

VEICHI

HYDROGEN POWER SUPPLY PRODUCTION CATALOG

VHP800 series high-performance IGBT power modules
and cabinets boosting green electricity hydrogen production



VEICHI

Suzhou Veichi Electric Co., Ltd
No.1000 Songjia Road, Guoxiang street, Wuzhong
Economic and Technological Development Zone,

Tel: +86-512-6617 1988 Fax: +86-512-6617 3610

Facebook: <https://www.facebook.com/veichigroup>

WhatsApp: +86-138 2881 8903
<https://www.veichi.com>



Official Website

Version: Jun. 2024

Any contents in this book are subject to change without
notice. Veichi Electric Co., Ltd all rights reserved.
reproduction in all its forms is strictly prohibited.

About us



VEICHI Electric (stock code: 688698) is a high-tech company focused on electrical drive and industrial control, offering a full range of industrial automation products. With facilities in Suzhou, Shenzhen, Xi'an, and a subsidiary in India, VEICHI serves customers worldwide with reliable and competitive offerings.

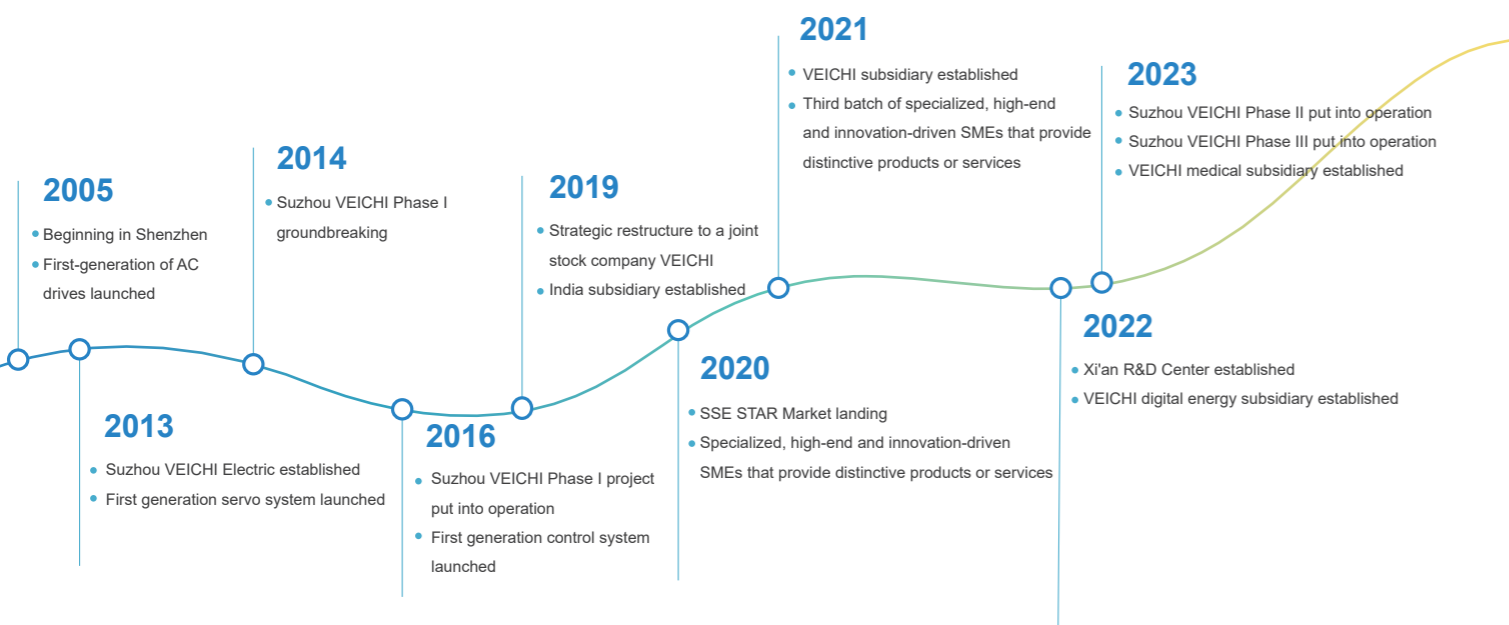
The company boasts an extensive portfolio of products, encompassing AC drives, servo systems, and control systems, which are widely utilized across various sectors such as heavy industry, light industry, and high-end equipment, providing scenario-based solutions that support the digital and intelligent transformation of the manufacturing industry. Moreover, the company is in lockstep with the zeitgeist, expanding its reach into burgeoning fields like robotics, renewable energy, and healthcare with a suite of innovative products, including hollow cup motors, frameless motors, hybrid inverters, and surgical power systems. These cutting-edge offerings significantly enhance the prosperity and advancement of the industries they serve.

Years of R&D efforts have led to mastery in the core technologies of motor control such as vector control of PMSM, V/F control, high-frequency pulse injection control,

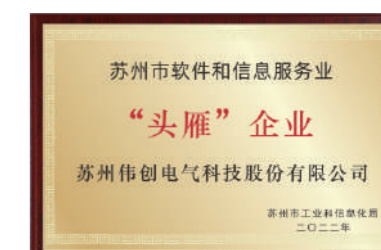
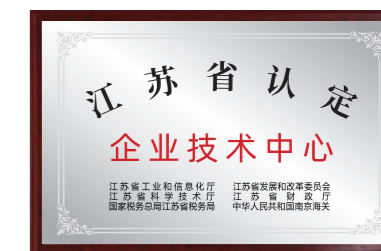
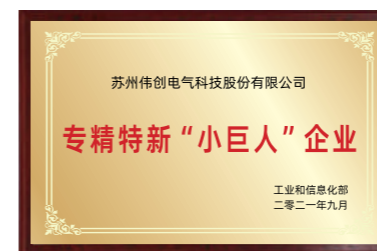
field-weakening control for higher speed etc, and of silicon carbide application, motor auto tuning, motor protection and fly track start-up. And it has also successfully cultivated a series of patented technologies with independent intellectual property rights. As of June 30, 2024, a total of 221 patents have been granted, including 51 patents for inventions.

Over the course of 19 years, VEICHI has earned recognition and certifications from national and authoritative bodies like the third batch of specialized, high-end and innovation-driven SMEs that provide distinctive products or services, "high-tech enterprise", "Jiangsu Provincial Engineering Technology Research Center", "Jiangsu Provincial Enterprise Technology Center", and "Jiangsu Industrial Internet Development Demonstration Enterprise (Benchmarking Factory Category)".

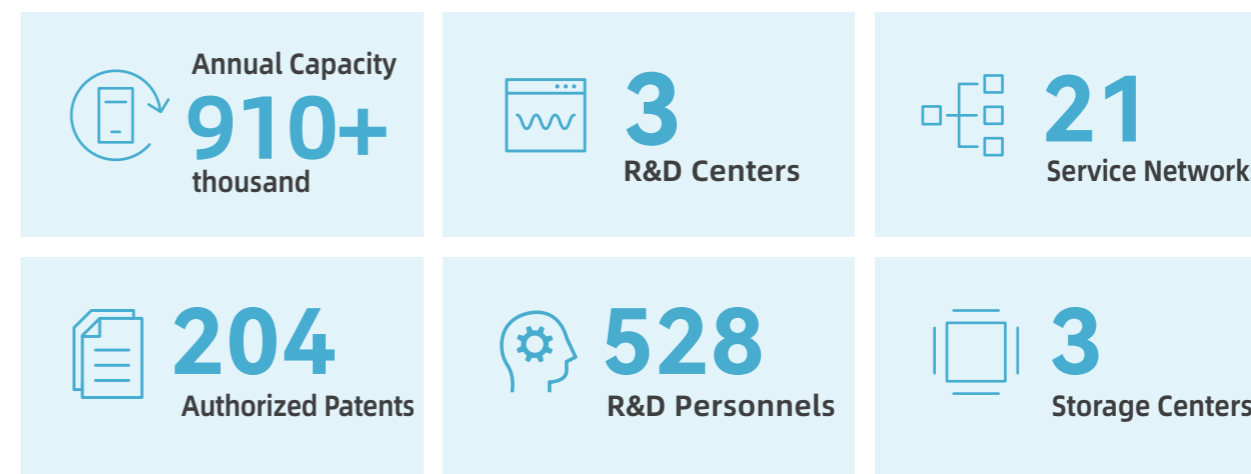
Steadfast in its commitment to the business philosophy of "guided by market demand and driven by technological innovation", VEICHI will fortify its research in key core technologies and enhance product iteration to expand relentlessly across the spectrum of high-performance and quality applications. This strategic focus will enable us to make significant contributions to the evolution of electrical drive and industrial control systems, propelling the industry forward with determination and vigor.



