

RENLE

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雷诺尔

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Science&Technology Co., Ltd.

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August , 2019



WeChat Public Service Account

RENLE

Professional manufacturer of
Smart Grid · New Energy · Electric Drive

RNHV SERIES

HV VFD (AC DRIVE)



Technical innovation benefits the world

Stock code: 833586



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Shanghai RENLE
Science&Technology Co., Ltd.

Intelligent power grid - New energy - Electric drive - Professional Manufacturer

RENLE Science&Technology Co., Ltd.



Shanghai Renle Science & Technology Co., Ltd. is the integrator designs the intelligent electrical energy-saving system, manufactures products and provides solutions to control system. Its products include HV/LV motor soft starter, HV/ LV frequency inverter, intelligent electricals, new-energy electricals, HV/LV complete equipment for electric power transmission distribution and so on. Its products are widely used in electric power, metallurgy, petroleum chemistry, military industry, mining, chemical industry, construction, light industry, pharmaceuticals, municipal construction, textile printing and dyeing, papermaking, rubber and plastic, electrified railway construction and other industries. Its products sell well in many countries and regions of the world.

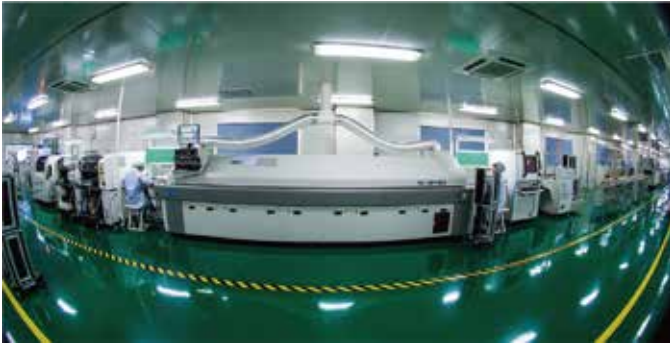
The company products are used in many projects, such as Expo 2010 Shanghai China, 2008 Beijing Olympic Games, Yangshan Deepwater Port Project of Shanghai International Shipping Center, Shanghai Pudong Airport, Shanghai Hongqiao Airport, the Three Gorges Project, Gansu Satellite Launching Center, South-to-North Water Diversion Project, West-to-East Natural Gas Transmission Project, China National Petroleum Corp., SINOPEC, Double Coin Holdings, Shandong Linglong Tyre and other national key supporting projects. Its premium products and excellent after-sales service are favored by the clients.





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The company takes a lead through the ISO9001 Quality Management System Certification, ISO14001 Environmental Management System Certificate, OHSAS18001 Occupational Health and Safety Management System Certificate, CE, China Compulsory Certification (CCC), China Certification Center for Energy Conservation Product (CECP), Technischer Überwachungsverein (TUV), Certificate of Conformity GOST and product inspection and certificate. The company keeps introducing international advanced production and test equipment, sets up labs, and provides D&R experiment base for several domestic colleges and universities. The company is approved to set up the postdoctoral centre by the Human Resources and Social Security Bureau, signaling Renle' s collaboration with the school in establishing the platform for combination of production, teaching and research, improving the enterprise' s capability of independent innovation, research and development.

Adhering to hard-working and enterprising-spirit, the compa-

ny gradually realized production modernization, group management, product specialization and technology leadership, and was credited with honors, such as the National Torch Plan Key High-tech Enterprise, High-tech Enterprise, Enterprises Accredited for Fulfilling Contract and Valuing Credit in China, National Key New Product, Shanghai Innovative Enterprise, Shanghai Certified Enterprise Technology Center, Shanghai Famous Trademark, Shanghai Famous Brand Product, Shanghai Key New Product, Shanghai Brand Name Products, Postdoctoral Centre and intelligent power grid R&D center and so on.

The company shall keep developing products of energy-saving, efficiency, precision and humane. With the specialized and unique control technology, advanced and applicable innovative products, and deep-integrated solutions, the company helps clients in realizing economic transformation, industry upgrading and speedy internalization. With its high-qualified products, the company aims to be the world-renowned specialized manufacture of intelligent electrical equipment.



