

箱式整装小水电站 CONTAINERIZED MINI HYDROPOWER PLANT (CMHP)

箱式整装小水电站，是2005年水利部农村电气化研究所通过水利部“948”项目引进，由我公司国产化形成的、具有自主知识产权的新型技术和产品，是一种将水电设备预装在集装箱内，运到现场进行短期安装调试即可发电的新型水电站设计布置方式。

国内首座箱式整装示范电站位于浙江金华，设计水头160m，装有一台160kW斜击式水轮发电机组。国内陆续建设并投运的有浙江永嘉、浙江玉环和四川南江等箱式水电站，同时也出口至马其顿、越南并建成投运。

The containerized mini hydropower plant is a new technology & product with intellectual property right of Hangzhou Yatai, which was introduced through “948 Project” of Ministry of Water Resources by National Research Institute for Rural Electrification in 2005. It adopts a new concept of erecting all the equipment in a container as to shorten the period of on-site installation and reduce the civil works amount.

The first containerized mini hydropower station was put into operation successfully in Jinhua, Zhejiang Province. It adopts a horizontal Pelton turbine-generator set, with the design head of 160m and the capacity of 160kW. There are many containerized mini hydropower stations built by Hangzhou Yatai in China, respectively located in Yongjia and Yuhuan of Zhejiang Province, and Nanjiang of Sichuan Province. It was also exported to Macedonia and Vietnam and was put into operation successfully.

箱式整装小水电站构成： The configuration of CMHP:

普通电站中的水轮机、发电机、励磁系统、调速系统、机组控制保护系统及开关等设备全部装于标准集装箱内。

As same as the regular hydropower plant, the CMHP also has turbine, generator, excitation system, governor, the control and protection system, circuit breaker and other equipments, but integrated into a container.



箱式整装小水电站特点： The characteristics of CMHP:

模块化 Modularization

- 发电模块 —— 水轮发电机组
Generating module —— The turbine-generator set
- 调速模块 —— HPU
Governor module —— HPU
- 控制模块 —— 机组控制测量保护柜
Control module —— Control, measuring and protecting panel
- 出线模块 —— 机组出线开关柜
Outlet module —— Circuit breaker panel
- 负荷模块 —— 电子负荷调节器
Load module —— ELC
- 通风模块 —— 通风风扇、冷风进气窗
Air cooling module —— Fan and air inlet
- 厂房模块 —— 集装箱箱体
Powerhouse module —— Standard container

集成化 Integration

所有模块在厂内统一安装调试完成后，只需将该集装箱运至现场进行简单布置即可。
All the parts are installed and tested in the workshop before the container is sent to the site. After arrival of the container at the site, only an assembly and installation is needed.

独立化 Independence

可并网运行，也可通过电子负荷调节器自行调节，实现孤立运行，对没有大电网的偏远山区进行供电。在局域电网崩溃时，也可作为黑启动电源。

Both grid-interconnected and isolated operations are possible for the power plant, which can supply power to the remote mountainous areas. Isolated operation can be realized via the adjustment of electronic load controller (ELC). In case of failure of the local grid, it can be served as a power source for the black-start.



调速模块 —— HPU / Governor module —— HPU

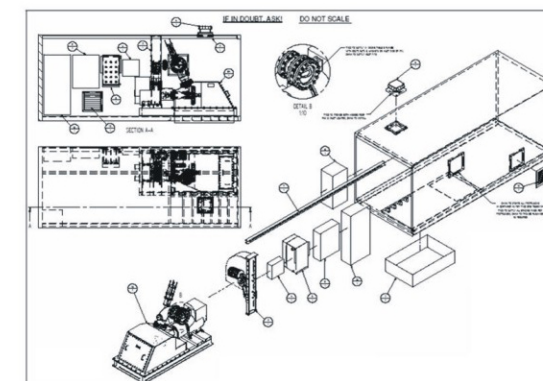


控制模块 —— 机组控制测量保护柜
Control module —— Control, measuring and protecting panel

负荷模块 —— 电子负荷调节器 / Load module —— ELC



出线模块 —— 机组出线开关柜(图片左侧)
Outlet module —— Circuit breaker panel (the left panel in the picture)



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优势 Advantages

以标准集装箱代替厂房，占地少，土建投资省
适合偏远地区孤网运行
也可用于并网发电
PID调节控制方式，响应快速调节稳定，自动化程度高
完全无人值守，运行成本低廉
生态基流的利用
减少电站建设对生态环境的影响，绿色环保

A standard container used as the powerhouse,
occupying less land and reducing cost of civil works
Suitable for both the isolated operation and
interconnected to power grid
PID controlling mode, fast response, stable regulating,
high level automation
Unattended operation resulting in lower operation cost
Fully utilizing the ecological water flow
Greatly reducing the negative impact on the ecological
environment



● 新老电站厂房对比 / Compared with the old powerhouse

适用范围 Scope of Application

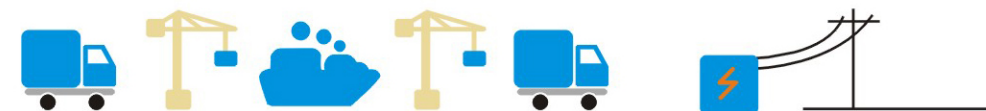
可采用水斗式、斜击式、混流式、轴流式和贯流式等机型
单机容量一般为500 kW以下
高水头小流量尤佳

Applicable are Pelton turbine, Turgo turbine, Francis turbine, axial flow turbine and tubular turbine
Applicable for the unit capacity of no more than 500kW
More suitable for sites with high water head and small flow

左：四川叁熙口箱式整装水电站 Sanxikou Containerized Mini Hydropower Station in Sichuan Province (left)
中：浙江玉环箱式整装水电站 Yuhuan Containerized Mini Hydropower Station in Zhejiang Province(middle)
右：马其顿特瑞吉箱式整装水电站 Turija Containerized Mini Hydropower Station in Macedonia(right)



浙江岩坦箱式整装小水电站安装展示 Zhejiang Yantan Containerized Mini Hydropower Station



箱式整装小水电站机组设备的主要安装调试工作已在出厂前完成，到达现场后只需连接进出水管路、出线电缆及检查其它设备的连接情况即可调试发电，这就大大缩短了工期，相比常规电站能够提前发电，产生更多的效益。

The testing and installation of the CMHP equipment is finished in the workshop. After arrival of the container at the site, only an assembly is needed including the connection of inlet and outlet water pipe, incoming and outgoing cables and connection of other devices, after which on-site commissioning can be carried out. In this case, the construction period is greatly shortened and more profit is secured compared to other power plants.

