RENLE

Smart Grid·New Energy· Electric Drive Professional Manufacturer

RNB1000 series

FREQUENCY INVERTER

Core Innovativeness of Science & Technology. Intelligence Benefit the Worldwide Users

雷诺尔

Shanghai RENLE
Science&Technology Co., Ltd.

Stock code: 833586

Smart Grid •New Energy• Electric Drive Professional Manufacturer ----------RENLE

Shanghai RENLE Science & Technology Co., Ltd, is located in the High & New Technology Industrial Park of national level in Jiading District, Shanghai, China. It originates from Shanghai RENLE Electric Co., Ltd founded in 1999. The company covers a total area of 100,000 square meters, including 85,000 square meters of workshops. RENLE's products include LV/MV/HV motor soft starter, LV/MV/HV frequency inverter (VFD or AC drive), SVG compensation device and complete sets of LV/HV power transmission and distribution equipment etc. RENLE is a high-tech enterprise that integrates trade, R&D and production and a leading enterprise in the industry of intelligent electric drive in China. RENLE now owns five branch companies, namely Shanghai RENLE Power Automation Co., Ltd, Shanghai RENLE Switch Co., Ltd, Shanghai RENLE Power Supply Co., Ltd, Shanghai RENLE Explosion-proof Electric Co., Ltd and Shanghai RENLE Electronics Co., Ltd. RENLE has established more than 40 sales branch companies and 120 marketing offices throughout the country. 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, papermaking 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. and SINOPEC etc.

The company has 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. The company has been honored with the titles of Shanghai High & New Tech Enterprise and National Enterprise Abiding by contract and valuing Credit. Its motor soft starter has been awarded with National Torch Plan Project in 2000; The RENLE products have been awarded with Shanghai Famous Brand Product, Shanghai Key New Product,


RENLE
OVERVIEW

RNB1000 series

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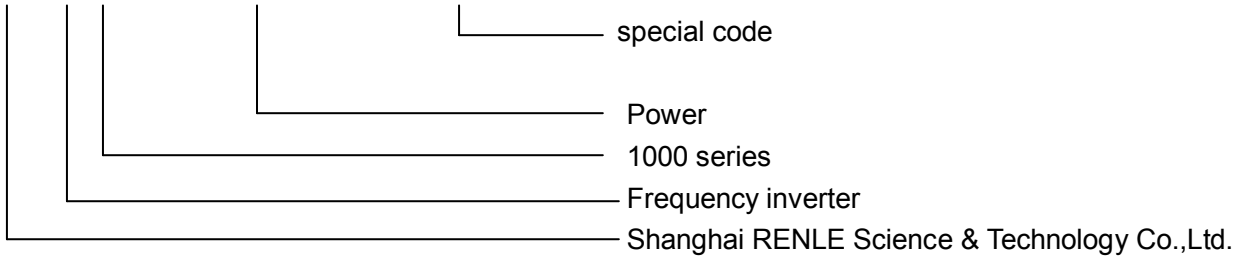
STKCD: 833586

Renle's frequency inverter is applicable to three phase squirrel cage asynchronous motor. Depending on its compact structure and high reliability, the product finds broad application in manufacturing industry, transportation industry and so on.

→ Various kinds of equipment such as: fan, pump etc
→ Ceramic machinery
→ Machine tool
→ Woodworking machinery
→ Packing and printing machinery
→ Material transportation equipment and other universal equipment, such as conveyor and elevator etc.

Type Description

R N B 1 X X X G / X X X P – X



CODE	DESCRIPTION
RN	Shanghai RENLE Science & Technology Co.,Ltd.
B	Low voltage frequency inverter
1	1000 series
XXXG/XXXP	Power code
	G: constant torque load(heavy) P: variable torque load (light) G/P: Gtype & Ptype together
	XXX: power code, for example: 001:1.5KW; 037: 37KW; 110:110KW
-X	Special code, of which the default is for general machine.

Produce Features

RNB1000 series frequency inverter increases production efficiency for customers with compact structure powerful functions and convenient operation.

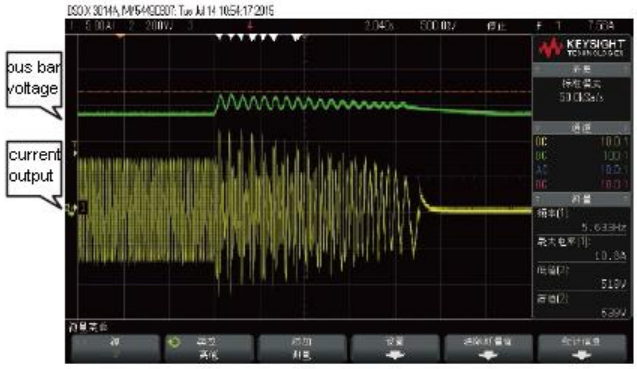
- Under the V/f control mode, the drive will not have over current alarm with high precise current limiting control, no matter how quickly the drive accelerates or decelerates, or stall, it could be reliable protecting the drive; and under vector control mode, the high-precision vector limiting control will output strong vector or gentle vector according to the user's requirement on the process control, and protect the mechanical equipment steadily and reliably.

- Under the V/f separation control mode, the output frequency and the output voltage could be set separately, which is applicable for the variable-frequency power supply, torque motor control etc conditions.

Control Mode	Starting torque	Speed Adjustable Range	Speed Accuracy	Torque Response
V/F control	0.5Hz 180%	1:100	±0.5%	
without PG vector control	0.5Hz 180%	1:100	±0.2%	＜10ms

Speed Search Starting

- Exact, reliable speed searching, could start the rotating motor without impact smoothly.
- Process PID control, with various given and feedback methods, two groups of proportion, integration, differentiation parameters can be switching freely.
  Especially for fan, pump load energy-saving application.
- Support the input of DC power resource, which can be easily for users to make a common bus application plan.

