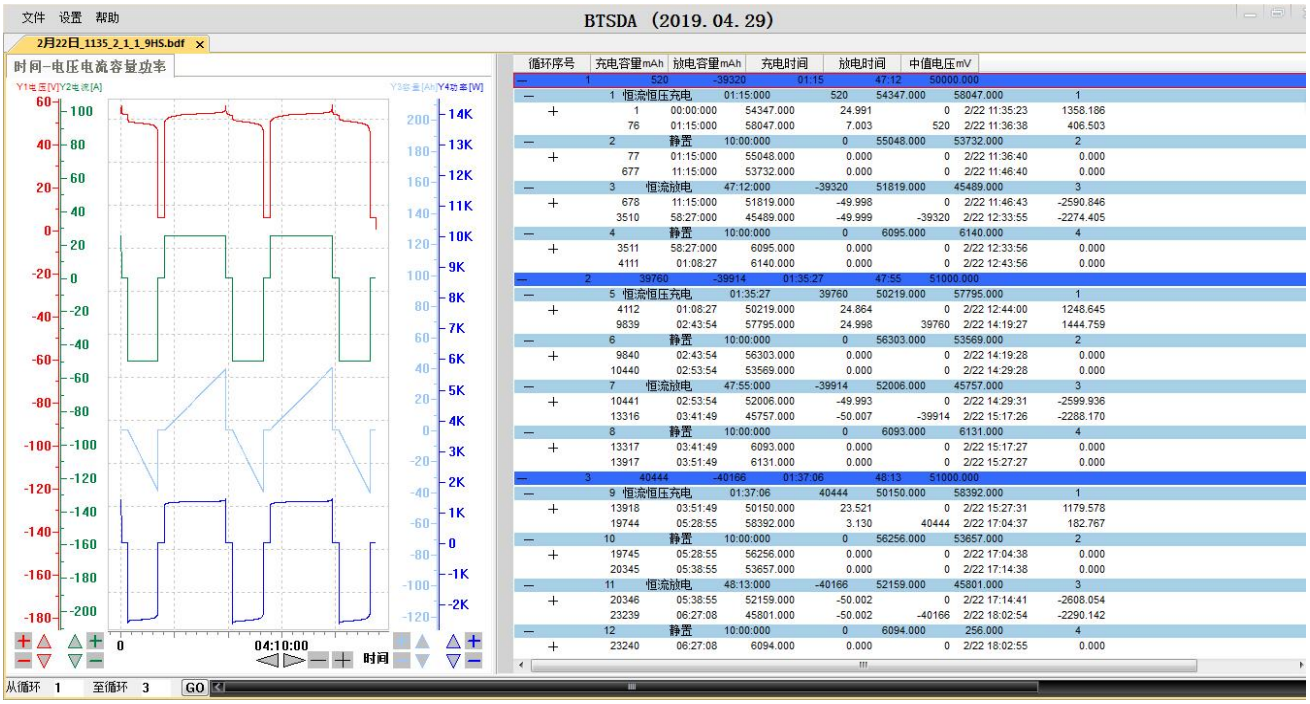
   Curve fitting: With multiple conditional sorting methods such as charging and discharging voltage capacity curve fitting, battery capacity, platform time (customizable platform voltage range), platform capacity, DCIR, capacity median voltage, etc., it effectively improves the consistency of batteries at the same level and improves the cycle life of battery packs.



软件界面（Software Interface）



工步编辑界面（Work step editing interface）



数据信息界面（Data information interface）

4、设备优势 (Equipment Advantages)

1. 能量回馈（最佳效率90%）：能量回馈型，充放电双向节能，大量节约耗电开支，同时节约大量能耗热量所产生的空气调节的电费开支。

Energy feedback (best efficiency 90%): energy return type, charging and discharging two-way energy saving, which save a lot of electricity consumption expenditure, at the same time, it can save a lot of energy consumption heat generated by the air conditioning electricity expenditure.

2. 恒流恒压充电：充电过程无隙过度，无任何电流电压冲击，可有效防止电池因尖峰电流出现热集中导致极耳微短路产生孤岛效应或过充现象引起PCB的保护动作和二次保护动作。

Constant-current and constant-voltage charging: the charging process without gap excess, without any current-voltage impact, which can effectively prevent the battery from the islanding effect caused by the heat concentration of the pole ear micro-short circuit due to the spike current or the overcharging phenomenon causing the PCB's protection action and secondary protection action.

3. 电流电压采样稳定性好，精度高：采用高精度，高动态范围AC/DC单元，采样精度高，长期稳定性好。

Good sampling stability and accuracy of current and voltage sampling: High precision, high dynamic range AC/DC unit, high sampling accuracy, good long-term stability.