Technical innovation benefits the world
Stock code: 833586

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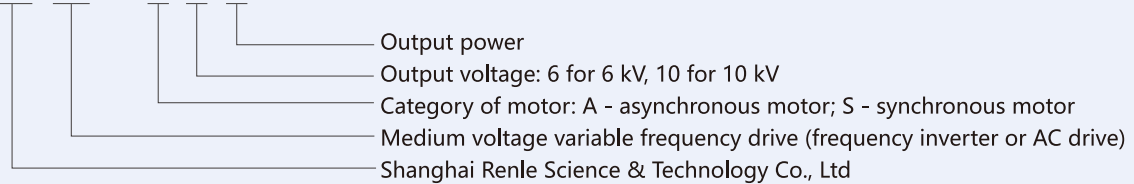
● Product overview

RNHV series smart medium voltage variable frequency drive (AC drive or frequency inverter), adopting power cell series connection technology, directly outputs 6 and 10kV voltage. It is a high voltage-high voltage VSI (Voltage Source Input) VFD. Renle regards high reliability, simplified operation and high performance as its design goal so as to meet the urgent requirements of the users for mechanical speed control and energy saving of fan and pumps and improvement of production technologies etc. In order to shorten the construction period required for installation and reconstruction of MV VFD system, Renle introduces the integrated design for the drive, which consists of all components and inner wiring of transformer cabinet, power cabinet, control cabinet and MV switchgear (bypass cabinet is optional). The user is only required to connect MV input/output cables, LV control power supply and control signal cables etc. The complete drive has been wholly tested prior to delivery so that both quality and performance of every product is guaranteed.

In order to meet the requirement of transformation project and reduce the investment of new project, every function part of RNHV series frequency inverter can be installed step by step. In this way, it is ensured that there is no accident during transportation and installation. Convenient front-back maintenance, high-performance key imported components, and advanced production technologies, all these greatly reduce the requirements of the drive for the site environment.

● Type Description

RN HV — A-□/□



● The VFD is widely used for

● Thermal power plant

— Such as fan, compressor, pumped storage pump, induced draft fan, condensate pump, circulating water pump and boiler feed pump etc.

● Petroleum, petrochemistry and natural gas

— Such as pipeline transportation pump, water injection pump, water feed pump, submersible pump, circulating water pump, brine pump, compressor, pressure blower, oil transfer pump and electric submersible pump etc.

● Coal industry and mines

— Such as scale removing pump, mud pump, slurry pump, clean water pump, feeding pump, axial flow fan, stirring pump, kiln, belt conveyer, dedusting fan, drainage pump, medium pump and counter-rotating fan etc.

● Steel industry and nonferrous metallurgy

— Such as blast furnace blower, induced draft fan, compressing blower, draft blower, water feed pump, water supply pump, dephosphorization pump, dedusting fan, converter and blast furnace etc.

● Cement and construction material

— Such as blast furnace blower, induced draft fan, compressing blower, draft blower, water feed pump, water supply pump, dephosphorization pump, dedusting fan, converter and blast furnace etc.

● Municipal construction

— Such as (for heating, water supply and waste water treatment etc.) aeration blower, induced draft fan, draft blower, pressure pump, hot water circulating pump, sewage pump, water purifying pump, lift pump, water supply pump and reclaimed water pump etc.

● Light industry and chemical industry

— Such as gas blower, pressure pump, compressor, axial flow pump, water softening pump and water supply pump etc.



● Product features

● Adapted to rigid environment

- Smooth operation at ambient temperature -5 to 40 °C without capacity reduction (derating);
- Excellent heat dissipation design, advanced S-shape air duct, long-life, large airflow cabinet-roof fans, and air intake filters that feature low wind resistance, strong dust-proof capability and easy disassembly;
- Superior power network adaptability that enables the drive to work without stop under +15~-25% of rated voltage;
- Coated circuit board that resists rigid environment;
- With super large margin design the power units can be designed and operated under 120% of load. All electronic components are designed and evaluated with 90% derating according to national standards.

● Adapted to rigid environment

- Perfect input at the grid side without harmonics. Harmonics control and suppression device not required;
- Efficiency of the complete VFD is above 96%;
- HV-HV structure directly outputs 6kV or 10kV voltage. No request is needed to modify the motors; Forward/reverse rotation speed tracking and restart function is particularly applicable to such load as fans.