Corporate Honors



Our Strengths



Contents

01 VHP800-C60-T3-004/0145-L
IGBT Power Module

Page 04-08



02 VHP800-D71-T3-010/0060-L
IGBT Power Module

Page 09-12



03 VHP800-E60-T3-028/0145-L
IGBT Power Cabinet

Page 13-16



04 VHP800-E71-T3-015/0080-L
IGBT Power Cabinet

Page 17-20



05 VHP800-E81-T3-144/0340-L
IGBT Power Cabinet

Page 21-24



VHP800-C60-T3-004/0145-L IGBT POWER MODULE

The IGBT power module adopts a two-stage scheme, with wide voltage and current range to deliver high efficiency, low interference and high precision. Power density is improved through water cooling so it is especially suitable for low-voltage and high-current occasions requiring adjustable output voltage and current, which provides safe, efficient and stable power supply for the green electricity hydrogen production.

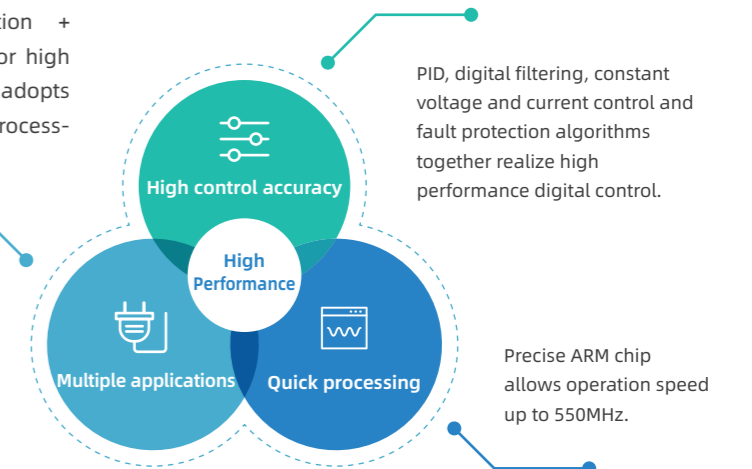


Product Feature

01 High-performance control strategy

The main control system of the power supply adopts 6-pulse uncontrolled rectification + interleaved three-phase DC-DC structure for high control accuracy; And the digital controller adopts ARM architecture for fast computing and processing.

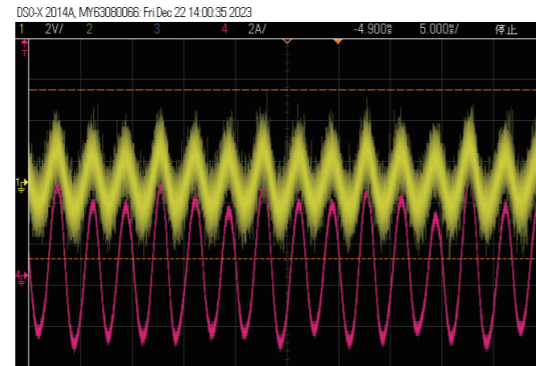
AC/DC+DC/DC topology is adopted for flexible power supply. And PWM technology lowers grid current harmonic down to 3% to minimize its pollution.



02 High-performance control algorithms

The voltage loop uses a feedback notch algorithm to filter out the industrial frequency ripple interference due to uncontrolled rectifier to reduce the output ripple.

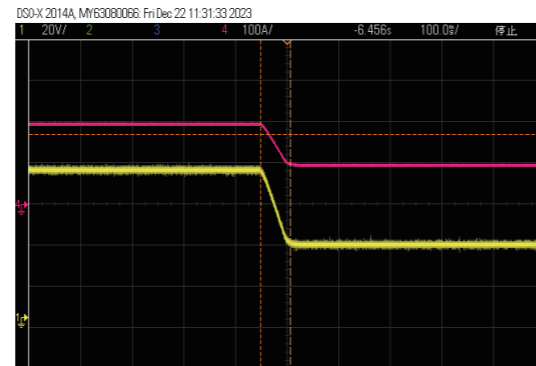
The current loop adopts a unique bus voltage feedforward algorithm and PR control algorithm to provide high performance output ripple and control accuracy metrics as low as 1% (peak peak), the control accuracy can reach $\pm 0.5\%$.



03 Soft-start adjustment in the full load section

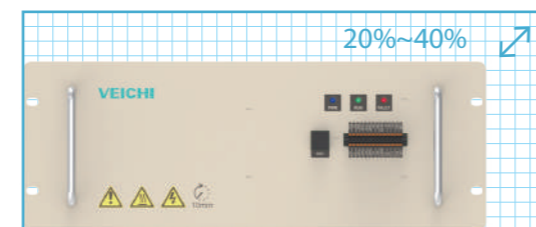
The control loop is integrated with the voltage or current online soft-start setting function, so that rising or descending slope can freely adapt to start-up and given parameters of models with different power, providing more stable running performance.

In voltage loop operation mode, the current limit is switched from 200A to 100A (The software sets the slope to 2A/ms.).



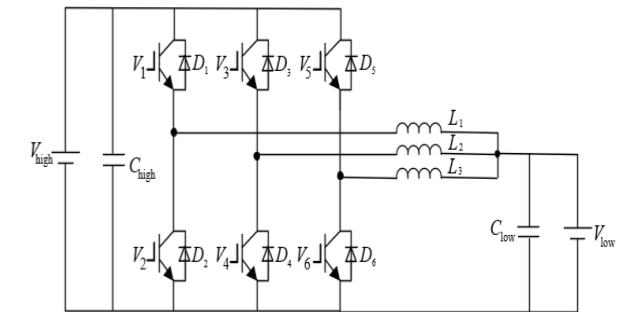
04 High power density

Integrated water cooling design delivers excellent heat dissipation performance in the small and delicate body which is 20%~40% smaller than market products.



05 High-efficiency topology

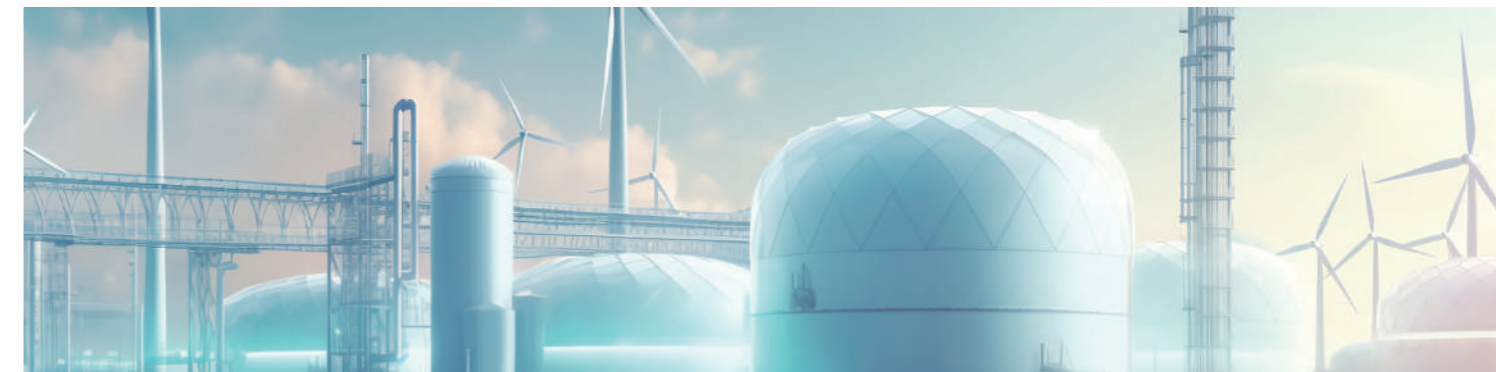
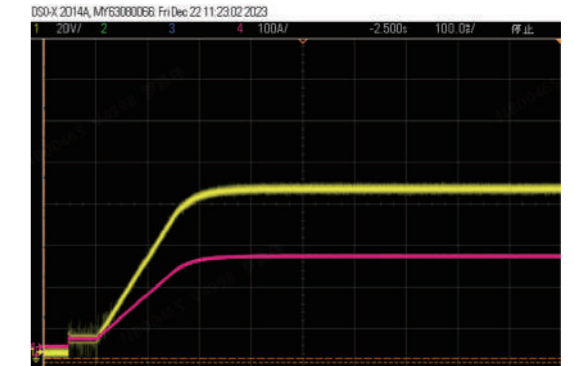
The three-phase interleaved parallel BUCK topology is used on the DC side for higher efficiency, smaller ripple current so that output current ripple is lower than 1%, and the overall efficiency is up to 94%-96%, which makes the electrolyzer and the whole system run more smoothly.