4. 用户管理：包括权限管理、角色管理和用户管理三部分，管理者可以对软件功能模块设置管理权限，根据操作者权限要求设置多个用户ID。

User management: it includes rights management, role management and user management, the administrator can set management rights to the software functional modules and set multiple user IDs according to the operator's rights requirements.

5. 动态负载保护：有效保护充放电中的电池，防止电池打火和有效的避免因为连接器松动而引起的电流冲击，有效保护电池和模组的电子组件不被冲击电流损坏。

Dynamic load protection: effectively protects the battery during charging and discharging, prevents the battery from firing and effectively avoids current shocks caused by loose connectors, effectively protects the battery and the electronic components of the module from being damaged by inrush current.

6. 电压钳位保护：充电过程中在电池保护动作或设备异常时，电压钳位在安全电压，防止电池或电池组保护板损坏。

Voltage clamp protection: during the charging process, when the battery protection operates or the equipment is abnormal, the voltage clamp is at a safe voltage to prevent damage to the battery or battery pack protection board.

7. 支持BMS、CAN等通讯功能：实时采集BMS系统的总电压，总电流，单节电压、温度等数据，设置BMS电压电流温度等数据达到一定条件时，主通道步骤停止或转换，具体读取信息由客户提供相关资料。

Support BMS, CAN and other communication functions: real-time collection of BMS system total voltage, total current, single section voltage, temperature and other data, while set the BMS voltage, current, temperature and other data reach to certain conditions, the main channel steps to stop or transition, specific reading information provided by the customer related information.

IV、技术指标（Technical Indicator）

指标项目 Indicator items	指标参数 Indicator parameters	
设备型号 Equipment Model	EST-BT60V20A-04CH	
单机通道数 Number of Single Channel	4CH	
输入电源 Input Power	AC380V±10%　50Hz 三相四线（Three phase four wire）	
充放电功率因数 Charge and Discharge Power Factor	≥99%	
THDi	≤5%	
整机效率 Efficiency	90%	
采样分辨率 Sampling Resolution	AD:24bit	
输入阻抗 Input Impedance	≥1MΩ	
整机功率 Whole Machine Power	满载（Fully loaded）：4.8kW	
AC输入保护 AC Input Protection	防浪涌、防孤岛、过欠频、过欠压、缺相保护、漏电保护、过温保护等 Anti-surge, anti-islanding, high and low frequency, high and low voltage, phase loss protection, leakage protection, over-temperature protection, etc.	
电压 Voltage	输出电压范围 Output Voltage Range	充电 0～60V 放电 5～60V Charge 0～60V　Discharge 5～60V
	精度 Precision	±0.05%FS＋0.05%RD（25℃±10℃）
	分辨率 Resolution	1mV
	采样时间 Sampling time	≤1mS

电流 Current	输出电流范围 Output current range	20mA～20A
	精度 Precision	±0.05%FS＋0.05%RD（25℃±10℃）
	分辨率 Resolution	1mA
	采样时间(S) Sampling time(S)	≤1Ms
	最小截止电流 Minimum cut-off current	20mA
功率 Power	单通道输出功率范围 Single channel output power range	0～1.2KW 持续输出（Continuous output）
	精度 Precision	±0.1%FS
	分辨率 Resolution	1mW
时间 Time	工步时间范围 Work step time range	≤365*24小时（Hours）
	工步时间格式支持 Support for step time format	00：00：00 (h、min、s)
	充放电电流上升时间 Workstep time format support (10%～90%)	≤10ms@单通道（Single Channel）
	充放电转换时间 Charge/discharge conversion time (-90%～90%)	≤20ms@单通道（Single Channel）
数据记录 Data Record	数据记录条件 Data recording conditions	时间（Time）： ΔT 电压（Voltage）： ΔU 电流（Current）： ΔI
	记录频率 Recording frequency	100mS
充放电 Charge and Discharge	充放电模式 Charge and discharge mode	恒电压、恒电流、恒功率、恒流恒压、恒阻、电流脉冲、功率脉冲、直流内阻测试等。 Constant voltage, constant current, constant power, constant current and constant voltage, constant resistance, current pulse, power pulse, DC internal resistance test, etc.
	截止/跳转条件（常规） Cut-off/jumping conditions (General)	具备进行电压、电流、相对时间、容量、温度、充电容量、放电容量等。 It is equipped to carry out voltage, current, relative time, capacity, temperature, charging capacity, discharging capacity, etc.

