

RENLE Science & technology



**RENLE**

JJR5000 Series

**Motor Soft Starter**



**雷诺尔**

Shanghai RENLE  
Science&Technology Co., Ltd.



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## Professional manufacturer of intelligent grid and new energy- RENLE

### Company profile

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

## JJR5000 Series MOTOR SOFT STARTER



### Product Description

JJR5000 Series Intelligent soft starter adopts international advanced electronics technology, Microprocessor technology and modern control theory to efficiently limit start voltage of asynchronous motor. The equipment could be widely applied to fan, pump, conveyor, and compressor and other heavy load equipment. It is an excellent product to substitute traditional startup equipments such as star/triangle transition, self-coupling voltage reduction, Magnetron voltage reduction and so on.

### ● Typical Application

JJR5000 series intelligent soft starter could be widely applied to electric power, metallurgy, petroleum, petrochemical, mining, chemical industry, construction, building materials, municipal project, arm industry, light industry, textile, printing and dyeing, paper industry, and pharmacy and so on.

- Pump: make use of soft stop function to relieve the influence of water hammer so as to save system maintenance cost.
- Ball mill: make use of voltage ramp startup to reduce gear torque friction so as to save cost and time.
- Fan: reduce belt friction and mechanical conflict to save maintenance cost.
- Compressor: make use of current limitation function to realize smooth startup so as to reduce motor heating and prolong its service life.
- Conveyor: make use of soft start to realize smooth and gradual startup process in order to avoid product move and liquid overflow.

## ● Technical Characteristics

- Three kinds of optional starting parameters are available for one soft starter to drive different motor load.
- Dynamic fault record function which is convenient for seeking the reason of fault.
- Multiple protection functions: over current, three-phase current imbalance, overheat, phase loss and motor overload protection.
- Powerful software functions and many kinds of hardware to easily satisfy different site application request.
- Two communication protocols are optional: Profibus / Modbus
- Reasonable structure design to make installation easier and use more convenient.
- Humanization designed operation mode. Display window is optional: LED or LCD.
- Menu tree is grouped by function in order to make operation easier.

## ● Technical Features

- Main loop work voltage: AC380/500V (+10%-25%) ;
- Main loop work loop: 11A~1500A;
- Main loop frequency: 50Hz/60Hz ( $\pm 2\%$ ) ;
- Control loop power supply: AC220V $\pm 15\%$ (0.5A);
- Soft starting rising time: 1~120S;
- Soft stop time: 0~60S;
- Current limiting times : 1.5~5.0Ie;
- Initial voltage: 25%~80%Ue;
- Cooling method: natural cooling;
- Communication method: RS485 series communication;
- Starting times $\leq 10/h$

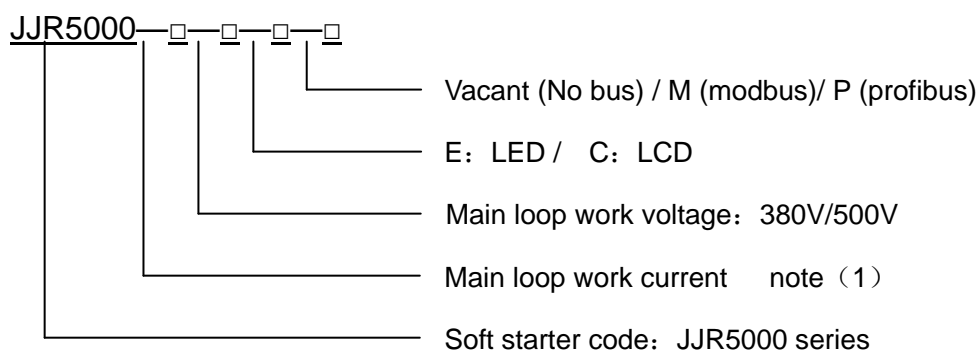
● Usage and Environment Standard	
Protection class	IP00
Vibration resistance	comply with IEC 68-2-6:

	2 to 13Hz is 1.5mm peak value;13 to 200Hz is 1gn
Impact resistance	comply with IEC 68-2-27: 15g, 11ms
Maximum ambient pollution class	Class 3, comply with IEC 947-4-2
Maximum relative humidity	93% no condensing or drip. Comply with IEC 68-2-3
Ambient temperature	Storage : -25°C to +70°C  Running : 10°C to +40°C without derating. Maximum +60°C, 2%  Above 40°C,the current will reduce by 2% for temperature rising for per 1°C.
Maximum running altitude	2000m without derating( above 2000m, current will reduce by 0.5% altitude rising for per 100m)
Running position	vertical position, between $\pm 10^\circ$

### ● Relationship between Altitude and Output Rating Ratio

Altitude	Output current rating ratio
Below 2000m	1.00
2000m-2500m	0.91
2500m-3000m	0.88

### ● Instruction for Product Model



### Notice for Model Selection

Soft starter must supply bigger torque than load resistance torque to complete start of related equipments such as pump, centrifugal pump.