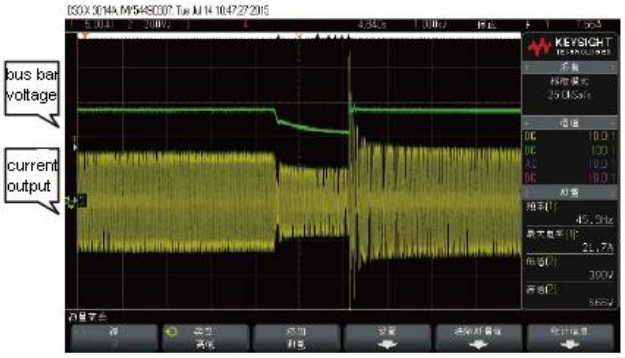


Over-voltage Suppress

- Over-voltage stall protection: When the load decelerates with great inertia and running quickly, the regenerated energy could result in over-voltage fault. It should be adjusting through the output frequency instantaneously, and then it could reduce the chance of over-voltage tripping, and protect the system running continuously and reliable.
- Under-voltage adjustment: When the instantaneous under-voltage or temporal outage happen, it could reduce the output frequency automatically, support the constant DC bus bar voltage, and protect the drive running continuously in the short time, which is applicable for fan, centrifugal pump etc.

Under-voltage Adjustment

- Over-current stall protection function: When the heavy load accelerates with rapid running, the great instantaneous slip could cause over-current fault. It should be adjusting through the output frequency instantaneously, and then it could reduce the chance of over-current tripping, and protect the system running continuously and reliable.
- Low-frequency fluctuation suppression function: As for the large-power motor, when it starts without load or with light load, it will fluctuate seriously and result in trip error. This function can suppress the low-frequency fluctuation effectively, and protect the system running reliable.
- Automatic torque rising: Under V/F control mode, it can be adjusting the output torque according to the load condition automatically, which can be suitable for the starting with light load, no load, even over-load.

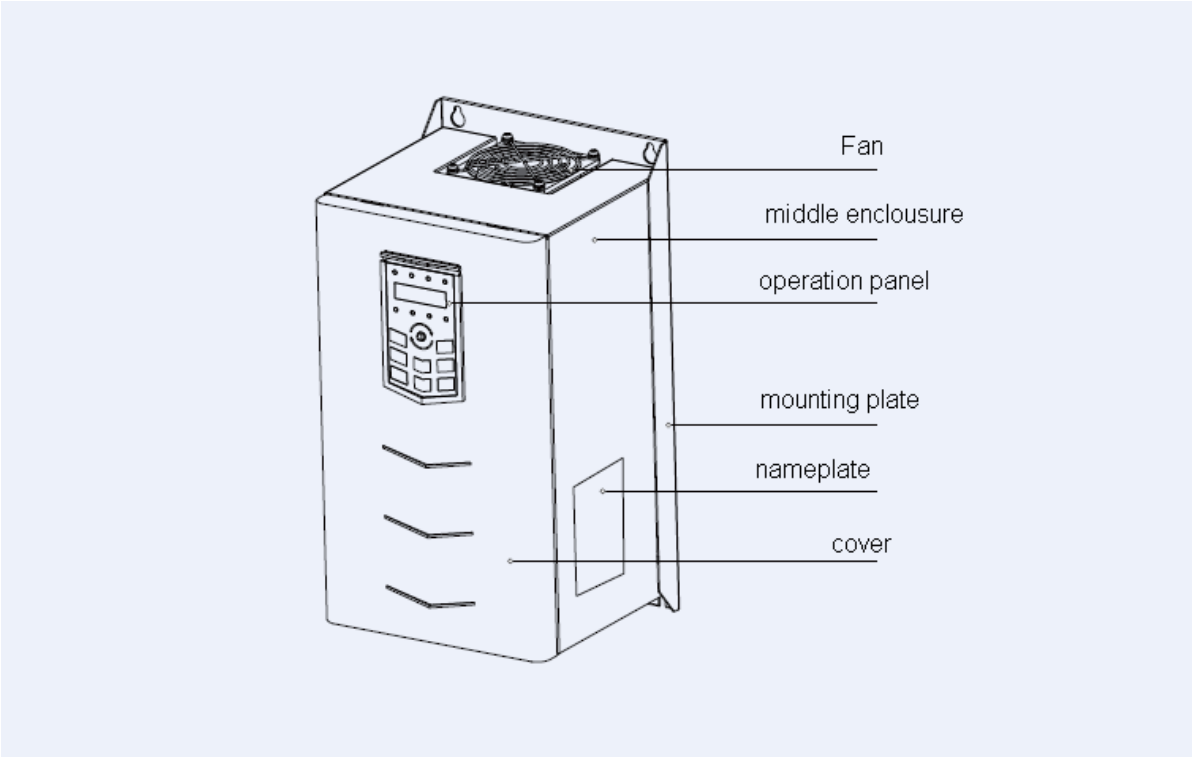


Over-current Stall Protection Function

● Parameters can be set for backup, easy for users to backup, debug, and restore parameters

●current limiting functions: When starting with heavy load or a heavy load added suddenly in the process, and before the over-current fault occur, it will limit the output current automatically, to avoid the frequency inverter trip frequently.