充放电 Charge and Discharge	**截止/跳转条件 （选配巡检仪或BMS组件） Cut-off/jumping conditions (Optional rover or BMS components)**	**单体总电压、单体最大电压、单体最小电压、单体压差、单体最大温度、单体最小温度、单体温度差、SOC、总电流等。 Monomer total voltage, monomer maximum voltage, monomer minimum voltage, monomer differential voltage, monomer maximum temperature, monomer minimum temperature, monomer differential temperature, SOC, total current, etc.**
循环 Circulation	循环测试范围 Cycle test range	1～65535 次（times）
	单循环工步数 Number of work steps in a single cycle	254 步（Step）
	循环嵌套 Loop nesting	支持 3 层嵌套 Supports 3 levels of nesting
接续功能 Continuous Function	设备可以在暂停、设备重启、设备故障等状况下进行接续 Equipment can be connected in case of pause, equipment restart, equipment failure, etc.	
数据展现方式 Data Presentation	循环层数据 Loop layer data	有循环序号、充电容量、放电容量、充放电效率、充电能量、放电能量、内阻、充电时间、放电时间等 There are cycle number, charging capacity, discharging capacity, charging and discharging efficiency, charging energy, discharging energy, internal resistance, charging time, discharging time, etc.
	工步层数据 Work-step layer data	有工步号、工步名称、工步时间、容量、能量、内阻、起始电压、终止电压、中值电压等。 There are work step number, work step name, work step time, capacity, energy, internal resistance, starting voltage, ending voltage, median voltage, etc.
	记录层数据 （常规） Recording layer data (General)	记录序号、工步序号、循环序号、工步号、工步名称、绝对时间、记录时间、工步时间、电压、电流、温度、容量、能量、功率等。 Recording number, work step number, cycle number, work step number, work step name, absolute time, recording time, work step time, voltage, current, temperature, capacity, energy, power, etc.
	记录层数据 （选配巡检仪或BMS组件） Recording layer data (Optional rover or BMS components)	**单体温度、单体电压、单体最高电压、单体最低电压、单体最高电压位置、单体最低电压位置等。 Monomer temperature, monomer voltage, monomer maximum voltage, monomer minimum voltage, monomer maximum voltage position, monomer minimum voltage position, etc.**

数据记录与保存 Data Recording and Storage	1、系统能够显示并保存温度、总电压、总电流及时间、累计循环次数，并能够计算容量、安时、瓦时、充放电效率等； The system can display and save temperature, total voltage, total current and time, cumulative cycle times, and can calculate capacity, ampere-hours, watt-hours, charge and discharge efficiency, etc; 2、数据记录表包含绝对时间，工步时间，电压，电流，温度，实际容量，内阻，能量等； Data record table contains absolute time, work step time, voltage, current, temperature, actual capacity, internal resistance, energy, etc; 3、数据记录表应能单独生成程序工步开始、跳转、结束等时刻的时间、电压、电流、温度、阶段容量等信息； The data record table should be able to generate information on time, voltage, current, temperature, stage capacity, etc. the beginning, jump and end of the program work step separately; 4、电流放电过程中的数据显示为负值，充电过程中的数据显示为正值；设备每个通道的测试数据可单独保存或查看，充电、放电及暂停等工艺步骤标应能以不同颜色或其他形式区分； The data during current discharge is displayed as a negative value, and the data during charging is displayed as a positive value; the test data of each channel of the equipment can be saved or viewed separately, and the process step markers such as charging, discharging and pausing should be able to be distinguished in different colors or other forms; 5、同一个项目数据保存时，所有数据可一次性保存在一个文件中； When the same project data preservation, all data can be saved in one file at one time; 6、具有历史数据查询功能，按照时间段、项目名称等实现数据查询。 With historical data query function, according to the time period, project name, etc. to achieve data query.	
工况模拟工步 Work Condition Simulation Work Step	充放电模式 Charge and discharge mode	电流、功率 Current, power
	切换 Switching	支持充放电连续切换 Supports continuous switching of charge and discharge
	截止条件 Cut-off conditions	时间、行号 Time, line number
	下载数据量 Download data volume	最大支持300万行工况下载 Support up to 3 million lines of work download
脉冲工步 Pulse Work Step	充放电模式 Charge and discharge mode	电流、功率 Current, power
	最小脉冲宽度 Minimum pulse width	100ms
	脉冲个数 Number of pulses	单个脉冲工步可支持32个不同的脉冲 Supports up to 32 different pulses in a single pulse work step
	充放电连续切换 Continuous switching of charge and discharge	一个脉冲工步可实现从充电到放电的连续切换 Continuous switching from charging to discharging in one pulse work step
	截止条件 Cut-off conditions	电压、相对时间 Voltage, relative time

