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Shanghai RENLE
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Technical innovation benefits the world
RENLE Science & technology

RENLE

Professional manufacturer of
Smart Grid · New Energy · Electric Drive

RNB3000 SERIES

FREQUENCY INVERTER

Technical innovation benefits the world

Stock Code : 833586

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About RENLE

Shanghai RENLE Science & Technology Co., Ltd. is one large industrial enterprises for capital operation, brand operation, and industry operation and so on. RENLE is specialized in the production of LV/MV/HV motor soft starter, LV/MV/HV frequency converter, intelligent electric equipment, new energy electric equipment and complete sets of LV/HV transmission and distribution equipments.

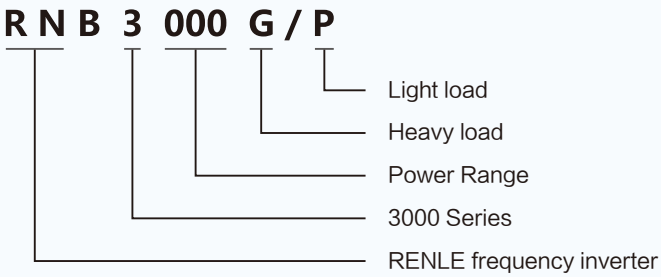
National key projects

Expo 2010 Shanghai China, 2008 Beijing Olympic Games, Yangshan Deepwater PortProject 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. and SINOPEC etc.

Manufacturer of intelligent power grid and new energy electric

RNB3000 Series
Frequency Inverter

Type introduction:



Note:

- P Type: Light load type, the overload ability is 120%,such as Fan, pump.
- G Type: Heavy load type, the overload ability is 150%.such as ball mill, rolling machine and belt machine.

Unique product performance

Newest space vector technology

Excellent vector algorithm guarantees the big torque for low frequency in premise of lowest switch loss. High efficiency power voltage availability and optimized sine wave output will reduce its working noise and heat of motor.

Unique software dead-zone compensation

Excellent vector algorithm guarantees the big torque for low frequency in premise of lowest switch loss. High efficiency power voltage availability and optimized sine wave output will reduce its working noise and heat of motor.

Excellent speed tracking self-starting without speed sensor

Start the running motor to guarantee the user's equipment to keep stable running RNB3000 can automatically recognize the speed to realize stable speed tracking.

Automatic energy saving running

Unique software power factor regulation which will regulate the power factor dynamically according to the change of load so as to save much energy.

Voltage fluctuation control

Automatic voltage control could guarantee the output voltage vibration is within ±5% when the input voltage vibration is within ±20%

Complete protection function

Overvoltage, overcurrent, undervoltage, IGBT short-circuit, inverse time limit overload protecting design. And it also requests necessary grounding to realize safe protection.

DC power supply

Save the power supply investment.

Built-in flexible PWM energy consumption braking

The user selects the suitable braking resistor to realize energy consumption braking conveniently.

Friendly HMI and flexible input&output interface port

LCD Chinese-English display, supply 8 routines digital input, 2 routines analog input.3 routines digital output, 2 routines analog output and multi-speed programmable running.Potential meter setting mode.

Intelligent temperature detection

Intelligent fan management

① Control the start and stop of the fan according to the inverter running/stop command;
②The user can set the temperature to control the start and stop of the fan.

The relation between the altitude and the output derating.