Description of Frequency Inverter components



Product Technical Specification

	Item	Specification
Main Electrical Input	Rated voltage	3 phase AC: 380V 50/60HZ
	Allowable value of frequency variation range	Voltage: 380V±20% frequency : ±5%
Mail Electrical Output	Output voltage	The maximum output voltage is equal to 3phase input voltage
	Output frequency	0Hz-600Hz
Technical Features	PWM modulation mode	SVPWM, 3phase PWM, 2phase PWM
	Control mode	V/F control, vector control without PG(open loop vector), torque control
	The mode of given run command	External terminal, keyboard, serial communication
	The mode of given speed command	Analog given, keyboard, serial communication, high-speed pulse, terminal multi-step speed given, PID control given, simple PLC given
	Speed adjustable range	Open loop vector control 1:100
	Speed control precision	Open loop vector control ±0.5%
	Overload capability	150% of rated output current for 60s, 185% of rated output current for 10s; 200% of rated output current for 1s.
	Automatic voltage regulation	When the grid voltage changes, it can automatically maintain a constant output voltage.
	Speed search starting	could start the rotating motor without impact smoothly
Control Terminal Input	Applicable internal power supply	1 route: +10VDC, max.current: 50mA(applicable to reference potentiometer)
		1 route: +24VDC, max.current: 200mA(applicable to logic input port)
	Analog input	1 route: 0~10VDC or 0/4~20mA DC, for option
		1 route: -10~+10VDC
	Switch input	8 programmable logic inputs, support NPN and PNP open-collector signal, 39 optional logic input functions including forward, reverse, failure reset etc.
	Pulse signal input	1 route high-speed pulse input, the input frequency range: 0~50Hz, which could be as a strong anti-interference, high precision speed given source or speed feedback source.
Control Terminal Output	Analog output	2 routes, 0~10VDC or 0~20mA DC, for option
	Switch output	2 routes of programmable logic output, NPN open-collector signal, 20 optional programmable output functions including in operation, forward running, reverse running, failure output etc.

	Pulse signal output	1 route high-speed pulse output, NPN open-collector signal, 13 optional output functions
	Programmable relay output	2 routes, each with 1 pair of normally open contact and 1 pair of normally close contact, contact capacity: 250VAC/3A, 30VDC/1A
	Item	Specification
Communication interface		RS485 interface, support Modbus protocol
Operation Panel	Display	High brightness LED digital tube display status parameter, fault code etc, set parameter
	Indicator	Status indicator, indicate the frequency inverter working status information; unit indicator, LED display the data unit
	Push-button	Operate the frequency inverter and set the parameter
	Data copy	Support the user to upload the parameter to the panel and save; meanwhile support the user to download the panel parameter to the machine too.
Fault Protection		25 fault protecting functions including: output over-current, bus bar over-voltage, bus bar under voltage, motor overload, input phase-loss, output phase-loss, over heating of rectifier module and inverter, external fault, communication failure, current detecting error, motor self-learning fault, EEPROM operating failure, PID feedback breakdown error, braking unit failure, factory set time expire etc.
Environment	Standard	RNB1000 series frequency inverter follows multiple international standards(IEC, EN), especially IEC/EN61800-5-1(low voltage), IEC/EN61800-3(conduction and radiation anti-interference standard)
	Applicable site	Indoor, altitude should be 1000m below, no dust, no corrosive gas and no direct sunlight
	Ambient temperature	Operation: -25℃~40℃ reliable running, no need for derating; 40℃~50℃ should be derating, as for the temperature rise 1℃, the output current will reduce 1%. Storage: -40℃~+70℃
	Altitude	0~2000m, above 1000m should be derating (each 100m rise, should be derate 1%)
	Humidity	5%~95%, no condensate or drip water
	Vibration strength	＜5.9m/s2(0.6g)
Others	Protection class	IP20
	Cooling method	Forced cooling air
	Installation method	Wall mounted

Table of specifications

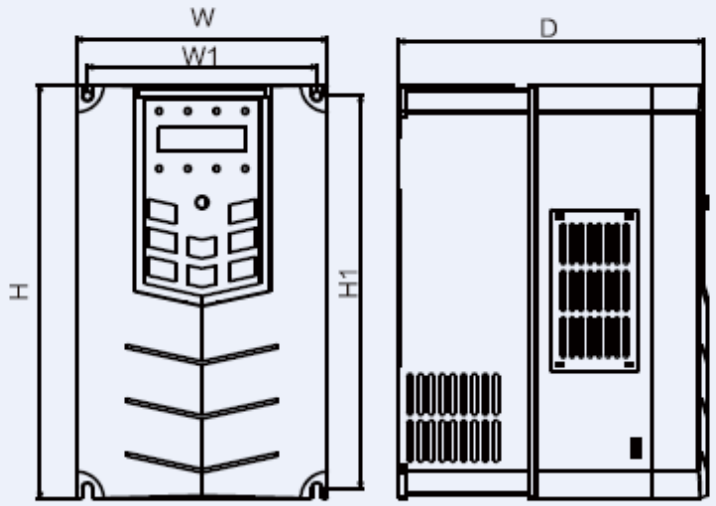
TYPE	POWER(KW)	INPUT VOLTAGE(V)	INPUT CURRENT(A)	OUTPUT CURRENT(A)	APPLICABLE MOTOR POWER(KW)
RNB1000G/001P	0.75	3phase 380V	3.4	2.5	0.75
	1.5		5.0	3.8	1.5
RNB1000G/001P	1.5		5.8	3.8	1.5
	2.2		5.8	5.1	2.2
RNB1002G/004P	2.2	3phase 380V	5.8	5.1	2.2
	4.0		12.0	9.5	4.0
RNB1004G/005P	4.0		12.0	9.5	4.0
	5.5.		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
RNB1185G/200P	185		344.0	340.0	185
	200		384.0	380.0	200
RNB1200G/220P	200		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