Single start constant load: permitted 40s for startup under 3 times limited current;

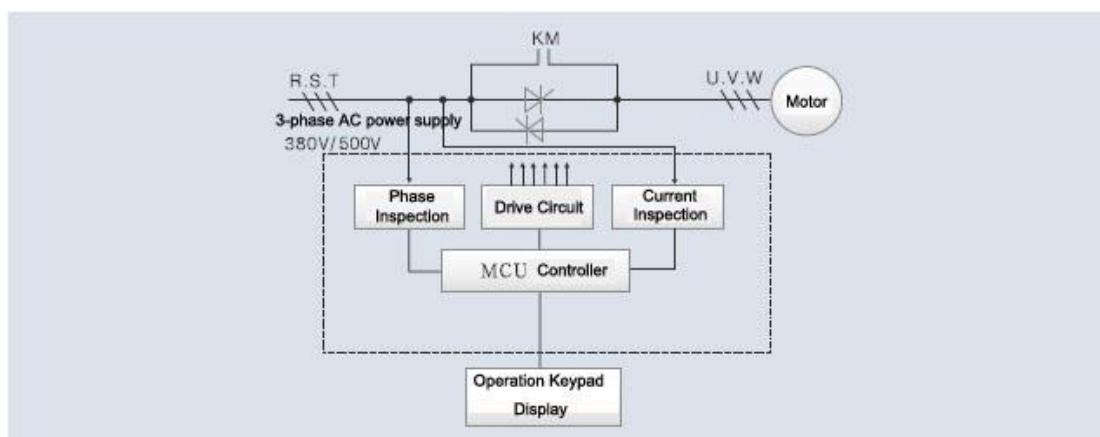
permitted 25s for startup under 4 times limited current.

Recycle start: if starting motor 10 times every hour, permitted 25s for startup under 3 times limited current; and permitted 15s for startup under 4 times limited current. Now the correspondent heat protection level is class 10.

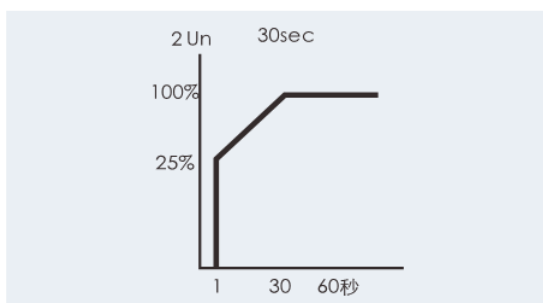
Permit to start heavy load motor such as ball mill, fan 5 times every hour. If limited current value is as above, the protection level is class 20. If increasing startup frequency, we have to adopt bigger power level product.

## ● Working principal

Main circuit of JJR 5000 soft starter adopts 6 SCRs (anti-parallel connected in series) connecting with stator circuit of AC motor. Based on function of SCR electronic switch, the soft starter makes use of microprocessor to adjust trigger angle to change SCR's conducting angle, so as to change motor input voltage value to realize the control of motor soft start. When completing the start, the output of soft starter will reach rated voltage. Then contactor KM which controls three-phase bypass will switch on to make motor run into the grid.



## Voltage Mode



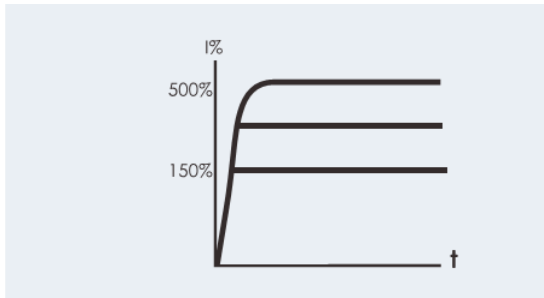
Initial motor torque: When the frequency is a constant value, motor torque is proportional to the square of the applied voltage.

