

RENLE

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WeChat Public Service Account

RENLE

Professional manufacturer of
Smart Grid · New Energy · Electric Drive

RNB1000 SERIES

FREQUENCY INVERTER



Technical innovation benefits the world

Stock code: 833586



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RENLE

Shanghai RENLE Science & Technology Co., Ltd is a designer and product provider of energy saving system for intelligent electric industry, as well as an integrator of solutions for control system. Renle's products include LV motor soft starter, LV frequency inverter (VFD or AC drive), intelligent electric equipment, new energy electric equipment and complete sets of LV/HV power transmission and distribution equipment etc. The products are widely used in different kinds of industries and fields, such as electric power industry, metallurgical industry, petroleum and petrochemical industries, mines, chemical industry, construction industry, construction material industry, municipal engineering, military industry, light industry, textile, printing and dyeing, paper-making and pharmaceutical industries etc. Renle's products are well exported to many countries and areas in the world.

Renle's products have been used as parts of complete national key 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 Type Group Ltd., and Shandong Linglong Tire Co., Ltd. etc. The products receive unanimous appraisal from the customers for excellent quality and perfect after-sales service.

In China, RENLE is a pioneer who has firstly passed the certification of ISO9001 Quality Management System, ISO 14001 Environment System, OHSAS 18001 Occupational Health and Safety

Management System, CE, TUV, GOST and national CCC etc. RENLE has been continuously introducing internationally advanced production and test equipment, and has established laboratories and provided R&D experiment base to domestic universities and colleges. Approved by National Human Resources and Social Security Bureau, RENLE has established a post-doctoral workstation. This shows that RENLE cooperates with universities for setting up platforms for teaching and study. This raises the independent innovation ability and R&D ability of the enterprise.

For many years Renle has been striving for and devoted to production modernization, administration collectivization, production specialization and technical leading. Renle has achieved many honors: Key High-tech Enterprise of National Torch Program, High and New Tech Enterprise, National Enterprise of Credit, State-level Key New product, Shanghai Innovative Enterprises, Shanghai Enterprise Certifying Technology Center, Shanghai Renowned Brand, Shanghai Famous Brand Product, Shanghai Key New Product, Shanghai Renowned and High Quality Product, Post-doctoral workstation and Smart Grid R&D centers.

Renle will continually develop energy saving, high efficient, precise and humanized products, as well as help customers realize economic transformation and industrial upgrading with unique industrial control technology, advanced and applicable innovation products and profoundly integrated solution. In addition, Renle will speed up its pace of internationalization, satisfy the customers with quality and try to become a world renowned professional supplier of smart electric equipment!



RENLE
Outline of Renle



RENLE



RNB1000 SERIES

FREQUENCY INVERTER

Renle's RNB1000 series frequency inverters are applicable to 3-phase squirrel cage asynchronous motor. With compact structure and high reliability, they are widely used in manufacturing and transportation and other industries.

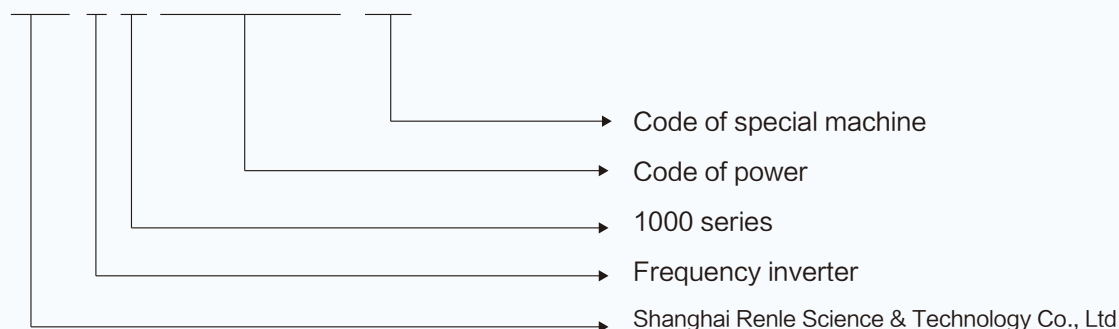
- Fan and pump;
- Ceramic machinery;
- Machine tool;
- Woodworking machinery;
- Packing and printing machinery;
- Material transportation equipment and other universal equipment (conveyor and lifter).

Technical innovation benefits the world

Stock code: 833586

Model description

R N B 1 XXXG/XXXP - X



Character	Description
RN	Shanghai Renle Science & Technology Co., Ltd
B	Low voltage frequency inverter
1	1000 series
XXXG/XXXP	Code of power: G: Constant torque load (heavy load); P: Variable torque load (light load); G/P: Integrator of type G and type P. XXX: Code of power, such as, 001:1.5 kW; 037:37 kW; 110:110 kW
-X	Code of special machine: Default value stands for universal machine Such as - S stands for special frequency inverter for constant pressure water supply.

Product Characteristics

RNB1000 series frequency inverters help users to raise production efficiency depending on their compact structure, powerful function and convenient operation.

- Under V/f control mode, the frequency inverters offer high-precision current limiting control. So the driver gets rid of overcurrent alarm no matter in fast acceleration/deceleration or during locked rotor. In such way the driver is protected reliably; Under vector control mode, high-precision torque limiting control allows the driver to output strong or soft torque according to the technological control of the user, and so reliably protect the mechanical equipment.
- Under V/f separation control mode, output frequency and output voltage can be set separately. This is applicable to variable frequency power supply, torque motor control and other applications.

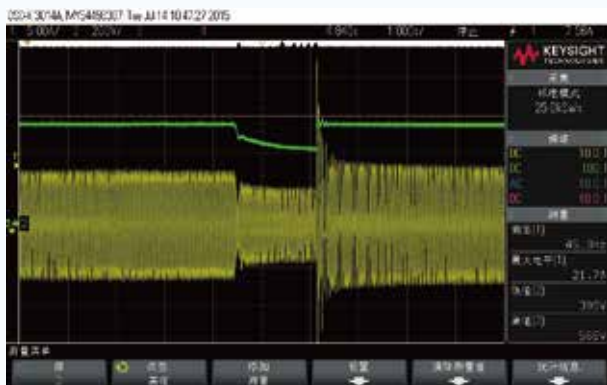
Control mode	Start torque	Range of speed control	Speed precision	Torque response
V/F control	0.5Hz 180%	1:100	±0.5%	
Vector control without PG	0.5Hz 180%	1:100	±0.2%	<10ms



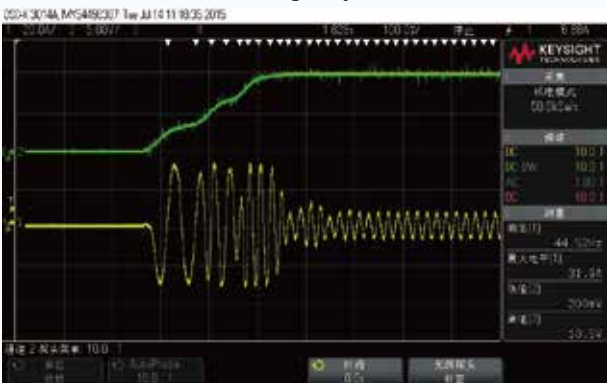
Speed search start



Overvoltage suppression



Undervoltage adjustment



Overcurrent stall protection function

- Speed search, accurate and reliable, can enable no-impact smooth start of rotating motor.