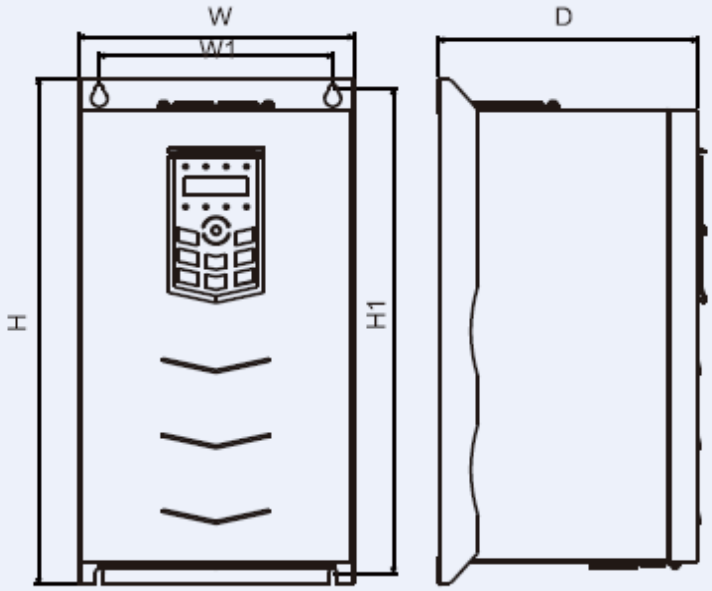
Note:

1. The inverters of power below (including) RNB1037G/045P have built-in brake unit, and the power and resistance value of brake resistor should meet the requirements in the above sheet, otherwise there is risk of product damage. And the inverters of power above RNB1045G/055P have external brake resistor, which the customers need to purchase by themselves.
2. The inverters with between RNB1015G/018P (including) and RNB1037G/045P (including) have built-in DC reactor. The power of frequency inverter between RNB1045G/055P (including) ~RNB1315G/350P (including) are for built external DC reactor, the customers need purchase DC reactor themselves; The power of frequency inverter between RNB1350G (including) ~ RNB1500G (including) are with input AC reactor.
3. The above machine type is for general type, not include special machine type, which should be customized.

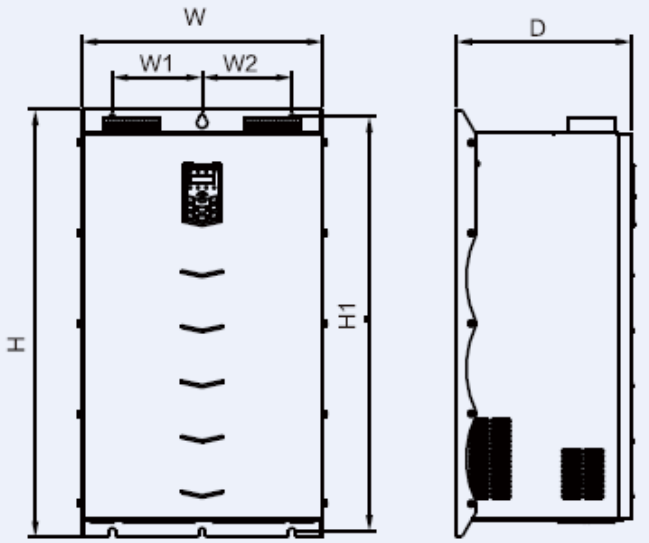
Product Appearance and Installation Size, weight



