

810V/30KW Intelligent energy-saving system specification

810V/30KW 智能节电系统

产品规格书

Revision History 规格书修订记录

Version 版本	Date 日期	Page 页码	Revision 变更内容	Prepared by 编写	Remark 备注
A0	2023-11-17	11	Original release 初版发行	杨万良	

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一、Summary 摘要

The energy-saving system stores excess energy during the descent of the pumping unit donkey head/elevator car through energy type supercapacitors, for use when the donkey head/elevator car ascends, achieving energy conservation and avoiding "reverse power generation", thereby affecting the safe and stable operation of power supply and distribution. Reasonably adjust the flushing frequency based on the actual situation of the oil well/elevator shaft, improve the efficiency of the mechanical production system/elevator system, avoid insufficient liquid supply and empty pumping, and achieve soft start and stop of the pumping unit motor/elevator motor, improve the system power factor, reduce the impact on the power supply and distribution system, reduce line losses, and optimize the capacity configuration of the power supply and distribution network. After installing this energy-saving system, the energy-saving rate of the entire system can reach at least 40%~50%, and the power factor can reach over 99%.

节电系统通过能量型超级电容储存抽油机驴头/电梯轿厢下行时的过剩能量，以供驴头/电梯轿厢上行时使用，实现节能，避免“倒发电”，从而影响供配电安全稳定运行。根据油井/电梯井的实际情况合理调节冲次，提升机采系统/电梯系统效率，避免供液不足，出现空抽，同时实现对抽油机电机/电梯电机的软启停，提高系统功率因数，减少对供配电系统冲击，降低线损，优化供配电网容量配置。安装此节电系统后，整个系统的节电率至少可以达到40%~50%，同时功率因素可以达到99%以上。

This energy-saving system is equipped with a frequency converter, which can control the speed of the motor according to the load situation of the motor, reduce the energy consumption of the motor, and achieve energy-saving effects. At the same time, the speed can be adjusted according to the load situation, effectively improving the efficiency of the equipment and avoiding motor overload operation.

本节电系统中配备了变频器，能够根据电机负载情况控制电机的转速，减少电机的能耗，达到节能的效果，同时能够根据负载情况调整转速，有效提高设备的效率，避免电机过载运行；

The intelligent energy-saving system consists of five super capacitor modules connected in series, with one module unit consisting of 60 energy type super capacitor monomers through 60S1P. At the same time, a 14.4KW bidirectional DC-DC control power supply is also configured in the system for the charging and discharging of super capacitors in this energy-saving system.

该节电系统由五个超级电容模组串联，其中一个模组单元由60个能量型超级电容单体通过60S1P组

成，同时系统中还配置了一台 14.4KW 双向 DC-DC 直流电源，用于此节能系统中超级电容的充放电。

In the intelligent energy-saving system, the module unit and DC-DC power module both adopt independent insertion mode for easy maintenance.

节电系统中，模组单元和 DC-DC 电源模块都是采用独立的插入模式，以便于维护。

The main configuration units of the energy-saving system are as follows:

节电系统主要配置单元如下表：

NO. 序号	Name 名称	Type 型号	Quantity 数量	Notes 备注
1	Frequency converter 变频器	GD200A-030G/037P-4	1	
2	Bidirectional DC/DC power supply 双向 DC/DC 电源	TY-DC-14.4KW	1	
3	HESC Module 能量型超级电容模组	162V60F	5	
4	Dual circuit control module 双回路控制模块	TYDC20A	1	
5	Wireless communication module 无线通讯模块	FR-DA-MB0013	1	
6	Main road and communication cable 主路及通讯线缆	/	/	

二、General characteristics 产品通用特性

2.1 Features and advantages 特点与优势

- ❖ High energy density 高能量密度
- ❖ High power density 高功率密度
- ❖ Ultra-low internal resistance 超低内阻
- ❖ Ultra Long Cycle Life 超长循环寿命
- ❖ Green and environmentally friendly 绿色环保

- ❖ Good safety performance 安全性能好
- ❖ Wide operating temperature range 工作温度范围宽

2.2 Typical application areas 典型应用领域

- ❖ Elevator energy-saving, wind power, oil field, thermal power frequency regulation, etc 电梯节能、风电、油田、火电频率调节等