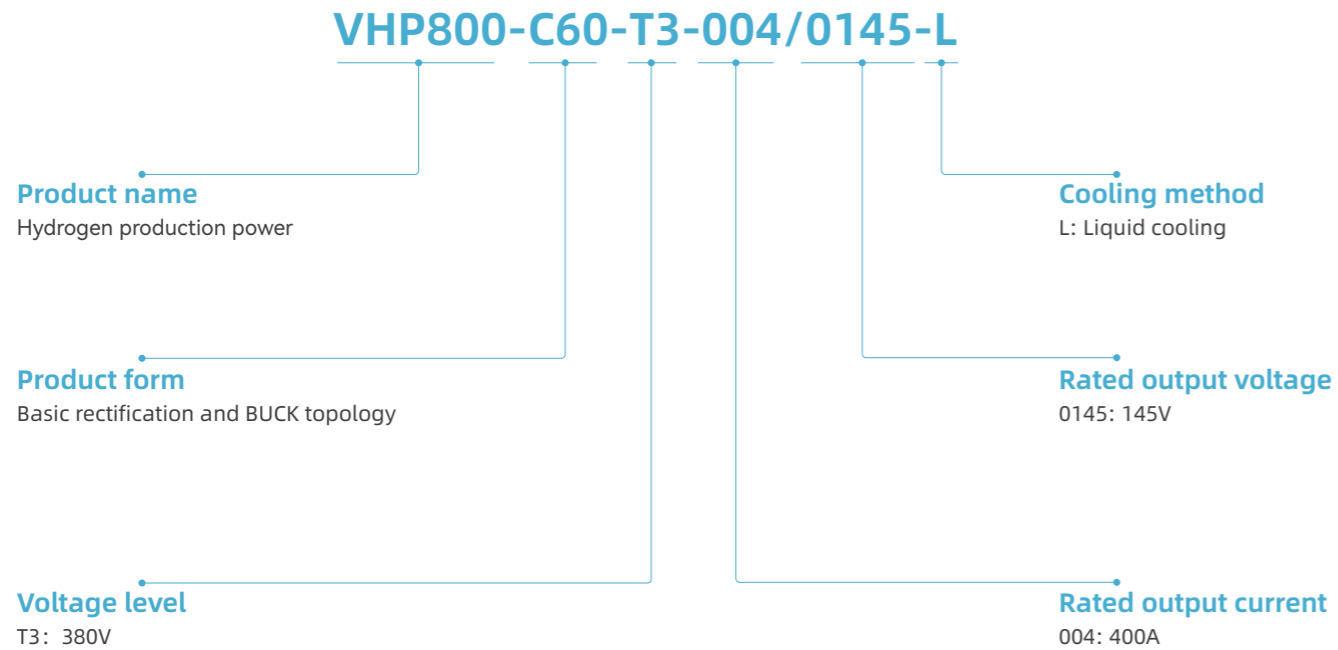
06 Quick response

The voltage and current closed-loop control technology can still ensure the stability of hydrogen production from the electrolyzer in the case of frequent fluctuation or abrupt load change. The power adjustment response speed stays within 300ms, which can respond to photovoltaic and wind instantly with rapid power switching.

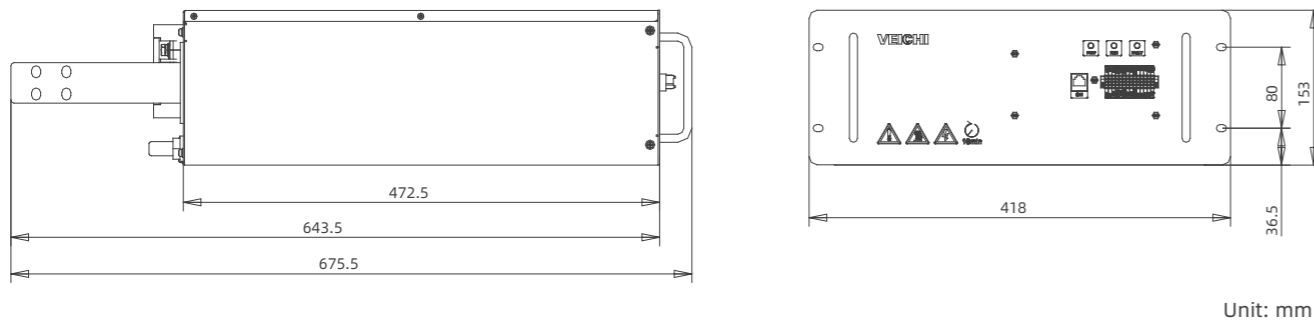
Waveform in yellow: Indicates the output voltage
Waveform in red: Indicates the output current



Naming Rules



Installation Dimensions



Technical Specifications

Item	Specification	
Input	Input voltage	380VAC (-15%~+20%)
	Input frequency	50Hz/60Hz
	Rated capacity	67kVA
	Rated current	110A
	Efficiency	Rated ≥ 94%
	Power factor	≥ 0.93
Output	Output voltage	0V~300V
	Output current	0A~400A
	Output power	58kW
	Output voltage accuracy	≤1%
	Output current accuracy	≤1%
	Output ripple and noise	< 1%
Communication	Control mode	Constant voltage, and constant current
	Analog signal	AI: 2 channels of 0V~10V, AO: 2 channels of 0V~10V
	Switching signal	DI: 5 channels, DO: 2 channels
	Interface	RS485 for Modbus and CAN communication
Protection	External protection	Short circuit, overcurrent, overvoltage, undervoltage, phase loss, overheating, overload, etc
Indicator	Status indicator	Power on indicator (blue)/Running indicator (green)/Fault indicator (red)
Environment	IP	IP30
	Operating temperature	-30°C ~+60°C
	Storage temperature	-40°C ~+70°C
	Cooling method	Liquid cooling
	Water quality	Pure water, ethylene glycol 50%
	Humidity	5%RH~95%RH, no condensation
	Altitude	4000m (>3000m Derating)
EMC and Safety	Electromagnetic Compatibility (Conduction and radiation)	IEC 61800-3 C3
	Security protection requirements	Safety requirements: Designed according to CE ROHS standard: Meet the requirements of ROHS standard Lightning protection: indoor
Noise	Noise (distance of 1m)	≤ 65dB

VHP800-D71-T3-010/0060-L IGBT POWER MODULE

The AD/DC+DC/DC topology ensures high power density, and the use of water-cooled plates promotes uniform heat dissipation and electrical isolation. This design is ideal for low-voltage, high-current isolated applications, enhancing the energy efficiency of electrolytic hydrogen production and delivering a safe, efficient, and stable power supply for green hydrogen generation systems.



02 High performance

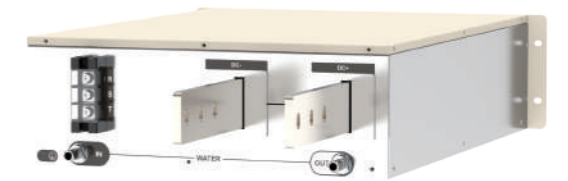
Enables high precision in output voltage and current regulation, with low ripple.

03 Easy debugging

Enables system debugging, with easy parallel module debugging.

04 High reliability

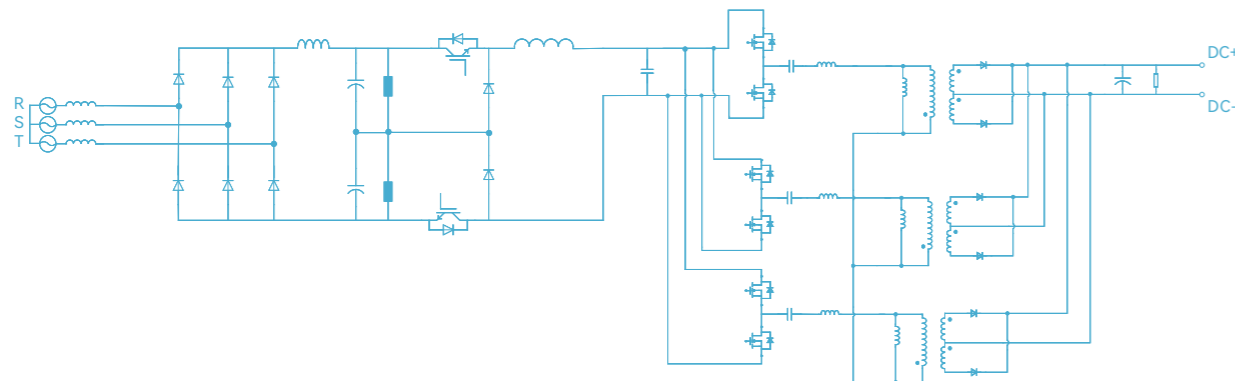
Enables self-check before power-on, operation process tracking, and de-rated operation during faults.