Setup range: 30% -80%. When adjusting the parameter, the user has to consider current impact and mechanical impact. If the value is too big, it will lead to a very big

initial current. And then current impact and mechanic impact will be too much more. Under voltage mode, current will change with the exact load. But if max. value is limited on 5 times rated current, the user could increase start time to reduce its start current. When the load is light or empty, it will also complete start process even though it does not reach

setup rising time because of motor potential energy which has accelerated the establishment.

### Limit Current Start



Max. permitted Current during motor start.  
Setup range: 150-500%FLA( motor rated current). If asking for an extending range, please contact the manufacturer. If the setup value is too big, the motor will get bigger current from the main circuit to accelerate its speed. If the setup value is too small, it will cause

that the motor still could not reach the full speed after completing its acceleration process. In order to help start current quickly reach limited value, it's better to setup start time short.

#### ● Motor and system protection functions:

JJR5000 series soft starter provides many kinds of protections upon motor and soft starter. The main functions are as below:








1. Protection for three-phase input phase failure. It won't start unless there is load with power supply from main loop and three phases.
2. Protection for overheat. Monitor the temperature. Frequent starts will lead to too high SCR's temperature. (Over 80 °C)
3. Protection for overlong start time. It is not good for motor and soft starter if start time is too long. So the default limit for start time is 30s. And the user could set up this time between 10~300s in accordance with exact load.
4. Protection for big current belongs to timing limit. If the current is over 5~8 times (available for setup), it will cut off output within 20ms ~200ms( available for setup).
5. Protection for inverse overload. There are 4 grade curves stall protection.
6. Light load alarm; trip protection, frequency mistake alarm.
7. Optional for choosing function of 'prohibiting start'. It will only permit restart when temperature of the motor reaches an expected value.

#### ● Humanized Operation Interface

● **LED Indication Light** There are 8 LED lights on the display panel to indicate soft starter's status.

Name		Color of light	Instruction
<i>power</i>	Power indication	● Green	On=Control system is supplied with power



<i>start</i>	Start indication	 Green	On=Motor runs normally Off=Motor stopped Flash=Motor is starting
<i>Moto</i>	Motor failure	 Red	On=Motor fault indication, such as overload, locked rotor, etc.
<i>equ</i>	Equipment failure	 Red	On=Soft starter's failure, such as input phase failure, thyristor overtemperature
<i>bus</i>	Bus indication	 Green	On=Normal communication (See communication manuals)
A		 Green	On=Current (unit: A)
SEC		 Green	On=Time (unit: second)
%		 Green	On=Current/voltage percentage

● **Key Function Description:**



RUN Start key: Start the motor, must set the control source



STOP Stop key: Stop the motor, must set the control source



SET Parameter setting key: Enter the next level of menu, key of saving the parameter



EXIT Return key: Exit from the previous menu

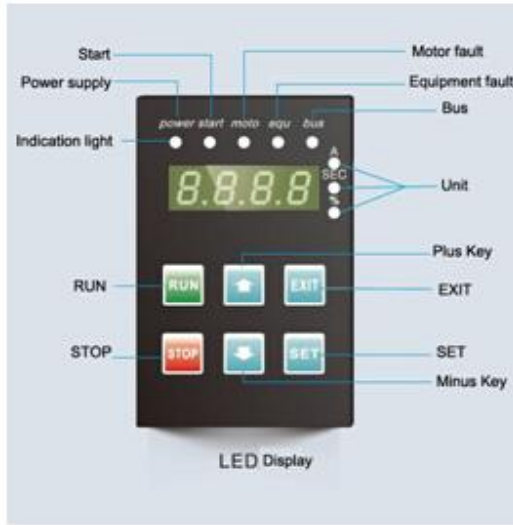
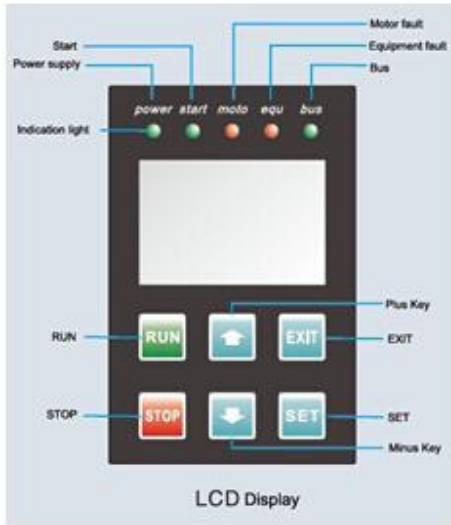