- Process PID control owns abundant giving and feedback modes. Two groups of proportion, integration and differential parameters can be switched freely.

This control is especially applicable to energy saving of fans and pumps.

- The inverter supports input of DC power and enables user to arrange application of common DC bus.

- Overvoltage stall protection: During fast deceleration of large inertia load, the regeneration energy may result in overvoltage fault. The instantaneous adjustment of output frequency can reduce the probability of overvoltage tripping, so the continuous and reliable operation of the system is ensured.

- Undervoltage adjustment: When instantaneous undervoltage or power failure occurs, the DC bus voltage remains constant depending on the automatic reduction of output frequency, so the continuous operation of the driver within short time is guaranteed. This function is applicable to application of fans and pumps.

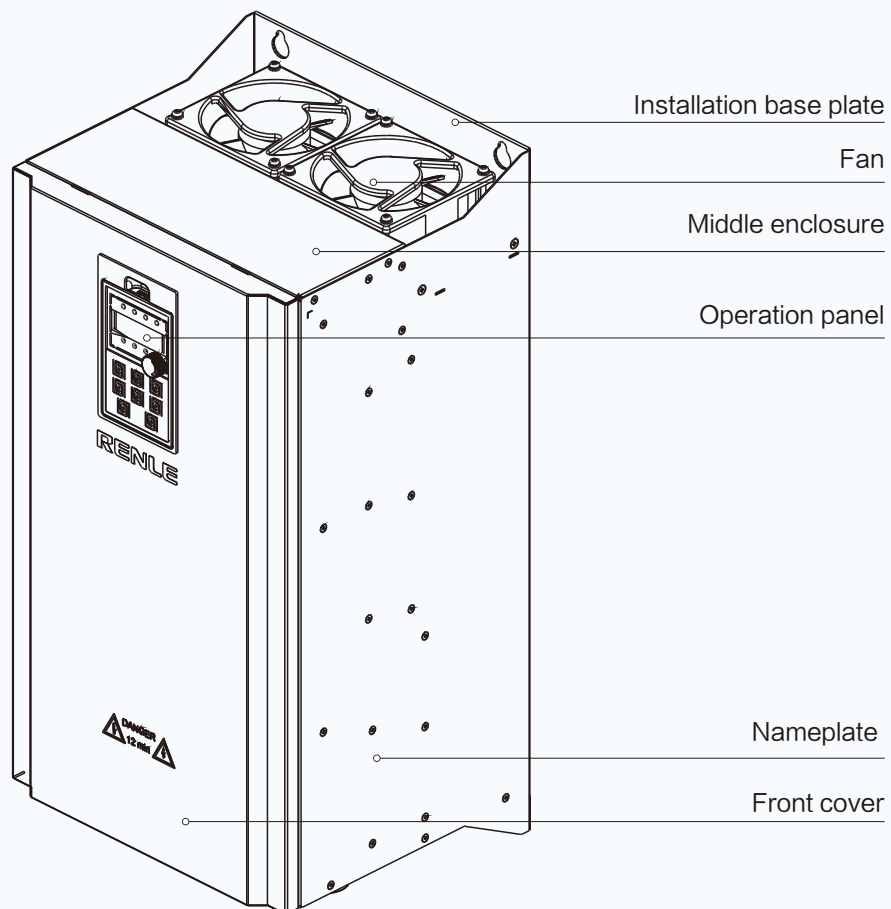
- Overcurrent stall protection function: During fast acceleration of heavy load, the instantaneous large slip may result in overcurrent fault. The instantaneous adjustment of output frequency can reduce the probability of overcurrent tripping, so the continuous and reliable operation of the system is ensured.

- Low frequency oscillation suppression function: During no-load or light load start of large power motor, the acute oscillation may occur and result in fault tripping. Enabling this function can suppress oscillation effectively and ensure reliable operation of the system.

- Automatic torque boost: Under V/f control mode, the inverter can automatically adjust output torque according to the state of the load. It is applicable to light load, no-load and even overload start.

- Wave-by-wave current limiting function: During heavy load start or abrupt increase of heavy load, this function enables automatic limitation of the output current before the overcurrent fault occurs, and avoids frequent tripping of the frequency inverter.

Description of parts of the frequency inverter



Product specifications

	ITEM	INDEX AND SPECIFICATION
Main input power	Rated voltage	3-phase, AC 380V, 50/60Hz
	Frequency range	Voltage: 380V ± 20% Frequency: ± 5%
Main output power	Rated voltage	0 ~ rated input voltage
	Output frequency	0Hz ~ 600 Hz
Technical features	PWM mode	SVPWM, 3-phase modulation and 2-phase modulation
	Control mode	V/F control, vector control without PG (open loop vector), torque control
	Operation command giving method	External terminals, keypad of the panel, serial communication
	Speed command giving method	Analog giving, keypad of the panel, communication, high-speed pulse, terminal multistage speed giving, PID control giving, simple PLC giving
	Range of speed control	Open loop vector control 1:100
	Speed control resolution	Open loop vector control ± 0.5%
	Overload capacity	150% of rated output current for 60s; 185% of rated output current for 10s; 200% of rated output current for 1s
	Automatic voltage adjustment	When the power grid's voltage changes, the inverter can automatically maintain constant output voltage
	Speed search start	Enables no-impact smooth start of rotating motor.
Control terminal input	Available inner power	1 route, +10VDC, max. current: 50mA (used for potentiometer)
		1 route, +24VDC, max. current: 200mA (used for logic input port)
	Analog input	2 routes, 0 ~ 10VDC or 0/4 ~ 20mA DC, selectable
		1 route, -10 ~ +10VDC
	Switching amount input	8 routes of programmable logic inputs. NPN and PNP collector open loop signals are supported. 39 logic input functions, such as forward, reverse, fault reset are selectable.
Pulse signal input	1 route of high-speed pulse input, which can be used as switching amount input. Input frequency range: 0~50KHz. They can also be used as high-precision speed giving source or speed feedback resource with strong anti-interference capability.	
Control terminal output	Analog amount output	2 routes, 0 ~ 10VDC or 0 ~ 20mA DC, selectable
	Switching amount output	2 routes of programmable logic outputs, NPN collector open loop signal, 20 logic input functions, such as in-operation, forward, reverse, fault output are selectable.
	Pulse signal output	1 route of high-speed pulse output. NPN collector open loop signal, 13 output functions selectable.
	Programmable relay output	2 routes with a couple of NO contacts and a couple of NC contacts separately, contact capacity: 250VAC/3A, 30VDC/1A
Communication interface		RS485 interface, supporting Modbus protocol

