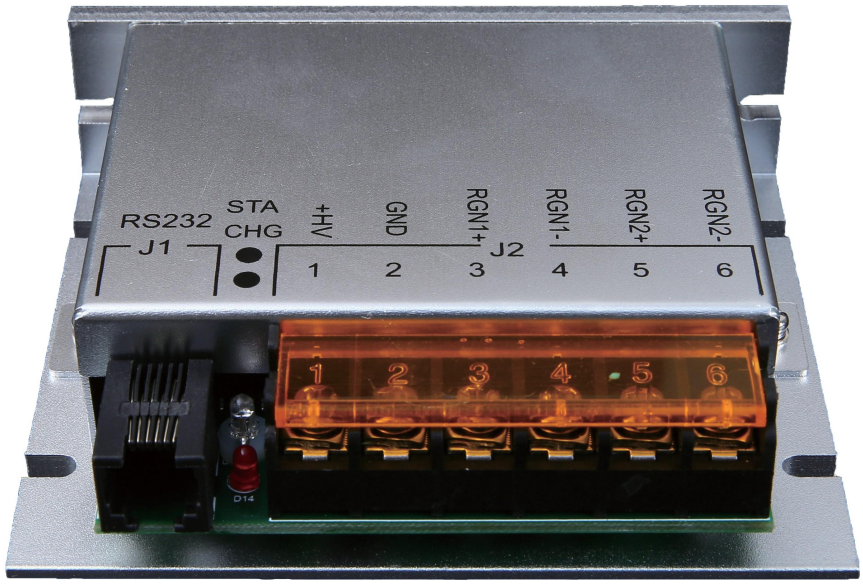
# Braking unit instructions

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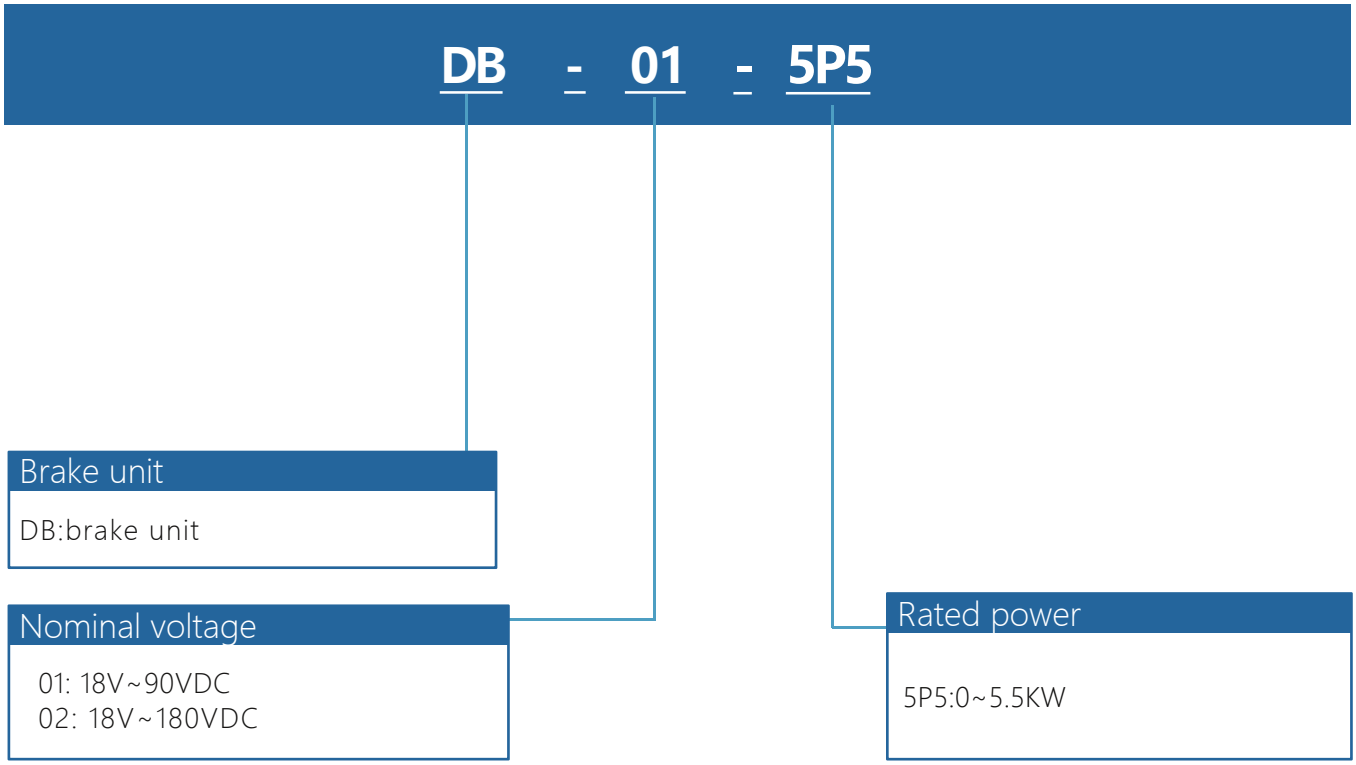
## Brake unit model description




## brake unit model summary

| model | voltage | Power |
|---|---|---|
| DB-01-5P5 | 18~90VDC | 0~5.5KW |
| DB-02-5P5 | 18~180VDC | 0~5.5KW |

### 1、Principle of brake unit:

The braking unit is composed of high power transistor MOS and its driving circuit. Its function is to discharge the current link capacitor in the specified voltage range can not be stored or the internal brake resistance is too late to consume and make the DC part "overvoltage", need to add external brake components to speed up the consumption of regenerative energy.

