Battery Charge/Discharge Device and Systems

YRD series

Today, we use a range of both big and small batteries, from lithium-ion batteries in cell phones and notebook computers, to the batteries used in hybrid cars. In the development of battery-powered devices, obtaining basic data such as battery durability is essential for verifying the reliability of products. It used to be the case that in order to build such a system, it was necessary to provide a battery charge/recharge device (since there were no high-capacity products available, the power supply and load had to be furnished separately), a data logger, and accompanying software for controlling this equipment. From a time and cost perspective, this was impractical. In response to this, YAMABISHI developed a new battery charge/discharge device designed specifically for charging and discharging equipped with a dedicated data logger and software. This product is ideal for reducing the time required for developing battery-powered products.

现今，从手机，笔记本电脑使用的锂离子电池到混合动力车所使用的电池，大大小小的所有电池都在被广泛利用。在开发这些电池应用机器时，为了检验应用产品的可靠性，必须获得内置电池的耐久性能等基础数据。但是，以前在构建这样一个系统时，需要准备充放电装置（因为没有大容量的产品，所以要准备各种电源，负载），数据记录器及管理这些设备的软件，所以从时间和成本方面来说比较困难。这次，YAMABISHI新开发出了特别适用于电池充放电的充放电装置，同时还准备了专用的数据记录器及软件。请一定利用此产品，缩短电池应用产品的开发时间。
Battery charge and discharge device (series regulator) YRD-ATX/TX series
电池充放电装置（串联型稳压方式）YRD-ATX/TX系列

Feature 特长

- High precision and high speed
  Uses a dropper system for high-precision, high-speed load changing. Also maintains low voltage and current ripples.
  高精度，高速度响应。
  采用连续给定方式，对于负荷变动能作出高精度，高速响应，并且能将电压，电流波动控制到很小。

- Low Noise
  Switching is unnecessary, so no emission noise is generated.
  低噪音。
  因为不进行整流，所以不会发出辐射噪音。

- Charge/Discharge devices of different capacities can be combined.
  Setting Charge device of small capacity can be lowering in cost.
  充电与放电可设定为不同容量。充电端设定小容量降低成本。

- Interface (Ethernet/CAN)
  An Ethernet communication interface has been implemented, and can be automatically operated from an external PC. By mounting a CAN (Control Area Network) interface, the auto industry standard, internal data can be collected and logged in blocks from the battery controlling the CAN interface.
  通过通信界面，设备有以太网接口，可以在外部的PC控制下自动运作，并且，装有汽车业界标准的CAN（Control Area Network）界面，还可以所管理的CAN界面电池中收集内部信息，并进行统一同步。

Battery charge/discharge device (regenerative inverter system) YRD-IX series
充放电装置（电力再生变换器方式）YRD-IX系列

Feature 特长

- Compact, highly efficient
  By implementing an inverter system, we were able to achieve a charge/discharge device that is not only compact, but also highly efficient (with a charge time of 85%). The regeneration of electrical power during loading creates an environmentally friendly system that uses energy efficiently.
  小型，高效。
  利用变换器方式实现了小型，高效（充电时 85%）。并且，通过加有负载时再生电力，实现了节能，环保的系统。

- A diverse range of control modes
  The charge/discharge device supports constant current charge/discharge, constant voltage charge/discharge, constant power charge/discharge, constant resistance, dischage and pulse modes.
  多样多彩的控制模式。
  可进行固定电流 充电 / 放电，固定电压 充电 / 放电。固定电力 充电 / 放电，固定电阻，放电，脉冲模式。

- High-speed responsiveness
  Using an optimized control circuit, we achieved high-speed responsiveness for our regenerative inverter system (10 msec charge/discharge; 10 msec transient response). (Even higher-speed responsiveness is possible.)
  实现了高速响应。
  通过控制电路的最佳化，作为电力再生变换器方式，实现了高速响应（充电 - 放电 3msec / 放电过量响应 5msec）。还可制定具有更高响应速度的充电装置。

- Interface (Ethernet/CAN)
  An Ethernet communication interface has been implemented, and can be automatically operated using an external PC. By mounting a CAN (Control Area Network) interface, the auto industry standard, internal data can be collected and logged in blocks from the battery controlling the CAN interface.
  通过通信界面，装有以太网接口，可以在外部的PC控制下自动运作，并且，装备有汽车业界标准的CAN（Control Area Network）界面，还可以所管理的CAN界面电池中收集内部信息，并进行统一同步。