Altitude	Output current derating rate
Below 1000	1.0

Note: Derating by 1% for altitude rising per 100m

Detailed specification

Serial No.	Specification and type	Applicable moton	Rated voltage	Rated current	The calculated total power loss
1	RNB3001G	1.5kW	380Vac	4.1A	52W
2	RNB3002G	2 2kW		5.6A	67W
3	RNB3003G	3kW		7.2A	81W
4	RNB3004G	4kW		10A	103W
5	RNB3005G	5.5kW		13A	142W
6	RNB3007G	7.5kW		16A	204W
7	RNB3011G	11kW		24A	295W
8	RNB3015G	15kW/18.5kW		32A/37.5A	450W
9	RNB3018G	18.5kW/22kW		37.5A/44A	540W
10	RNB3022G	22kW/30kW		44A/61A	660W
11	RNB3030G	30kW/37kW		61A/73A	900W
12	RNB3037G	37kW/45kW		73A/90A	1100W
13	RNB3045G	45kW/55kW		90A/106A	1350W
14	RNB3055G	55kW/75kW		106A/147A	1650W
15	RNB3075G	75kW/90kW		147A/177A	2250W
16	RNB3090G	90kW/110kW		177A/212A	2700W
17	RNB3110G	110kW/132kW		212A/260A	3300W
18	RNB3132G	132kW/160kW		260A/315A	3960W
19	RNB3160G	160kW/200kW		315A/368A	4800W
20	RNB3200G	200kW/250kW		368A/480A	6000W
21	RNB3250G	250kW/315kW		480A/600A	7500W
22	RNB3315G	315kW/355kW		600A/650A	9450W
23	RNB3400	400kW		760A	12000W
24	RNB3500	500kW		972A	15000W

Product technical specification

Item	Standard	
Input	Power supply	3 phase 380Vac 50/60Hz
	Input voltage range	Voltage: ±20%, Voltage imbalance ratio: <3%: Frequency: ±5%
Output	Applicable motor capacity	1.5~500kW(Constant torque application); 2.2~500kW(Torque change applications)
	Applicable motor capacity	4.1~972kW(Constant torque application); 5.6~972kW(Torque change applications)
	Rated current output	3 phase 380Vac 50/60Hz
	Frequency range	0~600Hz
	Setting resolution	· Analog setting: 0.4% of the maximum setting frequency · Diaital settina: 0.01Hz (below 100Hz): 0.1Hz (above 100Hz)
	Frequency precision	· Analog setting: ±0.2% (25±10℃) · Digital setting: ±0.01% (−10~+50℃)
	Over current withstand capacity	G type: 150% rated output current for 1 Min; P type: 120% rated output current for 1 Min.

Control	Control type	Optimized space vector SPWM
	Torque compensation	Automatic torque arising for starting, which will reach 150%
	Slip compensation	Compensate the speed drop when driving the load in order to enhance the mechanical characteristic hardness
	Restarting when instant power supply failure	It will restart for the power recovery undergoing instant power supply failure
	Upper and lower frequency	Set the upper frequency and lower frequency
	Skip frequency	Set 3 groups of skip frequency
	Speed tracking restarting	No need to stop the running motor but it could interchange to run under continual running operated by frequency inverter.
	Acceleration and deceleration integral type	The available linear line, S1 and S2 curve, which will satisfy multi-purpose demand.
	Running operation mode	· Keyboard operation; keyboard control; communication operation;diaital input operation and analoa input control · Serial communication: controlled by upper machine through the RS485 port
	Stop mode	Free stop, deceleration stop and deceleration with DC braking stop
	Low noise running control	Adjust the frequency from 1KHz to 6KHz to reduce the running noise.
	PID closed-loopcontrol	It is available application for different closed-loop control system such as flow, pressure, temperature
	Frequency setting	· Keyboard setting: use ▲ and ▼ key to set. · Analog input signal setting(potential setting): with 0~10VDC voltage signal · 0-20mA, 4-20mA current signal setting · Multi-step frequency selection setting: Configurated by the digital input to select the 1~7 running frequency.
	Running status output signal	· Relay output: running status, fault status and monitoring status are available. · Analogue output: available to select related parameters like frequency, current, voltage, speed and so on.
Display	Running/stop	Display frequency, current and so on.
	Setting mode	Display the setted menu No. or setted parameter value
	Function operation mode	Display the operating function information and warning information.
	Alarm and fault mode	Display all the alarms and fault codes
Protection	Overload protection	Monitor the output load current of frequency inverter to protect the frequency inverter.
	Overvoltage protection	Monitor the overvoltage of DC bus to protect the frequency inverter.
	Surge voltage protection	When power line-to-line or line-to-grounding exists the surge voltage, this function will protect the frequency inverter
	Under voltage protection	Monitor the DC bus voltage, when the voltage is lower than the setting level of n608, this protection will protect the frequency inverter.
	Overheat protection	Monitor the temperature arising of the heat sink. Once the temperature exceeds the setting, this function will protect the frequency inverter.
	Short-circuit protection	Short-circuit or overcurrent of frequency output side, this protection will protect frequency inverter.
	Short-circuit to grounding protection	When Short-circuit to grounding happens on output side of frequency inverter, this function will protect frequency inverter.
	Motor overheat protection	The frequency inverter will use electronic relay to carry out the motor overload protection.
	Over current protection	100-150% (Adjustable)
	Grounding protection	U, V, W relative short circuit, inverter stop.
Environment	Application site	Indoor, the altitude is less than 1000m. It requests no corrosive gas, no flammable gas, no dust, no oil mist, no water drop. Prohibit direct sunshine without strong magnetic field interference.
	Application temperature	-10℃~40℃