Plus or minus key: increase and decrease key for menu and setting









parameters

[Indicator] see the above table of the meaning description



或者

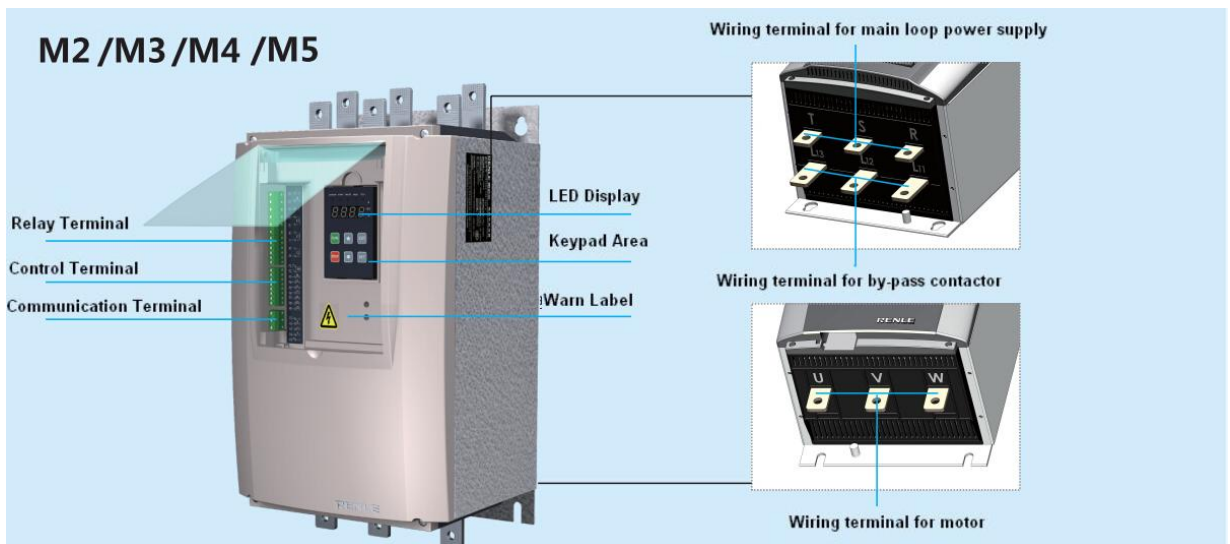
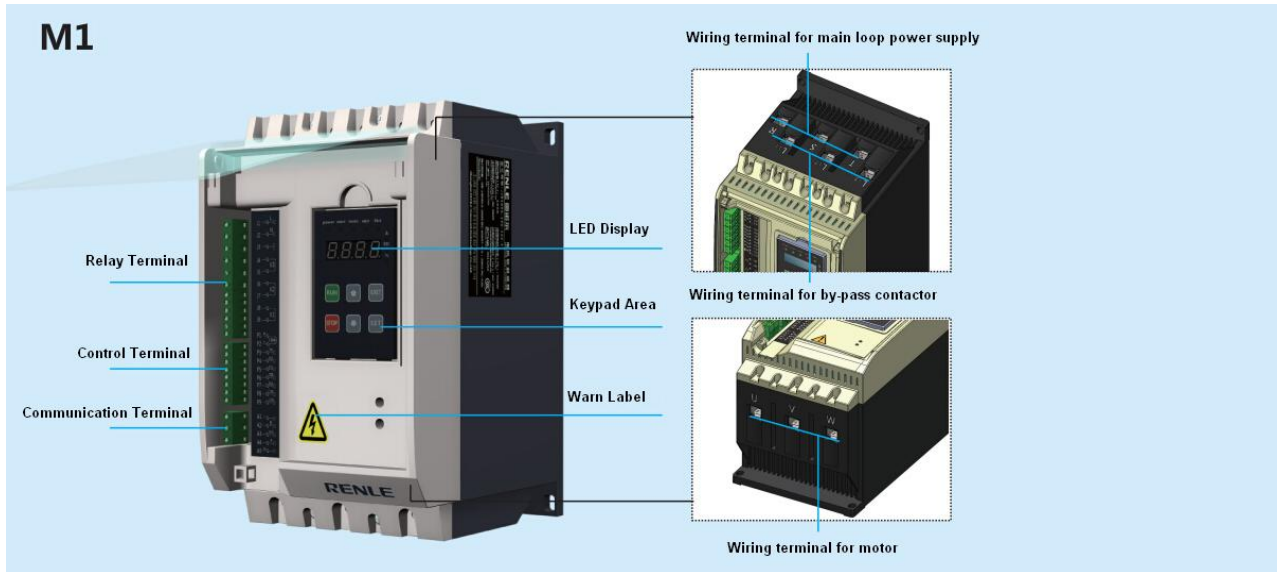
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-  **RUN** Start key: Start the motor, must set the control source
-  **STOP** Stop key: Stop the motor, must set the control source
-  **SET** Parameter setting key: Enter the next level of menu, key of saving the parameter
-  **EXIT** Return key: Exit from the previous menu
-  Plus or minus key: increase and decrease key for menu and setting parameters
- 

