



Shanghai RENLE Science & Technology Co., Ltd No.188 Building 1, Lane 3968, Chengbei Road, Jiading District, Shanghai, 201807, P.R. China Tel: +86-21-3953 8058, 5996 6666 Fax: +86-21-3953 8129 E-mail: info@renle.eu

RENLE Europe GmbH Wendemuthstraße 5 22041 Hamburg Germany Tel: +49 40-2508 415 Fax: +49 40-5009 7043

http://www.renle.eu National toll free service Hotline: +86 800-8200-785 August , 2019



### Technical innovation benefits the world RENLE Science & technology

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## Technical innovation benefits the world

RENLE Science & technology

RENLE



## RNB5000 SERIES FREQUENCY INVERTER



**国** おanghai RENLE Science&Technology Co., Ltd.



## Professional Manufacturer of Smart Grid, New Energy and Electric Drive



Shanghai RENLE Science & Technology Co., Ltd is a large enterprise that incorporates capital operation, brand operation and industry operation. Renle's products include LV/MV motor soft starter, LV/MV 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.



## **Company Profile**

Shanghai RENLE Science & Technology Co., Ltd is located in the High & New Technology Industrial Park of Jiading District, Shanghai, China. 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), 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 astextile, papermaking, machine tools, packing, food and lifting etc. They are perfectly used for crusher, compressor, winch, drawbench, transfer cart, feeder, mixer, spinning machine, cigarette making machine, injection molding machine, submersible pumps and other mechanical equipment.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 products receive unanimous appraise from the customers for excellent quality and perfect after-sales service.

Renle always lays emphasis on quality control so as to attain perfection. 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. RENLE has been continuously introducing internationally advanced production and test equipment to establish laboratories and provide R&D experiment base to domestic universities and colleges. The company, paying much attention to independent innovation, has established powerful new product R&D technical center.

For many years Renle has been striving for and devoted to production modernization, administration collectivization, production specialization and technical leading. Renlehas 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!



## RNB5000 SERIES FREQUENCY INVERTER



## RNB5000 SERIES FREQUENCY INVERTER

## Model description

• Nomenclature



Character	Description
RN	Shanghai Renle Science & Technology Co., Ltd
В	Low voltage frequency inverter
5	RNB5000 series
XXX	Code of power: such as, 0.37: 37kW, 110: 110kW, 1000:1000kW
-XT	Voltage level: 4T: 3-phase, 380V; 6T: 3-phase, 690V; 11T: 3-phase, 1140V

Nameplate of inverter



### Features

RNB5000 series inverter is a low voltage (large) power and medium voltage inverter developed for common usage. It is not only applicable for universal fan and pump load driving, but also widely used forindustrial automation equipment control of many industries, such as textile, stone sawing, air compressor, oil field, coal mine etc. It can also provide solutions for ball mill, injection molding, intelligent motor and other professional applications.

## Technical features

• Using high-performance current vector control. High starting torque can be realized also for induction motors.

V/F control	1Hz, 150% torque (speed control range – 60:1)				
Open loop vector control	0.5Hz, 150% torque (speed control range - 100:1)				
Closed loop vector control	0Hz, 180% torque (speed control range - 1000:1)				

#### • Equipped with abundant parameter tuning method

Static self-tuning	Most suitable for for debugging purposes under the state of					
	connection to motor and handling machinery.					
Detation calf turing	Most suitable for the application of high starting torque, high speed,					
Rotation self-tuning	high control precision;					
Online perspector colf, tuning	During operation, the change of the motor characteristics can be					
Online parameter self-tuning	detected and the high-precision speed control can be performed.					

#### • Instantaneous power outage measures in accord with the application

Speed tracking function is most applicable for fluid machinery with rotating body, such as fans and blowers.Instantaneous non-stop function and power outage measures for film production line can leave out the UPS and other special equipment. Automatic instantaneous power failure compensation is performed whenlow power is detected.



Speed tracking function



Instantaneous non-stop function

#### Easy debugging

Application selection function: Just select the mechanical application, you can have the automatically set and the most appropriate parameters, without cumbersome parameter settings. So the trial run time can be shortened.

## • Standard keyboard has parameter copy function. The parameters can be uploaded or downloaded.

#### Support of tools of xPowerTooL and xLoaderTool

xPowerTool can monitor real-time status of the inverter, configure the inverter' s parameters, control inverter' s operation. Using a computer, you can manage parameters of several inverters.