	Application of humidity	5~95%RH (No frost)
	Vibration	≤0.5g
	Storage temperature	-25℃~60℃

Terminal function

Control terminal function description

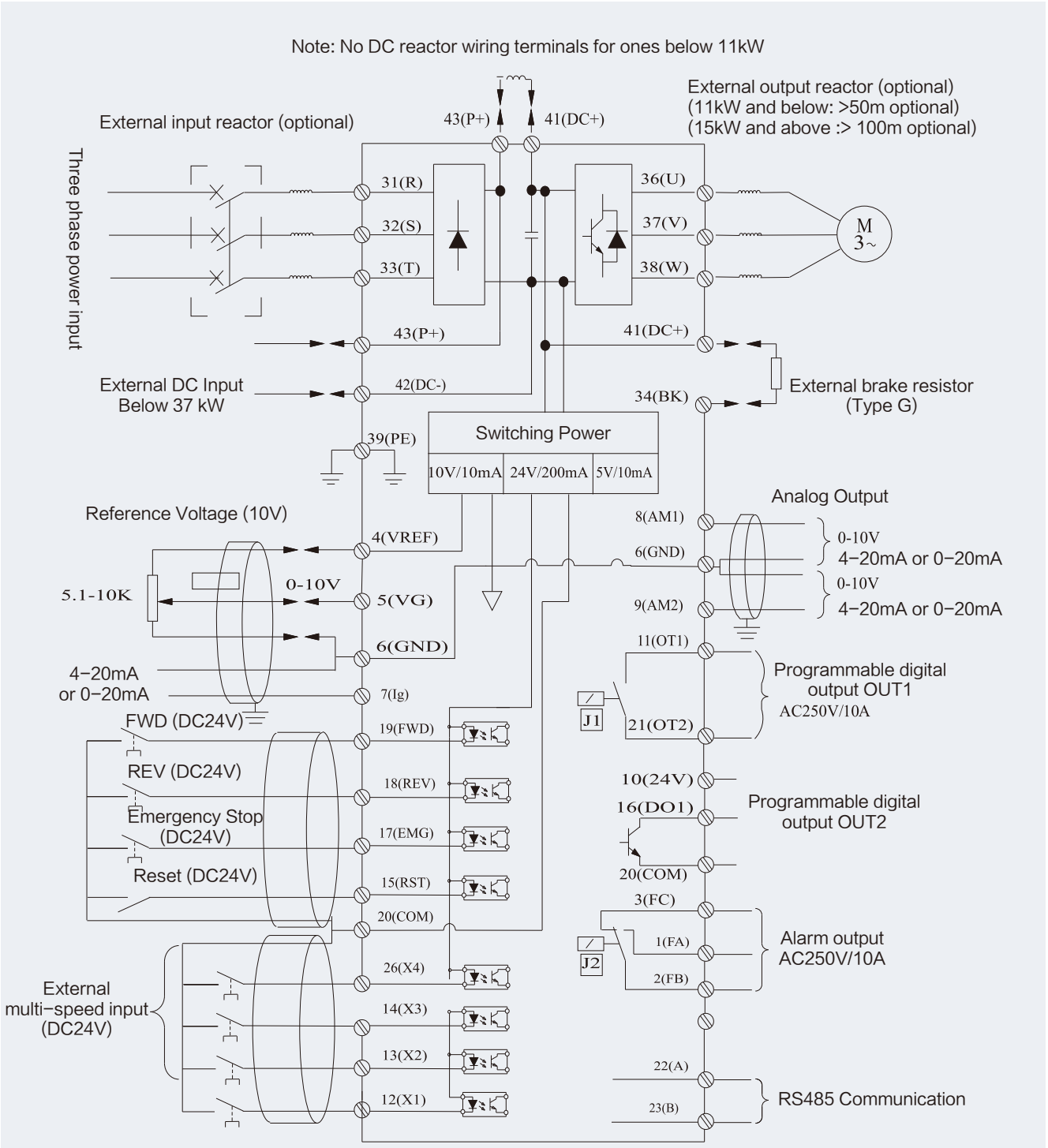
Terminal	Code	Terminal name	Instruction
4	VRBF	Power supply for potential meter	Power supply(+10VDC) of frequency setting potential meter(5-10k)
5	VG	Voltage input of frequency setting	(1) Connect the external analog input voltage command to set the frequency 0-10V/ 0-100% resolution 10bit input precision is 1% (2) Input the feedback signal of PID control (input resistor 20K)
7	Ig	Current input of frequency setting	(1) Connect the external current to set frequency 4-20mA(or 0-20mA)/0-100% (2) Input the feedback signal of PID control, resolution of 10bit input precision is 1%
6	GND	Digital/Analog signal common	The common terminal of analog input/output signal
12 13 14 26	X1 X2 X3 X4	External multi-purpose terminal	(1) 12, 13, 14 connect with 20 to form external 7 steps setting frequency. (2)X1, X2 JOG potential meter (3)Extension function(See the detailed instruction)
15	RST	Reset	15 connects with 20 to reset the frequency nverter
17	EMG	Emergency stop	17 connects with 20 to make the motor stop freely, the electric level is 24VDC
18	REV	Reverse	REV-COM close(ON), reverse running, open(OFF), decelera-tion to stop
19	FWD	Forward	FWD-COM (ON), (Forward running), (OFF), deceleration to stop
20	COM	Control signal common	
10	24V	Control signal power	Available to be offered by the external power(24VDC, current <200mA)
8	AM1	Analog output	Output current, voltage and frequency signal(GND is common terminal) terminal output level is 0-10V electric level
9	AM2		Output current, voltage and frequency signal(GND is common terminal) terminal output signal is 4-20mA(or 0-20mA)
11 21	OT1 OT2	Programmable output	Output relay signal of the start/stop, reaching the given frequency(open-loop), exceeding preset frequency, less than preset frequency, the contact capacity: AC 250V 2A
16	D01	Programmable output	Output the signal of the start/stop, reaching the given frequen-cy(open-loop),exceeding preset frequency, less than preset frequency, open collector signal output, electrical level 24 VDC, current<100mA. Voltage withstand 50V
22 23	A B	Signal output	RS485 communication

1	FA	Fault relay output	When the frequency inverter stops because of alarm caused by overcurrent, over voltage, undervoltage, overheat, overload, short-circuit. The fault relay output contact (1.2.3) will output the alarm signal. If the alarms occur, the alarms need to be reset according to the manual. Contact capacity: AC250V 10A
2	FB		
3	FC		