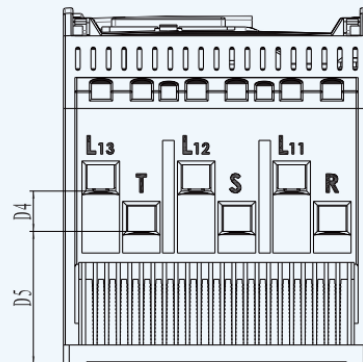
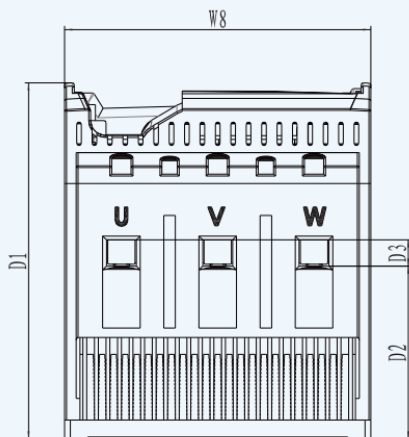
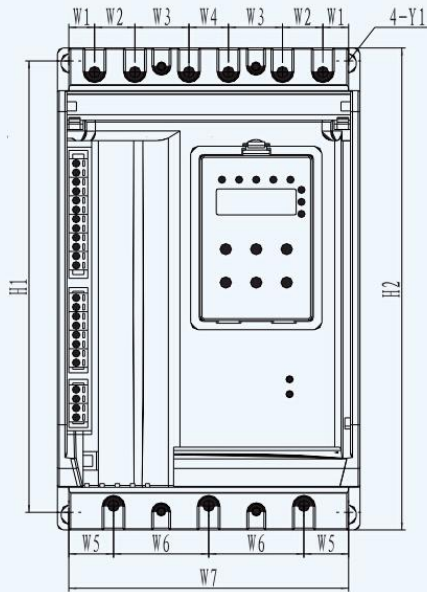
[Indicator] see the above table of the meaning description