(1) Equipped with a variety of monitoring, parameter editing, curve operation, oscilloscope and other functions, so that the debugging and maintenance of the inverter becomes more convenient. The drive replacement function, which automatically converts parameters from previous products, eliminates the need to set parameters duringre–placement of the inverter has fault.

(2) xLoaderTooL can upgrade inverter's software online for quick and easy maintenance.

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#### • Support master-slave control

xPowerTool can monitor the inverter status in real time, configure the inverter parameters and control the inverter operation. Using a computer, you can manage several inverter parameters.

The inverter itself can be set as master or slave.							
Set as master	You can select the synchronized reference value for reference of frequency,						
Oet as master	operating frequency or torque.						
Set as slave	You can set whether the slave will follow the host's command.						
The inverter supports drooping control, which can realize load distribution control during drive of the same load by multiple motors.							

### • Support standard brake logic and other safety shutdown functions

Inverter demonstrates outstanding performance in construction lifting, tower crane, bridge and other applications.





### • Support speed limiting mode under a variety of torque control. The inverter can be used in many torque control circumstances.

Inverter demonstrates outstanding performance in construction lifting, tower crane, bridge and other applications.



Pic. 1: Speed limiting mode 0: Diagram of setting from min. limiting frequency to max. limiting frequency



Pic. 2: Speed limiting mode 1: Diagram of setting from min. limiting frequency to output frequency



Pic. 4: Speed limiting mode 3: Diagram of setting from output frequency to max. limiting frequency



Pic. 6: Speed limiting mode 5: Diagram of setting from 0 Hz to output frequency



Pic. 3: Speed limiting mode 2: Diagram of setting from negativeoutput frequency to positive output frequency



Pic. 5: Speed limiting mode 4: Diagram of setting of output frequency +window

## • Technical parameters

	ITEM	DESCRIPTION
	Rated input	380V/690V/1140V; 50/60Hz
	Rated voltage range	Fluctuation: -15% ~ +10%; Unbalance: <3%; Frequency: 47~63Hz
	Control mode	VF control: open loop vector control, closed loop vector control
	Frequency resolution	Digital setting: 0.01Hz; Analog input: 0.5% X max. frequency
Basic	Maximum output	V/F control: 3000Hz; Vector control: 300Hz
features	Speed control range	VF control: 1:60; vector control: 1:100
	Carrier frequency	0.5 ~ 12.0KHz (maximum value is determined by the type of the inverter),
	Carrier requericy	automatically adjustable according to the temperature of the heat radiator
	Start torque	0.5Hz/150% of rated torque of the motor
	Overload capacity	150% of rated output current for 60s, 180% of rated output current for 3
	Operation mode	Keyboard: terminal (two wires, three wires); Communication (RS485) Switching of different modes is available at will through the switching amount input terminal.
	V/F curve	Straight line, multistage, multiple powers.
	Acceleration/	Straight line or S curve; four sets of acceleration/deceleration time
Basic function	deceleration curve	(range: 0.1 ~6000.0s)
	Torque boost	Automatic torque boost, manual torque boost
	Speed tracking	Speed tracking function is available over all power ratings
	Motor braking	DC braking, energy consumption braking, flux braking
		Braking frequency: 0.00Hz ~ maximum frequency: Braking time:
	DC braking	0.0 ~ 100.0s; Braking current: 0.0 ~ 100% of rated current of the motor
		Applicable for circumstances where rapid stop and energy regeneratio
	Flux braking	is required to prevent frequent occurrence of overvoltage protection
	Wave-by-wave	For reducing the overcurrent fault to maximum and protect normal
	current limiting	operation of the inverter.
	Overcurrent and	For automatic limiting of current and voltage during operation to
	overvoltage control	prevent frequent occurrence of overcurrent overvoltage protection.
	- · · · ·	Response delay (0.0 ~3000.0s) can be set to input/output terminals
	Terminal delay	of switching amount.
	Jog control	Control mode: keyboard, terminal; Communication frequency:
function	30g control	0.00Hz ~ maximum frequency; Acceleration/deceleration time: 0.1 ~ 6000.0
	Multistage speed simple DLO	Maximum 16-stage speed operation can be realized through
Special	Multistage speed, simple PLC	built-in smple PLC or switching input terminal.
function	Puilt-in two groups of DID	When used as normal PID, they can conveniently realize process
	Built–in two groups of PID	control closed loop system.
	Fixed length and counting	Counting value can be changed to length for display or for fixed length contr
		Fixed swing frequency, sudden change and period output at any
Basic Sr function M Flu W Cu Ov Ov Special M function Bu Fiz	Swing frequency prevention	frequency can be realized.
	Timing control	Inverter's timing stop control is available (0 ~ 65000h)



