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Technical innovation benefits the world
RENLE Science & technology

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Technical innovation benefits the world

Stock code: 833586

Shanghai RENLE Science & Technology Co., Ltd.
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 systems. 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 appraise 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!
RNB2000 series frequency inverters are a kind of high-performance vector frequency inverter with abundant and powerful functions and excellent and stable features. They can drive 3-phase AC asynchronous motor or 3-phase AC permanent magnet synchronous motor. This series of inverters demonstrates excellent dynamic features and strong overload capacity in the fields of control and adjustment of torque, speed and low-speed high-torque output of 3-phase asynchronous or synchronous motors. Supporting different kinds of I/O extended cards, PG cards and communication extended cards, they are widely used in automatic production equipment and automatic production lines.

Technical innovation benefits the world
Stock code: 833586
Model description

R N B 2 XXX - X

- Code of special machine
- Code of power
- 2000 series
- Frequency inverter
- Shanghai Renle Science & Technology Co., Ltd

<table>
<thead>
<tr>
<th>Character</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RN</td>
<td>Shanghai Renle Science &amp; Technology Co., Ltd</td>
</tr>
<tr>
<td>B</td>
<td>Low voltage frequency inverter</td>
</tr>
<tr>
<td>2</td>
<td>2000 series</td>
</tr>
<tr>
<td>XXX</td>
<td>Such as, 000:0.75 kW; 001:1.5 kW; 037:37 kW; 110:110 kW</td>
</tr>
<tr>
<td>-X</td>
<td>Code of special machine: Default value stands for universal machine</td>
</tr>
<tr>
<td></td>
<td>Such as:</td>
</tr>
<tr>
<td></td>
<td>- U stands for special frequency inverter for beam pumping unit of the oil field;</td>
</tr>
<tr>
<td></td>
<td>- J stands for special frequency inverter for main line drive of metallurgical industry;</td>
</tr>
<tr>
<td></td>
<td>- Q stands for special frequency inverter for hoisting;</td>
</tr>
<tr>
<td></td>
<td>- Z stands for special frequency inverter for main line drive of paper making industry;</td>
</tr>
<tr>
<td></td>
<td>- K stands for special frequency inverter (synchronous/asynchronous) for air compressor industry;</td>
</tr>
<tr>
<td></td>
<td>- G stands for four-quadrant frequency inverter for harbor machine.</td>
</tr>
</tbody>
</table>

Product Characteristics

RNB2000 series frequency inverters meet requirements of high standards for production technology in different high-end applications, depending on their high-end control platform, rich interface resources, multiple communication modes, advanced control algorithm and flexible extension interfaces.

- The frequency inverters adopt new generation of digital signal processor (DSP) of TI, USA for motor control. The main frequency can reach 150MHz.

- The frequency inverters adopt 4th generation of IGBT of Infineon, Germany. The frequency inverters further lower switching loss, depending on the feature of 175 °C highest junction temperature and new PWM mode. So the driver can operate without derating in the environment of 50 °C.
The frequency inverters support drive of asynchronous motor and permanent magnet synchronous motor. They can accurately discriminate the parameters of asynchronous motor and permanent magnet synchronous motor and allow presetting of two groups of motor parameters. They allow switching of control for the driver between two different motors. The switching function can be set by communication or multifunctional terminals.

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.

<table>
<thead>
<tr>
<th>Control mode</th>
<th>Start torque</th>
<th>Range of speed control</th>
<th>Speed precision</th>
<th>Torque response</th>
</tr>
</thead>
<tbody>
<tr>
<td>V/F control</td>
<td>0.5Hz 180%</td>
<td>1:100</td>
<td>±0.5%</td>
<td></td>
</tr>
<tr>
<td>Vector control without PG</td>
<td>0.5Hz 180%</td>
<td>1:100</td>
<td>±0.2%</td>
<td>&lt;10ms</td>
</tr>
<tr>
<td>Vector control with PG</td>
<td>0 Hz 200%</td>
<td>1:200</td>
<td>±0.02%</td>
<td>&lt;5ms</td>
</tr>
</tbody>
</table>

AC permanent magnet synchronous motor  AC asynchronous motor
• Under the V/f separation control mode, the output frequency and output voltage can be set separately. This mode is applicable to applications such as frequency conversion power supply and torque motor control etc.

• Smart extension interface allows simultaneous connection of two extension cards, so it can meet the special control requirements of industries.