DCIR直流内阻测试 DCIR	支持自定义取点进行DCIR的计算 Support custom fetch points for DCIR calculation	
测试工艺编辑功能 Test Process Editing Function	可按用户要求对工艺进行删除、插入等。 Processes can be deleted, inserted, etc. according to the user's requirements.	
曲线种类 Types of Curves	X 坐标：时间、电压、电流、容量 X-coordinate: time, voltage, current, capacity	
	Y 坐标：电压、电流、容量 Y-coordinate: voltage, current, capacity	
数据输出方式 Data Output Method	EXCEL、图表 EXCEL, charts and graphs	
数据库 Database	采用MySQL 数据库集中管理测试数据 Centralized test data management using MySQL database	
保护 Protection	主机保护 Host Protection	输出短路保护功能、反接保护 Output short circuit protection function, reverse connection protection
		自检保护（过温、风扇故障状态检测保护、具备MOS管失效（击穿、短路等）保护，并保证MOS管异常时通道无电流输出、设备和电池电压软启动保护） Self-test protection (over-temperature, fan failure status detection protection, with MOS tube failure (breakdown, short circuit, etc.) protection, and to ensure that the MOS tube abnormal channel no current output, equipment and battery voltage soft-start protection)
		可设定安全保护条件，设置参数包括：总压上限、主电压下限、单体电压上限、单体电压下限、电流上限、电流下限、延时时间、容量上下限、功率上限下限、温度上下限等 Safety protection conditions can be set, setting parameters includes: total voltage upper limit, main voltage lower limit, individual voltage upper limit, individual voltage lower limit, current upper limit, current lower limit, delay time, capacity upper and lower limits, power upper and lower limits, temperature upper and lower limits, etc.
	超规格保护 Over-specification protection	电压保护超设备规格和超过样品规格进行提示告警 Voltage protection over equipment specifications and over sample specifications for prompt alarms
	保护设置 Protection settings	跳转、告警保护条件设置错误、未设置保护 Jump, alarm protection conditions are set incorrectly, no protection is set
	急停保护 Emergency stop protection	在紧急异常情况下，急停按钮可以实现对设备紧急停机 In case of emergency, the emergency stop button can realize the emergency stop of the equipment.

保护 Protection	掉电数据保护 Power down data protection	断电后，电池与设备之间自动断开，有效避免因重新上电造成意外，同时保存断点数据，来电后可续接工艺运行； Automatic disconnection between the battery and the equipment after power failure, effectively avoiding accidents caused by re-powering, at the same time, the data of break point would be saved and renewing the process operation after the incoming call;
	趋势保护 Trend Protection	具备电压、电流超差保护，电压趋势异常保护，电压波动保护； With voltage and current over-difference protection, voltage trend abnormal protection, voltage fluctuation protection;
	输出保护 Output Protection	过流、过温、过压、欠压等保护； The protection of over-current, over-temperature, over-voltage and under-voltage protection;
	通讯保护 Communication protection	中位机和下位机、电压温度辅助通道板具备应答校验通讯保护、生命帧保护功能；具备通讯中断、丢包、无码保护；具备上位机/中位机/电脑/网线等异常保护。 Mid-level computer and lower level computer, voltage and temperature auxiliary channel board with answer-check communication protection, life frame protection; with communication interruption, packet loss, no code protection; with abnormal protection for upper computer/medium computer/computer/network cable, etc.
	程序保护 Program Protection	中位机/上位机必须具备程序卡死（部分卡死或整体卡死）等异常状况保护； 实时监控设备软件程序运行线程状态和保护功能。软件各模块（子程序）或线程之间具备状态监测和异常保护功能。 The mid/upper computer must have protection against abnormal conditions such as program jamming (partial jamming or overall jamming); Real-time monitoring of the state and protect functions of the running threads of the equipment software program. Software modules (subroutines) or threads have status monitoring and abnormal protection functions between them.
	确认修改保护 Confirm modification protection	电压（辅助电压或主电压）保护条件未设置或未更新确认，进行提醒保护和流程无法发起保护。 Voltage (auxiliary voltage or main voltage) protection conditions are not set or not updated to confirm for reminder protection and process cannot initiate protection.