三、System composition 系统组成

3.1 Main components 主要部件

(1) High energy super capacitor;

(1) 能量型超级电容;

(2) CMS: The Capacitor Management System (CMS) is the link between capacitors and users, which can improve capacitor utilization and prevent overcharging and excessive discharge of batteries. Capable of completing functions such as charging and discharging control of the energy storage system and monitoring of capacitor SOC information according to instructions

(2) CMS: 电容管理系统 (CMS) 是电容器和用户之间的纽带, 可以提高电容器的利用率, 防止电池过度充电和过度放电。能按指令完成储能系统充放电控制、电容器 SOC 信息监测等功能

(3) Capacitor module: The energy storage system adopts a frame cabinet design, which can be combined with multiple cabinets. The cabinets can be installed indoors or in containers; The energy storage system has comprehensive communication, monitoring, management, control, early warning and protection functions, and can operate safely for a long time. It can detect the system's operating status through EMS and CMS, and has rich data analysis functions.

电容模组: 超级电容储能系统采用框架式机柜设计。机柜可以安装在室内, 室外或集装箱中; 储能系统具有全面的通信、监测、管理、控制、预警和保护功能, 可以长期安全运行。它可以通过 EMS 和 CMS 检测系统的运行状态, 并具有丰富的数据分析功能。

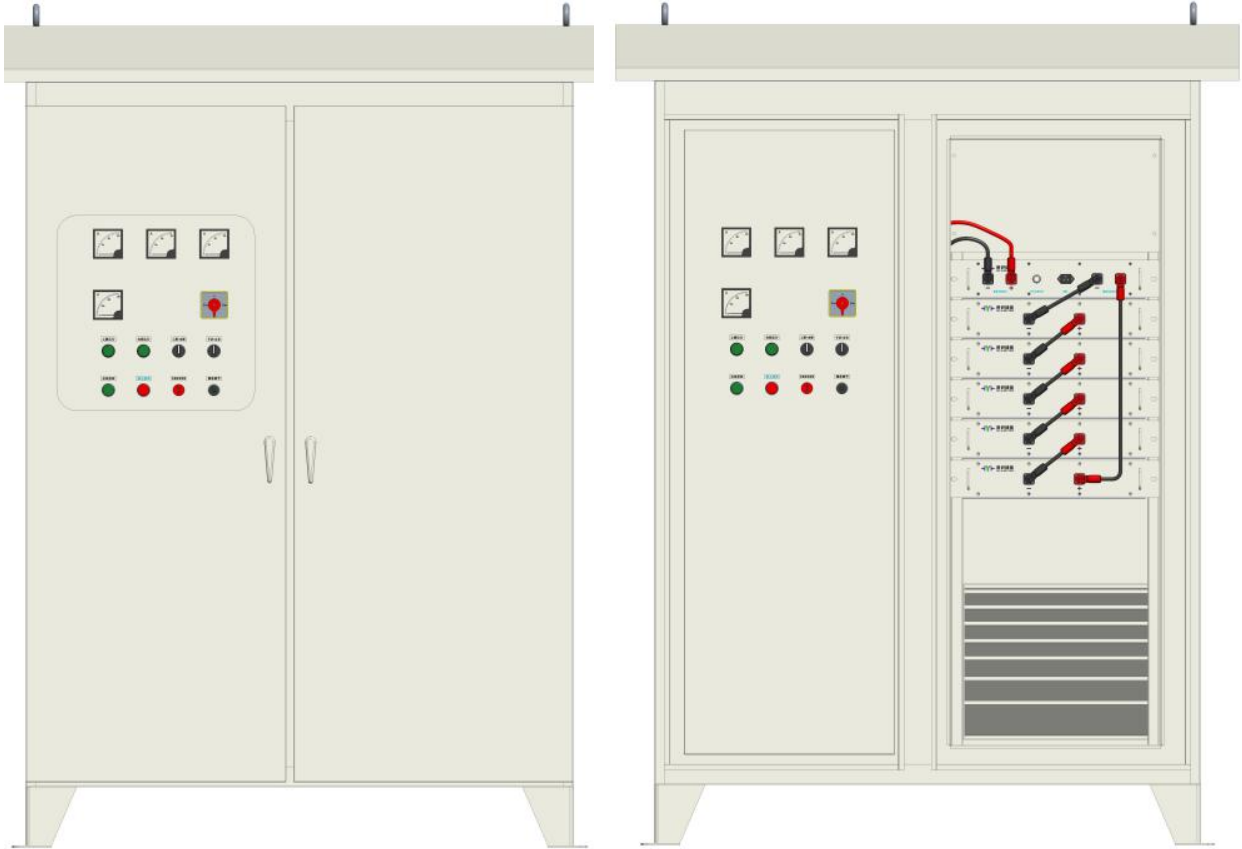
(4) DC-DC control power supply : It can control the charging and discharging process of super capacitors and perform bidirectional DC conversion.