> To be continued

> Continued

	ITEM	INDEX AND SPECIFICATION
Operation panel	Display	Digitron panel or LED panel, displaying state parameters and fault codes etc, and for setting parameters
	Indication lamp	State indication lamp, displaying the operation state information of the inverter; Unit indication lamp, displaying the unit of the digital data shown by the LED
	Push button	For operating the inverter and setting parameters
	Parameter copy	The inverter supports upload of the data by the user to the panel for storage. It also supports download of the data stored by the user in the panel to the machine.
Fault protection		With 25 fault protection functions, such as output overcurrent, bus overvoltage, bus undervoltage, motor overload, inverter overload, input phase failure, output phase failure, rectification module overtemperature, inversion module overtemperature, external fault, communication fault, current detection fault, motor self-learning fault, EEPROM operation fault, PID feedback failure fault, braking unit fault and arrival of factory setting time etc.
Environment	Standard	In compliance with diversity of international standards (IEC, EN), especially, IEC/EN61800-5-1(Low voltage), IEC/EN61800-3 (standard for anti-interference of conduction and radiation)
	Place of application	Indoors, altitude < 1000 m, no dust, no erosive gas and no exposure to direct sunshine
	Environmental temperature	Operation: -25 °C ~ 40 °C, reliable operation without derating; Within 40 °C ~ 50 °C, derating is necessary. The output current reduces by 1% for every rise of 1 °C. Storage: -40 °C ~ +70 °C
	Altitude	0 ~ 2000m, derating is necessary when altitude >1000m (The inverter is derated by 1% for each rise of 100m)
	Humidity	5% ~ 95%, no condensed water or dripping water
	Vibration strength	<5.9m/s ² (0.6g)
Other	Protection level	IP20
	Cooling	Forced air
	Installation method	0.75~315kW: Wall mounted: 350~500kW: Floor type

Type and specifications

Model of inverter	Power (kW)	Input voltage (V)	Input current (A)	Output current (A)	Power of applicable motor (kW)
RNB1000G	0.75	3-phase, 380V	3.4	2.5	0.75
RNB1001G	1.5		5.0	3.8	1.5
RNB1002G	2.2		5.8	5.3	2.2
RNB1004G/005P	4.0		12.0	9.5	4.0
	5.5		18.5	14	5.5
RNB1005G/007P	5.5		18.5	14	5.5
	7.5		22.5	18.5	7.5
RNB1007G/011P	7.5		22.5	18.5	7.5
	11		30.0	25.0	11
RNB1011G/015P	11		30.0	25.0	11
	15		39.0	32.0	15
RNB1015G/018P	15		39.0	32.0	15
	18.5		45.0	38.0	18.5
RNB1018G/022P	18.5		45.0	38.0	18.5
	22		54.0	45.0	22
RNB1022G/030P	22		54.0	45.0	22
	30		68.0	60.0	30
RNB1030G/037P	30		68.0	60.0	30
	37		84.0	75.0	37
RNB1037G/045P	37		84.0	75.0	37
	45		98.0	92.0	45
RNB1045G/055P	45		98.0	92.0	45
	55		123.0	115.0	55
RNB1055G/075P	55		123.0	115.0	55
	75		157.0	150.0	75
RNB1075G/090P	75		157.0	150.0	75
	90		188.0	180.0	90
RNB1090G/110P	90		188.0	180.0	90
	110		221.0	215.0	110
RNB1110G/132P	110		221.0	215.0	110
	132		267.0	260.0	132
RNB1132G/160P	132		267.0	260.0	132
	160	309.0	305.0	160	
RNB1160G/185P	160	309.0	305.0	160	
	185	344.0	340.0	185	
RNB1500G	185	344.0	340.0	185	
	200	384.0	380.0	200	

> To be continued

> Continued

Model of inverter	Power (kW)	Input voltage (V)	Input current (A)	Output current (A)	Power of applicable motor (kW)
RNB1200G/220P	200	3-phase, 380V	384.0	380.0	200
	220		429.0	425.0	220
RNB1220G/250P	220		429.0	425.0	220
	250		484.0	480.0	250
RNB1250G/280P	250		484.0	480.0	250
	280		539.0	530.0	280
RNB1280G/315P	280		539.0	530.0	280
	315		612.0	600.0	315
RNB1315G/350P	315		612.0	600.0	315
	350		665.0	650.0	350
RNB1350G	350		665.0	650.0	350
RNB1400G	400		715	720	400
RNB1500G	500		890	860	500

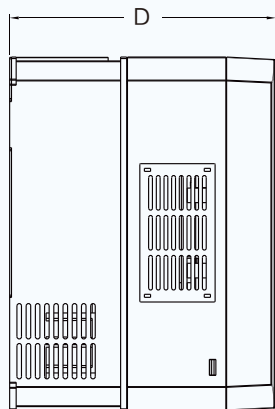
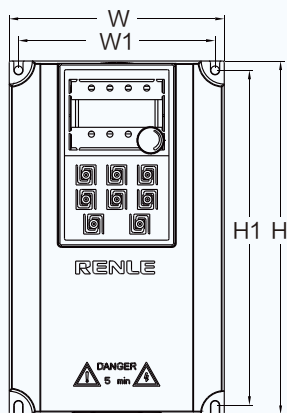
Note:

1. Frequency inverters of power rating below RNB1037G/045P (included) have built-in braking unit, whose power and resistance value should meet the requirements in the above-mentioned table. Otherwise there is risk of damage to the product. Frequency inverters of power rating above RNB1045G/055P(included) have external braking resistance, which is purchased by the customer itself.

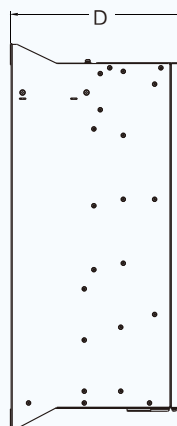
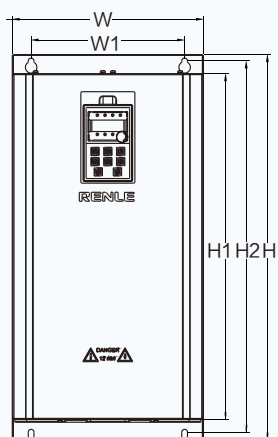
2. Frequency inverters of power rating between RNB1015G/018P (included) and RNB1037G/045P (included) have built-in DC reactor. Frequency inverters of power rating between RNB1045G/055P (included) and RNB1315G/350P (included) have external DC reactor, which is purchased by the customer itself. Frequency inverters of power rating between RNB1350G (included) and RNB1500G (included) are equipped with AC input reactor.

3. The above machines are for general type, not including special machine type. Customization of non-standard machine type is available.