- Local operation (touch panel/jog dial)
  Mounted with Yamabishi’s common touch panel and job dial for charge/discharge devices. Using these, low-capacity bench use charge/discharge tests can be performed without a PC. Moreover, screens can be added for controls that are required as part of user test systems using the customization options (such as conductor ON/OFF).
  本机操作（触控控制面板，设施功能键）。
  装备有YAMABISHI充电放电装置通用的触控控制面板与设施功能键。可以将其作为小容量的座充，用来进行无PC的充电放电试验，并且，可通过自定义添加窗口，来控制试验系统所必需的机器（例如：接触器的打开（ON）/（OFF））。

- Customized products
  Standard
  可选制造用户定制品。
  除了标准产品以外，还可以制造根据客户指定的容量制造产品。
Battery Charge/Discharge Device and Systems

YRD series

Specifications

Battery Charge・Discharge System / Transistor Type & Pre-Regulator Type

<table>
<thead>
<tr>
<th>Model</th>
<th>100-5ATX</th>
<th>100-10ATX</th>
<th>200-10ATX</th>
<th>300-10ATX</th>
<th>5ATX</th>
<th>10ATX</th>
<th>20ATX</th>
<th>30ATX</th>
<th>50ATX</th>
<th>60ATX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max Capacity</td>
<td>All Transistor Type</td>
<td>Pre-Regulator Type</td>
<td>500W</td>
<td>1kW</td>
<td>2kW</td>
<td>3kW</td>
<td>5kW</td>
<td>10kW</td>
<td>20kW</td>
<td>30kW</td>
</tr>
<tr>
<td>Operation Mode</td>
<td>Charge</td>
<td>Discharge</td>
<td>CV CC CP</td>
<td>CC CP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage Setting Range</td>
<td>Charge</td>
<td>Discharge</td>
<td>0-100V</td>
<td>0-100V</td>
<td>0-200V</td>
<td>0-300V</td>
<td>0-250V</td>
<td>0-250V</td>
<td>0-400V</td>
<td>0-500V</td>
</tr>
<tr>
<td>Constant Voltage Range</td>
<td>Charge</td>
<td>Discharge</td>
<td>10-100V</td>
<td>20-200V</td>
<td>30-300V</td>
<td>25-250V</td>
<td>25-250V</td>
<td>40-400V</td>
<td>50-500V</td>
<td>60-600V</td>
</tr>
<tr>
<td>Voltage Accuracy</td>
<td>Charge</td>
<td>Discharge</td>
<td>Input Fluctuation</td>
<td>0.1%±30mV</td>
<td>0.1%±30mV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ripple</td>
<td></td>
<td></td>
<td>Output Fluctuation</td>
<td>0.1%rms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transient Response</td>
<td></td>
<td></td>
<td>less than 1msec.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current Setting Range</td>
<td>Charge</td>
<td>Discharge</td>
<td>0-5A</td>
<td>0-10A</td>
<td>0-10A</td>
<td>0-10A</td>
<td>0-20A</td>
<td>0-40A</td>
<td>0-50A</td>
<td>0-60A</td>
</tr>
<tr>
<td>Constant Current Range</td>
<td>Charge</td>
<td>Discharge</td>
<td>0.5-5A</td>
<td>0-10A</td>
<td>0-10A</td>
<td>0-10A</td>
<td>0-20A</td>
<td>0-40A</td>
<td>0-50A</td>
<td>0-60A</td>
</tr>
<tr>
<td>Current Accuracy</td>
<td>Charge</td>
<td>Discharge</td>
<td>0.1±10mA</td>
<td>0.1±10mA</td>
<td>0.1±10mA</td>
<td>0.1±10mA</td>
<td>0.1±10mA</td>
<td>0.1±10mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interface</td>
<td>Ethernet/CAN/UDP/USB-232C Option</td>
<td>CAN/USB-232C Option</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

充电电源装置

电池充放电装置, 全晶体贯式, 前置调节器
### Battery Charge / Discharging System -Re-Generating Type 电池充放电装置，电力再生变换器方式

<table>
<thead>
<tr>
<th>model 型号</th>
<th>YRD-</th>
</tr>
</thead>
<tbody>
<tr>
<td>50KX</td>
<td>50K</td>
</tr>
<tr>
<td>75KX</td>
<td>75K</td>
</tr>
<tr>
<td>100KX</td>
<td>100K</td>
</tr>
<tr>
<td>200KX</td>
<td>200K</td>
</tr>
<tr>
<td>300KX</td>
<td>300K</td>
</tr>
</tbody>
</table>

#### Operation Mode 操作模式
- **Charge 充电**
  - fixed voltage, fixed current, fixed duty 固定电压，固定电流，固定电能
  - CV CC CP

- **Discharge 放电**
  - fixed voltage, fixed current, fixed duty 固定电压，固定电流，固定电能
  - CV CC CP