Product Feature

01 High-efficiency topology

Two-stage isolated DC/DC topology for minimal interference and ripple-free output; BUCK with three-level control technology for fast regulation and reduced overshoot; Resonant output across full power range with soft-switching control for high efficiency.



Naming Rules

VHP800-D71-T3-010/0060-L

Product name.
VHP800: Hydrogen production power

Cooling method
L: Liquid cooling

Product form.
Basic rectification + BUCK + LLC

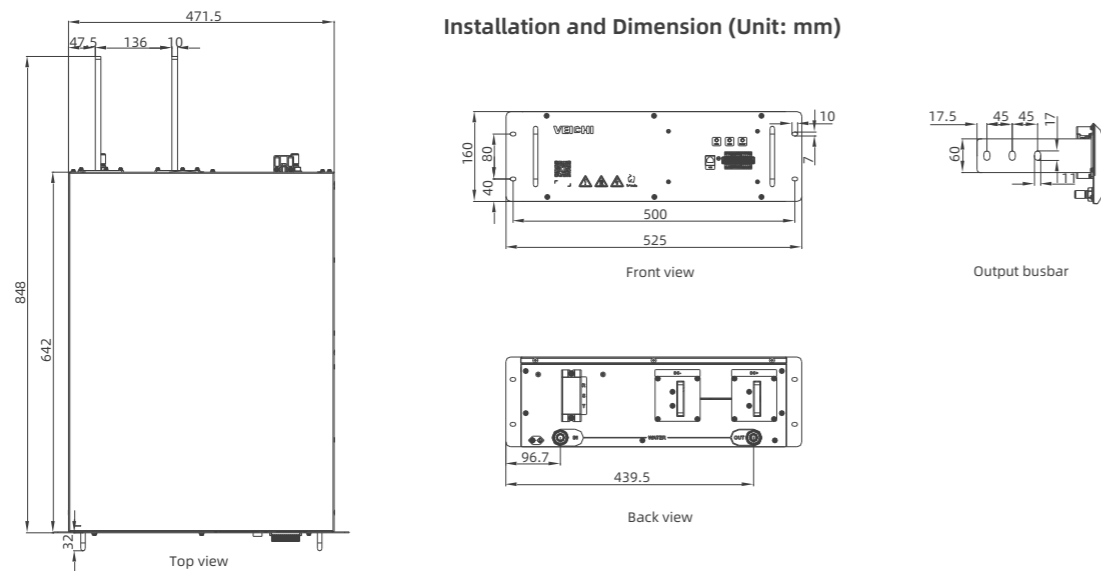
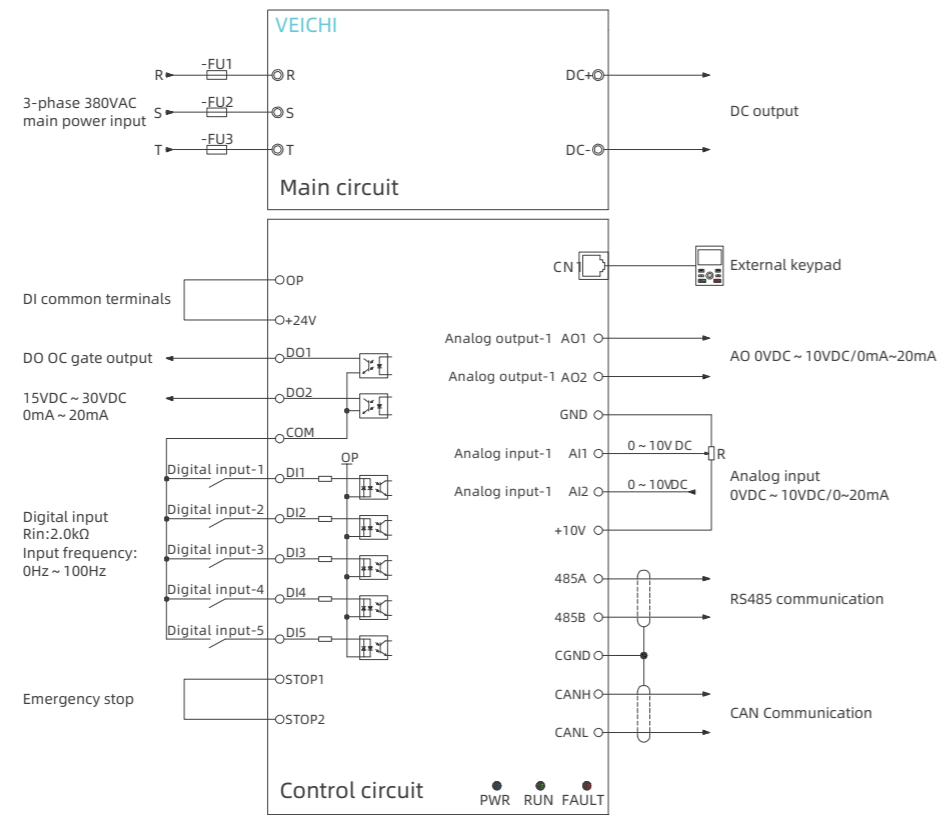
Rated output voltage
0060: 60V

Voltage level
T3: 380V

Rated output current
010: 1000A

Installation Dimension

Wiring Diagram



Technical Specification

Item	Specification	
Input	Input voltage	380VAC (-15%~+20%)
	Input frequency	50Hz/60Hz
	Rated capacity	76kVA
	Rated current	117A
	Efficiency	Rated ≥94%
Output	Output voltage	0V~60V
	Output current	0A~1000A
	Output power	60kW
	Output voltage accuracy	< 1%
	Output current accuracy	< 1%
	Output ripple and noise	< 3%
Communication Control	Control mode	Constant voltage, constant current, constant power
	Analog signal	AI: 2 channels of 0V-10V, AO: 2 channels of 0V-10V
	Switching signal	DI: 5 channels (including emergency stop signal), DO: 2 channels
	Interface	RS485 for Modbus and CAN communication
Security	Insulation resistance	≥10MΩ
	Ground connection	≤0.1Ω (Condition: 15A, 1S)
	Insulation	2120VDC, 60S, ≤10mA
Protection	External protection	Against overheat, input phase loss, bus overvoltage, output overcurrent, output power limit alarms, and output overvoltage
	Drive protection	Short-circuit constant current output
Indicator	Status indicator	Power on indicator (blue)/Running indicator (green)/Error indicator (red)
EMC and Safety	Electromagnetic Compatibility (conduction and radiation)	IEC61800-3 C3
	Security protection requirements	Safety requirements: Designed according to CE ROHS standard: Meet the requirements of ROHS standard Lightning protection: indoor

VHP800-E60-T3-028/0145-L IGBT POWER CABINET

The power supply system integrates up to 7 IGBT modules in a modular format, allowing for flexible combination, and independently controls voltage, current, or power with high accuracy and speed. The output parameters can be smoothly varied from zero to maximum without steps. Encased in a robust frame, the cabinet can handle heavy loads and seismic activity in challenging conditions.



02 Comprehensive protection



Black Box: Save data before and after failures in a specified time



Single Module Protection:

Offer protections for short circuit, overcurrent, overvoltage, undervoltage, phase loss, overheat, overload, etc.



Electrolyzer Protection:

Adapt to the electrolyzer characteristics and switch the protection strategy flexibly

03 Redundancy switch control



Multiple Redundancy Design:

Each module operates separately, so if there's a problem with one, it can be quickly resolved to maintain overall reliable performance.

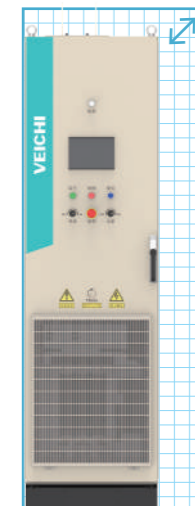


Layered Protection:

Ensures maximum availability of the equipment.

04 High power density

Compact drawer design greatly saves the cabinet space.

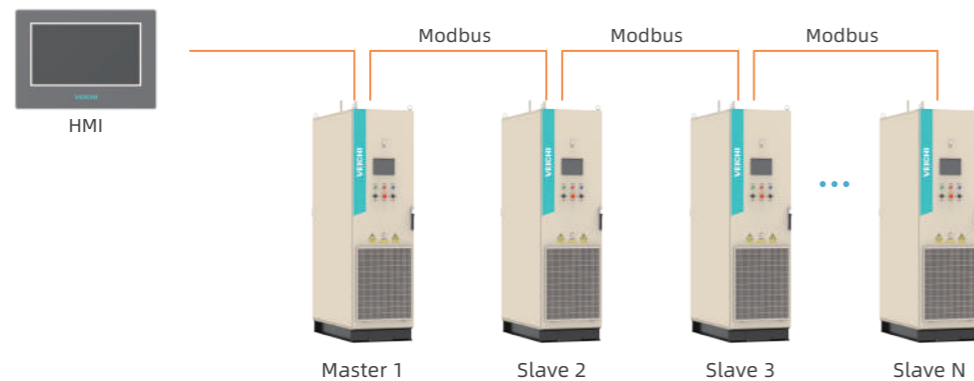


20%~30%
smaller than
market product

Product Feature

01 Master-slave control

Adopt master/slave processors for controlling system functions. The software specifies a cabinet as the master or slave, and if the master module is damaged, the next slave cabinet can be switched to the master.