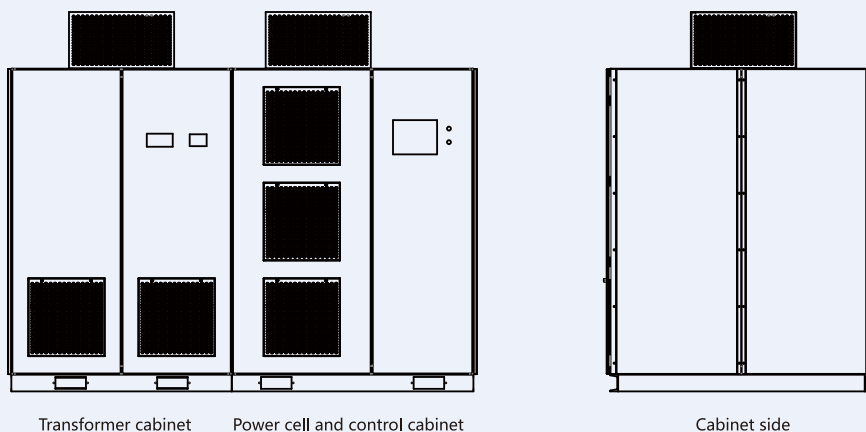
● Prominent features

- The product offers three kinds of control modes: V/F, vector control with PG, vector control without PG;
- Multifunctional self-adaptive V/F feature ensures maximum start torque;
- DSP + Field Orientation Control (FOC) technology ensures optimum dynamic features;
- CAN bus communication torque distribution control is applicable to multmachine reconnection;
- Precise inverter nonlinear compensation acquires good low speed features;
- Neutral point drifting technology ensures maximum output power and reduction of power during bypass running of the power cells;
- Power cell automatic bypass technology;
- Perfect fault self-diagnosis and self-repairing ability;
- Power grid gapless synchronous switching;
- Restart-after- power failure function, speed search and speed tracking restart.

● High quality after-sales service

- RENLE offers rapid one-stop service to customers during the service life of the equipment;
- Suggestion and tracking from specification establishment to aftersales services;
- RENLE' s service network is all over China.

● Product outer dimensions and parameters



Outline diagrams of transformer cabinet and control cabinet

6kV/106kV MV VFD configuration table

Voltage degree	Power (KW)	Capacity of transformer (KVA)	Transformer Cabinet	Power Cabinet (W×D×H)	The Maximum Size of the Complete Machine (W×D×H)	Fan	Quantity of Fan
6KV	250	315	1125X1500X1803	1275X1500X1803	2440X1540X2098	RH40M-4DK.4C.1R	2
	280	350					
	315	400					
	355	450					
	400	500					
	450	560					
	500	630					
	560	700					
	630	800	1800X1500X2151	1700X1500X2151	3539X1540X2446	RH40M-4DK.4C.1R	4
	710	900					
	800	1000					
	900	1125					
	1000	1250					
	1120	1400					
	1250	1600	1975X1300X2253	2350X1300X2253	4364X1340X2587	RH45M-VDK.4F.1R	4
	1400	1750					
	1600	2000					
	1800	2250					
2000	2500	2175X1500X2523	3375X1500X2523	5589X1540X2857	RH45M-VDK.4F.1R	6	
2240	2800						
2500	3150						
2800	3500						
3150	4000						
3350	4450	2500X1500X2447	4575X1500X2447	7114X1536X2781	RH45M-VDK.4F.1R	9	
4000	5000						
4500	5600						
5000	6300						
5000	6300						
10KV	315	400KVA	1300X1550X1900	1425X1550X1900	2765X1590X2237	RH45M-VDK.4F.1R	2
	400	500KVA					
	450	560KVA					
	500	630KVA					
	560	710KVA					
	630	800KVA					
	710	900KVA					
	800	1000KVA					

> To be continued

> Continuing

Voltage degree	Power (KW)	Capacity of transformer (KVA)	Transformer Cabinet	Power Cabinet (W×D×H)	The Maximum Size of the Complete Machine (W×D×H)	Fan	Quantity of Fan
10KV	900	1120KVA	1850X1550X2000	1425X1550X2000	3315X1590X2337	RH45M -VDK.4F.1R	2
	1000	1250KVA					
	1120	1400KVA					
	1250	1600KVA	2100X1600X2260	1650X1600X2260	3790X1640X2597	RH45M -VDK.4F.1R	4
	1400	1800KVA					
	1600	2000KVA					
	1800	2240KVA					
	2000	2500KVA	2250X1300X2300	3275X1300X2300	5568X1340X2637	RH45M -VDK.4F.1R	5
	2240	2800KVA					
	2500	3150KVA					
	2800	3550KVA	2400X1400X2510	4125X1400X2510	6568X1440X2847	RH45M -VDK.4F.1R	7
	3150	4000KVA					
	3550	4500KVA					
	4000	5000KVA					
	4500	5600KVA	2800X1600X2755	6450X1600X2755	9293X1640X3092	RH45M -VDK.4F.1R	10
	5000	6300KVA					
5600	7000KVA						
6300	8000KVA						
7100	9000KVA						
8000	10000KVA						

Note: The dimensions of VFD mentioned above are only for reference. The actual dimensions are regulated in the technical agreement.