System control function

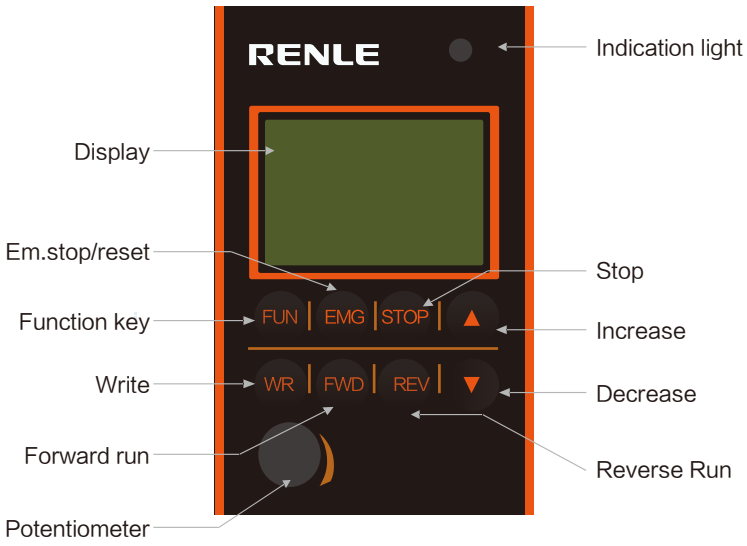
Input control	Output control	
Analog input:	Analog output: Two loops(Programmable output)(See function table)	
Voltage input: (0-10V) 1 loop Current input: 4~20mA or 0~20mA 1 loop	0~10VOutput 4~20mA or 0~20mA output	2 loops programmable terminal can output the voltage, current, power and frequency.
Digital input: 8 loops	Digital output: 3 loops	
1 loop for Forward, 1 loop for reverse, 1 loop for emergency stop and 1 loop for reset Programmable point: 4 loops (See the function table)	Fault output relay: 1 loop(see function table) Programmable digital output: 2 loops(See function table)	

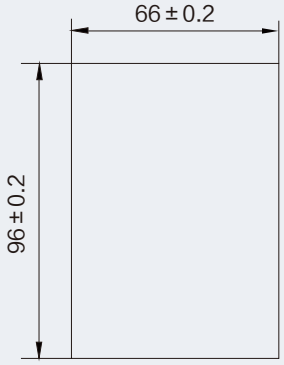
Wiring diagram



Note: It is recommended to use the DC reactor for ones with 45kW and above.

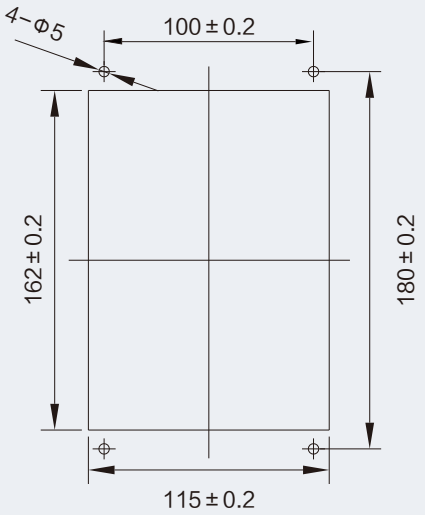
Operation keyboard





1.5kW–315kW

Hole size for assembly on its body and outer keypad



400kW–500kW

Hole size for assembly on its body

The keyboard panel can display English and Chinese. The keyboard panel has abundant functions, such as the keyboard panel running(frequency setting, running/stop command), function code data confirmation and change with many confirmation functions. Please operate the equipment after understanding the function operation completely.

Indication lamp: Indicate the frequency inverter status.

- a. Green lamp flashing:indicate that the inverter is forward running;
- b. Red lamp flashing:indicate that the inverter is reverse running
- c. alternating flashing between red lamp and green lamp:Indicate the fault happens in frequency inverter

Display: LCD display is used to display frequency, motor current, DC voltage, synchronous speed, temperature and so on. And it also displays the reason of stop because of protection activation. Moreover, It displays function codes and data codes set by the program.