a) applicable for RNB1000G/001P~RNB1011G/015P



b) applicable for RNB1015G/015P~RNB1110G/132P



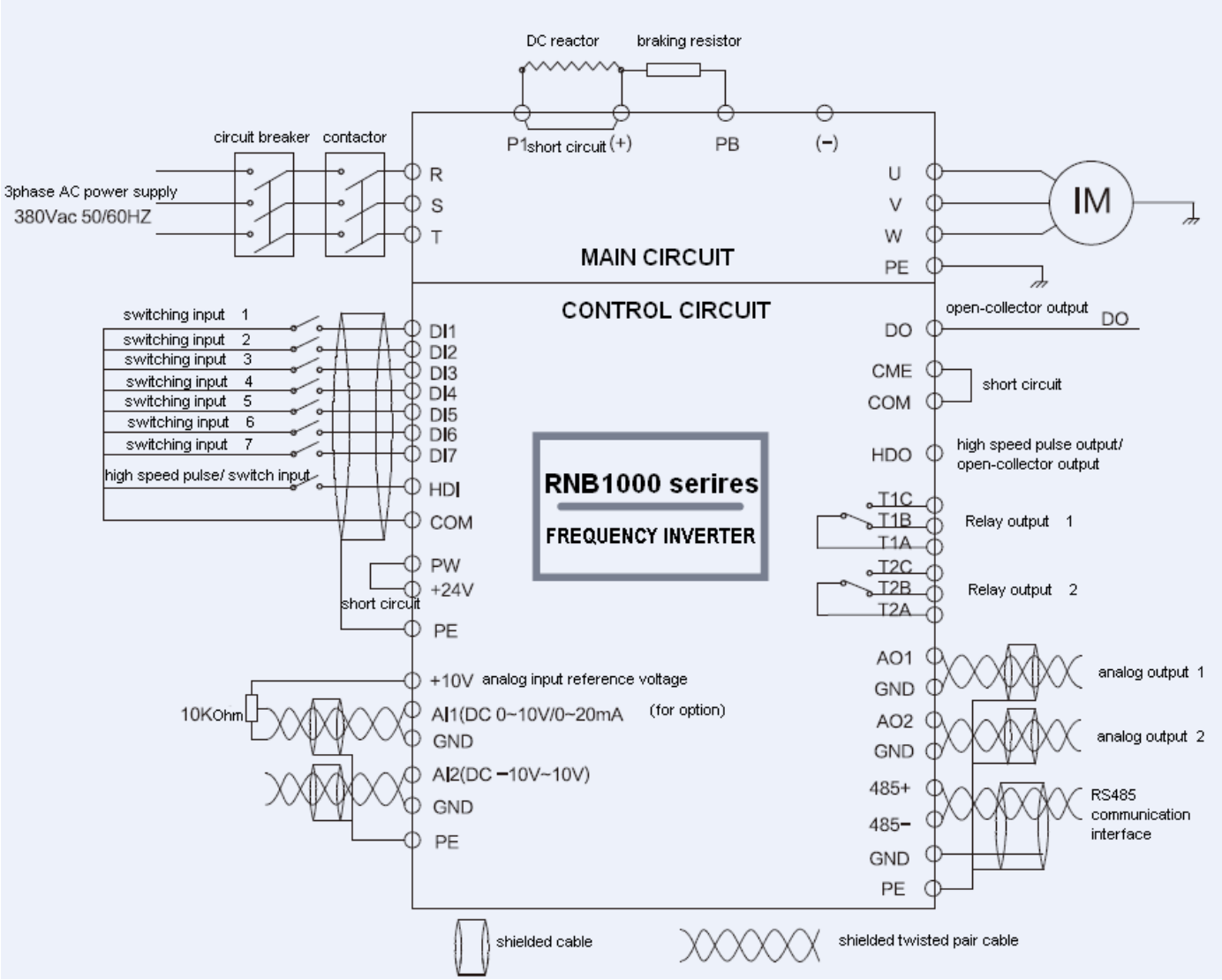
c) applicable for RNB1132G/160P~RNB1315G/350P

Table of Product Installation Specification Data

TYPE	Installation Specification(mm)					Diameter of Mounting Hole	Enclosure Type
	W	H	D	W1	H1		
RNB1000G/001P	140	230	172	128	218	5.5	S1
RNB1001G/002P							
RNB1002G/004P							
RNB1004G/005P							
RNB1005G/007P							
RNB1007G/011P	165	285	200	153	273	5.5	S2
RNB1011G/015P							
RNB1015G/018P	214	410	203	184	385	6.5	S3
RNB1018G/022P							
RNB1022G/030P							
RNB1030G/037P	250	450	230	220	425	6.5	S4
RNB1037G/045P							
RNB1045G/055P	300	600	280	240	580	8.5	S5
RNB1055G/075P							
RNB1075G/090P	330	660	330	250	640	8.5	S6
RNB1090G/110P							
RNB1110G/132P							
RNB1132G/160P	485	850	355	180	826	11	S7
RNB1160G/185P							
RNB1185G/200P							
RNB1200G/220P							
RNB1220G/250P	683	940	355	240	910	13	S8
RNB1250G/280P							
RNB1280G/315P							
RNB1315G/350P							

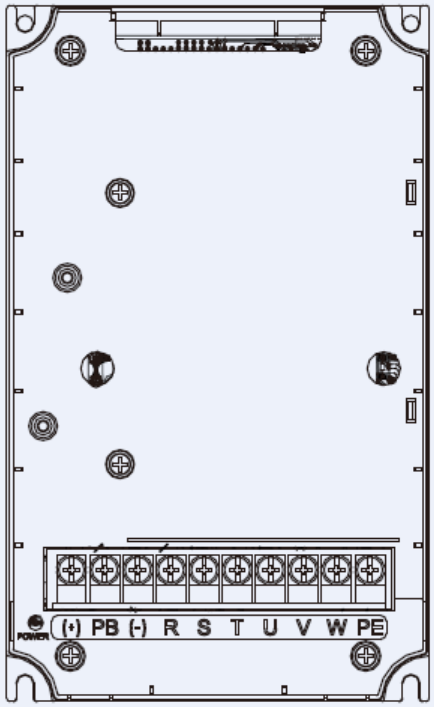
Standard Wiring Diagram

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.



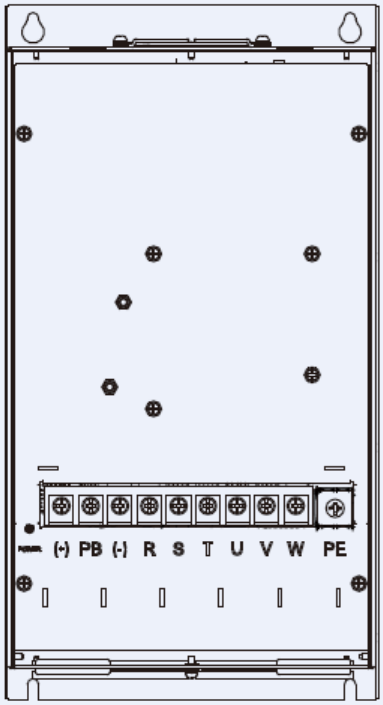
1. Input voltage signal or current signal can be selected for A|1, the type of input signal can be set by the dial switch X2 on the control board.
2. Output voltage signal or current signal can be selected for AO1, the type of input signal can be set by the dial switch X3 on the control board.
3. Output voltage signal or current signal can be selected for AO2, the type of input signal can be set by the dial switch X4 on the control board.
4. Correct connection must be followed when external braking resistor is required.
5. In the diagram, "◎" means main circuit terminal, "O" means control terminal.