● Product's technical parameters

Name	Item	SPECIFICATION
Input	Power supply	3-phase, 6/10kV, 50/60Hz
	Input voltage range	Voltage: -15%~ +10%; Frequency: 2%
Output	Rated voltage	3-phase, 6/10kV, 50/60Hz
	Frequency range	0 ~ 120HZ
	Set resolution	0.01 HZ
	Overcurrent capacity	120% of rated output current for 1 minute; protection starts immediately under 180% of rated output current
Control	Control mode	V/F, vector control with PG, vector control without PG
	Synchronous switching	The VFD attains the status of grid-connected operation by following the phase and frequency of the voltage, so it realizes smooth switching from frequency conversion to working frequency without impact.
	Torque compensation	During start stage torque boost is realized automatically up to 150% and above
	Slip compensation	To compensate the speed drop under load and increase the hardness of mechanical characteristics

> To be continued

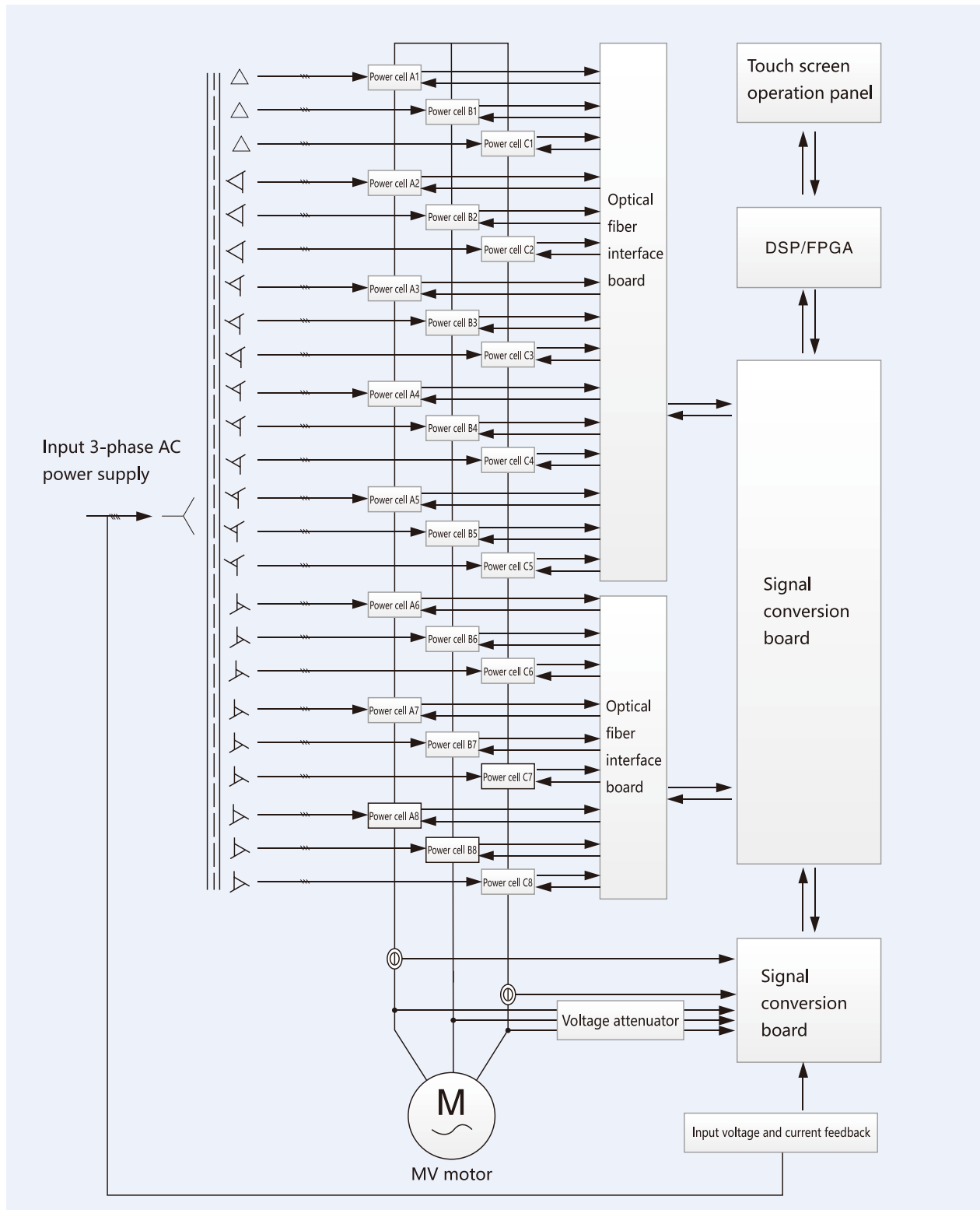
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Name	Item	SPECIFICATION
Control	Upper and lower limits of frequency	Setting of upper and lower frequency limits is available
	Jump frequency	Setting of three groups of jump frequencies is available
	Rotation speed tracking and restart	Switching to frequency conversion mode for operation without stopping the running motor
	Acceleration and deceleration time	0.1~3600 sec. Independent setting of acceleration and deceleration time is available
	Acceleration and deceleration integral type	Linear, S1 and S2 curves are selectable to meet different application requirements
	Operation mode	Operation on the VFD, local operation, remote operation
	Stop mode	Free stop, deceleration stop and deceleration plus DC braking stop are selectable
	PID closed-loop control	Applicable to different closed-loop control systems of flow, pressure and temperature etc.
	Neutral point drifting	Any power cell can be bypassed. Through neutral point drifting technology, the 3-phase output is still balanced. In this way, maximization of VFD's output power is ensured after one power cell is bypassed. So when a certain power cell has fault, it can be bypassed and the normal operation is not influenced.
	Automatic power cell bypass	When a certain power cell has fault, the VFD will automatically bypass the faulted power cell and continue running through the Neutral Point Drifting technology. Without manual intervention. When two or more power cells are bypassed, the user can perform derated running according to requirements.
	Restart-after- power failure	When power grid fails abruptly, the VFD can be restarted within the set time after the power is resumed. The VFD will go back to its status before power failure without manual intervention.
	Frequency setting	Analog input signal setting: setting is realized with 0~10VDC voltage signal, 0~20MA, 4~20MA current signal. Multi-frequency selection setting: selection of 1~7 frequency operation is available by combination of digital quantity input ports