- **Stop key:** it is used to interchange main monitoring value display under the status of regular motor stop or stop status.
- **Value increased key:** it is used to search for the function code or modify the parameters (To constantly press this key will make it to be with automatic step-distance recognition function)
- **Value decreased key:** It is used to search for the function code or modify the parameters (To constantly press this key will make it to be with automatic step-distance recognition function)
- **Emergency stop/reset key:** It is used to stop freely and reset fault .
- **Function key:** It is used for transferring window between function code and function parameter. Pressing the key for one time will transfer one time.
- **Input key:** It is used to confirm (store) parameter or interchange the display of main monitoring value under running state.

Note Item:

When the frequency inverter is controlled by the contactor or use the output relay of the frequency inverter to control the contactor, the R-C damping loop should be connected with the loop of AC contactor. The DC contactor should be added with the fly-wheel diode.

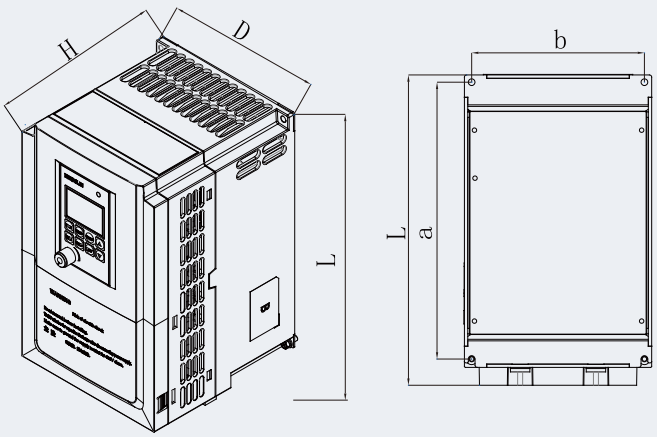
⚠ Note:

- Please confirm that the input power phase number of frequency inverter, rated input voltage should comply with phase and voltage value of AC power number. The frequency inverter just needs three phase AC power supply. The zero wire can not be wired into frequency inverter in any way.
- Must connect the grounding wire
- The wiring operation should be carried out by the qualified personnel.
- Confirm to cut off the power and then begin to operate.
- When there is the thermal relay between frequency inverter and motor, we should connect the output filter, input reactor and output reactor due to the wrong action which probably happen even if the cable length from frequency inverter to motor is less than 5Om.

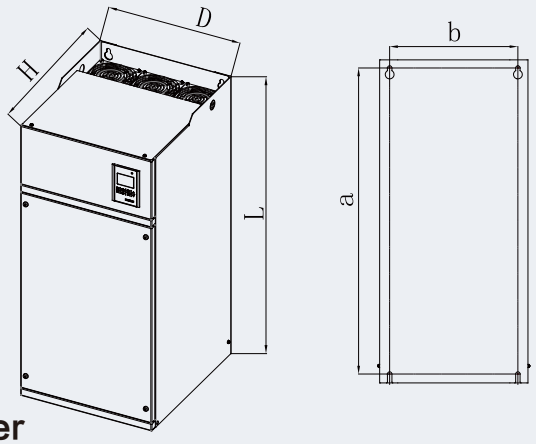
The supplement instruction

Input reactor(option)	The input reactor can repress the high order harmonic of the frequency inverter current so as to improve the input power factor and prevent the surge impact. For following situation, the input AC reactor is suggested to be used. 1. Imbalance of three phases is more than 3%. 2. The SCR equipments or the power factor compensation device controlled by the switch on the same power supply. 3. The power of frequency inverter is above 110KW
Output reactor(option)	The main function of output reactor is to compensate the influence of the distributed capacitor, which could repress the output harmonic of frequency inverter and reduce the noise of frequency inverter. For following situation, we must adopt output reactor. The length of cable to motor: below 11kw, more than 50m; above 15kw, more than 100m.
DC reactor(option)	Function: improve the power factor. If the power is above 45KW (including 45kw), the DC reactor is suggested to be used.