Main Circuit Terminal Description



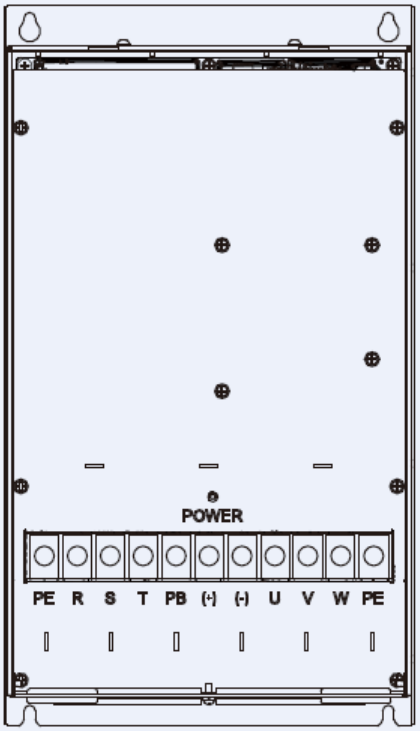
RNB1000G/001P ~ RNB1011G/015P

Wiring Diagram of Main Circuit Terminal



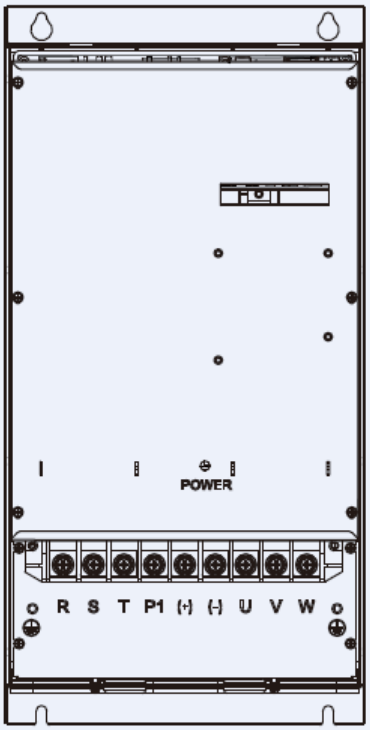
RNB1015G/018P ~ RNB1022G/030P

Wiring Diagram of Main Circuit Terminal



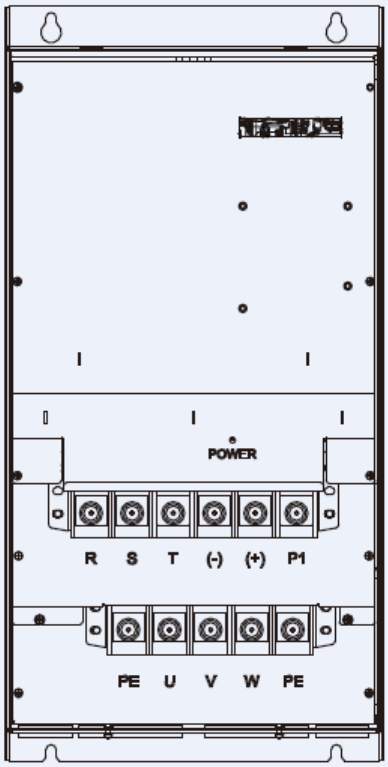
RNB1030G/037P ~ RNB1037G/045P

Wiring Diagram of Main Circuit Terminal



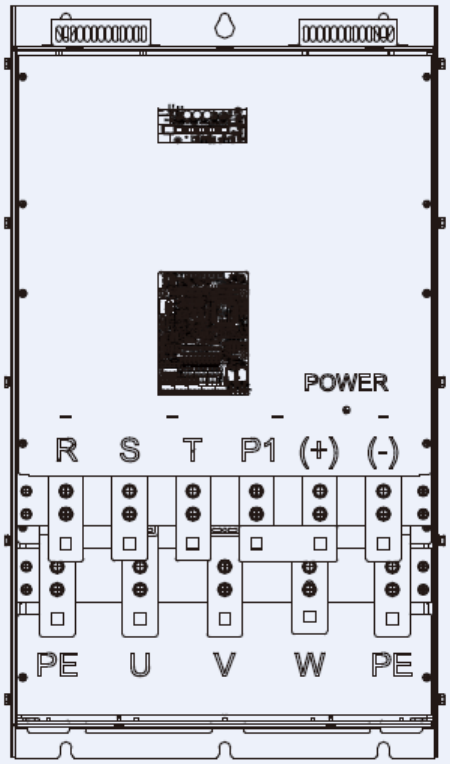
RNB1045G/055P ~ RNB1055G/075P

Wiring Diagram of Main Circuit Terminal



RNB1075G/090P ~ RNB1110G/132P

Wiring Diagram of Main Circuit Terminal



RNB1132G/160P ~ RNB1200G/220P

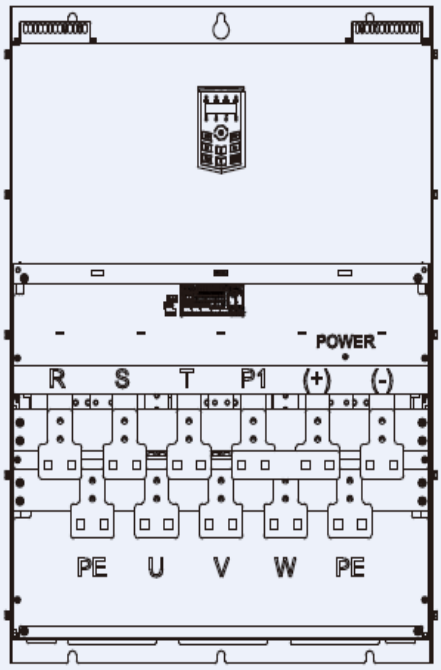
Wiring Diagram of Main Circuit Terminal

terminal

terminal

terminal

terminal



RNB1220G/250P ~ RNB1315G/350P

Main Circuit Terminal Function Table

Terminal Name	Function Description
R.S.T	3phase power supply input
(+),(-)	External braking unit reserve
(+),PB	Common DC bus bar terminal External brake resistor reserve
P1,(+)	External DC reactor reserve
(-)	DC negative bus bar output terminal
U,V,W	3phase AC output terminal
⏚	Grounding terminal (PE)