• When the encoder is positioned not at the shaft end, PG vector control can still be realized if the deceleration ratio between this axis and the motor axis is kept fixed.

• 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. Positive and negative action feature can be selected.

  This control is 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.

- 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.

- Parameter backup is available. It provides convenience to the user for parameter backup, test and restoration.
### Description of parts of the frequency inverter

<table>
<thead>
<tr>
<th>ITEM</th>
<th>INDEX AND SPECIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main input power</strong></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>3–phase, AC 380V, 50/60Hz</td>
</tr>
<tr>
<td>Frequency range</td>
<td>Voltage: 380V ± 20%  Frequency: ± 5%</td>
</tr>
<tr>
<td><strong>Main output power</strong></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>0 – rated input voltage</td>
</tr>
<tr>
<td>Output frequency</td>
<td>0Hz ~ 600 Hz</td>
</tr>
<tr>
<td><strong>PWM mode</strong></td>
<td>SVPWM, 3–phase modulation and 2–phase modulation</td>
</tr>
<tr>
<td><strong>Control mode</strong></td>
<td>V/F control, vector control without PG (open loop vector), vector control with PG (closed loop vector), torque control</td>
</tr>
<tr>
<td>Motor category</td>
<td>AC asynchronous motor, AC permanent magnet synchronous motor</td>
</tr>
<tr>
<td>Operation command giving method</td>
<td>External terminals, keypad of the panel, communication</td>
</tr>
<tr>
<td>Speed command giving method</td>
<td>Analog giving, keypad of the panel, communication, high–speed pulse, terminal multistage speed giving, PID control giving, simple PLC giving</td>
</tr>
<tr>
<td>Range of speed control</td>
<td>For asynchronous motor – 1: 200 (V/F, vector control without PG); For synchronous motor – 1: 20 (vector control without PG)</td>
</tr>
<tr>
<td>Speed control precision</td>
<td>Open loop vector control ±0.2%</td>
</tr>
<tr>
<td>Speed fluctuation</td>
<td>Open loop vector control ±0.3%</td>
</tr>
<tr>
<td>Torque response</td>
<td>&lt;20ms (vector control without PG)</td>
</tr>
<tr>
<td>Torque control precision</td>
<td>10% (vector control without PG)</td>
</tr>
<tr>
<td>Start torque</td>
<td>Asynchronous motor: 0.25Hz/150% (vector control without PG); Synchronous motor: 2.5Hz/150% (vector control without PG)</td>
</tr>
</tbody>
</table>

> To be continued
<table>
<thead>
<tr>
<th>ITEM</th>
<th>INDEX AND SPECIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overload capacity</td>
<td>150% of rated output current for 60s; 180% of rated output current for 10s; 200% of rated output current for 1s</td>
</tr>
<tr>
<td>Automatic voltage adjustment</td>
<td>When the power grid’s voltage changes, the inverter can automatically maintain constant output voltage</td>
</tr>
<tr>
<td>Instantaneous frequency reduction</td>
<td>When undervoltage occurs in the power grid, the inverter instantaneously reduces the frequency to maintain the bus voltage</td>
</tr>
<tr>
<td>Speed search start</td>
<td>Enables no-impact smooth start of rotating motor.</td>
</tr>
<tr>
<td>Available inner power</td>
<td>1 route, +10VDC, max. current: 50mA (used for potentiometer) 1 route, +24VDC, max. current: 200mA (used for logic input port)</td>
</tr>
<tr>
<td>Analog input</td>
<td>2 routes, 0 ~ 10VDC or 0/4 ~ 20mA DC, selectable 1 route, −10 ~ +10VDC</td>
</tr>
<tr>
<td>Switching amount input</td>
<td>9 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.</td>
</tr>
<tr>
<td>Pulse signal input</td>
<td>2 routes of high–speed pulse inputs, 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. One of the routes can be used as signal input of photoelectric incremental encoder.</td>
</tr>
<tr>
<td>Analog amount output</td>
<td>2 routes, 0 ~ 10VDC or 0 ~ 20mADC, selectable</td>
</tr>
<tr>
<td>Switching amount output</td>
<td>1 route of programmable logic outputs, NPN collector open loop signal, 20 logic input functions, such as in–operation, forward, reverse, fault output are selectable.</td>
</tr>
<tr>
<td>Pulse signal output</td>
<td>1 route of high–speed pulse output, which can also be used as switching amount output, NPN collector open loop signal, 13 output functions selectable.</td>
</tr>
<tr>
<td>Programmable relay output</td>
<td>2 routes with a couple of NO contacts and a couple of NC contacts separately, contact capacity: 250VAC/3A, 30VDC/1A</td>
</tr>
<tr>
<td>Standard interface</td>
<td>RS485 interface, supporting Modbus protocol</td>
</tr>
<tr>
<td>Extended communication interface</td>
<td>Profibus, CAN, Ethernet; supporting protocols, such as Profibus DP, CANopen and Ethernet TCP/IP etc, is available</td>
</tr>
<tr>
<td>Display</td>
<td>For displaying state parameters and fault codes etc, and for setting parameters. Default display is digitron panel. LED (Chinese/English language) operation panel is optional.</td>
</tr>
<tr>
<td>Indication lamp</td>
<td>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</td>
</tr>
<tr>
<td>Push button</td>
<td>For operating the inverter and setting parameters</td>
</tr>
<tr>
<td>Parameter copy</td>
<td>The LED operation panel 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.</td>
</tr>
</tbody>
</table>
### 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.