(4) DC-DC 控制电源: 可以控制超级电容的充电和放电过程, 进行双向直流转换。

(5) Frequency converter : The output voltage and frequency values can be flexibly adjusted. For situations where full frequency operation is not required, low frequency and low speed operation can be adjusted, which can effectively save energy.

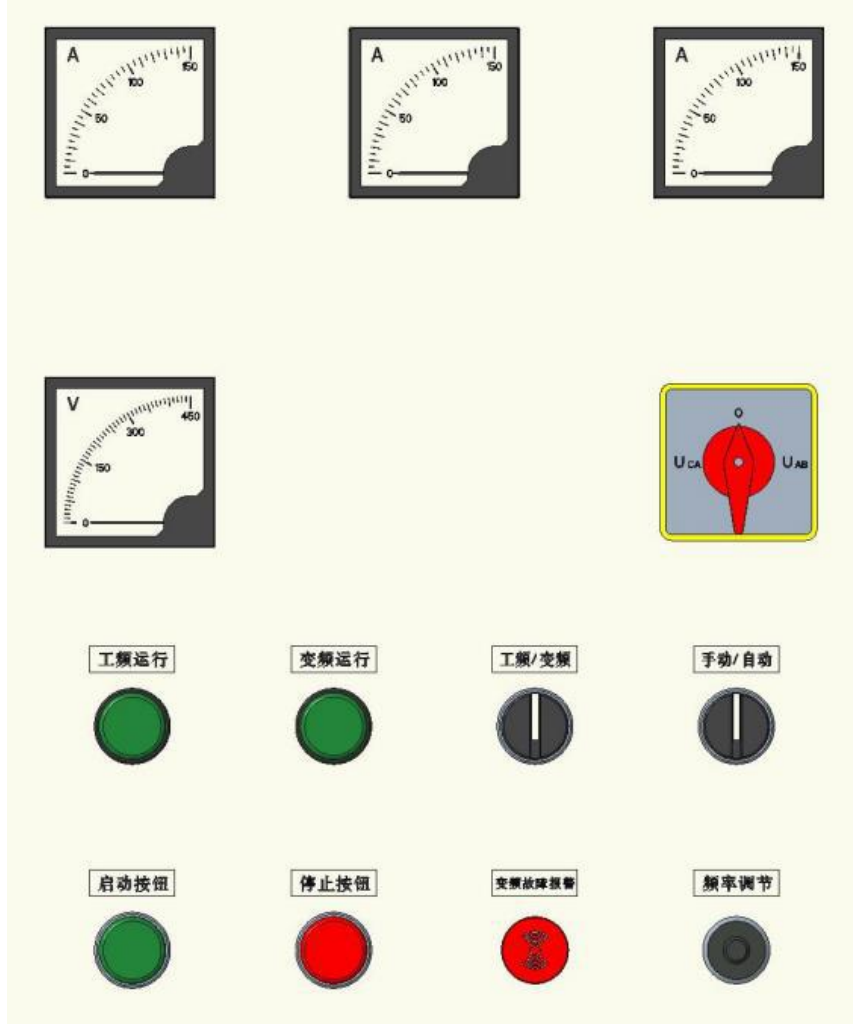
(5)变频器：可以灵活调节输出电压、输出频率的值，对于不需要满频率工作的场合，可以调节低频率低转速工作，这样可以有效节能。