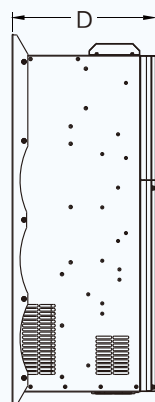
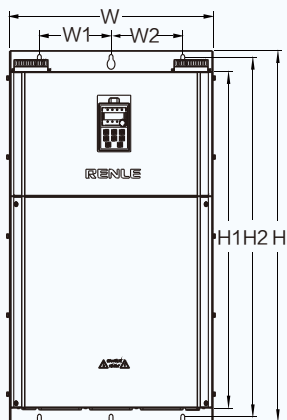
Product appearance and installation size and weight



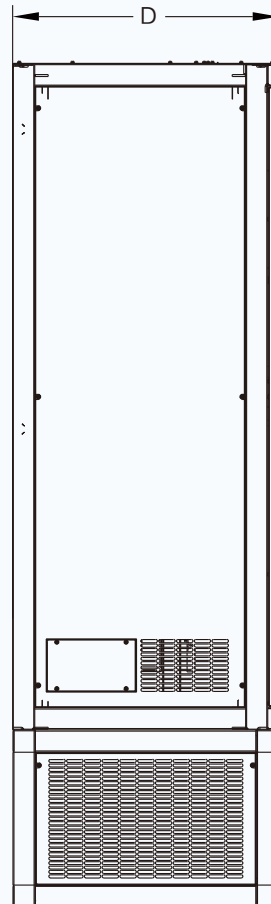
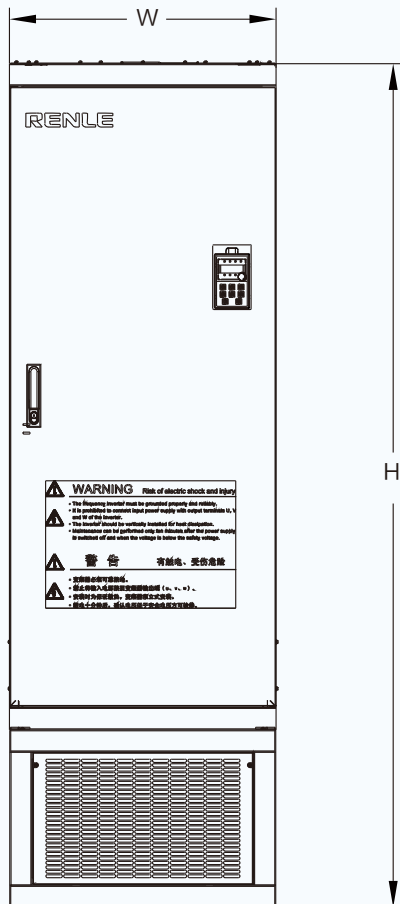
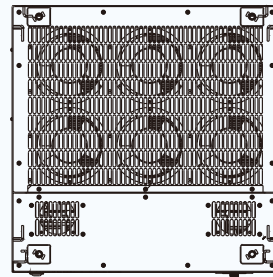
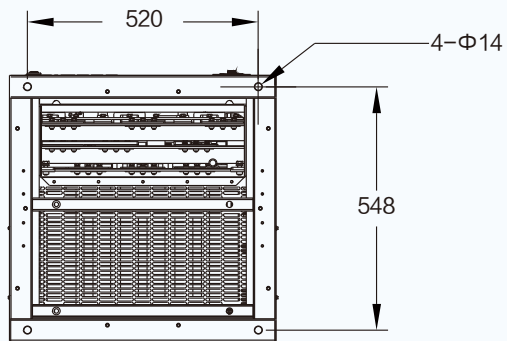
a) Applicable for RNB1000G/001P (incl.) ~ RNB1011G/015P (incl.)



b) Applicable for RNB1015G/018P (incl.) ~ RNB1110G/132P (incl.)



c) Applicable for RNB1132G/160P (incl.) ~ RNB1315G/350P (incl.)

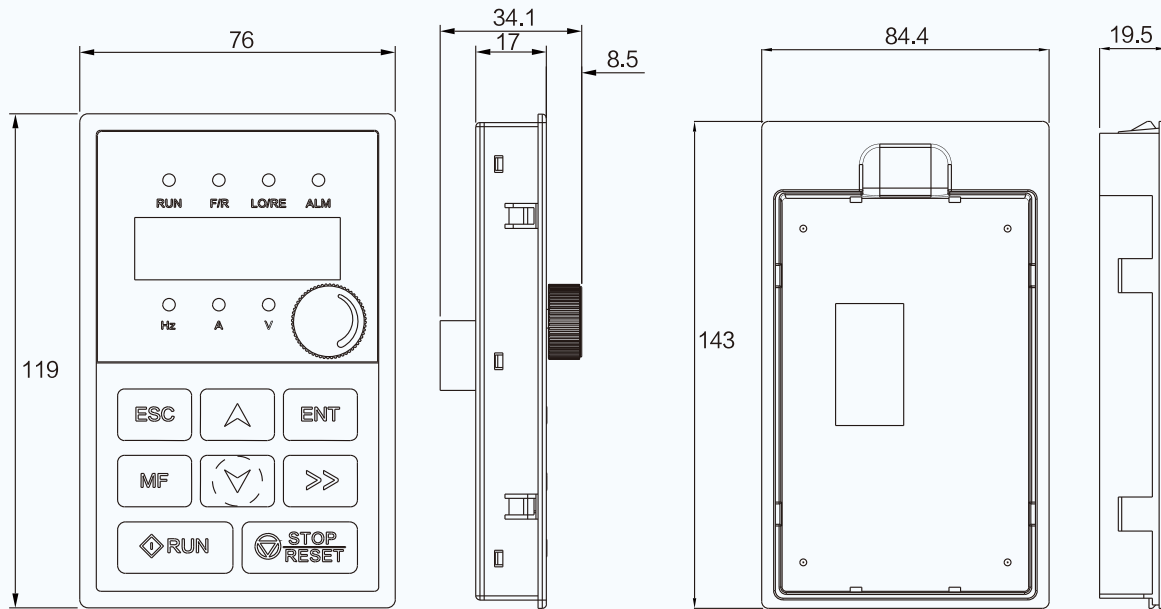


d) Applicable for RNB1350G (incl.) ~ RNB1500G (incl.)

Table of product outer and installation dimensions

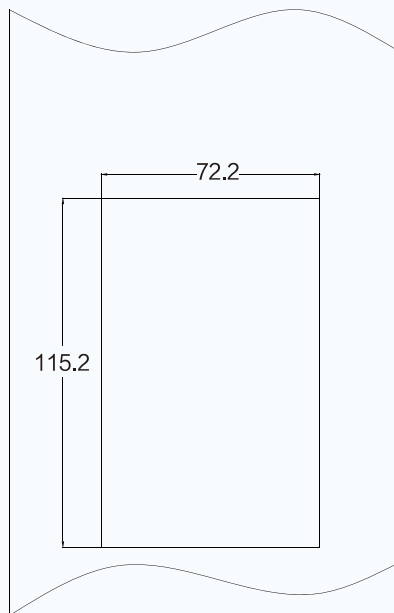
Model of inverter	Outer and installation dimensions (mm)						Diameter of Mounting Hole	Weight (kg)	Enclosure type
	W	H	D	W1	H1	H2			
RNB1000G	126	186	155	115	175	---	5	2.8	S0
RNB1001G									
RNB1002G									
RNB1004G/005P	140	230	172	128	218	---	5.5	3.5	S1
RNB1005G/007P									
RNB1007G/011P	165	285	200	153	273	---	5.5	5.2	S2
RNB1011G/015P									
RNB1015G/018P	214	410	203	184	360	385	7	11.5	S3
RNB1018G/022P									
RNB1022G/030P									
RNB1030G/037P	250	450	230	220	400	425	7	19	S4
RNB1037G/045P									
RNB1045G/055P	300	600	280	240	540	580	9	30	S5
RNB1055G/075P									
RNB1075G/090P	330	660	330	250	600	640	9	56	S6
RNB1090G/110P									
RNB1110G/132P									
RNB1132G/160P	485	850	355	180	772	826	11	110	S7
RNB1160G/185P									
RNB1185G/200P									
RNB1200G/220P									
RNB1220G/250P	683	940	355	240	860	910	13	165	S8
RNB1250G/280P									
RNB1280G/315P									
RNB1315G/350P									
RNB1350G	600	1700	600	---	---	---	---	200	S9
RNB1400G									
RNB1500G									