### Special Functions

- Parameter copy, parameter backup, common DC bus, free switching of two groups of motor parameters, speed tracking, swing frequency control, fixed length control, counting function, preexitation, overcurrent stall, overvoltage stall, powering-off then restart, skip frequency, four stages of acceleration/deceleration, motor overtemperature protection, flexible fan control, process PID control, simple PLC control, drooping control, parameter discrimination, weak magnet control, high-precision torque control, V/f separation control

### Environment

<table>
<thead>
<tr>
<th>Standard</th>
<th>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)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Place of application</td>
<td>Indoors, altitude &lt; 1000 m, no dust, no erosive gas and no exposure to direct sunshine</td>
</tr>
<tr>
<td>Environmental temperature</td>
<td>Operation: −25 °C to 40 °C, reliable operation without derating; Within 40 °C to 50 °C, derating is necessary. The output current reduces by 1% for every rise of 1 °C. Storage: −40 °C to +70 °C</td>
</tr>
<tr>
<td>Altitude</td>
<td>0 to 2000m, derating is necessary when altitude &gt;1000m (The inverter is derated by 1% for each rise of 100m)</td>
</tr>
<tr>
<td>Humidity</td>
<td>5% to 95%, no condensed water or dripping water</td>
</tr>
<tr>
<td>Vibration strength</td>
<td>&lt;5.9m/s²(0.6g)</td>
</tr>
</tbody>
</table>

### Other

<table>
<thead>
<tr>
<th>Protection level</th>
<th>IP20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling</td>
<td>Forced air</td>
</tr>
</tbody>
</table>
# Type and specifications

<table>
<thead>
<tr>
<th>Model of inverter</th>
<th>Power (kW)</th>
<th>Input voltage (V)</th>
<th>Input current (A)</th>
<th>Output current (A)</th>
<th>Power of applicable motor (kW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RNB2000</td>
<td>0.75</td>
<td></td>
<td>3.4</td>
<td>2.5</td>
<td>0.75</td>
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<tr>
<td>RNB2001</td>
<td>1.5</td>
<td></td>
<td>5.0</td>
<td>3.8</td>
<td>1.5</td>
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<tr>
<td>RNB2002</td>
<td>2.2</td>
<td></td>
<td>5.8</td>
<td>5.3</td>
<td>2.2</td>
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<tr>
<td>RNB2004</td>
<td>4.0</td>
<td></td>
<td>12.0</td>
<td>9.5</td>
<td>4.0</td>
</tr>
<tr>
<td>RNB2005</td>
<td>5.5</td>
<td></td>
<td>18.5</td>
<td>14</td>
<td>5.5</td>
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<tr>
<td>RNB2007</td>
<td>7.5</td>
<td></td>
<td>22.5</td>
<td>18.5</td>
<td>7.5</td>
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<tr>
<td>RNB2011</td>
<td>11</td>
<td></td>
<td>30.0</td>
<td>25.0</td>
<td>11</td>
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<tr>
<td>RNB2015</td>
<td>15</td>
<td></td>
<td>39.0</td>
<td>32.0</td>
<td>15</td>
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<tr>
<td>RNB2018</td>
<td>18.5</td>
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<td>45.0</td>
<td>38.0</td>
<td>18.5</td>
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<tr>
<td>RNB2022</td>
<td>22</td>
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<td>54.0</td>
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<tr>
<td>RNB2030</td>
<td>30</td>
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<td>68.0</td>
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<tr>
<td>RNB2037</td>
<td>37</td>
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<td>84.0</td>
<td>75.0</td>
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<td>RNB2045</td>
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<td>98.0</td>
<td>92.0</td>
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<td>RNB2055</td>
<td>55</td>
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<td>123.0</td>
<td>115.0</td>
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<td>RNB2075</td>
<td>75</td>
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<td>157.0</td>
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<tr>
<td>RNB2090</td>
<td>90</td>
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<td>188.0</td>
<td>180.0</td>
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<td>RNB2110</td>
<td>110</td>
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<td>221.0</td>
<td>215.0</td>
<td>110</td>
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<tr>
<td>RNB2132</td>
<td>132</td>
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<td>267.0</td>
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<td>RNB2160</td>
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<td>RNB2185</td>
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<td>RNB2200</td>
<td>200</td>
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<td>380.0</td>
<td>200</td>
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<td>RNB2220</td>
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<td>429.0</td>
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<tr>
<td>RNB2250</td>
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<tr>
<td>RNB2280</td>
<td>280</td>
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<tr>
<td>RNB2315</td>
<td>315</td>
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<td>RNB2350</td>
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<tr>
<td>RNB2400</td>
<td>400</td>
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<td>715</td>
<td>720</td>
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<tr>
<td>RNB2500</td>
<td>500</td>
<td></td>
<td>890</td>
<td>860</td>
<td>500</td>
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</tbody>
</table>