3.2 Appearance and size 外观及尺寸



Cabinet appearance diagram
机柜外观图

Schematic diagram of the cabinet after opening the door
机柜开门后示意图



Schematic diagram of cabinet operation panel
机柜操作面板示意图

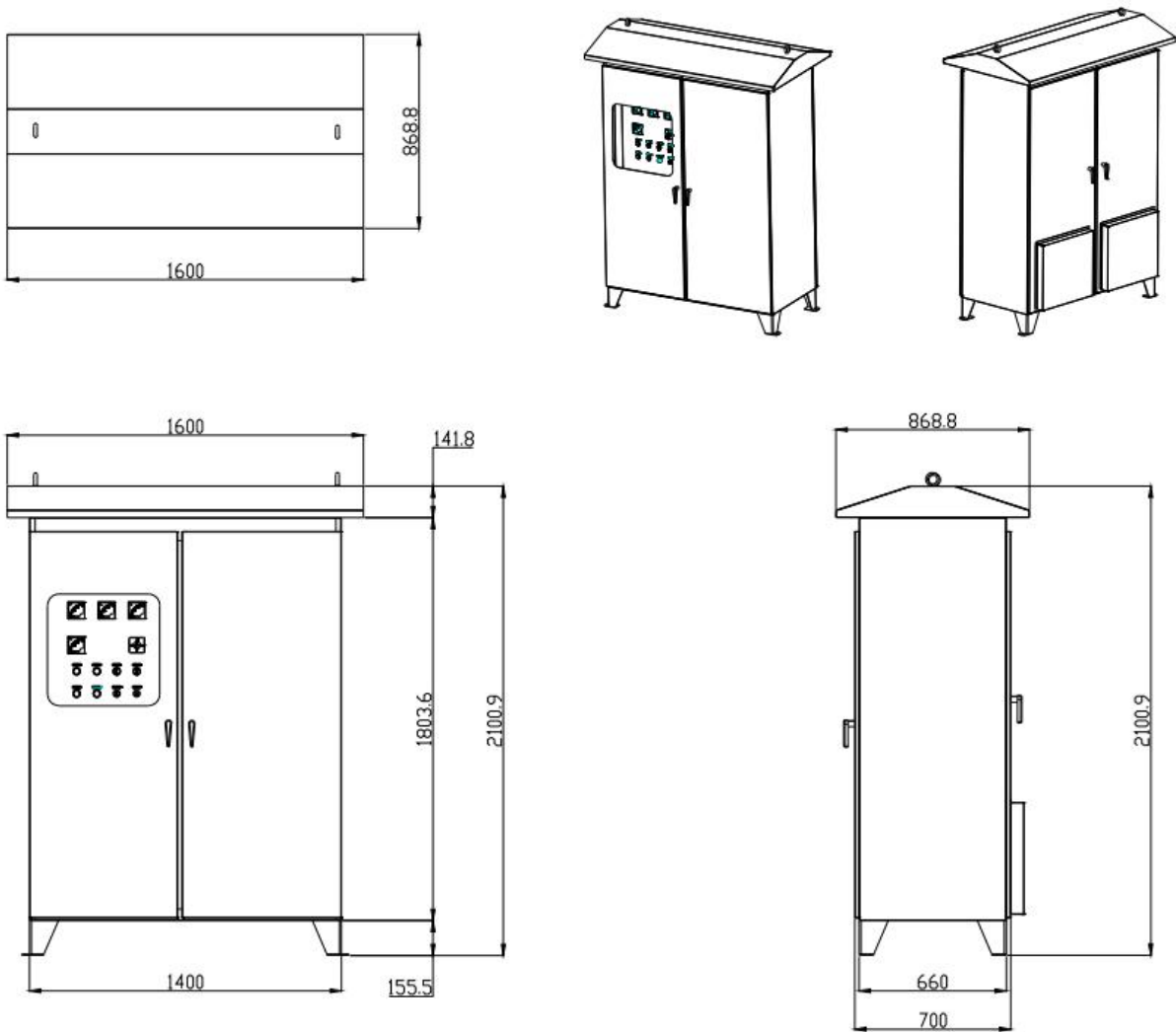


Control power panel
控制电源面板



Module panel
模组面板

Unit: mm



Cabinet Dimensional Drawing

机柜尺寸图

四、System configuration 系统配置

4.1 Super capacitor parameters 超级电容参数

Types 类别	Parameter 参数	Minimum voltage (V) 最小电压	Maximum voltage (V) 最大电压	Rated voltage (V) 额定电压	Maximum storage energy 最大存储能量	Quantity 数量
Cell 电芯	/	/	/	/	/	300
Module 模组	1P60S	/	162	120	/	5
System 系统	1P300S	/	810	600	/	1