## ● Outline and wiring terminals

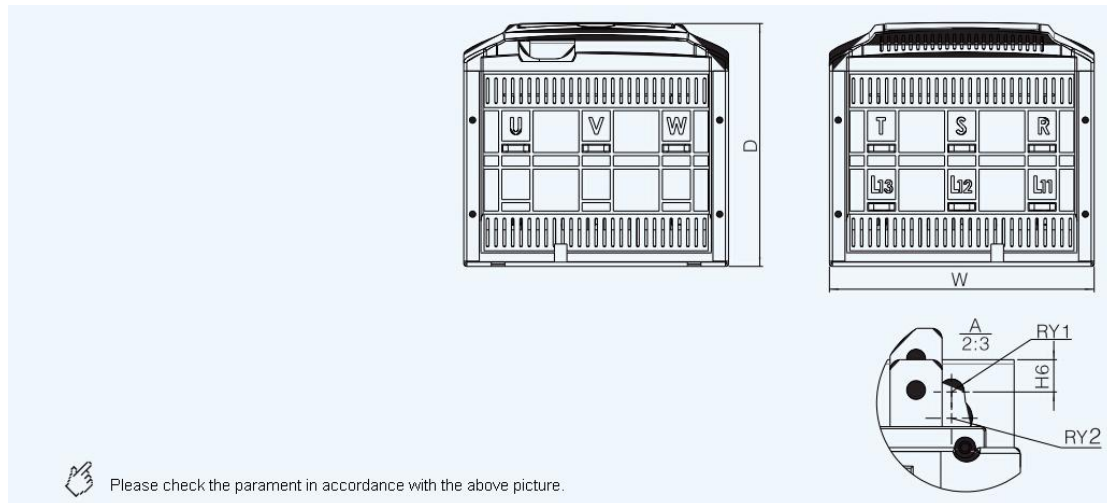
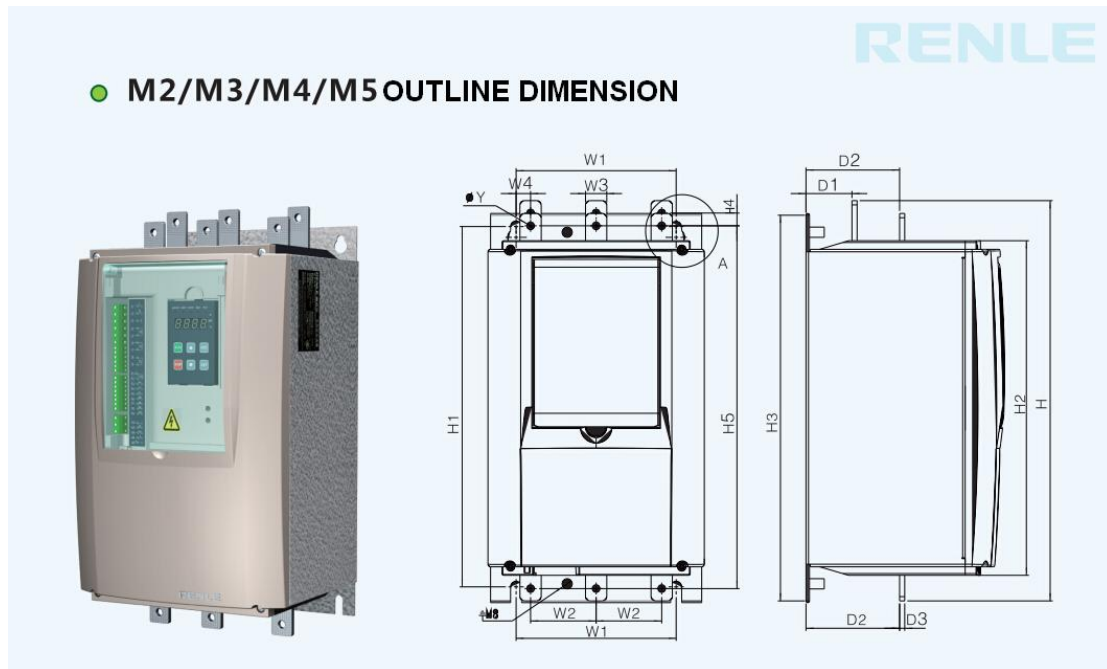


● M1 OUTLINE DIMENSION



Please check the parament in accordance with the above picture.

Model	Dimension (mm)															
	W1	W2	W3	W4	W5	W6	W7	W8	D1	D2	D3	D4	D5	H1	H2	Y1
M1	13.5	21.2	28.4	20.7	23.5	50	147	159	190	92	14	21.5	70.5	243.5	260	Φ8×10.5