3-phase, 380V

Note 1: Frequency inverters of power rating below RNB2037 (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 between RNB2045 (included) and RNB2055 (included) can have either built-in or external braking unit. The default is external braking unit. The braking resistors of frequency inverters of power rating above RNB2075 (included) are external. They should be purchased by the customer itself.

Note 2: Frequency inverters of power rating between RNB2018 (included) and RNB2037 (included) have built-in DC reactor. Frequency inverters of power rating between RNB2045 (included) and RNB2315 (included) have external DC reactor, which is purchased by the customer itself. Frequency inverters of power rating between RNB2350 (included) and RNB2500 (included) are equipped with AC input reactor.

Note 3: The above machines are for general type, not including special machine type. Customization of non-standard machine type is available.
Outer dimensions, installation dimensions and weight

a) Applicable for RNB2000 (incl.) ~ RNB2011 (incl.)

b) Applicable for RNB2015 (incl.) ~ RNB2110 (incl.)

c) Applicable for RNB2132 (incl.) ~ RNB2315 (incl.)
d) Applicable for RNB2350 (incl.) – RNB2500 (incl.)
## Table of Product Outer and Installation Dimensions

<table>
<thead>
<tr>
<th>Model of inverter</th>
<th>Outer and installation dimensions (mm)</th>
<th>Diameter of Mounting Hole</th>
<th>Weight (kg)</th>
<th>Enclosure Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>W</td>
<td>H</td>
<td>D</td>
<td>W1</td>
</tr>
<tr>
<td>RNB2000</td>
<td></td>
<td></td>
<td></td>
<td>126</td>
</tr>
<tr>
<td>RNB2001</td>
<td></td>
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<tr>
<td>RNB2002</td>
<td></td>
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<tr>
<td>RNB2004</td>
<td></td>
<td></td>
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<tr>
<td>RNB2005</td>
<td></td>
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<tr>
<td>RNB2007</td>
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<tr>
<td>RNB2011</td>
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<td>330</td>
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<tr>
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<td>RNB2500</td>
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</table>
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 RNB2015 (incl.) – RNB2022 (incl.)

b) Applicable for RNB2030 (incl.) – RNB2037 (incl.)

c) Applicable for RNB2045 (incl.) – RNB2055 (incl.)
d) Applicable for RNB2075 (incl.) – RNB2110 (incl.)

e) Applicable for RNB2132 (incl.) – RNB2200 (incl.)
f) Applicable for RNB2220 (incl.) – RNB2315 (incl.)