Shape and dimensions of operation panel

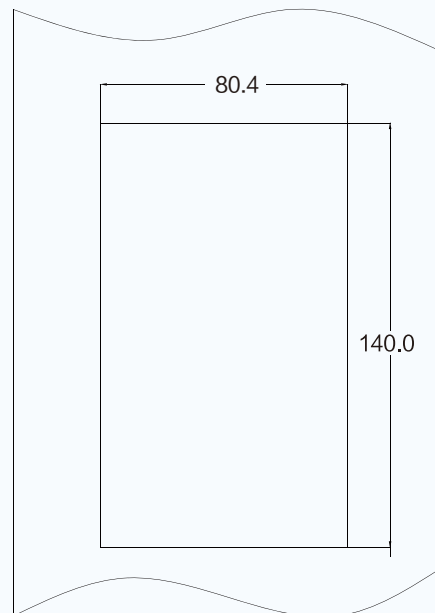


a) Outer diagram of panel body

b) Outer diagram of panel support

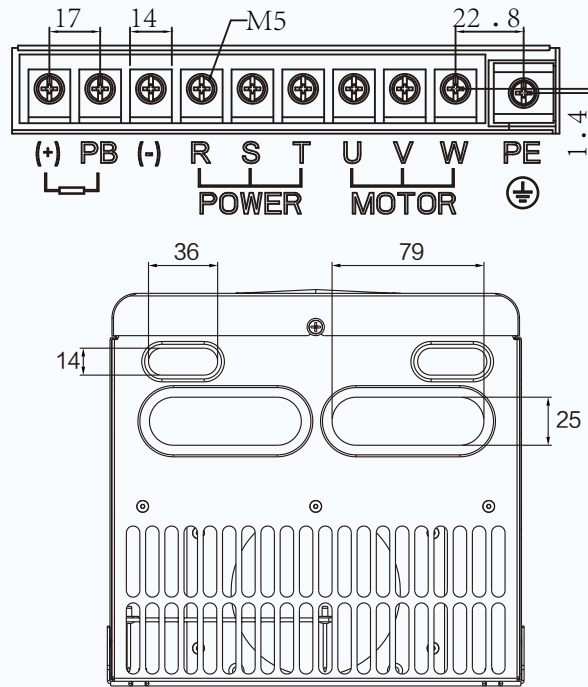


c) Hole diagram of panel body

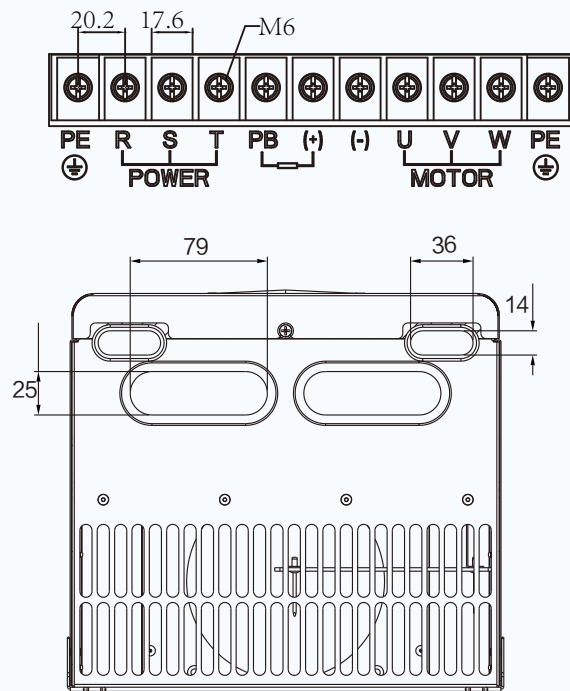


d) Hole diagram of panel support

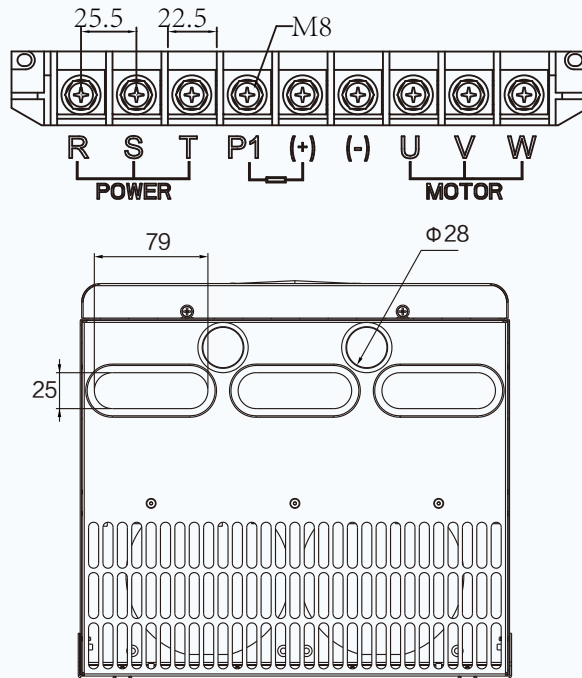
Diagram of main circuit wiring terminals and sizes of overcoils



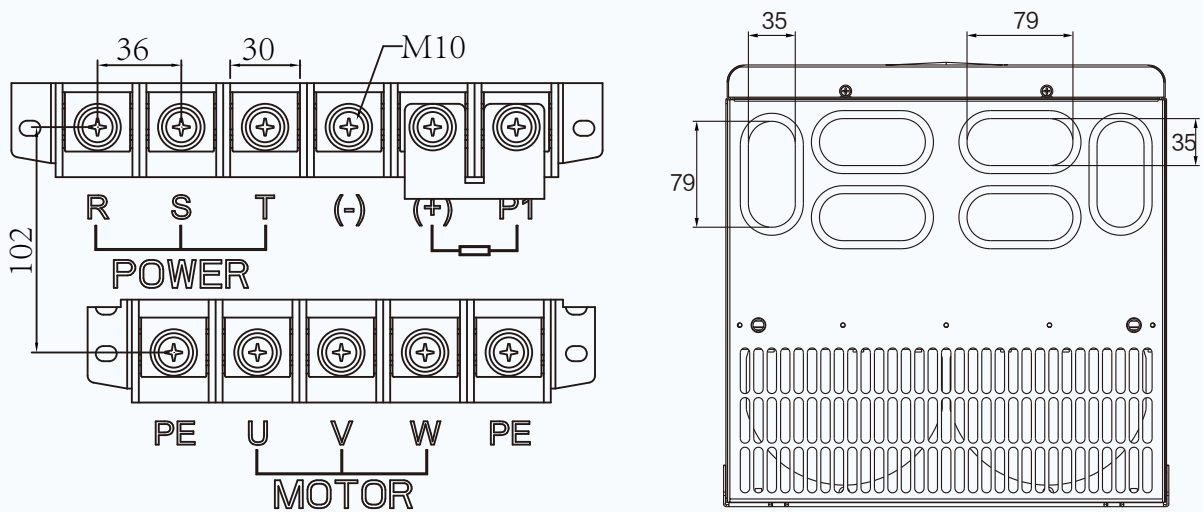
a) Applicable for RNB1015G/018P (incl.) ~ RNB1022G/030P (incl.)