Field bus	Modbus,TCP/IP, Profibus-Dp	
Operation state output signal	Relay output: selectable to display running states of operation, stop and fault etc. Analog output: selectable to display frequency, current, voltage, rotation speed or other running parameters.	
Display	During running/stop state	To display frequency, current, voltage and power
	During setting state	To display set menu number or set parameters
	During function operation state	To display prompting information of function being operated
	During alarm and fault state	To display different alarm and fault codes
Protection	Overload protection	To monitor output current of the drive to protect it when overload occurs
	Overvoltage protection	To monitor overvoltage at DV bus and input voltage of the drive for protection of the drive
	Surge voltage protection	This function protects the drive on the occasion of surge voltage among side lines of input power supply or between the lines and the earth
	Undervoltage protection	To monitor input voltage to protect the drive when undervoltage occurs
	Overheating protection	To monitor the temperature rise of the heat radiator for protection of the drive when the rise exceeds the set value
	Short circuit protection	This function protects the drive when short circuit or overcurrent occurs at the output side of the drive
	Overload protection of electric motor	To monitor the overload running of the motor for protection of it
Phase failure protection	To monitor input voltage failure for protection of the drive	
Environment	Application place	Indoors application with altitude below 1000m above the sea level; Without erosive gas and flammable gas; no dust, mist or water drop etc; No direct exposure to sunshine and no interference of strong magnetic field. The drive has to be derated at altitude over 1000m
	Temperature of application	-5°C ~ +40°C
	Humidity of application	5 ~ 95%RH((with no frost)
	Vibration	≤0.5g
	Storage temperature	-40°C ~ +70°C
Protection level	IP30	

● Working principle and diagram

Each phase of the RNHV medium voltage drive consists of power units in series connection with the function of voltage boost through superposed wave. Every power unit is provided with independent phase-shift power by the isolation transformer. By the means of changing the quantity of series units, it is convenient to obtain output of different voltage levels. The power unit adopts AC-DC-AC method. IGBT is used as the main circuit switching element.

Working Principle Diagram of 6/10kV MV VFD



● System structure of the VFD

Please refer to the diagram for the structure diagram of RNHV series MV variable speed drive. RENLE' s MV drive consists of phase-shift transformer cabinet, power cell cabinet and control cabinet. The drive, which adopts cell module series connection and multi-level technology, is a voltage source input drive. With high reliability and easy operation features, it meets the requirement for speed control of fans and pumps etc.