g) Applicable for RNB2350 (incl.) – RNB2500 (incl.)
1. AI1 is used to select input voltage or current signal. Pin X2 in the control panel determines the input signal type.
2. AI2 is used to select input voltage or current signal. Pin X3 in the control panel determines the input signal type.
3. AO1 is used to select output voltage or current signal. Pin X4 in the control panel determines the input signal type.
4. AO2 is used to select output voltage or current signal. Pin X5 in the control panel determines the input signal type.
5. X7 and X8 are extended card interface.
6. X9 is the main signal interface, used for signal connection between the control panel and the driving board.
7. X10 is the socket for download of the CPU of the control panel and MICRO USB interface. When the main circuit is not powered on, it offers convenience to the user for supplying power to the control panel and for parameter setting through MICRO USB connection wire with the help of external 5V power supply, such as power bank or USB interface of the notebook computer etc.
8. X11 is the external keyboard interface.
9. X13, X14 and X15 are special pins for download of the CPU of the control panel (setting has been performed at factory. The user does not have to make modification).
10. If external braking resistor is required, make sure the wiring is correct during connection of the braking resistor.
11. In the figure “◎” is the terminal of the main circuit, and “●” is the control terminal.
Description of Control Circuit Terminal

Main signal interface

Keyboard interface

Program upgrading interface

External extended card interface 1

Selection of resistance at the RS485 communication terminal

Selection of current and voltage of analog input 1

Selection of current and voltage of analog input 2

Selection of current and voltage of analog output 1

Selection of current and voltage of analog output 2

User’s signal terminal

Figure: Distribution of control panel interface

Figure: Diagram of user’s terminals in the control panel
<table>
<thead>
<tr>
<th>Type</th>
<th>Terminal</th>
<th>Terminal Function Description</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switch</td>
<td>+24V</td>
<td>+24V power supply</td>
<td>24V ± 10%, internally isolated from GND. Max. load 200mA</td>
</tr>
<tr>
<td>input</td>
<td>PW</td>
<td>External power supply input terminal (digital input terminal power source)</td>
<td>Short connected with +24V at factory</td>
</tr>
<tr>
<td></td>
<td>DI1 ~ DI9</td>
<td>Switch input terminal 1~9</td>
<td>Input specification: 24V, 5mA</td>
</tr>
<tr>
<td></td>
<td>HDI1, HDI2</td>
<td>High speed pulse input or switching input</td>
<td>Pulse input frequency range: 0~50KHz. High level voltage: 24V</td>
</tr>
<tr>
<td></td>
<td>PHDI1, PHDI2</td>
<td>External power supply input terminals of DI1/HDI2</td>
<td>Short connected with +24V at factory</td>
</tr>
<tr>
<td></td>
<td>COM</td>
<td>+24V power supply or external power source</td>
<td>Internally isolated from GND</td>
</tr>
<tr>
<td>witching</td>
<td>DO</td>
<td>Open collector output. The common terminal is CME</td>
<td>External voltage range: 0~24V</td>
</tr>
<tr>
<td>output</td>
<td>CME</td>
<td>Open collector output common terminal</td>
<td>Short connected with COM at factory</td>
</tr>
<tr>
<td></td>
<td>HDO</td>
<td>High speed pulse output or open collector output. The common terminal is COM</td>
<td>Pulse output frequency range: 0~50KHz</td>
</tr>
<tr>
<td></td>
<td>COM</td>
<td>Common terminal of HDO</td>
<td>Internally isolated from GND</td>
</tr>
<tr>
<td></td>
<td>+10V</td>
<td>+10V power output supplied by the inverter</td>
<td>Output current range: 0~50mA (if the potentiometer is connected between +10V and GND, its resistance should be no less than 2KΩ)</td>
</tr>
<tr>
<td>Analog</td>
<td>A1</td>
<td>Analog input terminal 1</td>
<td>Input voltage and current can be selectable</td>
</tr>
<tr>
<td>Input</td>
<td></td>
<td>Input voltage range: 0V~10V</td>
<td>Input current range: 0/4~20mA</td>
</tr>
<tr>
<td></td>
<td>A2</td>
<td>Analog input terminal 2</td>
<td>Input voltage and current can be selectable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Input voltage range: 0V~10V</td>
<td>Input current range: 0/4~20mA</td>
</tr>
<tr>
<td></td>
<td>A3</td>
<td>Analog input terminal 3</td>
<td>Input voltage range: -10V~10V</td>
</tr>
<tr>
<td></td>
<td>GND</td>
<td>Analog ground</td>
<td>Internal isolated with COM</td>
</tr>
<tr>
<td>Analog</td>
<td>AO1~AO2</td>
<td>Analog output terminal</td>
<td>Output voltage and current should be selectable</td>
</tr>
<tr>
<td>Output</td>
<td></td>
<td>Output voltage range: 0~10V</td>
<td>Output current range: 0~20mA</td>
</tr>
<tr>
<td></td>
<td>GND</td>
<td>Analog ground</td>
<td>Internally isolated from GND</td>
</tr>
<tr>
<td>Relay</td>
<td>T1A/T1B/T1C</td>
<td>Relay output</td>
<td>T1A~T1B: normally closed</td>
</tr>
<tr>
<td>Output</td>
<td></td>
<td>T1A~T1C: normally open</td>
<td>Contact capacity: 250VAC/3A, 30VDC/1A</td>
</tr>
<tr>
<td></td>
<td>T2A/T2B/T2C</td>
<td>Relay output</td>
<td>T2A~T2B: normally close</td>
</tr>
<tr>
<td></td>
<td></td>
<td>T2A~T2C: normally open</td>
<td>Contact capacity: 250VAC/3A, 30VDC/1A</td>
</tr>
<tr>
<td>Communication</td>
<td>485+/485−</td>
<td>RS485 communication interface</td>
<td>RS485 communication interface</td>
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</tbody>
</table>
Description of peripheral components of the product