保护 Protection	采样线和电流线反接保护 Sampling line and current line reverse connection protection	单通道电压线防反接、单通道电流线防反接、通道间电压线防反接、通道间电流线防反接； Single-channel voltage line anti-reverse connection, single-channel current line anti-reverse connection, inter-channel voltage line anti-reverse connection, inter-channel current line anti-reverse connection.
	电压钳位保护 Voltage clamp protection	在充电过程中，当电池保护板主动分断时，设备端输出电压钳位功能生效，确保输出电压尖峰小于等于10V During the charging process, when the battery protection plate is actively disconnected, the output voltage clamp function at the device side takes effect to ensure that the output voltage spike is less than or equal to 10V.
	电压跳变保护 Voltage jump protection	具备充放电或搁置途中电压突变保护；具备运行模式转换（搁置转充电、搁置转放电）跳转电压突变保护，充电时电压下降，放电时电压上升保护。 With sudden voltage change protection during charging and discharging or shelving; with sudden voltage change protection for jumping during operation mode conversion (shelving to charging, shelving to discharging), voltage drop during charging and voltage rise during discharging.
	断线保护 Disconnection protection	设备具备电压线、电流线断线异常保护 Equipment with voltage line, current line breakage abnormal protection
	绝缘保护 Insulation protection	设备内部高压铜排、端子、接线排绝缘保护 Equipment internal high-voltage copper row, terminal, terminal row insulation protection
特点 Features	隔离方式 Isolation method	高频隔离（High frequency isolation）
	冷却方式 Cooling method	强制风冷（Forced air cooling）
	通道特点 Channel Features	恒流源与恒压源采用独立双闭环结构 Constant current source and constant voltage source adopt independent double closed-loop structure
	是否支持扫码 Whether to support sweep code	支持（Support）
	是否支持通道并联 Whether to support parallel connection of channels	支持（Support）
	通道控制模式 Channel control mode	独立控制（Independent control）
	电压电流检测采样 Voltage and current detection sampling	四线制连接（Four-wire connection）
模块均流度 Module Average Flow Rate	＜5%	

重量 Weight	＜380KG
设备尺寸 Equipment Size	宽（L）×深（W）×高（H）/MM：740×710×1150
防护等级 Protection Level	IP20
认证要求 Certification Requirements	CE EN 62477-1:2012　　IEC 62477-1:2012 + AMD1:2016
噪声（Noise）	＜75dB
上位机通讯方式 Upper Computer Communication Method	基于TCP/IP 协议（Based on TCP/IP protocol）
工作温度 Operating Temperature	0℃～40℃
湿度 Humidity	＜95% 无凝露（No condensation）
海拔 Elevation	＜3000M
夹具形式 Clamp Form	鳄鱼夹（Alligator clip）
通道输出方式 Channel Output Method	分口模式（Channel branching）

V、配件清单（Parts List）

序号 Serial number	标配 Standard	单位 Unit	数量 Quantity
1	智能回馈型电池老化设备 Intelligent Feed-Back Type Battery Aging Equipment	PCS	1
2	亿昇达电池检测系统软件　软件著作权登记号:2018SR128569 Yi Sheng Da Battery Testing System Software Software Copyright Registration Number:2018SR128569	PCS	1
3	通道线 2×0.5mm²＋2×6mm²×3m＋鳄鱼夹 Channel Lines 2×0.5mm²＋2×6mm²×3m＋Alligator Clip	PCS	4
4	出货测试报告（Shipping Test Report）	PCS	1
5	用户手册/设备接线图（User Manuals/Equipment Wiring Diagrams）	PCS	1
6	出货清单（Shipping List）	PCS	1
7	合格证（Certificate of Conformity）	PCS	1
8	电源线：电源线标准：3×6mm²＋2.5mm² Power Lind：Power cord standards: 3×6mm² +2.5mm²	M	5
9	网线（Network Cable）	M	5

VI、易损件清单（List of vulnerable）

易损件名称 Name of wearing parts	参数 Parameters	特记事项 Special Notes
通道线 Channel Lines	参考配件清单 Reference accessories list	不在保修范围内 Not covered by warranty
鳄鱼夹 Alligator Clip		

VII、选配项目清单（List of optional items）

选配项目 Optional items	以下功能为选配功能 细则 The following functions are optional Specifications	
扩展通讯 Extended Communication	支持巡检仪通讯，BMS系统和通讯，单台最大16CH。 通讯方式：485/CAN。支持DBC协议。 Support inspector communication, BMS system and communication, single unit maximum 16CH. communication mode: 485/CAN. support DBC protocol.	
可选夹具 Optional Fixture	OT端子（OT terminal）M6、M8、M10	
可选通道模式 Optional Channel Mode	同口模式（Same channel）	
温度辅助通道 Temperature Auxiliary Channel	温度范围（Temperature range）	-40～120℃
	温度精度（Temperature accuracy）	±1℃
	温度分辨率（Temperature resolution）	0.1℃
	通道数（Number of channels）	12
电压辅助通道 Voltage Auxiliary Channel	电压范围（Voltage Range）	1～6V
	电压精度（Voltage accuracy）	±0.1%FS
	电压分辨率（Voltage Resolution）	1mV
	通道数（Number of channels）	24