Naming Rules

VHP800-E60-T3-028/0145-L

Product name

VHP800: Hydrogen production power supply

Product form

Basic rectifier + BUCK topology power cabinet

Voltage level

T3: 380V

Cooling method

L: Liquid cooling

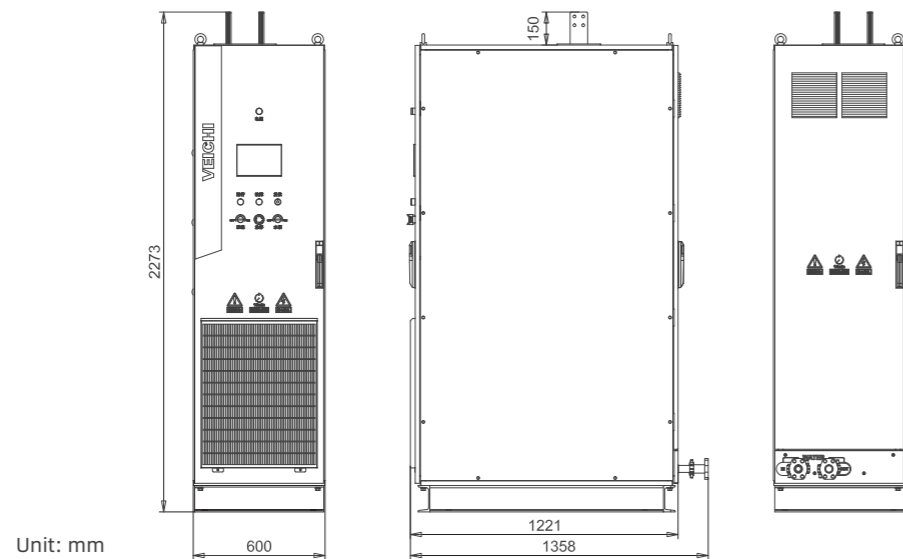
Rated output voltage

0145: 145V

Rated output current

028: 2800A

Installation Dimensions



Technical Specification

Item	Specification	
Input	Input voltage	380VAC (-15%~+15%)
	Input frequency	50Hz/60Hz
	Rated capacity	Nx67kVA, N (N≤7): number of cabinets in parallel
	Rated current	N x110A
	Efficiency	Rated ≥ 94%
	Power factor	≥ 0.93
Output	Output voltage	0V~300V
	Output current	0A~Nx1000A (N: number of cabinets in parallel)
	Output power	Nx58kW (N: number of cabinets in parallel)
	Output voltage accuracy	≤1%
	Output current accuracy	≤1%
	Output ripple and noise	< 1%
Communication	Control mode	Constant voltage, and constant current
	Analog signal	Host PC given
	Switching signal	DI: 5 channels, DO: 2 channels
	Interface	External RS485 Internal CAN
Protection	External protection	Short circuit, overcurrent, overvoltage, undervoltage, phase loss, overheating, overload, etc
Indicator	Status indicator	Power-on (blue) / run (green) / fault (red)
	HMI	Output status Fault alarm
Environment	Operating temperature	-30°C~+60°C (40°C~60°C derating)
	Storage temperature	-40°C~+70°C
	Cooling method	Liquid cooling
	Humidity	5%RH~95%RH, no condensation
	Altitude	4000m (>3000m Derating)
EMC and Safety	Electromagnetic Compatibility (Conduction and radiation)	IEC 61800-3 C3
	Security protection requirements	Safety requirements: Designed according to CE ROHS standard: Meet the requirements of ROHS standard Lightning protection: indoor
Noise	Noise (distance of 1m)	≤65dB

VHP800-E71-T3-015/0080-L IGBT POWER CABINET

It integrates up to 5 IGBT rectifier module units in parallel, and independently controls voltage, current, or power with high accuracy and speed. The output parameters can be smoothly varied from zero to maximum without steps, suitable for alkaline and PEM electrolysis cells.



02 Comprehensive protection

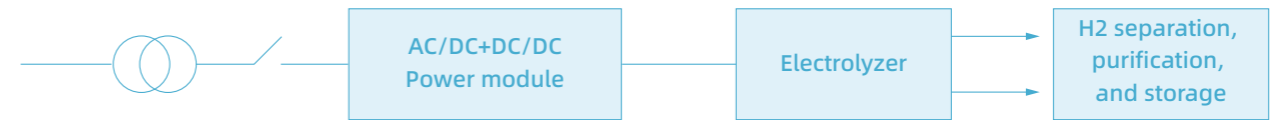
Offers protections for overheat, overvoltage, undervoltage, input phase loss, short-circuit current limiting, etc.

03 High control accuracy

IGBT power cabinet features ARM digital control and utilizes CAN communication for inter-module master-slave parallel current sharing control.

04 Universal solutions

Flexible grid voltage compatibility and good parallel characteristic facilitate convenient system expansion and provide efficient and stable green electricity for hydrogen production.



Product Feature

01 Flexible combination

Modular design for flexible option of modules based on operating conditions.