Wiring Diagram of Main Circuit Terminal

Description of Control Circuit Terminal

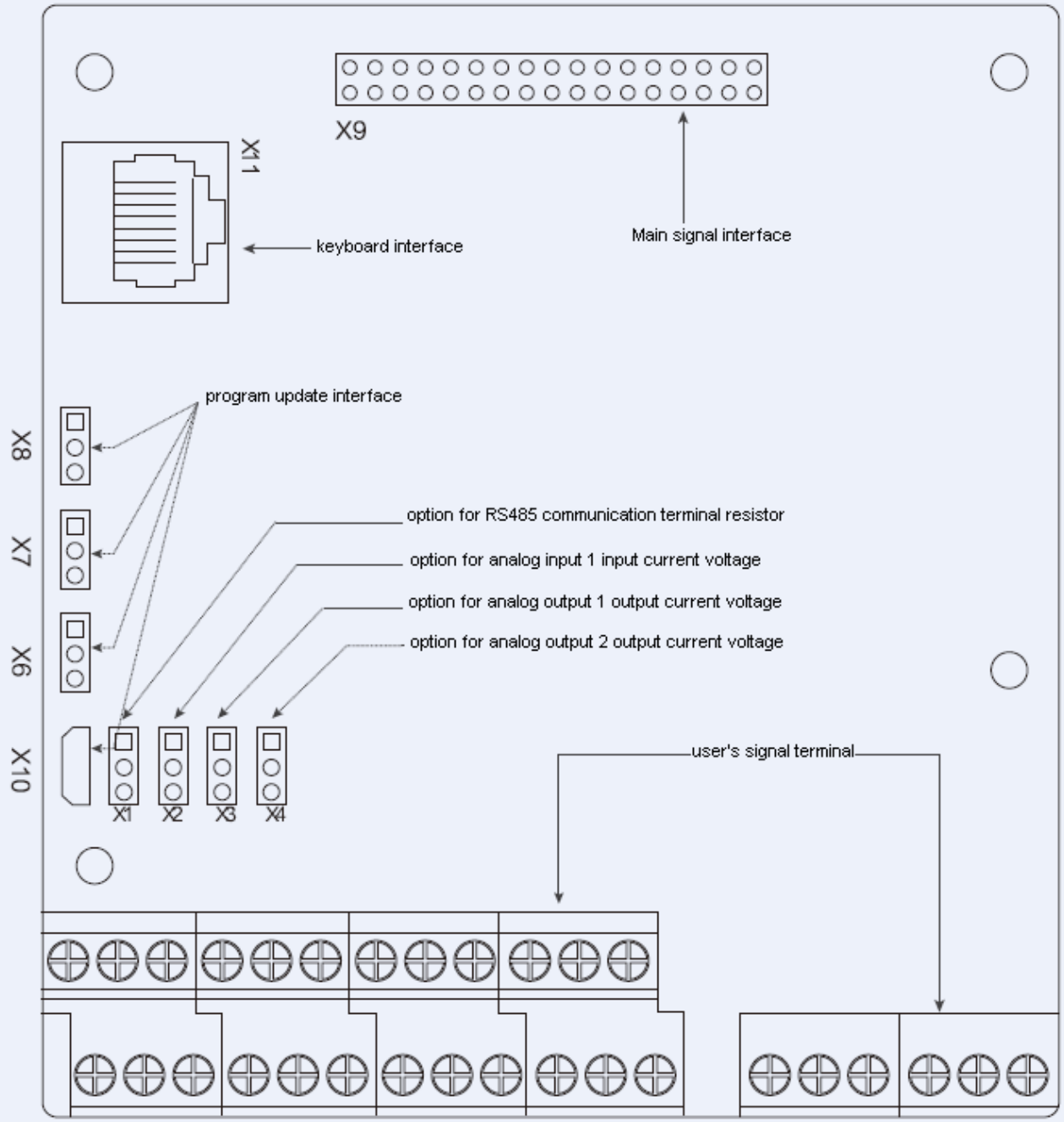


Diagram Control board interface distribution

+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

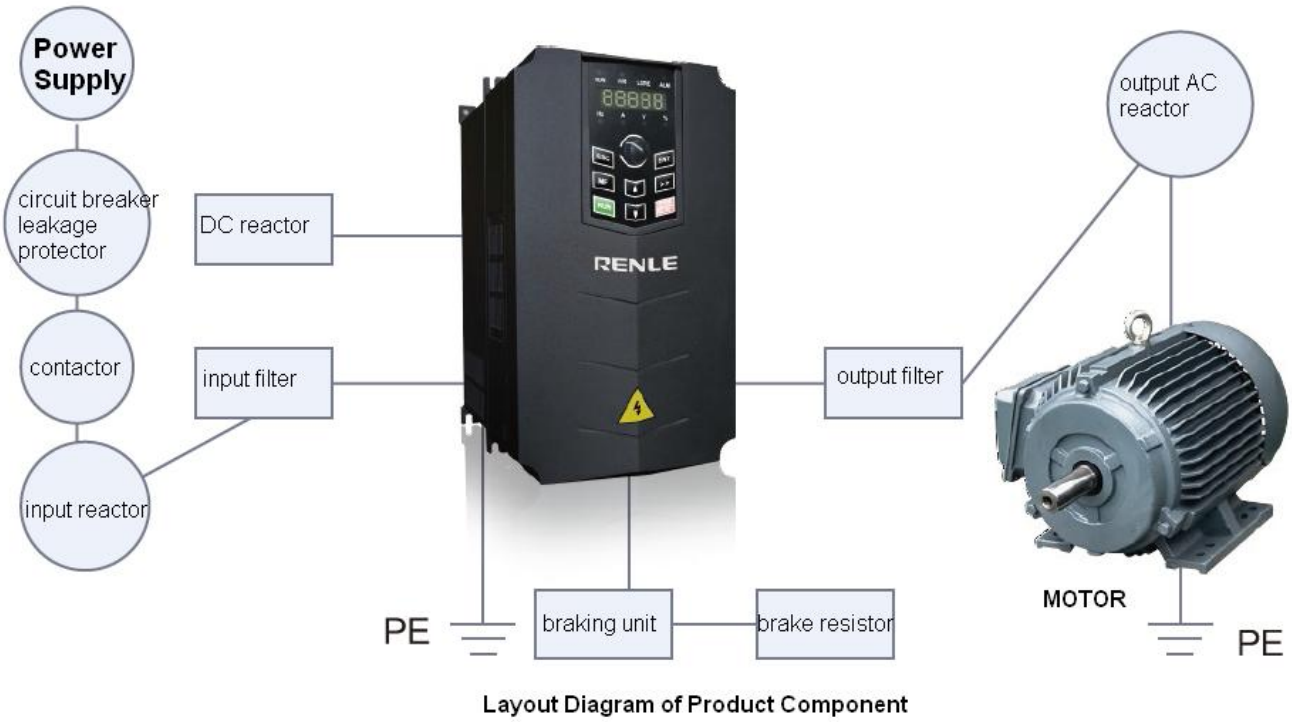
T1A	T1B	T1C	T2A	T2B	T2C

Diagram User's terminal diagram of Control board

Function Table of Control Board Terminal

Type	Terminal	Terminal Function Description	Specification
Switch Input	+24V	+24V power supply	24V±10%, inner isolated with GND. Max. load 200mA
	PW	External power supply input terminal(digital input terminal power source)	short connected with +24V when leave factory
	D|1~D|7	Switch input terminal 1~7	Input specification: 24V, 5mA
	HD|	High speed pulse input	Pulse input frequency range: 0~50KHz
		Or switch input	High level voltage: 24V
	COM	+24V power supply or external power source	Internal isolated with GND
Switch Output	DO	Open-collector output, common terminal COM	External voltage range: 0~24V
	CME	Open-collector output common terminal	Short connected with COM when leave factory
	HDO	High speed pulse output or open-collector output, common terminal COM	Pulse output frequency range: 0~50KHz
	COM	HDO common terminal	Internal isolated with GND
Analog Input	+10V	Local supplied +10V power output	Output current range: 0~50mA(if the potentiometer is connected between +10V and GND, its resistance should be no less than 2K ohm)
	A|1	Analog input terminal 1	Input voltage and current should be 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 grounding	Internal 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 grounding	Internal isolated with COM
Relay Output	T1A/T|B/T|C	Relay output	T1A-T1B: normally close
			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-	RS485communication interface	RS485communication interface

Instructions for the Product Components



Layout Diagram of Product Component

Function Table of Product Component

Name	Function Description
Circuit Breaker	Application: it can cut off the power when there's a fault happened on the equipment, and protect the equipment.
	Selection: select the breaking current of circuit breaker as twice as the frequency inverter