VIII、客户需准备的物品（Items to be prepared by customers）

序号 Serial number	名称 Name	参数 Parameters	单位 Unit	数量 Quantity	备注 Remarks
1	电脑 Computer	1、Intel主频2.4G以上，双核处理器的计算机； Intel main frequency of 2.4G or more, dual-core processor computer; 2、4G以上内存； more than 4G memory; 3、500GB以上硬盘空间； more than 500GB of hard disk space; 4、电脑系统要求：WIN7以上64位操作系统； computer system requirements: win7 and above 64-bit operating system; 5、软件对系统环境依赖性较强，建议联网将系统补丁补全 (Microsoft Visual C++ 2015) the software is highly dependent on the system environment, it is recommended that the network will be fully patched system. (Microsoft Visual C++ 2015)	PCS	1	不可与其他有数据库的软件共用 Cannot be shared with other software that has a database
2	配电开关 Power Distribution	电源开关电压：大于380V 三相四线 Power switch voltage: greater than 380V three-phase four-wire 推荐电源开关：D型-32A-3P 空气开关 Recommended power switch: D-32A-3P Air Switch	PCS	1	每台设备一个 One per device

IX、设备安装和培训（Equipment installation and training）

1、现场环境确认（confirmation of on-site environmental）

1. 确认设备放置场地（至少设备前后和墙壁相隔0.5米。要求地面平整）
   Confirm the equipment placement site (at least the front and back of the equipment and walls are separated by 0.5M, requiring a flat floor)
2. 确认电梯高度
   Confirm the height of elevator.
3. 确认配电开关规格（每台设备对应一个配电开关）
   Confirm distribution switch specifications (one distribution switch for one device)

2、安装流程（Installation Process）

1. 对设备进行配电、网线安装

   Power distribution and network cable installation for equipment

2. 对后台软件进行安装

   Install backend software

3. 通电试运

   Power on test the equipment whether can running

3、培训（Training）

通过培训使操作者掌握设备基本工作要求：

Train operators to master the basic working requirements of the equipment:

1. 具有对设备软件进行安装和卸载的能力

   Possess the ability to install and uninstall device software

2. 具有对设备进行维护的能力

   Possess the ability to maintain the equipment

3. 具有对设备常见故障有排除的能力

   Possess the ability to troubleshoot common equipment faults

4. 具有对设备软件进行操作和使用的能力

   Possess the ability to operate and use device software

4、售后服务（After Sales Service）

1. 从验收签字之日起，供方对设备整机免费保修时间为__壹__年。

   From the date of acceptance and signature, the supplier's free warranty time for the whole machine is **one** year.

2. 免费保修期内，供方免费安排技术人员上门回访和设备检查。

   During the free warranty period, the supplier will arrange free visits and equipment inspections by technicians.

3. 对于需方提出的技术问题，应在 2 小时内响应，需要现场技术支持的 48 小时内到场。

   For technical issues raised by the demander, they should respond within 2 hours and be present within 48 hours of on-site technical support.

4. 在免费保修期间，如由于需方违反用户手册要求操作，或设备到厂后所发生的自然灾害或人为操作失误造成设备损坏，需方承担维修成本。

   During the free warranty period, if the equipment is damaged due to the demander's violation of the user manual requirements, or natural disasters or human operation errors that occur after the equipment arrives at the factory, the demander shall bear the repair cost.

X、质量保证（Quality Assurance）

免责声明（Disclaimers）

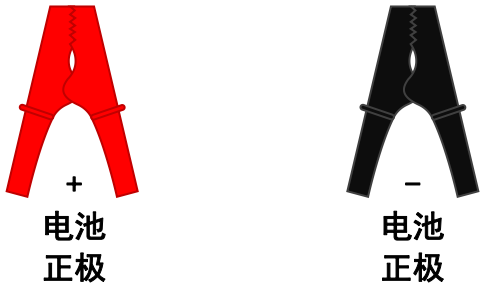
首先感谢您对广东亿昇达科技有限公司的信任并选用本公司的产品，为了保障您的权益，请您在购买本产品前，务必认真仔细的阅读规格书，以下情况出现，本公司不进行质量保证。

Firstly, thank you for your trust in Guangdong Yi Sheng Da Technology Co., Ltd. and for choosing our products. In order to protect your rights and interests, please carefully read the specifications before purchasing this product. In the following cases, our company does not provide quality assurance.