#### > Continuing

	ITEM	DESCRIPTION					
	Non-stop during	When instantaneous power failure occurs, inverter can reduce frequency					
Special	instantaneous	for operation so that load feedback energy compensates the reduction					
function	power failure	of bus voltage and the inverter does not stop in short time.					
	Multifunction of jog key	Jog key is used for jog, direction switching and command source switching et					
	Reference power supply	10V/30mA. Normally used for power supply of analog input signal.					
	Control power	24V/200mA. Normally used for power supply of switching amount					
		input/output terminal signal.					
		Two routes of analog input terminals, Voltage or current signal input is					
	Analog input	selectable. Each route supports three signal ranges: 0~10V, 0~20mA,					
Peripheral		-10-10V, all of which are programmable.					
terminal		Two routes of analog output terminals, Voltage or current signal output is					
	Analog output	selectable. Each route supports two signal ranges: 0~10V, 0~20mA, all of					
		which are programmable.					
		6 multifunctional switching amount input terminals, with both active PNP					
	Switching amount input	and NPN input modes. Among the terminals, X6 can be used for input of					
		high speed pulse (0~100KHz), and programmable.					
	Switching amount output	2 open collector output terminals, among which, Y2 can be used for output					
		of high speed pulse (0~100KHz), and programmable. 2 relay output termina					
Fault	Common type	Input/output phase failure, undervoltage, overvoltage, overcurrent,					
protection		overload, short circuit, module fault, peripheral fault, self-defined fault etc					
	Site	Indoors, no exposure to direct sunshine, no dust, water drop, salt, oil mist					
		vapor, inflammable gas, erosive gas etc.					
		When altitude $\leq$ 1000m, the inverter works normally under rated condition					
	Altitude	When altitude > 1000m, the inverter is derated by 1% for each rise of 100 m in heig					
Basic		When altitude > 3000m, please consult the manufacturer for technical support					
function		$-10 \sim +40^{\circ}$ C; When the environmental temperature is within 40 °C $\sim$ 50 °C					
	Temperature	please keep good ventilation and use the inverter by derating. The inverte					
		is derated by 3% for each rise of 1 $^{\circ}$ in temperature.					
	Humidity	<95%RH, no condensed water					
	Vibration	<0.6g					
	Storage	Storage: -25° C ~ +65° C					

## • Product outer view diagram









Metal WG03



Metal WG04

## • Type and specifications

## • 3-phase, 380V input

Model of inverter	Power (KW)	Power capacity (KV/A)	Input current (A)	Output current (A)	Braking unit	DC reactor	Keypad
RNB5630-4T	630	840	1155	1120			
RNB5710-4T	710	947	1310	1270	Ontional	Otanaland	Standard LED+LCD
RNB5800-4T	800	1067	1475	1430	Optional	Standard	
RNB5900-4T	900	1200	1668	1610	External	Built-in	dual
RNB51000-4T	1000	1334	1850	1790			

## • 3-phase, 690V input

Model of inverter	Power (KW)	Power capacity (KV/A)	Input current (A)	Output current (A)	Braking unit	DC reactor	Keypad
RNB5037-6T	37	60	50	45			
RNB5045-6T	45	66	55	52		Optional	
RNB5055-6T	55	79	66	63		External	
RNB5075-6T	75	108	90	86			
RNB5090-6T	90	122	102	98			
RNB5110-6T	110	150	125	121			
RNB5132-6T	132	190	158	150			
RNB5160-6T	160	220	185	175		Standard	Standard LED+LCD dual
RNB5185-6T	185	250	205	198			
RNB5200-6T	200	276	230	218	Optional		
RNB5220-6T	220	300	250	240	External	External	
RNB5250-6T	250	340	284	270	LAternal	LAtemai	
RNB5280-6T	280	384	320	305			
RNB5315-6T	315	440	368	350			
RNB5355-6T	355	480	400	380			
RNB5400-6T	400	540	450	430			
RNB5450-6T	450	588	490	490			
RNB5500-6T	500	684	570	570		Standard Built−in	
RNB5560-6T	560	756	630	630			
RNB5630-6T	630	850	715	715			
RNB5710-6T	710	950	799	799			
RNB5800-6T	800	1050	883	883			