Table of Functions of Peripheral Component

<table>
<thead>
<tr>
<th>Name</th>
<th>Description of function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circuit breaker</td>
<td>Application: To cut off the power when fault occurs in the back equipment and protect the equipment.</td>
</tr>
<tr>
<td></td>
<td>Selection: Select the breaking current of the circuit breaker as twice the breaking current of the frequency inverter</td>
</tr>
<tr>
<td>Leakage protector</td>
<td>The high frequency leakage current is unavoidable due to the PWM high frequency output chopper voltage of the frequency inverter. Thereupon, special leakage protectors must be selected.</td>
</tr>
<tr>
<td>Contactor</td>
<td>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.</td>
</tr>
<tr>
<td>Input reactor and DC reactor</td>
<td>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. To restrain the influence of pulse current to the rectifier bridge effectively.</td>
</tr>
<tr>
<td>Input and output filter</td>
<td>To reduce the interference of frequency inverter to the peripheral devices.</td>
</tr>
<tr>
<td>Braking unit, braking resistor</td>
<td>To consume the feedback energy of the motor and quickly realize braking during braking.</td>
</tr>
<tr>
<td>Output reactor</td>
<td>To reduce the frequency inverter protection caused by the leakage current.</td>
</tr>
<tr>
<td></td>
<td>It is suggested to install the output reactor when the cable length is longer than 100m between the frequency inverter and the motor.</td>
</tr>
</tbody>
</table>
Application case of the product
Application in hoisting industry

Feature

High start torque and fast response.
Vector control without PG, 0.25Hz, reaching 180% of output torque, torque response time <10ms; Vector control with PG, 0Hz, 200% of output torque is available, torque response time <5ms; These can prevent accidents such as sliding of the load due to inadequate torque under low speed.

Switching of dual motors
Two groups of motor parameters can be set individually for the instance when one inverter drives two different motors for walk or translation.

Contracting brake function
Regarding to the contracting brake logic control and monitoring function of lifting industry, Renle’s RNB1000 series inverters more flexibly realize stable start and stop of hoister and effectively prevent the slide and fall of the object.

Perfect protection functions
All-around alarming and protection functions meet the safety requirements of the industries.

Application
Tower cranes, bridge cranes, port machines, electric hoists, construction lifts, hoist doors, electric winches and mine hoisters.
Application in winding industry

Feature

Flexible rewinding and unwinding methods
Multiple roll diameter calculation methods are available. Constant linear velocity and constant tension control can be realized for the central rewinding and unwinding occasions.

Function designs in compliance with the technological requirements of industries.
Friction compensation and inertia compensation function ensures consistent tension during acceleration and deceleration for compensation adjustment of different mechanical equipment.

Perfect forming control
Multiple ways to control the tension taper ensure good forming effect of unwinding and rewinding.

Perfect protection functions
All-around alarming and protection functions meet the safety requirements of the industries.

Abundant interface design and parameter copy function
The function offers convenience to design and equipment commissioning and simplifies the work of completing clients.

Application
Printing machinery, packing machinery, film blowing machine and wire drawing machine.
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 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 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
Qingdao Beihai Shipyard
PetroChinaChangqing oilfield