1. 未按照用户手册来操作，不正确的工作环境或错误安装，本公司不承担任何责任。
   We are not responsible for failure to operate in accordance with the user's manual, incorrect working environment or incorrect installation.
2. 设备运行期间，工作人员擅自离开，导致的一切损失和事故，本公司不承担民事及相关连带责任。
   During the operation of the equipment, our company shall not be liable for any losses or accidents caused by the unauthorized departure of personnel.
3. 使用者由操作不当导致设备人为损坏（操作失误、划伤、搬运、磕碰、接入不合适电压）造成的任何故障或损害，本公司不负任何责任。
   Our company shall not be responsible for any malfunction or damage caused by improper operation of the equipment by the user(including operational errors, scratches, handling, collisions, or improper voltage connection).
4. 购买后擅自拆卸设备、撕毁防撕标签、对设备更换未配套及未经认可的部件，质保失效且本公司不承担任何责任。
   Unauthorized disassembly of equipment, tearing of tear resistant labels, or replacement of equipment with unmatched or unapproved components after purchase will void the warranty and our company will not assume any responsibility.
5. 设备和测量仪器等易耗品超出使用寿命造成的问题，本公司不承担任何责任。
   We will not be responsible for problems caused by consumables such as equipment and measuring instruments that have exceeded their useful life.
6. 使用者提供的动力设施对设备产生的负面影响造成的问题，本公司不承担任何责任。
   We are not responsible for any problems caused by the negative effects of the power facilities provided by the user on the equipment.
7. 由灾害、战争、异常天气或其他不可抗力造成的问题，本公司不承担任何责任。
   We are not responsible for problems caused by disasters, war, unusual weather or other force majeure.
8. 使用者对设备维护不当，将设备放在过冷、过热、恶劣的环境中，造成的问题，本公司不承担任何责任。
   We will not be responsible for any problems caused by improper maintenance of the equipment by the user, placing the equipment in too cold, too hot or harsh environment.
9. 设备使用中，夹具需接到正确的极性端子，并保持接触良好，因夹具连接错误或未接触好，导致电池短路、损毁，本公司不承担任何责任。
   During the use of the equipment, the fixture must be connected to the correct polarity terminal and maintained in good contact. Our company does not assume any responsibility for battery short circuits or damage caused by incorrect or incomplete connection of the fixture.

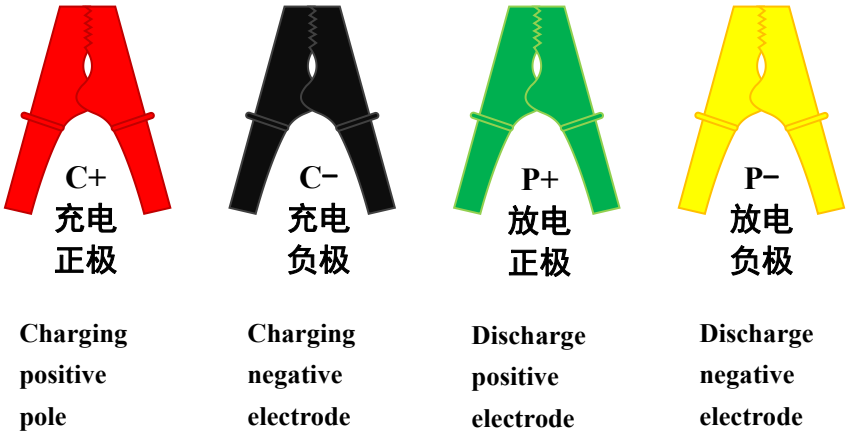
① 同口模式设备：红色接电池正极、黑色接电池负极。

Same channel equipment：red connects to the positive battery terminal, black connects to the negative battery terminal.



② 分口模式设备：红色C+接电池充电正极、绿色P+接电池放电正极、黑色C−接电池充电负极、黄色P−接电池放电负极。

Channel branching equipment: red C+connected to battery charging positive pole, green P+connected to battery discharge positive pole, black C - connected to battery charging negative pole, yellow P - connected to battery discharge negative pole.



XI、验收（Check and Accept）

1. 乙方必须在交货之前对设备的质量、规格、性能进行全面的检验，并签发质量证明书，证明设备符合合同规定。此证明书不作为设备质量、规格、性能的最后依据，乙方必须将检验结果的书面报告附在质量证明书内；

Party B must conduct a comprehensive inspection of the quality, specifications and performance of the equipment before delivery and issue a quality certificate to prove that the equipment conforms to the provisions of the contract. This certificate is not the final basis for the quality, specifications and performance of the equipment, and Party B must attach the written report of the inspection results to the quality certificate;

2. 本合同下设备在甲方安装现场全部安装、调试完成以后，试运行10个工作日。

After the equipment under this contract is fully installed and debugged on the installation site of Party A, it shall be put into trial operation for 10 working days.

3. 在验收过程中如果发现设备的数量、质量、规格、性能等与国家相关标准、合同规定（包括附件）不符或设备在质保期内被证明有缺陷，包括内在缺陷，甲方有权按照合同所约定的赔偿方式向乙方索赔；

If during the acceptance process, it is found that the quantity, quality, specifications, performance, etc. of the equipment do not comply with relevant national standards and contract provisions (including attachments), or if the equipment is proven to have defects, including internal defects, during the warranty period, Party A has the right to claim compensation from Party B in accordance with the compensation method stipulated in the contract.