#### Efficiency 效率
<table>
<thead>
<tr>
<th></th>
<th>Charge 充电</th>
<th>Discharge 放电</th>
</tr>
</thead>
<tbody>
<tr>
<td>50KX</td>
<td>over 85%</td>
<td>over 5%</td>
</tr>
<tr>
<td>75KX</td>
<td>over 85%</td>
<td>over 5%</td>
</tr>
<tr>
<td>100KX</td>
<td>over 85%</td>
<td>over 5%</td>
</tr>
<tr>
<td>200KX</td>
<td>over 85%</td>
<td>over 5%</td>
</tr>
<tr>
<td>300KX</td>
<td>over 85%</td>
<td>over 5%</td>
</tr>
</tbody>
</table>

#### Power Factor 功率因数
<table>
<thead>
<tr>
<th></th>
<th>Charge 充电</th>
<th>Discharge 放电</th>
</tr>
</thead>
<tbody>
<tr>
<td>50KX</td>
<td>over 95%</td>
<td>over 95%</td>
</tr>
<tr>
<td>75KX</td>
<td>over 95%</td>
<td>over 95%</td>
</tr>
<tr>
<td>100KX</td>
<td>over 95%</td>
<td>over 95%</td>
</tr>
<tr>
<td>200KX</td>
<td>over 95%</td>
<td>over 95%</td>
</tr>
<tr>
<td>300KX</td>
<td>over 95%</td>
<td>over 95%</td>
</tr>
</tbody>
</table>

#### Voltage Setting Range 电压设定范围
- **Charge 充电**
  - 0-50V or 0-100V or 0-200V or 0-300V or 0-400V or 0-500V or 0-600V*1

- **Discharge 放电**
  - 0-50V or 0-100V or 0-200V or 0-300V or 0-400V or 0-500V or 0-600V*1

#### Voltage Accuracy 电压精度
<table>
<thead>
<tr>
<th>Charge 充电</th>
<th>Discharge 放电</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Fluctuation 输入波动</td>
<td>±0.5%</td>
</tr>
<tr>
<td>Load Fluctuation 负载波动</td>
<td>±0.5%</td>
</tr>
</tbody>
</table>

#### Voltage Ripple 电压纹波
- 0.2%rms(at FS)

#### Transient Response 过渡响应
- under 10msec.
- 少于 0.01秒

#### Charge/Discharge Switching Time 充放电切换时间
- under 10msec.*2
- 少于 0.01秒

#### Current Setting Range 电流设定范围
<table>
<thead>
<tr>
<th>Charge 充电</th>
<th>Discharge 放电</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-600A*3</td>
<td>0-600A*3</td>
</tr>
</tbody>
</table>

#### Current Accuracy 电流精度
<table>
<thead>
<tr>
<th>Charge 充电</th>
<th>Discharge 放电</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Fluctuation 输入波动</td>
<td>±0.5%</td>
</tr>
<tr>
<td>Load Fluctuation 负载波动</td>
<td>±0.5%</td>
</tr>
</tbody>
</table>

#### Current Ripple 电流纹波
- 1.5%rms(at FS)

#### Interface 界面
- Ethernet/CAN/J1939/IP/RS-232C Option
- 以太网/CAN/J1939/IP/RS-232C 选项

*1 Over 600V Option 600V 以上（选则）
*2 Faster Switching Time Option 高速度切换（选则）
*3 Over 600A Option 600A 以上（选则）
Charge/Discharge Software

Feature 特长

● Simple operation
Dedicated software for performing battery characteristic tests. Even without any knowledge of programming, users can get started with just a few settings.

使用简单。
为进行电池特性试验而设计的专用软件，即使用户不具备编程知识，也只需设定几处便可开始使用。

● Scheduled operation
Can be operated automatically using pre-programmed schedules and triggers.

任务计划运行。
可利用预先编制好的任务计划与触发器进行自动运转。

● Multi-channel operation
Data logging for multiple charge and discharge devices connected via Ethernet can be controlled individually.

多通道运行。
可分别控制通过以太网连接在一起的多个充放电装置，数据记录器。

可利用各充放电装置执行不同的任务计划，并且还可以推测生产设备等，利用多个充放电装置执行同一个任务计划。

可很方便地增设通道，从而可以将不同容量、不同方式的充放电装置搭配在一起使用。

Software specifications 软件规格

● Manual charge/discharge control
You can select from the following operation modes:
Constant current charge/discharge
Constant power charge/discharge
Constant voltage charge/discharge
Controls output (on/off).

Warning indications
Displays warnings, including warnings for excess voltage, current surges, excess power, and excess heat.