● Product introduction – structural composition

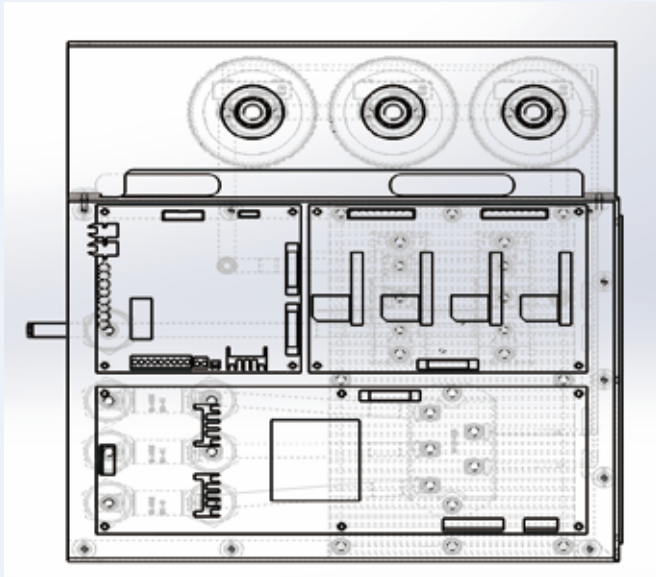
● Power cell

The Power cell is a very important execution part in the MV drive. Renle' s advanced design ideas are thoroughly embodied in the power cabinet. In order to ensure long, safe and stable running of the system, Renle is very careful in choosing every part and component in the power cabinet. Renle also devotes huge energy to production technology to ensure excellent features of the product.

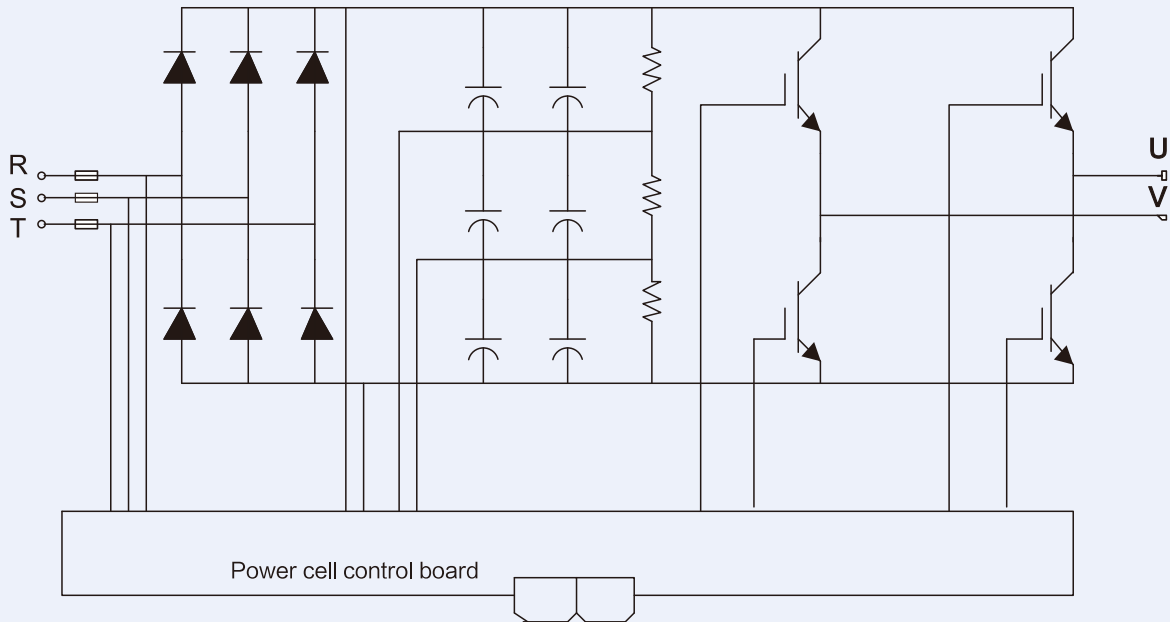
1) Power unit modularization is adopted as the design idea. Each power unit can be drawn out, moved and replaced with ease from the supporting racks. Since all power units are totally identical, if one certain power unit fails to work properly due to fault, it is applicable to replace it with a backup power unit within the time allowed for withdrawal. It takes only 5 minutes to replace a power unit with no special tool.

2) The mature Inverter technology is applied. Each power unit in the power cabinet is powered by a group of the second side of the input transformer. The power units are insulated to each other and so are the second windings of the transformer. Every power unit directly uses power devices of large power which are interchangeable to each other. The power cell is basic single phase inverter circuit and the rectifier side is diode three phase full bridge. The control mode of IGBT inverter bridge is PWM control.