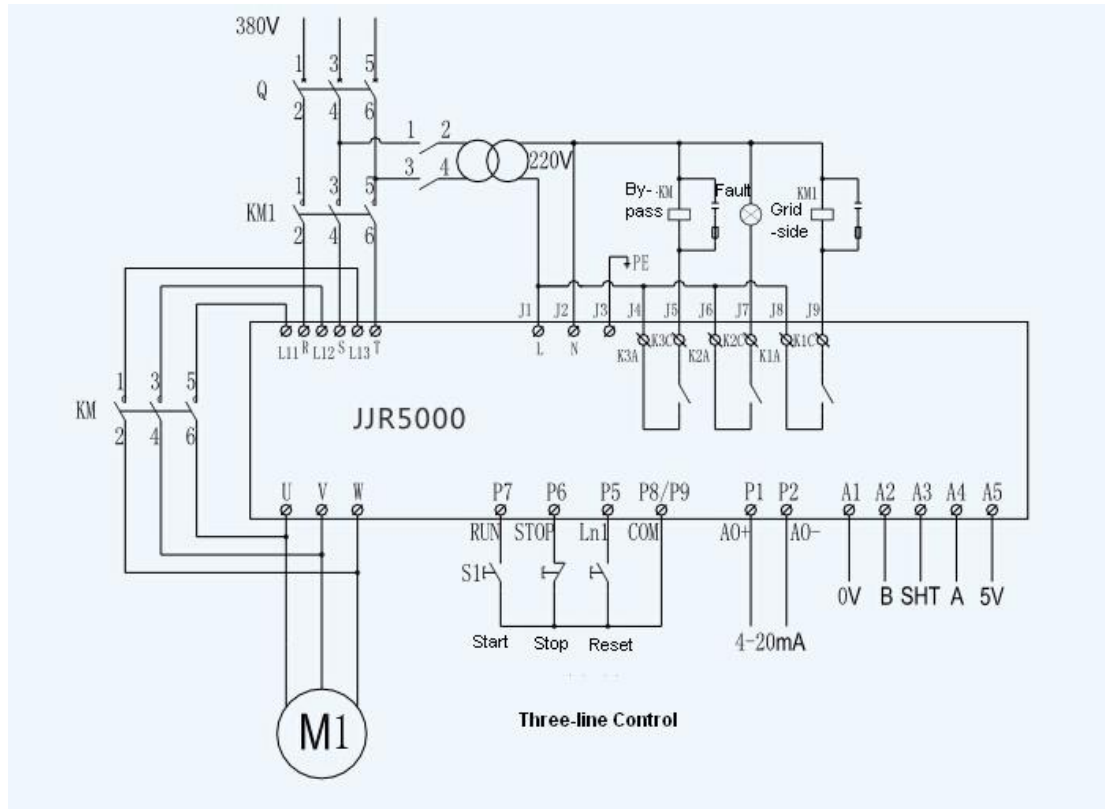
Please check the parameter in accordance with the above picture.

Model	Dimension (mm)																		
	W	W1	W2	W3	W4	D	D1	D2	D3	H	H1	H2	H3	H4	H5	H6	Y	Y1	Y2
M1	254	188	77	25	17	226	54	110	6	474	418	392	446	8.5	429	12	9	5.5	10
M2	290	224	89	31	23	247	74	130	6	552	472	452	506	4.5	497	15.5	13	5.5	10
M3	326	260	101	37	29	273	92	150	8	605	515	495	549	-0.5	550	15.5	13	6.5	11
M4	404	338	127	50	42	318	128	188	10	754	626	606	660	-4	669	15.5	13	6.5	11

● **Product Specification**

380/500V(+10%-15%)50/60Hz(±2%)			Applicable motor rated power			
Structure model	Product Model	Rated current I <sub>e</sub> (A)	Outside wiring		Inside wiring	
			380V(kW)	500V(kW)	380V(kW)	500V(kW)
M1	JJR3000-11-□	11	5.5	7.5	7.5	11
	JJR3000-15-□	15	7.5	11	11	18.5
	JJR3000-22-□	22	11	15	15	22
	JJR3000-30-□	30	15	18.5	22	30
	JJR3000-37-□	37	18.5	22	30	37
	JJR3000-45-□	45	22	30	37	45
	JJR3000-60-□	60	30	37	45	55
	JJR3000-75-□	75	37	45	55	75
	JJR3000-90-□	90	45	55	75	95
	JJR3000-110-□	110	55	75	95	115
M2	JJR3000-145-□	145	75	95	115	132
	JJR3000-190-□	190	95	115	132	160
	JJR3000-220-□	220	115	132	160	200
M3	JJR3000-250-□	250	132	160	185	250
	JJR3000-300-□	300	160	200	200	320
	JJR3000-350-□	350	185	220	250	350
M4	JJR3000-390-□	390	200	250	320	400
	JJR3000-480-□	480	250	320	400	500
	JJR3000-600-□	600	320	400	500	600
	JJR3000-670-□	670	350	450	600	700
M5	JJR3000-720-□	720	385	500	650	800
	JJR3000-800-□	800	400	550	700	900
	JJR3000-950-□	950	500	650	800	1100
	JJR3000-1150-□	1150	600	800	1000	1350
	JJR3000-1350-□	1350	700	800	1200	1550
	JJR3000-1500-□	1500	800	1000	1350	1700