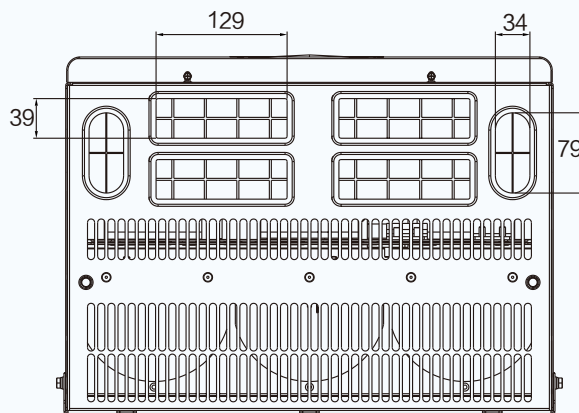
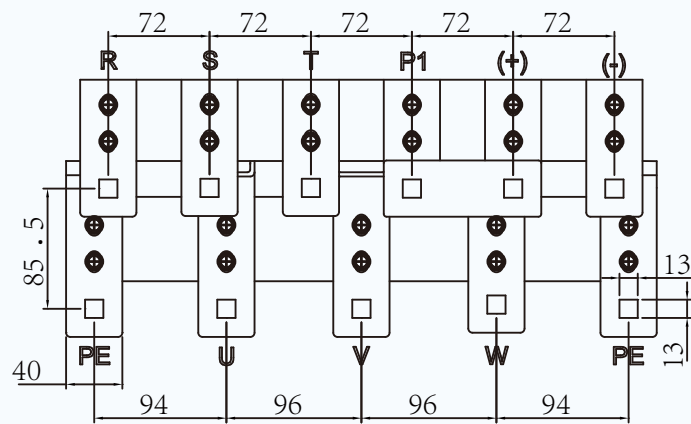
b) Applicable for RNB1030G/037P (incl.) ~ RNB1037G/045P (incl.)



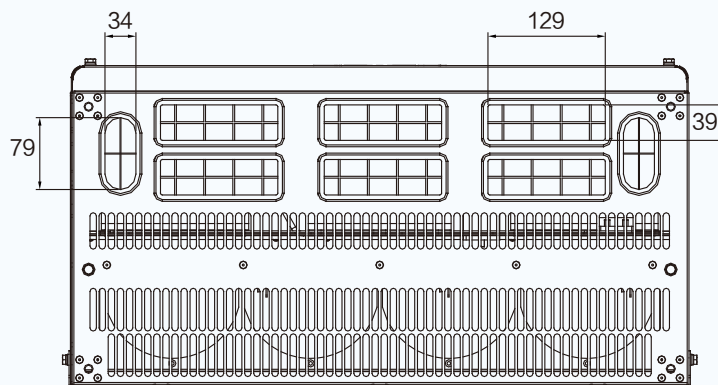
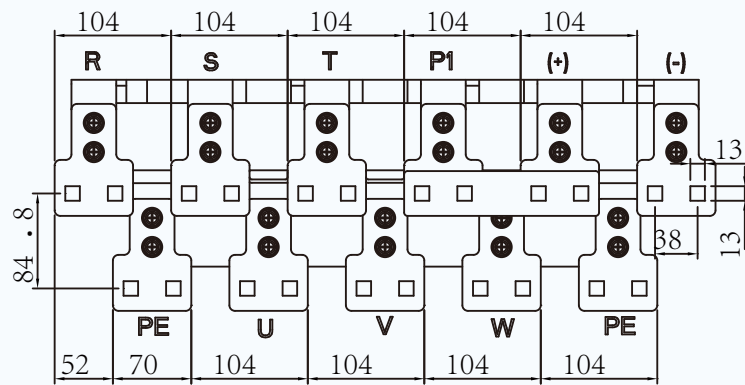
c) Applicable for RNB1045G/055P (incl.) ~ RNB1055G/075P (incl.)



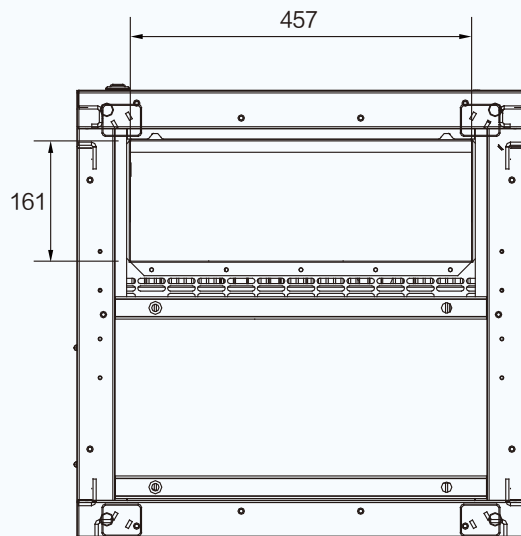
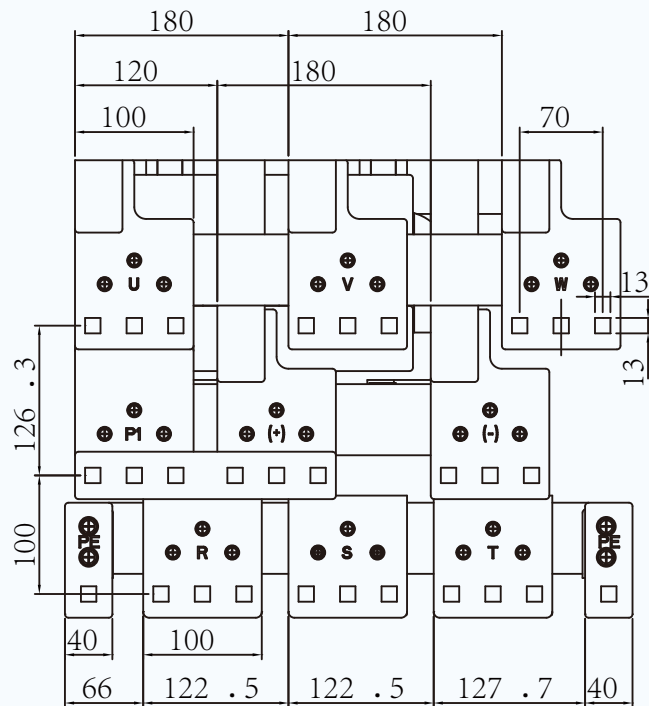
d) Applicable for RNB1075G/090P (incl.) ~ RNB1100G/132P (incl.)



e) Applicable for RNB1132G/160P (incl.) ~ RNB1200G/220P (incl.)