•	3-phase,	1140V	input
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Model of inverter	Power (KW)	Power capacity (KV/A)	Input current (A)	Output current (A)	Braking unit	DC reactor	Keypad
RNB5075-11T	75	108	55	52			
RNB5090-11T	90	123	62	59			
RNB5110-11T	110	152	77	73			
RNB5132-11T	132	183	93	88			
RNB5160-11T	160	216	109	104	-		
RNB5185-11T	185	254	128	122			标配 LED +LCD 双显 键盘
RNB5200-11T	200	274	139	132	_	Standard Built−in	
RNB5220-11T	220	308	156	148			
RNB5250-11T	250	337	171	162	Optional		
RNB5280-11T	280	376	191	181	External		
RNB5315-11T	315	432	219	208	-		
RNB5355-11T	355	470	238	226			жш.
RNB5400-11T	400	540	274	260			
RNB5450-11T	450	609	308	293			
RNB5500-11T	500	678	343	326			
RNB5560-11T	560	738	374	355			
RNB5630-11T	630	831	421	400			
RNB5710-11T	710	935	474	450			

Note: Models in the tables are single machines, vertical cabinet type.

- Outer dimensions and installation dimensions
  - Product's outer dimensions diagram



Dimension diagram C02



Dimension diagram C04



D



Dimension diagram CG02

Dimension diagram CG03



Dimension diagram CG04

•	Table	of	outer	instal	lation	dime	nsion	data
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Outer	Model of	C	outer dimension	s (mm)		Installa	ation dim (mm)	ensions	Dimension
diagram	inverter	Н	H1	W	D	Α	В	Hole diameter	diagram
			3-р	hase, 38	30V		1		
	RNB5630-4T	2000	2000	1200	600	,	,	,	
	RNB5710-4T	2060	2000	1200	620	/	/	/	
WG02	RNB5800-4T	2160	2100	1250	635	/	/	/	CG02
	RNB5900-4T	2200	2200	4500	050	,	,	,	
	RNB51000-4T	2260	2200	1500	650	/	/	/	
			3-р	hase, 69	90V				
	RNB5018-6T								
	RNB5022-6T	582	552	265	265	200	560	Φ7	
	RNB5030-6T								
W04	RNB5037-6T								C02
	RNB5045-6T	760	720	330	320	200	733	Φ9	
	RNB5055-6T	100	120		020	200	100	<u></u>	
	RNB5075-6T								
	RNB5090-6T		980/						
	RNB5110-6T	1030	H2: 1350	480	352	320	998	Φ12	
	RNB5132-6T								
	RNB5160-6T								
	RNB5185-6T	1010	1160/						
W06	RNB5200-6T	1210	H2: 1590	640	400	420	1178	Φ12	C04
	RNB5220-6T								
	RNB5250-6T								
	RNB5280-6T	1105	1350/	700	400	000	4070		
	RNB5315-6T	1405	H2: 1805	720	426	600	1373	Φ14	
	RNB5355-6T RNB5400-6T								
	RNB5450-6T								
	RNB5500-6T	1870	2020	1000	500	,	,	,	
W06	RNB5560-6T	1670	2020	1000	500				CG03
0000	RNB5630-6T								0003
	RNB5710-6T								
	RNB5800-6T	2200	1350	1250	635	/	/	/	
			a–2	hase, 11	40V				<u> </u>
	RNB5075-11T		•	,					
14/000	RNB5090-11T	1000	1000	000	450	,	,	,	0000
WG03	RNB5110-11T	1200	1360	680	450	/	/		CG03
	RNB5132-11T								



#### > Continued

Outer	Model of	С	Outer dimension	s (mm)		Installa	ation dim (mm)	ensions	Dimension
diagram	inverter	Н	H1	W	D	А	В	Hole diameter	diagram
			3-pl	nase, 11	40V				
	RNB5160-11T								
	RNB5185-11T								
WG03	RNB5200-11T	1500	1660	800	500	1	/	/	
	RNB5220-11T								
	RNB5250-11T								
	RNB5280-11T								
	RNB5315-11T		(====						
	RNB5355-11T	2150	1700	900	570	/	/	/	
	RNB5400-11T								
WG04	RNB5450-11T								CG04
	RNB5500-11T								
	RNB5560-11T	2355	1900	1100	700	/	/	/	
	RNB5630-11T								
	RNB5710-11T								