3) Power unit series connection and multi-level technologies are applied. Solutions of different quantity of power units are adopted in terms of voltage levels. By mutual series connection of output terminals U and V at each power unit into star connection, the drive supplies power to the motor. PWM waveform of each power unit is recombined to provide a perfect PWM waveform with lower dv/dt, and to reduce damage to cables and motor. There is no need for output filter and the cables can be extended to a long distance according the requirement of the customer. The motor can be run without derating and the drive can be directly used for the renovation of old equipment. Meanwhile, the harmonic loss of the motor is greatly reduced, the mechanical vibration thereof is eliminated and the mechanical force of bearing and impeller is also decreased.



Power cell



Circuit diagram of the power cells

● Control Cabinet

The control cabinet is the core of the whole MV frequency conversion and speed control system. All the functions of the drive are realized depending on the advanced control concept. The elaborately designed algorithm in the controller ensures optimal operation performance of the motor. The man-machine interface provides friendly English/Chinese monitoring and operation interface. In the meantime remote control and network control is realized.

1) The control cabinet consists of DSP/FPGA high-speed processor, man-machine interface and PLC etc. The man-machine interface (HMI) is a window for communication between the VFD and the user at application site. DSP/FPGA processor realizes PWM control algorithm. The man-machine interface provides connection of the drive with the site interface of the customer. The built-in PLC is employed for logic processing of the switch signals in the cabinet and can be flexibly connected to the interface at customers' site of application to meet their special requirement.

2) PLCs are adopted to process different switching value logic signals, customer' s site control system flow signals and state signals. This enables Renle' s drive to own strong system interface and communication capability which are subject to extension according the requirement of the users.

3) Optical fiber communication technology is adopted between the control cabinet and power cells. There is effective electric isolation in the low voltage and the high voltage sections. The system has high reliability, rapid communication and strong anti-electro-magnetic interference capability. The control cabinet is equipped with UPS, which ensures reliability of supply by the control power.

● Installation, transportation and storage

- By common transportation vehicle
- Handle with care. Strictly no rain drench, violent vibration or impact during transportation
- Storage temperature: $-40^{\circ}\text{C} \sim +70^{\circ}\text{C}$
- Requirement for storage environment: No dust and corrosion and without inflammable and explosive atmosphere
- Installation requirement: Vertical installation for the cabinets

● Design standard

Standard	Description
GB156-2007	Standard voltages
GB/T1980-2005	Standard frequencies
GB2681-81	Colours of insulated conductors used in electrical assembly devices
GB3797.34	Electric-driving controlgear Part 2: Electric-driving controgear incorporating electronic devices
GB3859.1-93	Semiconductor convertors – Specification of basic requirements
GB3893.2-93	Semiconductor convertors – Application guide
GB3859.3-93	Semiconductor convertors – Transformers and reactors
GB10233-2005	Basic test method for electric – driving controlgear assemblies
GB12668.3-2003	Adjustable speed electrical power drive systems Part 3: EMC product STANDARD including specific test methods
GB12668.4-2006	Adjustable speed electrical power drive systems Part 4: General requirements – Rating specifications for AC power drive systems above 1000 VAC not exceeding 35 kV
GB/T14436-93	General principles of industrial product guarantee documents
GB/T15139-94	General technical standard for electrical equipment structure
GB/T13422-92	Power semiconductor convertors – Electrical test methods
GB/T14549-93	Quality of electric energy supply, harmonics in public supply network
IEEE Std-1992	Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems

- Several project acceptance reports



ACCEPTANCE REPORT

● Several project acceptance reports



RENLE

验收报告

基本信息	
项目名称	600MW海上风电项目
项目编号	REN-2017-120
客户名称	上海雷诺尔科技股份有限公司
合同编号	本行五金字第 01 号在案附件 01 号
生产编号	RN-FV-G12021
验收日期	2017.5.27
设备安装	
安装地点/环境情况	与安装说明书相符, 基础可靠/稳定
使用环境	符合使用要求, 接地电阻小于 4 欧
验收方式	整机验收/出厂
调试情况	
运行控制调试	正常, 满足现场工作要求
风机空载调试	正常, 变频器运行正常
风机带载调试	正常, 满足风机运行要求
试运行/验收情况	设备性能达到投入正式生产运行要求, 发电率为 50%

结论:
 一、设备在调试、试运、正常生产期间, 二次性启动调试工作正常, 供货商能够按照提报验收方案要求, 合理处理设备控制部分故障, 满足了现场工艺调试的要求, 发电率为 50%, 变频器运行稳定, 在稳定运行的同时, 节约了能源, 实现了显著的经济效益和社会效益。
 实测数据对比, 发现节能效果非常明显, 同时满足了现场调试的要求。
 验收结论: 同意验收

上海雷诺尔科技股份有限公司

● Part of achievements

DatangGangu Power Plant

Datang Shandong Power Generation Technical Engineering Co., Ltd.