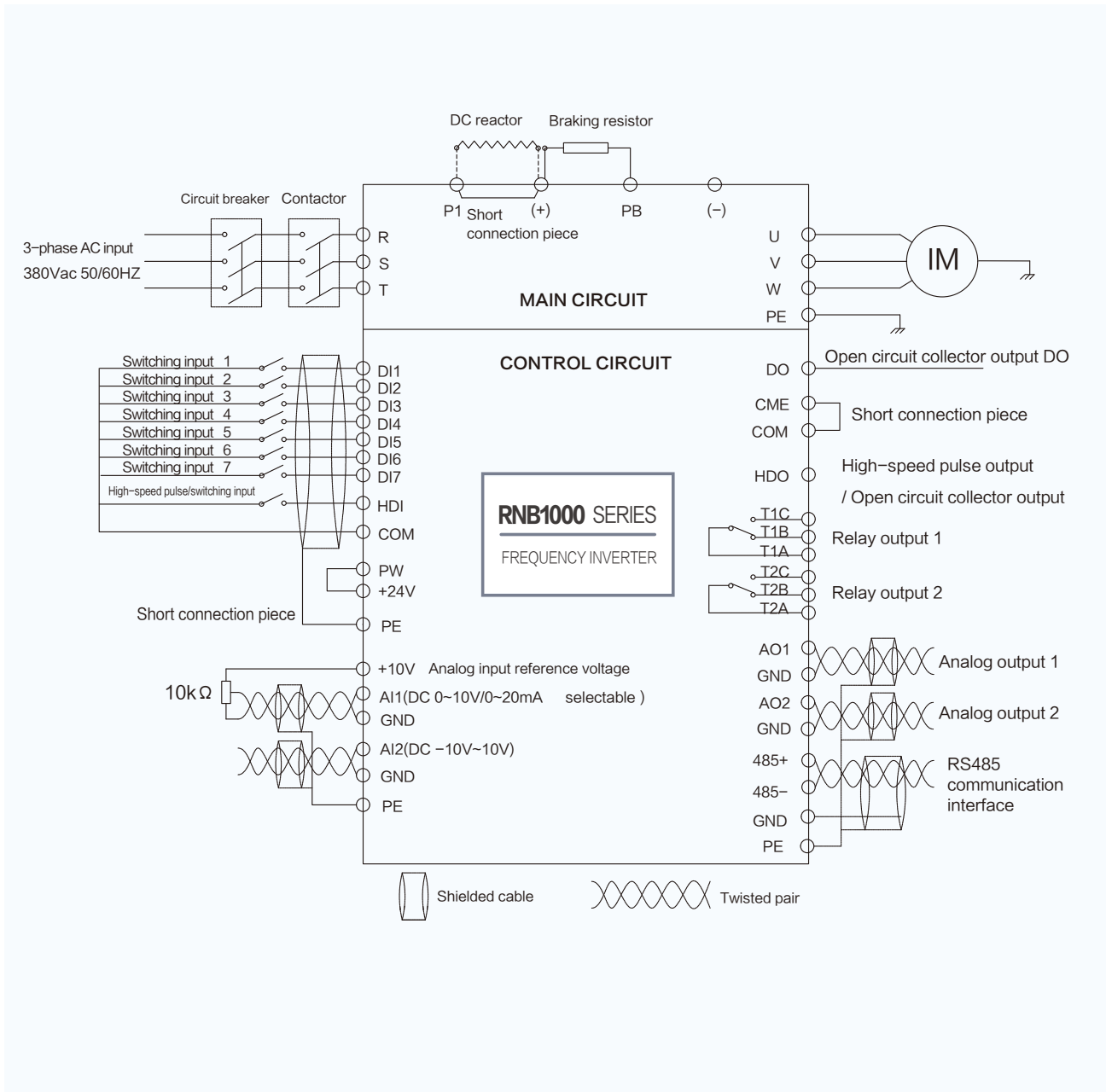
f) Applicable for RNB1220G/250P (incl.) ~ RNB1315G/350P (incl.)



g) Applicable for RNB1350G (incl.) ~ RNB1500G (incl.)

Standard wiring diagram

Please refer to the following diagram for wiring of the frequency inverter. Make only the connection of the main circuit to start the motor when operating the frequency inverter with keyboard.



1. AI1 is used to select input voltage or current signal. Pin X2 in the control panel determines the input signal type.
2. AO1 is used to select output voltage or current signal. Pin X3 in the control panel determines the input signal type.
3. AO2 is used to select output voltage or current signal. Pin X4 in the control panel determines the input signal type.
4. If external braking resistor is required, make sure the wiring is correct during connection of the braking resistor.
5. In the figure “⊙” is the terminal of the main circuit, and “○” is the control terminal.
6. This short connection piece can be removed only when DC reactor is connected externally.