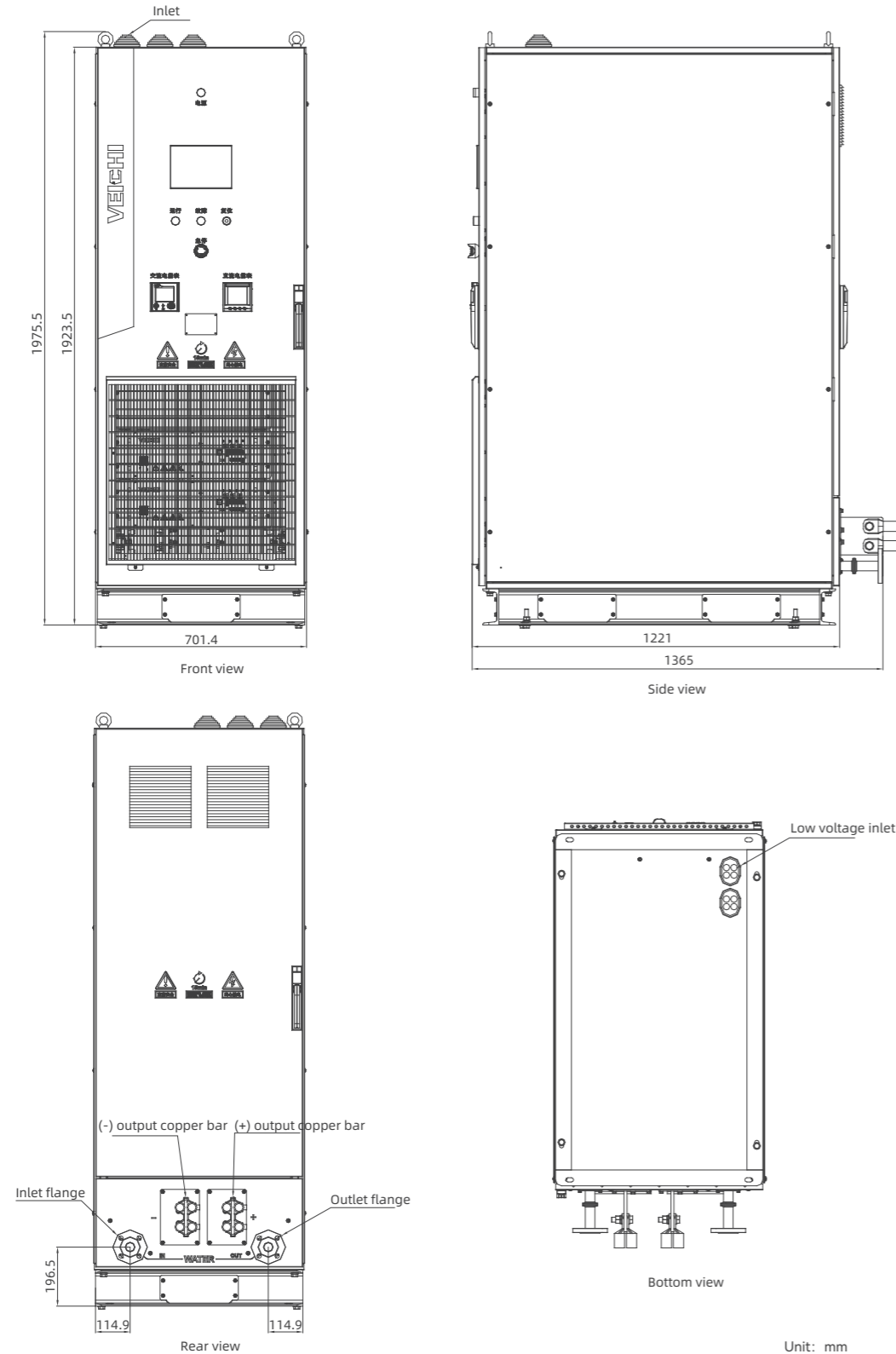


Naming Rules

VHP800-E71-T3-015/0080-L



Installation Dimensions



Technical Specification

Item	Specification	
Input	Input voltage	380VAC (-15%~+20%)
	Input frequency	50Hz/60Hz
	Rated capacity	152kVA
	Rated current	234A
	Efficiency	Rated≥94%
	Power factor	0.93
Output	Output voltage	0V~80V
	Output current	0A~1500A
	Output power	120kW
	Output voltage accuracy	< 1%
	Output current accuracy	< 1%
Output ripple and noise	< 3%	
Communication Control	Control mode	Constant voltage/constant current/power
	Analog signal	AI: 2 channels of 0V-10V, AO: 2 channels of 0V-10V
	Switching signal	DI: 5 channels (including emergency stop signal), DO: 2 channels
	Interface	RS485 for Modbus and CAN communication
Security	Insulation resistance	≥10MΩ
	Ground connection	≤0.1Ω (Condition: 15A, 1S)
	Insulation	2120VDC, 60S, ≤10mA
Protection	External protection	Against overheat, input phase loss, bus overvoltage, output overcurrent, output power limit alarms, and output overvoltage
	Drive protection	Short-circuit constant current output
Indicator	Status indicator	Power on indicator (white)/Running indicator (green)/Error indicator (red)
EMC and Safety	Electromagnetic Compatibility (conduction and radiation)	IEC61800-3 C3
	Security protection requirements	1. Safety requirements: Designed according to CE 2. ROHS standard: Meet the requirements of ROHS standard 3. Lightning protection: indoor

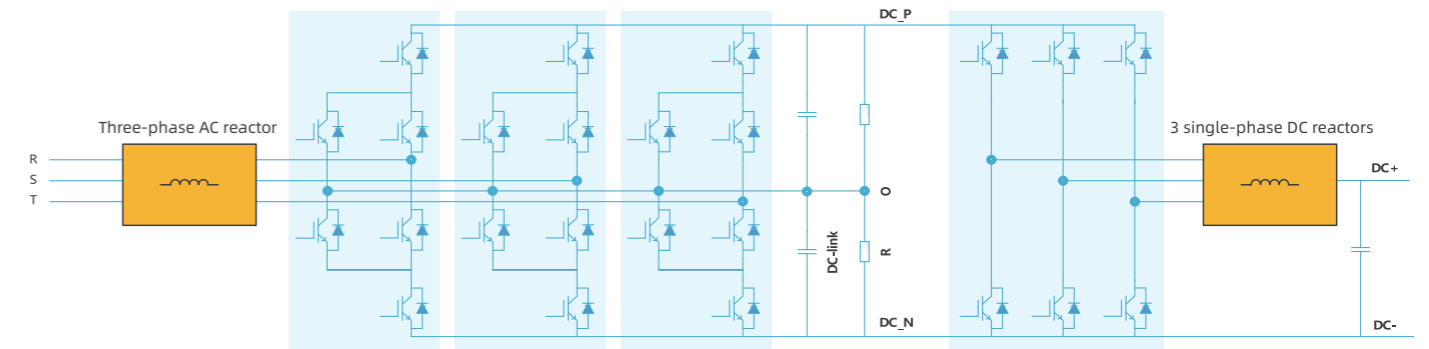
VHP800-E81-T3-144/0340-L IGBT POWER CABINET

High-power supply system with multiple IGBT power modules, featuring with separate regulation of voltage, current or power, ensuring high regulation accuracy and fast response. Modular design for free combination and expansion, providing high efficient, stable, safe and low harmonic DC power for large-capacity electrolyzer.



02 High-efficiency topology

Power transformer + three-level rectifier + three-phase interleaved BUCK circuit for high efficiency; DC voltage ripple $\leq 1\%$, overall efficiency $\geq 97\%$ for smoother operation of electrolyzer and the whole system.



Product Feature

01 Flexible combination

Book-type design for easy combination and space saving.



High Output Power:

Parallel control structure with a max. output power of 10 MW.



Rapid Response:

IGBT control, fast regulation response speed.



High Reliability :

Excellent adaptability to grid fluctuations from new energy power generation, and harsh environment at -30°C and 4000m.

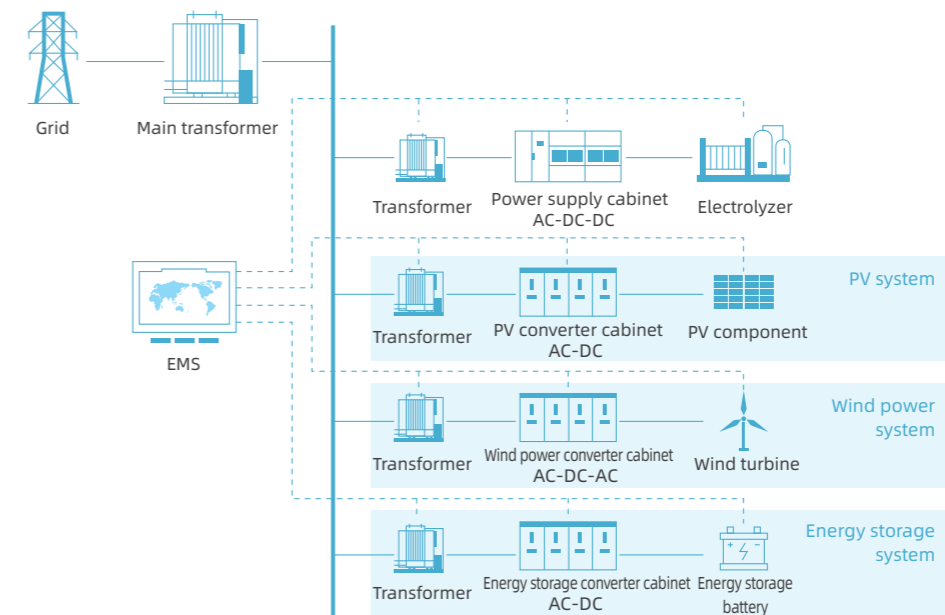


High Grid-Friendliness :

Harmonic content $< 3\%$, power factor ≥ 0.99 , with functions as reactive power compensation and high/low voltage ride-through.

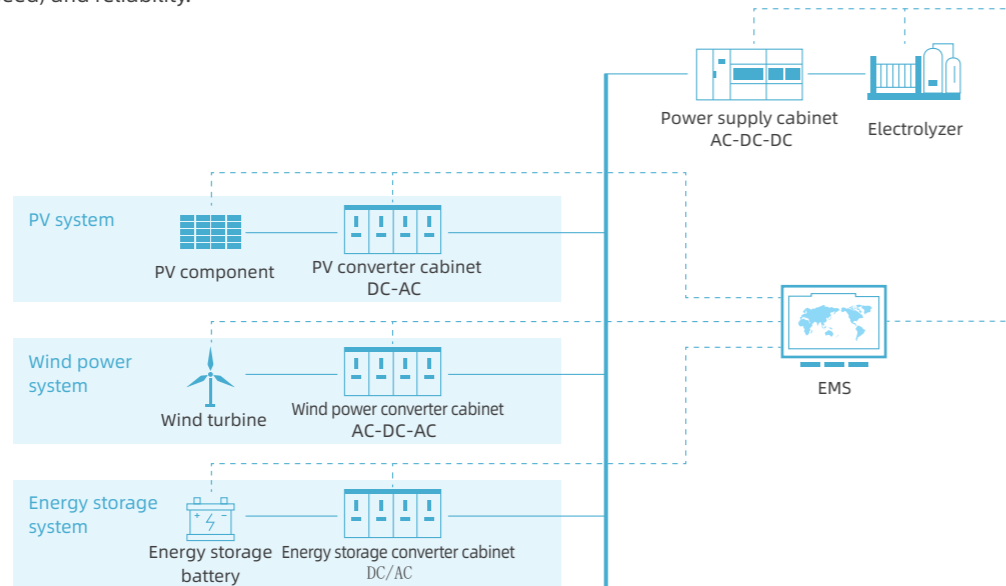
03 On-grid hydrogen production solution

Diverse renewable energy sources secure energy reliability so as to enhance hydrogen production efficiency. With an intelligent Energy Management System (EMS) for optimal control and coordination of wind, solar, energy storage, and hydrogen production equipment, a hybrid hydrogen production system is established to balance power supply and enhance hydrogen production efficiency.