Leakage Protector	The unavoidable high frequency leakage current is because of the output of frequency inverter is PWM high frequency chopped voltage, so there is a special leakage protector.
Contactor	Please do not on-off the contactor frequently, which will result in the fault of frequency inverter, and it should not start/stop the frequency inverter through switching on/off the main circuit, it will affect the service life.
Input Reactor and DC Reactor	Improve the power factor
	The influence caused by the imbalance of input power supply to the system will be improved.
	Suppress the higher harmonic, and reduce the propagation of the harmonic to the outside.
	Restrain the influence of pulse current to the rectifier effectively
Input Output Filter	Reduce the interference of frequency inverter to the around devices
Braking Unit, Brake Resistor	The consumption of the feedback energy of the motor could quick the braking
Output Reactor	Reduce the frequency inverter protection, of which is due to the leakage current
	It suggests installing the output reactor when the cable length is longer than 100m between the frequency inverter and motor.

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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
Air-to air Missile Research Center in China
Air Force of the CPLA Radar Base
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 Expansion Project
Terminal of Inner Mongolian Hohhot Baita International Airport Extension Project
Shenyang Olympic Center
Yunnan 2409 Air Force Airport
Qingdao Olympic Center
South of Beijing Airport
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 Wanjiazhai 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
Guangxi Longtan Hydroelectric Project
Gansu Satellite Launching Center

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上海雷诺尔科技股份有限公司
Shanghai RENLE Science&Technology Co., Ltd.

No.3988 Chengbei Road, Jiading District, Shanghai,
201807, P. R. China
Tel: +86 21 3953 8058
Fax: +86 21 3953 8129
E-mail: export@renle.com
http://www.renle.com
National toll free service hotline: +86 800-8200-785

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