Size of outline and installation



Small power



Medium and big power

Type	Outline size (mm)			Installation size		Screw installation
	L	D	H	a	b	
1.5-5.5kW	330	156	202	313	100	M6
7.5-11kW	372	180	226	355	120	M6
15-22 kW	508	242	245	480	180	M8
30-37 kW	508	242	245	560	180	M8
45-55 kW	680	307	288	660	240	M8
75-90 kW	709	370	295	692	260	M8
110-132 kW	800	370	430	760	320	M10
160-200 kW	930	468	405	900	380	M10
250-315 kW	1170	620	418	1140	520	M10
400-500 kW	1430	800	498	1398	680	M10

Remarks: Installation mode for all the above types is wall mounting. Type 400-500kw could choose bottom rack.

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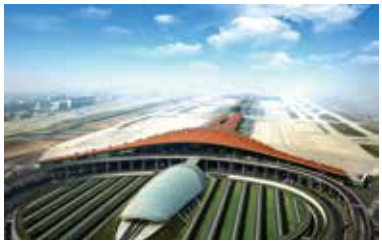
National Key Projects

Three Gorges Project
Beijing Olympic Rowing-Canoeing Park
Supporting Projects for the Beijing Olympic Games
Wukesong Indoor Stadium
Bureau of Government Offices Administration of the State Council
CCTV (China Central Television)
Beijing Capital International Airport
China Second Artillery Corps Missile Base
China Air-to-air Missile Research Centre
LA Air Force Radar Base
South-to-North Water Diversion
Zhejiang Huangqunan Expressway
Electricity Transmission from West to East China
West-East Natural Gas Transmission
Shanghai Maglev Rail Transit Station
Supporting Projects for Shanghai Expo
Shanghai Pudong International Airport
Shanghai Auto Museum
Extension Project for Shanghai Hongqiao Airport
Terminal Expanded for Hohhot Baita International Airport
Shenyang Olympic Sports Center
Beijing Nanyuan Airport
Yunnan 2409 Airforce Airport
Qingdao Olympic Sports Center
Jinan Olympic Sports Center
Extension Projects for Chengdu Shuangliu International Airport
Chongqing Olympic Sports Center
New Baiyun International Airport
Wuhan Tianhe Airport
Shanghai Metro Line 3
Chongqing International Conference Centre
Shanxi Wanjiazhai Yellow River Diversion Project
Qinghai Xiaoyou Mountain Ecological Project



Tianiin Badapian Heating Project
Shandong Heze Yellow River Diversion & Water Supply Project
Shanghai International Shipping Center Yangshan Deepwater Port
Xichang Satellite Launch Center
Guangxi Longtan Hydropower Project
Gansu Satellite Launch Center
Yunnan Honghe Nansha Hydropower Station
Datang International Power Generation Co., Ltd.
Guizhou Kailin Group Co., Ltd.
Inner Mongolia Shenhua Group
Jinshan Petrochemical Company
Shanghai Baostéel Group
Taizhou Petrochemical Company
Anshan Iron and Steel Group
Jilin Petrochemical Company
Wuhan Iron and Steel Group
Guangxi Liuzhou Chemical Industry
Capital Iron and Steel Company
Guangzhou Petrochemical Company
China Great Wall Aluminum Corporation
Luoyang Petrochemical Company
Guangxi Pingguo Aluminum Company
Yueyang Petrochemical Company
Guangxi Liuzhou Iron and Steel Group
Nanjing Petrochemical Company
Maanshan Iron and Steel
Beijing Yanshan Petrochemical Company
Shanxi Zhongyang Steel
Urumqi Petrochemical Company
Daqing Oilfield
Jinxi Petrochemical Company
Shengli Oilfield
Dushanzi Petrochemical Company
Liaohe Oilfield
Beijing Financial Street
Talimu Oilfield
Panda Museum in the Chengdu Ecological Park of Giant Panda
Karamay Oilfield
Qingdao Beihai Shipyard
Shaanxi Changqing Oilfield