04 Off-grid hydrogen production solution

Hydrogen is produced by supplying electricity directly from various renewable energy sources to a water electrolysis facility. The EMS controls and coordinates all parts as a whole to fulfill power needs and enhance the hydrogen system's efficiency, speed, and reliability.



Naming Rules

VHP800-E81-T3-144/0340-L

Product name

VHP800: Hydrogen production power supply

Product form

AFE rectifier +three-phase parallel BUCK topology

Voltage level

T3: 400V

Cooling method

L: Liquid cooling

Rated output voltage

0340: 340V

Rated output current

144: 14400A

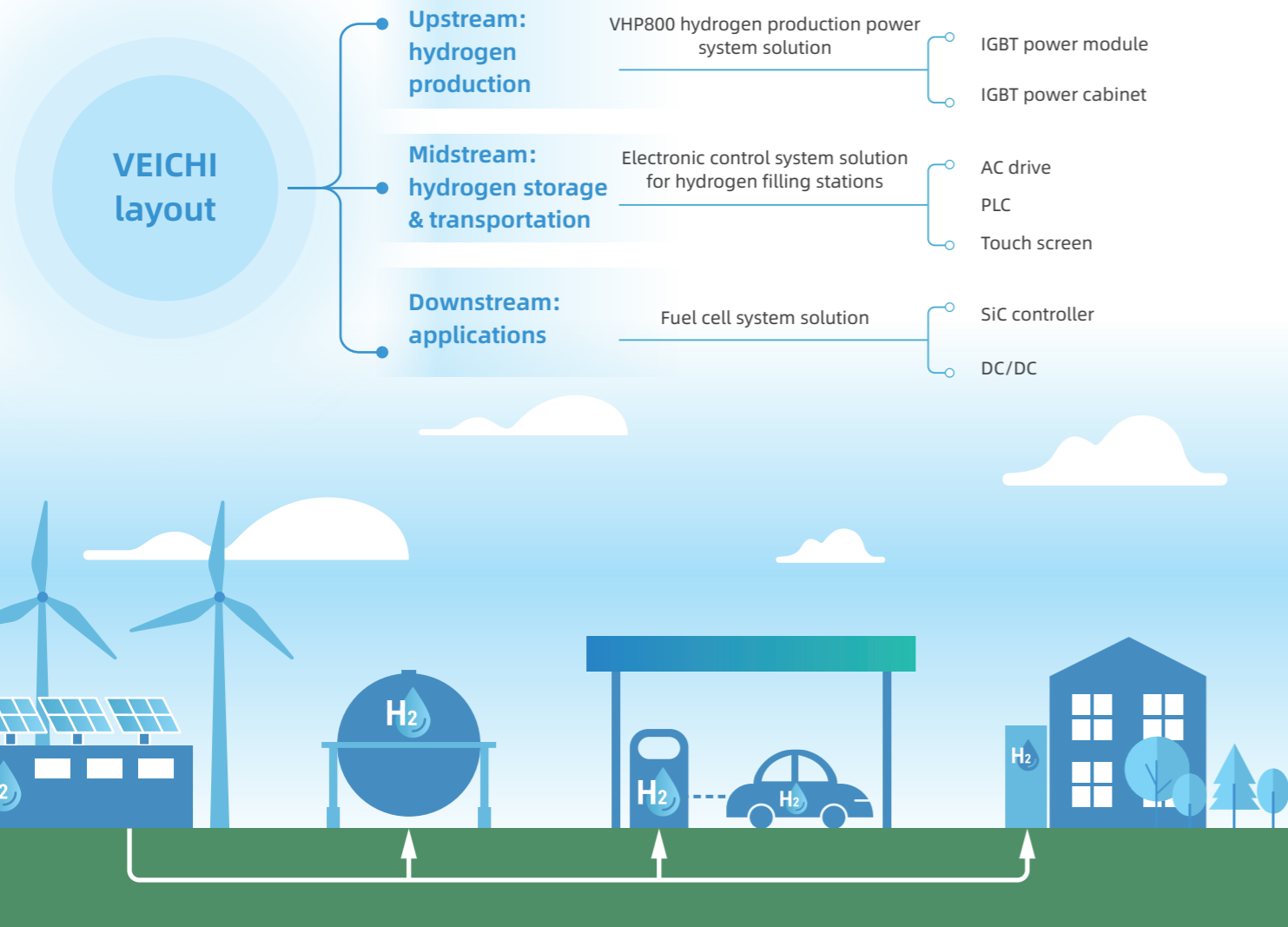
Technical Specification

Item	Specification	
Input	Input voltage range	400V-690V
	Rated operating frequency	50Hz/60Hz
	Rated power factor	> 0.99
	Power factor range	-0.95 ahead~0.95 lag
	Grid frequency deviation	±10%
	Grid voltage deviation	±10%
	On-grid total harmonic distortion rate	<3% (at rated power)
	Connection method	3-phase 3-line + PE
Output	Output voltage range	0V-1000V
	Output current range	0A~20000A
	Voltage ripple	≤1%
	Current stabilizer accuracy	±1% (steady state)
	Voltage stabilizer accuracy	±1% (steady state)
	Load response time	<0.1s (0%~100% of load, operating status)
Control mode	Output control	Voltage control, current control, power control
Protection	Protection function	Short-circuit, over-current, over-voltage, under-voltage, phase loss, overheating, and overload, etc.
System	Inlet/outlet method	Lower inlet, lower outlet (customizable)
	Efficiency	≥97%
Environment requirement	Cooling	Liquid cooling
	Operating temperature	-30°C ~ +60°C(>45°C derating)
	Storage temperature	-40°C~+70°C
	EME	Class A
	Relative humidity	5%RH ~ 95%RH (non-condensing)
	Enclosure IP	IP54 (Customization available)
	Altitude	4000m (>2000m derating)
Communication	Interface	RS485, Ethernet, etc.
	Protocol	Modbus RTU, Modbus TCP, etc.
Noise	Noise (1m distance)	≤65dB
Display	HMI	Touch screen (customizable)