Description of control circuit terminal

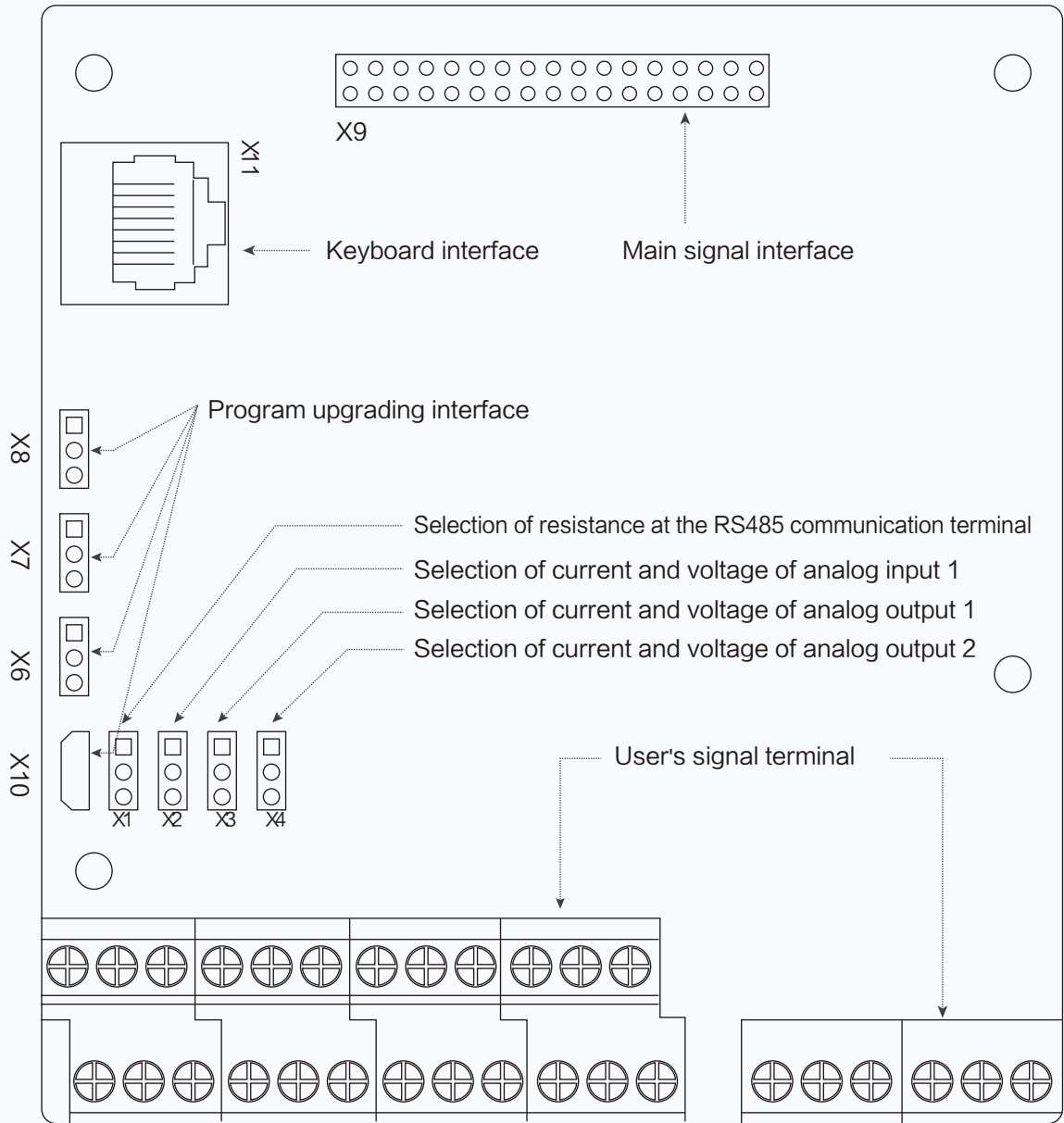


Figure: Distribution of control panel interface

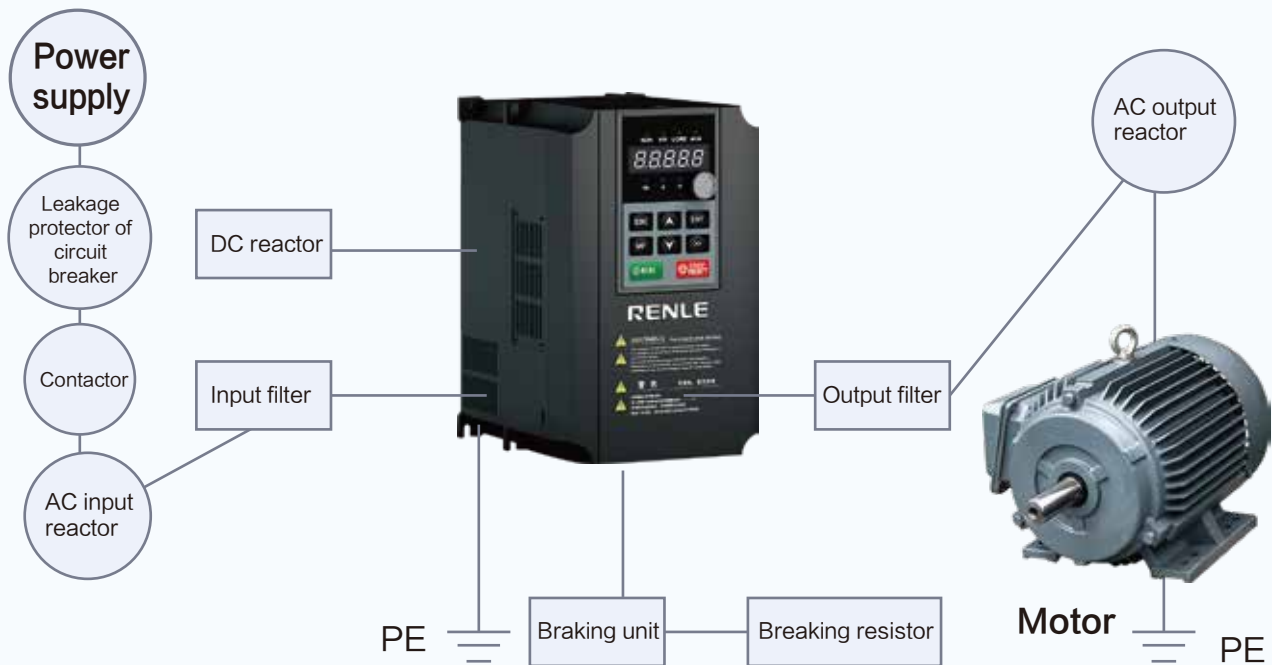
+10V	GND	AI1	AI2	COM	DI1	DI2	DI3	DI4	DI5	DI6	DI7	DO							
PE	485+	485-	GND	AO1	AO2	+24V	PW	COM	HDI	HDO	COM	CME	T1A	T1B	T1C	T2A	T2B	T2C	

Figure: Diagram of user's terminals in the control panel

Table of functions of control board terminal

Type	Terminal	Terminal Function Description	Specification
Switch input	+24V	+24V power supply	24V ± 10%, internally isolated from GND. Max. load 200mA
	PW	External power supply input terminal (digital input terminal power source)	Short connected with +24V at factory
	DI1 ~DI7	Switch input terminal 1~7	Input specification: 24V, 5mA
	HDI1	High speed pulse input or switching input	Pulse input frequency range: 0~50KHz. High level voltage: 24V
	COM	+24V power supply or external power source	Internally isolated from GND
Switching output	DO	Open collector output. The common terminal is CME	External voltage range: 0~24V
	CME	Open collector output common terminal	Short connected with COM at factory
	HDO	High speed pulse output or open collector output. The common terminal is COM	Pulse output frequency range: 0~50KHz
	COM	Common terminal of HDO	Internally isolated from GND
Analog Input	+10V	+10V power output supplied by the inverter	Output current range: 0~50mA (if the potentiometer is connected between +10V and GND, its resistance should be no less than 2KΩ)
	A 1	Analog input terminal 1	Output voltage and current are selectable Input voltage range: 0V~10V Input current range: 0/4~20mA
	A 2	Analog input terminal 2	Input voltage range: -10V~10V
	GND	Analog ground	Internally isolated with COM
Analog Output	AO1~AO2	Analog output terminal	Output voltage and current should be selectable Output voltage range: 0~10V Output current range: 0~20mA
	GND	Analog ground	Internally isolated from GND
Relay Output	T1A/T1B/T1C	Relay output	T1A-T1B: normally closed T1A-T1C: normally open Contact capacity: 250VAC/3A, 30VDC/1A
	T2A/T2B/T2C	Relay output	T2A-T2B: normally close T2A-T2C: normally open Contact capacity: 250VAC/3A, 30VDC/1A
Communication interface	485+/485-	RS485 communication interface	RS485 communication interface

Description of peripheral components of the product



Configuration diagram of the inverter's peripheral components

Table of Functions of Peripheral Component

Name	Description of function
Circuit breaker	Application: To cut off the power when fault occurs in the back equipment and protect the equipment.
	Selection: Select the breaking current of the circuit breaker as twice the breaking current of the frequency inverter.
Leakage protector	The high frequency leakage current is unavoidable due to the PWM high frequency output chopper voltage of the frequency inverter. Therefore special leakage protector must be selected.
Contactor	Please do not switch on and off the contactor frequently. This may result in the fault of frequency inverter, and do not start/stop the frequency inverter by switching on/off the main circuit. This may affect the service life of the inverter.
Input reactor and DC reactor	To improve the power factor
	To improve the influence caused by the imbalance of input power supply to the system.
	To suppress the high order harmonics and reduce the transmission of the harmonic to the outside.
Input and output filter	To restrain the influence of pulse current to the rectifier bridge effectively.
	To reduce the interference of frequency inverter to the peripheral devices.
Braking unit, braking resistor	To consume the feedback energy of the motor and quickly realize braking during braking.
Output reactor	To reduce the frequency inverter protection caused by the leakage current.
	It is suggested to install the output reactor when the cable length is longer than 100m between the frequency inverter and the motor.

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





雷诺尔

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

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