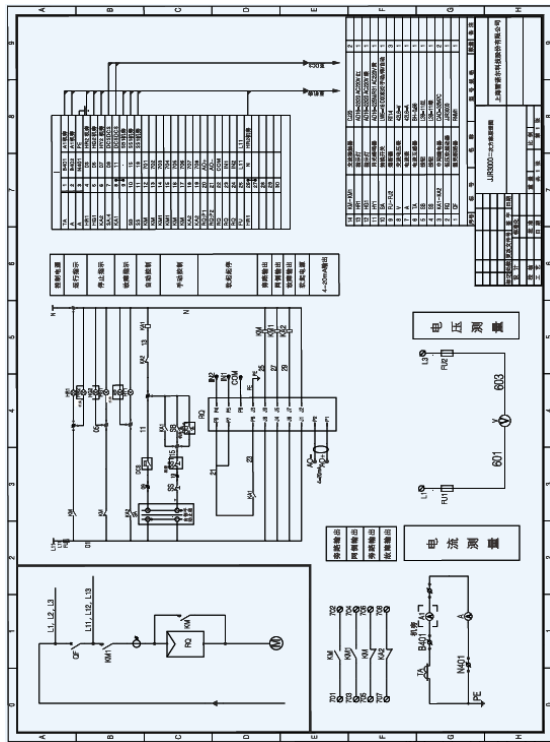
● **Outside Wiring Drawing**



#### Instruction:

1. Main loop wiring: Terminal R-S-T connect power supply; Terminal U-V-W connect motor
2. Control power supply wiring: it connects control loop terminal J1 and J2.
3. Ground wiring: it connects control loop J3.
4. K3 controls bypass contactor. K1 and K2 are programmable relay output. They are pass contacts.
5. Start and stop loop wiring: Follow circuit diagram to connect control loop terminals P6, P7, P8 and P9.
6. P4 and P5 are programmable input terminals. P3 is temperature inspecting terminal.
7. P1 and P2 are 4-20mA analogue signal output terminals.
8. A1, A2, A3, A4 and A5 are RS485 communication terminals.

### ● Secondary Wiring Drawing



图纸中文翻译如下:

旁路输出: By-pass Output 网侧输出: Grid-side Output 旁路输出: By-pass Output 故障输出: Fault Output 机旁: Beside the Machine

电流测量: Current Measuring

机旁: Beside the Machine 自动: Auto 停止: Stop 手动: Manual

电压测量: Voltage Measuring

控制电源: Control Power Supply 运行指示: Running Indication

停止指示: Stop Indication 故障指示: Fault Indication

自动控制: Automatic Control 手动控制: Manual Control

软起起停: Soft-starter Start/Stop 旁路输出: By-pass Output

网侧输出: Grid-side Output 故障输出: Fault Output

软起电源: Soft-starter Power Supply 4-20mA 输出: 4-20mA Output

至机旁: To beside the machine 至 DCS: To DCS

交流接触器: AC Contactor 指示灯: Illumination Lamp 闪光蜂鸣器: Flash Buzzer

转换开关: Switch 熔断器: Fuse 交流电压表: AC Voltmeter 电流表: AMP

电流互感器: Current Transformer 按钮: Button 中间继电器: Intermediate Relay

电压软起动器: LV Soft-starter 塑壳断路器: MCCB

红绿黄: red green yellow

JJR5000 二次方案原理图 : JJR5000 Secondary Principle Diagram

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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  
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  
Shanxi Wanjiazhai Yellow River Diversion Project  
Qinghai Xiaoyou Mountain Ecological Engineering  
Tianjin Eight Large Regions Heating Engineering  
Shandong Heze City Yellow River Diversion Project  
Guangxi Longtan Hydroelectric Project  
Gansu Satellite Launching Center



Yangshan Deepwater Port Project of Shanghai  
International Shipping Center  
Sichuan Xichang Satellite Launching Center  
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  
PetroChina Jinxi Petrochemical Company  
SINOPEC Shenli Oilfield  
CNPC Dushanzi Petrochemical Company  
PetroChina Liaohe Oilfield  
Beijing Financial Street  
PetroChina Tarim Oilfield  
Panda Museum of Chengdu Panda Ecological  
Park  
Karamay Oilfield  
Qingdao Beihai Shipyard  
PetroChina Changqing oilfield  
Inner Mongolian Shenhua Group Corporation Limited  
Shanghai Petrochemical Company Limited  
Baosteel Group Corporation in Shanghai  
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Yunnan Honghe River Nansha Hydropower Station  
Datang International Power Generation Co., Ltd.



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