4.2 Main parameters of frequency converter 变频器主要参数

Types 类别	Minimum value 最小值	Rated value 额定值	Maximum value 最大值	Notes 备注
Input voltage 输入电压	323VAC	380VAC	484 VAC	
Input current 输入电流		70A		Constant torque 恒转矩
		80A		Variable torque 变转矩
Input frequency 输入频率	47Hz		63Hz	
Output voltage 输出电压	0		Input voltage 输入电压	
Output current 输出电流		60A		Constant torque 恒转矩
		75A		Variable torque 变转矩
Output frequency 输出频率	0		400Hz	
Output power 输出功率		30KW		Constant torque 恒转矩
		37KW		Variable torque 变转矩

4.3 Control power electrical parameters 控制电源电气参数

Types 类别	Minimum value 最小值	Rated value 额定值	Maximum value 最大值	Notes 备注
Input voltage 输入电压	400VDC		720 VDC	
Input current 输入电流			15A	Full load 满载
Start time 启机时间	1S			
Output voltage 输出电压	400 VDC		720 VDC	
Output current 输出电流			20A	
Efficiency 效率	96%			Full load 满载

4.4 Control power protection function 控制电源保护功能

NO. 序号	Describe 描述	Specifications 规格	Notes 备注
1	Overcurrent protection 过流保护	120-150%	Protection when the output is greater than 120-150% of the rated current. 输出大于额定电流的 120-150%时保护。
2	Short Circuit Protection 输出短路保护		After a short circuit, the output loses power, and after the short circuit disappears, it automatically recovers. 短路后，输出掉电，短路消失后，自动恢复。
3	Overvoltage protection 过压保护	105-110%	Turn off the output voltage and restart to recover. 关断输出电压，重启恢复。

五、Product performance testing 产品性能测试

5.1 Test conditions 测试条件

Standard test conditions for this product specification:

Temperature: 25°C ± 5°C, relative humidity: 25%~85%, atmospheric pressure: 86KPa~106 KPa.

本产品规格书标准测试条件为:

温度: 25°C ± 5°C、相对湿度: 25%~85%、大气压力: 86KPa~106 KPa。

5.2 According to standards 依据标准

QC/T741—2017	《车用超级电容器》
GB/T36276—2018	《电力储能用锂离子电池》
GB/T34870.1—2017	《超级电容器》
GB/T 31485-2015	《电动汽车用动力蓄电池安全要求及试验方法》
GB/T 19826-2005	《电力工程直流电源设备通用技术条件及安全要求》
DLT 5044-2014	《电力工程直流电源系统设计技术规程》
DLT 5044-2004	《电力工程直流系统设计技术规程》

六、Notice 使用注意事项

- ❖ High energy super capacitors have fixed polarity. 高能量型超级电容器具有固定的极性。
- ❖ Do not touch metal objects when using supercapacitors to avoid short circuits caused by positive and negative pole connections. 使用超级电容器时请勿接触金属物体，以免正负极连接引起产品短路。

- ❖ The ambient temperature affects the lifespan of supercapacitors.环境温度影响超级电容器的寿命。
- ❖ Do not apply pressure outside the product.请勿在产品外部施压。
- ❖ Reverse charging is not allowed.不可以反向充电。
- ❖ The product should be used at nominal voltage and current.产品应在标称电压、电流下使用。
- ❖ Please do not place the product near a heat source. The product should not be used in an environment exceeding 65 °C.请勿将产品靠近热源，产品不宜在超过 65°C 的环境中使用。
- ❖ The product is suitable for live storage during storage.储存时产品适宜带电存储。

七、Storage 储存

- ❖ The capacitor cannot be stored in place with humidity over 85%RH or place with toxic gas.产品不能储存在湿度超过 85%，或有毒气体的地方。
- ❖ The capacitor should be best stored in the environment within -20~50°C temperature with relative humidity less than 60%.最好储存在温度-20~50°C，湿度 60%的环境中。