Schedule operation controls
Control of schedule operations, including start, stop, and discontinuation, and displays elapsed time.

Reading and saving charge/discharge files
Saves channel allocation and schedule/trigger programs to a disc.

手动充放电管理
可选择以下工作模式。
固定电流 充电/放电
固定功率 充电/放电
固定电压 充电/放电

进行输出的打开关闭管理。

警报提示
显示过电压、过电流、过电、过热等警报。

任务计划运行管理
进行开始、停止、暂停等任务计划的管理与显示经过时间。

充放电配置文件的读入、保存
将通道分配表、任务计划 / 触发程序保存至磁盘。

● Logical channel settings
Unit no., module no. and channel no. combinations are labeled (logical channel name) and entered. Management of channels is simple using trigger settings.

逻辑通道设定
登记单元编号，模块编号，通道编号的组合，并赋予其权限（逻辑通道名称）。
可通过设定触发器等很方便地管理通道。

单设设定
设定插入了数据记录器的模板。

从多个数据记录器同时收集数据时，设定单元的 IP 地址。
Schedule settings
Performs charging and discharging following pre-set programs (steps). In addition to charge/discharge directions, control directions, such as jump and loop, may be used. Data for scheduled operations is saved as a log file.

Trigger settings
If logical channel values specified during scheduled charging and recharging deviate from the tolerance values, defined operations (next step/suspension of operation) are run. In addition to instantaneous values, variations within a specified period of time can also be selected. For example, you can control the way the device switches over to discharge to prevent a rise in temperature during full charges.

Task Setting
According to the task setting, the electronic device is charged or discharged. The tasks are selected and configured using the Web view.

Main panel
Specifies the unit (charge/discharge device) connected to the network. Specifies IP address and predetermined schedules. Enables mixed control of charge/discharge devices with different capacities and different systems.

Data view
Logical channels can be monitored as numerical values. When viewing wave patterns in the Web view, wave pattern color and line width can be specified.

Wave view
Logical channel values are displayed as oscilloscope-like wave patterns. Wave color and line width can be specified for the data view. Time lines can be selected from 10/20/30/60 seconds. Also equipped with a function that displays detailed wave data when specific screen areas are selected.

波形查看器
显示波形显示逻辑通道的值，可利用数据查看器指定波形颜色，线宽，并且，可从10/20/30/60秒中选择一个作为时间轴。其还可在窗口上某处单击一下，显示该处详细波形信息的功能。
Data logger MES-192CH 数据记录器 MES-192CH

- Highly expandable
  上至8通道类型，可容纳24个通道，
  每个通道可输入24个通道。
  通过使用LAN线缆将数据记录器相互连接，最多可测量1536个通道。

- High-speed sampling
  采用一个AD转换器，使得影响在
  采样时间增加时，单个样本100ms不变。

- High-life
  A semiconductor (high-compression Photo MOS relay) is used for the
  multiplexer, so there is no need to worry about the
  duration of contact with other logger products that use relay.
  In addition, DC200V is supplied between channels to eliminate
  channel-to-channel compression problems associated with other
  semiconductor multiplexer loggers, allowing the cell voltage of
  batteries connected serially to be measured without any
  problems.

- System Block Diagram
  系统结构图

<table>
<thead>
<tr>
<th>Data Logger</th>
<th>数据记录器</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Signal</td>
<td>DC20-20V(1mV Resolution)</td>
</tr>
<tr>
<td></td>
<td>Thermo Couple T.K型 (0.1C Resolution)</td>
</tr>
<tr>
<td>Input Channel</td>
<td>Max 1536 Channel 24Channel (1 Module)</td>
</tr>
<tr>
<td></td>
<td>8Module (1Unit) 8Unit (1 System)</td>
</tr>
<tr>
<td>Sampling Time</td>
<td>0.1s-60s (All Channel at once)</td>
</tr>
<tr>
<td></td>
<td>0.1 – 60秒 (全部通道同时采样)</td>
</tr>
</tbody>
</table>
| Withstand Voltage  | between channel DC200V between module DC500V | 电压
|                    | 通道间DC200V  module间DC500V |
| Interface          | to Host : PC Ethernet (TCP/IP) to Charge & Discharge | 接口
|                    | Original Serial Communication |
| CPU                | 32bitRISC made by YAMABISHI | CPU
|                    | 内置YAMABISHI制造的32bit RISC微型计算机 |
| Dimensions (mm)    | W400 x D440 x H130  | 尺寸(mm)       |
| Weight (kg)        | 10kg  | 重量(kg)       |
|                    | 8400 x 2440 x 30mm  | 8400 x 2440 x 30mm |

Charger/Discharger Device 充放电装置

Charge/Discharge Software 充放电软件