• Outer shape and dimensions of keypad of RNB5000

• Keypad A (LED)

4 digit LED display. See the following diagram for outer appearance and dimensions:

Keyboard A together with its baseis used for the sheet metal structure or user's add-on. See the following diagram for outer appearance and dimensions:



Picture of keypad A



Picture of base of keypad A

### • Keypad B (LED+LCD dual displays)

4 digit LED+LCD dual displays. See the following diagram for outer shape and dimensions:



Picture of keypad B

Keyboard B together with its base is used for the sheet metal structure or user's add-on. See the following diagram for outer shape and dimensions:



Picture of base of keypad B

Basic wiring diagram

### • Terminals of the main circuit





	Image: second symplectic sympl
Pic.13 RNB5400-6T ~ RNB5800-6T	Pic.14 RNB5075-11T ~ RNB5710-11T

## • Description of the terminals of the main circuit for the inverter

Code of the terminal	Name	Description
R、S、T	3-phase power supply input terminal	Connection point of AC input 3-phase power supply
P+、P-	Positive/negative terminal of the DC bus	Input point of common DC bus
P+、PB	Connection terminal of braking resistor	Connection point of braking resistor
P1、P+	Connection terminal of outer reactor	Connection point of external reactor
U, V, W	Output terminal of the inverter	Connected to 3-phase motor
<u><u> </u></u>	Grounding terminal	Grounding terminal

Description of control terminal and wiring

• The layout of the control terminals are as follows:





Pic. 16: Layout diagram of control terminals of RNB5000 vector frequency inverter



**Note:**The default connection is short connection of 24V and CMX. The jumpers of Al1, A01and A02 is "V" (voltage), and jumper of Al2 is "mA" (current).



#### External appearance of the keypad 0



Keypad A (pure LED)



Keypad B (LED+LCD dual displays)

#### Keypad indication lamp igodol

L	.amp	Name	Meaning
	Hz	Frequency indication	The unit of the currently displayed parameter is Hz.
	А	Current indication lamp	The unit of the currently displayed parameter is A.
	V	Voltage indication lamp	The unit of the currently displayed parameter is V.
Unit	Hz + A	Speed indication lamp	The unit of the currently displayed parameter is R/MIN (rotation/minute)
indication	A+V	Percentage indication lamp	The unit of the currently displayed parameter is % (percentage).
	Hz + V	MPa indication lamp	The unit of the currently displayed parameter isMPa.
	(MON)	Command source indication lamp	Off: Keypad control; On: Terminal control; Blink: Communication control
	RUN	Operation/stop indication lamp	On: Operation state; Off: Stop state; Blink: Deceleration state
State indication	(DIR)	Direction indication lamp	Off: There is forward command during stop or in the forward operation. On: There is reverse command during stop or in the reverse operation.
	(TRIP)	Fault state indication lamp	The frequency inverter is in alarming or fault state

Note: The lamp with brackets "()" exists only in keypad A; Indication lamps RUN and TRIP are red, and others are green.

### Basic wiring diagram



## Vote:

- Terminal © means terminal of the main circuit, and  $\bigcirc$  means terminal of the control circuit.
- Both the inverter and the motor should be reliably grounded.
- If neither the motor nor the inverter can be grounded, please connect the grounding terminal

of the motor and the PE terminal of the inverter.

## • Several project acceptance reports



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校告于武式, 5 教授教育史代表指述 化, 确认了转换了了 私行的时代, 节约1	
影景教教史间希信書 他: 确认了转换了参 私和的研究, 节约1	6出药循环方面觉法,亦可把利油条的控制我会实施改造 5.得予的紧柔,但成于约万.10%,含糊液是可加做定,亦可
日本日前点、5     日本日前の元川市市市     市地市元川市市市     市市市市市,市市     东田南田町市,市市     东田南田町市     东田     市       市     市       市	олдания и очена дологовор здала потока, чена за на наказати од об жи. как сказона на наказати од об сказати од обрани и обрани и нака наказати обрани обрани и наказати обрани и обрани и наказати обрани и наказати обрани и обрани и обрани и наказати и наказати и наказати и





## • 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 Gompany 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.

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 Chongging 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 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 PingguoAluminium 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 Daging 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