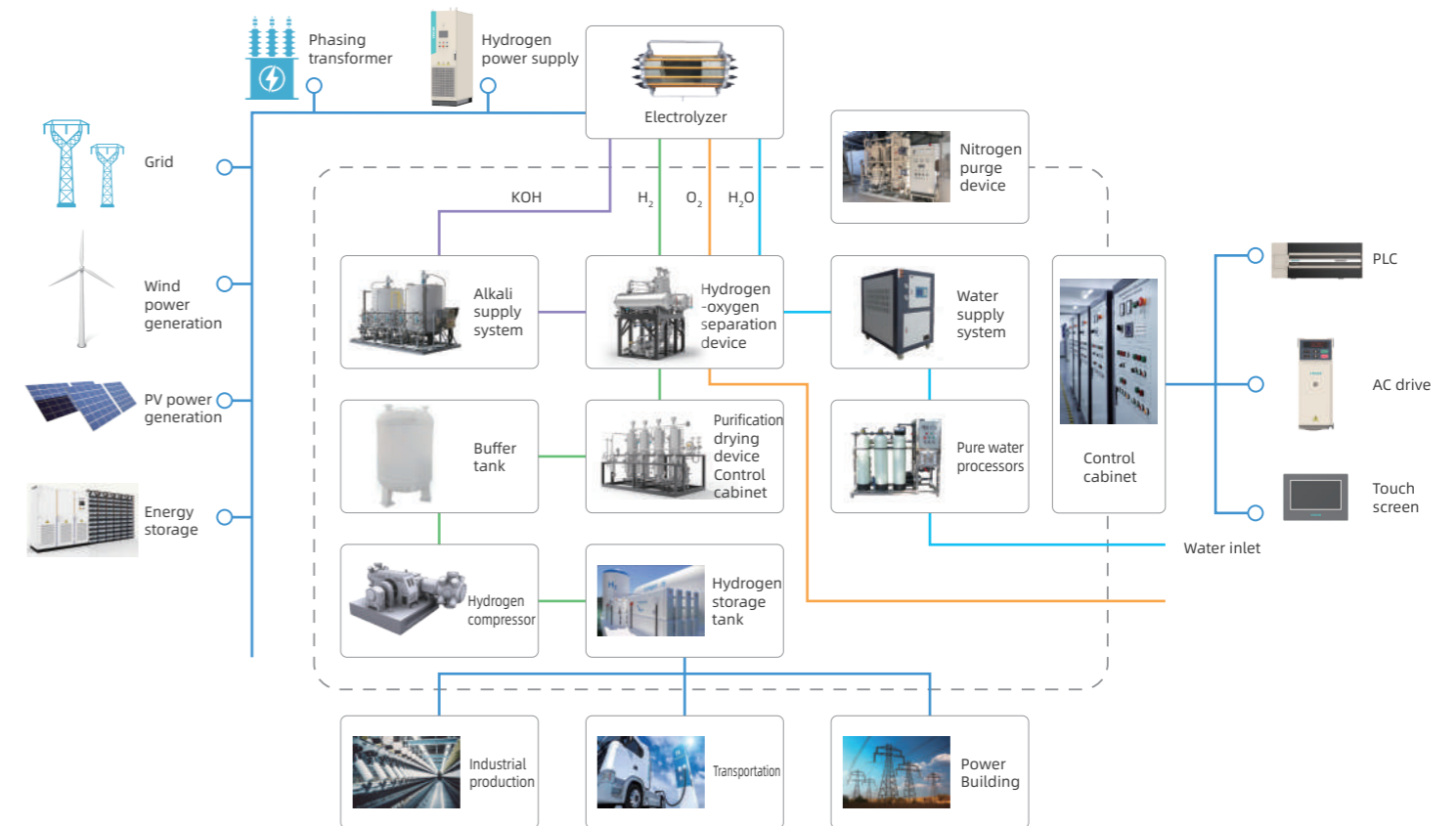
VEICHI Hydrogen Energy Layout

China aims to hit its two major goal of "carbon peak" and "carbon neutrality". Hydrogen energy, given its pivotal role in replacing fossil fuels and enhancing renewable energy consumption, is essential for fulfilling these carbon commitments. And producing green hydrogen from renewable sources represents the direction of future development.

As a pioneer in industrial control, VEICHI is dedicated to hydrogen energy sector through digital, intelligent, and efficient solutions across its entire industry chain. VEICHI has established strategic alliances with leading entities like CM Energy and Huashang Xiageng (CM's subsidiary). Moving forward, the company aims to integrate deeply with industry players across the industry chain, address critical challenges, and offer superior, safe, and efficient products and solutions. In collaboration with industry allies, VEICHI is committed to fostering the sustainable growth of the hydrogen energy industry and driving innovation towards a greener future.



Hydrogen Production System Solution



Quick Start

- Quick start in flexible power supply scenarios
- Cold start <30m, and hot start <10m

Rapid Response

- IGBT module power adjustment response speed <300ms, quickly responds to PV, wind power and other applications
- Output current ripple <1%, overall efficiency of 94%~96%

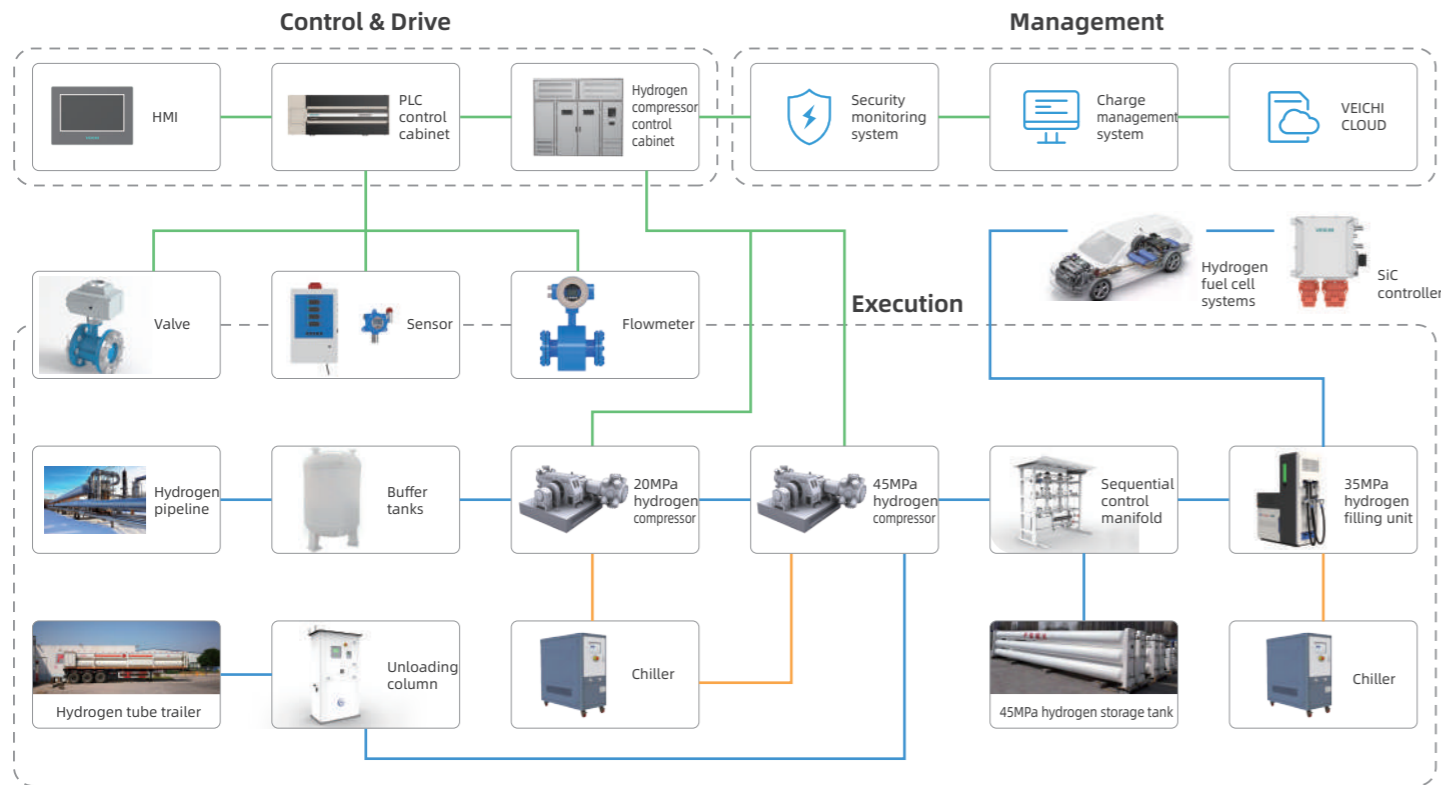
Adaptive System

- Multi-level control algorithm for optimal system adaptability and anti-interference
- Safe and efficient hydrogen production system

Wide-Range Adjustment

- Constant voltage/current control algorithm for output voltage, current and power adjustment in the range of 0%~110%.

Hydrogen Filling and Application Solutions



Solution feature:

VEICHI self-developed monitoring and management system, PLC control cabinet and hydrogen compressor control cabinet with optimal product performance and adaptability for applications.

Stable and efficient SiC controller + DC/DC control solution for hydrogen cell system.

SiC product features:

Wide input voltage range: 450VDC~850VDC
 Strong overload capacity: 2x of rated overload for 20s
 High frequency application: Carrier up to 50 kHz
 High output frequency: 0Hz~5000Hz
 High efficiency: ≥97%
 IP: IP67
 Superior high-carrier synchronous modulation technology and high-carrier motor control technology

Application Site



R&D and Manufacturing

R&D Capacity

- > Excellent professional and technical talents in the field of industrial control in China have gathered in VEICHI with R&D personnel accounting for 37.16% of the total employees, while technical personals with bachelor's degrees or above for 75.19%.
- > VEICHI is always committed to providing customers with stable and trustworthy products and technical services in accordance to the research and development concept of "strive for excellence by innovating technologies".
- > Annual R&D investment of accounts for about 10% of the whole revenue. EMC laboratory, safety laboratory, reliability laboratory, product performance testing laboratory and a number of experimental platforms for multiple industrial applications are established successively.
- > In-depth cooperation with many famous universities and research institutions in China has been established and "Jiangsu Postdoctoral Innovation Practice Base" and "Jiangsu Postgraduate Workstation" set up successively.

Intelligent Automation Production

- > Products are based on digital technologies from the beginning of product development, to production programming and then production, that is the whole production cycle, with an annual output up to 914,600 units.
- > 5 fully imported MT high-speed chip mounting lines, 5 automatic coating lines, 4 DIP testing lines, 1 automated line equipped with robotic arms, 12 production lines ensure production of all of the VEICHI products.
- > All of the products are checked by the quality management mode of 3 (tri-inspection system)+ 1 (proportional inspection) during the whole process, and all of them are carried out automatically so as to ensure the performance.
- > Three major production management system WMS, MES and ERP together ensure that the unique code of each product is traceable in the system to manage product quality.



Service and Support