GuizhouHuadianTangzhai Power Generation Co., Ltd.

Hubei Xiangfan Power Generation Co., Ltd of China Huadian Corporation Ltd.

Wujiang Thermal Power Company of China Huadian Engineering (Group) Co., Ltd.

Weihai Thermal Power Group Co., Ltd.

Anhui HuadianLu' an Power Plant

Xinjiang Steel and Iron Co., Ltd of Laigang Group

Tonghua Iron & Steel Co., Ltd.

Jigang International Engineering & Technology Co., Ltd.

Shanxi Jindi Mining Co., Ltd

Alxa Yellow River High Head Irrigation Administration

ZuoyunDonggucheng Coal Co., Ltd of Shanxi Coal Imp. & Exp. Group Co., Ltd.

Xinjiang Xiyi Instrument Sales Co., Ltd.

Xinjiang Yili Biotechnology Co., Ltd.

Sichuan HuiliHengchao Mine Co., Ltd.



● National Key Projects

Three Gorges Project

Beijing Olympic Rowing–Canoeing Park

Beijing Olympic Games Supporting Projects

Beijing Wukesong Gymnasium

Government Offices Administration of the State Council

CCTV, China

Beijing Capital International Airport

South-to-North Water Diversion Project

Huangshan–Quzhou–Nanping Expressway

West-to-East Electricity Transmission Project

West-to-East Natural Gas Transmission Project

Stations of Shanghai Magnetic Levitation Rail Transportation

Expo 2010 Shanghai China Supporting Projects

Shanghai Pudong Airport

Shanghai International Automobile Museum

Shanghai Hongqiao Airport Extension Project

Terminal of Inner Mongolian Hohhot Baita International Airport Extension Project

Shenyang Olympic Center

Qingdao Olympic Center

Jinan Olympic Center

Chengdu Shuangliu International Airport Extension Project

Chongqing Yuanjiagang Olympic Sports Center

Guangzhou New Baiyun International Airport

Wuhan Tianhe Airport

Shanghai Metro Line 3

Chongqing International Convention & Exhibition Center

Shanxi Wanjiashai Yellow River Diversion Project

Qinghai Xiaoyou Mountain Ecological Engineering

Tianjin Eight Large Regions Heating Engineering

Shandong Heze City Yellow River Diversion Project

Yangshan Deepwater Port Project of Shanghai International Shipping Center

Sichuan Xichang Satellite Launching Center





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Shanghai RENLE
Science&Technology Co., Ltd.



Guangxi Longtan Hydroelectric Project

Gansu Satellite Launching Center

Yunnan Honghe River Nansha Hydropower Station

Datang International Power Generation Co., Ltd.

Guizhou Kailin (Group) Co., Ltd

Inner Mongolian Shenhua Group Corporation Limited

Shanghai Petrochemical Company Limited

Baosteel Group Corporation in Shanghai

Taizhou Petrochemical Co., LTD

Anshan Iron and Steel Group Corporation

Jilin Petrochemical Company

Wuhan Iron and Steel (Group) Corp.

Liuzhou Chemical Industry Co., Ltd, Guangxi

Beijing Shougang Company Limited

SINOPEC Cangzhou Company

China Great Wall Aluminum Corporation

SINOPEC Luoyang Company

Guangxi Pingguo Aluminium Company

Yueyang Petrochemical Factory

Liuzhou Iron and Steel Co., Ltd

Sinopec Nanjing Chemical Industry Co., Ltd

Magang (Group) Holding Company Ltd

SINOPEC Beijing Yanshan Company

Shanxi Zhongyang Iron and Steel Co., Ltd.

PetroChina Urumqi Petrochemical Company

Daqing Oilfield Limited Company

PetroChinaJinxi Petrochemical Company

SINOPEC Shenli Oilfield

CNPC Dushanzi Petrochemical Company

PetroChinaLiaohe Oilfield

Beijing Financial Street

PetroChinaTarim Oilfield

Panda Museum of Chengdu Panda Ecological Park

Karamay Oilfield

Qingdao Beihai Shipyard

PetroChinaChangqing oilfield