4. 验收内容包括但不限于以下：外观检查、供货清单的确认、技术资料及相关技术文件的检查与移交、设备的基本功能与主要技术参数的验证；

The acceptance content includes but is not limited to the following: appearance inspection, confirmation of supply list, inspection and handover of technical data and related technical documents, verification of basic functions and main technical parameters of equipment;

XII、其他条款（Other Terms）

1. 如客户有与本方案不同意见及特殊的技术要求，双方可进一步协商。

If the customer has different opinions and special technical requirements from this program, both parties can further negotiate.

2. 本协议经双方签字盖章之日起生效，本协议一式两份，甲乙双方各执一份，具有同等效力。

This agreement shall take effect on the date of signature and seal of both parties, and this agreement shall be in two copies, one for each of A and B, with equal effect.

3. 本协议作为《设备采购合同》附件，为《设备采购合同》不可分割的一部分。

This Agreement is attached to the Equipment Purchase Contract and it is an integral part of the Equipment Purchase Contract.

XIII、联系我们（Contact Us）

如客户有与本方案不同意见及特殊的技术要求，双方可进一步协商。

If the customer has different opinions and special technical requirements from this program, both parties can further negotiate.

特别注明：上述规格简介如有更改恕不另行通知，英文版仅供参考，签订内容以中文为准，本书内容最终解释权属**广东亿昇达科技有限公司**

Special note: The above specifications are subject to change without prior notice. The English version is for production reference only, and the signed content is subject to the Chinese version. The final interpretation of the content of this book belongs to **Guangdong Yishengda Technology Co., Ltd.**

需方 Demander		供方 Supplier	广东亿昇达科技有限公司
公司地址 Company Address		公司地址 Company Address	东莞市塘厦镇 沙湖新苑南路1号
法定代表人签章 Legal representative's signature		法定代表人签章 Legal representative's signature	
联系方式 Contact information		联系方式 Contact information	
联系人 Contact person		联系人 Contact person	

客 户 需 求 单 V3.5

Customer request form

订 单 日 期（Order date）：　　*必填项（Required）

客户信息（Customer）				
*公司名称 Corporate name			*联系人/职务 Contacts/duties	
邮箱 Mailbox			*联系电话 Telephone	
*公司地址 Company Address				
*设备类型（Device Type）	EST-BT60V20A-04CH			
*出货数量（Shipment quantity）	____台（Tower）			
类型（Types of）	配置清单（Configuration List）			
出售类型（Sales type）	出货（Shipment）			
客户需求交货日期 Customer demand delivery date				
输入电源（Input power supply）	AC380V±10% 50Hz 三相四线（Three-phase four-wire）			

	项目名称（Entry name）	常规配置 conventional arrangement	选配配置 Optional configuration
设备信息 Device Information	电源线长度（AC power cord length）	☑ 5米（M）	☐ 其他（Other）：
	网线长度（Network cable）	☑ 5米（M）	☐ 其他（Other）：
	通道输出方式 Channel output mode	☐ 分口方式（Channel branching）	☑ 同口方式（Same channel）
	通道线长度（Channel line length）	☑ 3米（M）	☐ 其他（Other）：
	夹具（Clamp）	☑ 鳄鱼夹（Alligator Clip）	☐ OT端子（OT terminal）：M8
	电压辅助通道 Voltage auxiliary channel	☑ 无（Not have）	☐ 有（Have）
	BMS通讯 BMS communication	☑ 无（Not have）	☐ RS485接口和CAN接口（RS485 and CAN）
	温度辅助通道 Temperature auxiliary channel	☐ 无（Not have）	☑ 有（Have）
出货信息 Shipping information	出货地区（Shipping region）	国内（Domestic）	
	包装需求（Packaging requirements）	标准机（Standard machine）	
	出货方式（Shipping method）	陆运（land transportation）	

设备其他需求 Other equipment requirements	中文（Chinese）	英文（English）
	1、电源线长度：5米 2、网线长度：5米 3、通道输出方式：同口方式 4、通道线长度：3米 5、夹具：鳄鱼夹 6、电压辅助通道：无 7、BMS通讯：无 8、温度辅助通道：有 9、其他需求：无	1、AC power cord length：5M 2、Network cable：5M 3、Channel output mode：Same channel 4、Channel line length：3M 5、Clamp：Alligator Clip 6、Voltage auxiliary channel：Not have 7、BMS communication：Not have 8、Temperature auxiliary channel：have 9、Other requirements：Not have

*需求跟单人签字（Require signature from individual）：　　客户签字（Customer signature）：

签字日期（Signature Date）：　　签字日期（Signature Date）：