## 2、Brake unit + resistor：

The braking unit is composed of high power transistor MOS and its driving circuit. Its function is to provide a path for the discharge current IB to flow through the brake resistor.

### The action process of the braking unit：

a、 when the motor decelerates under the action of an external force, the motor runs in a power generation state to generate renewable energy. The resulting three-phase AC EMF is rectified by a three-phase fully controlled bridge composed of six free-flowing diodes in the inverter part of the inverter, so that the dc-bus voltage in the inverter is continuously increased.

b、When the DC voltage reaches a certain voltage (the opening voltage of the brake unit), the power switch tube of the brake unit is opened and the current flows through the brake resistance.

c、The brake resistor releases heat and absorbs regenerative energy, the motor speed decreases, and the DC bus voltage of the inverter decreases.

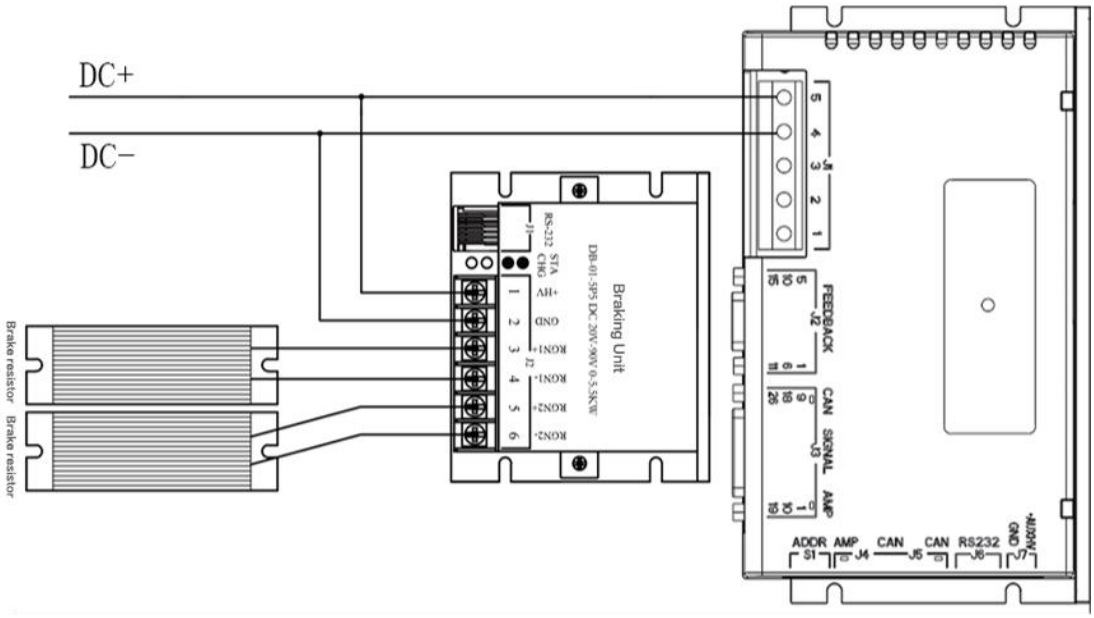
d、When the DC bus voltage drops to a certain voltage (brake unit stop voltage), the power tube of the brake unit is turned off. At this time, there is no braking current flowing through the resistance, and the brake resistance is naturally radiating heat to reduce its own temperature.

e、When the voltage of the DC bus rises again to make the braking unit act, the braking unit will repeat the above process to balance the bus voltage and make the system operate normally.

Because the working condition of the brake unit belongs to short-time work, that is, the power on time is very short, in the power on time, the temperature rise is far from stable temperature rise; The intermittent time after each power is longer, in the intermittent time, its temperature is enough to drop to the same as the ambient temperature, so the rated power of the brake resistor will be greatly reduced, the price will also fall; In addition, because there is only one IGBT and the braking time is ms level, the requirements for the transient performance index of the power tube opening and turning off are low, and even the turn-off time is required to be as short as possible to reduce the turn-off pulse voltage and protect the power tube. The control mechanism is also relatively simple and easy to implement. Because of the above advantages, it is widely used in crane and other potential energy load and need fast braking but short working system occasions.

## 3、Brake unit wiring & module wiring diagram

| | |
|---|---|
| 1 | J1 The RS232 connection line and the host computer are connected to adjust the data of the braking unit |
| 2 | STA CHG status light |
| 3 | J2<br>a. +HV Connect the positive end of the bus<br>b. GND Connect the negative end of the bus<br>c. RGN1+/RGN1- junction resistor. RGN2+/RGN2 can be connected when multiple resistors are needed |




Cautions：

1）The brake unit and the servo driver can share the RS23 debugging cable.

2）Please select the specification of the brake resistor according to the motor power.

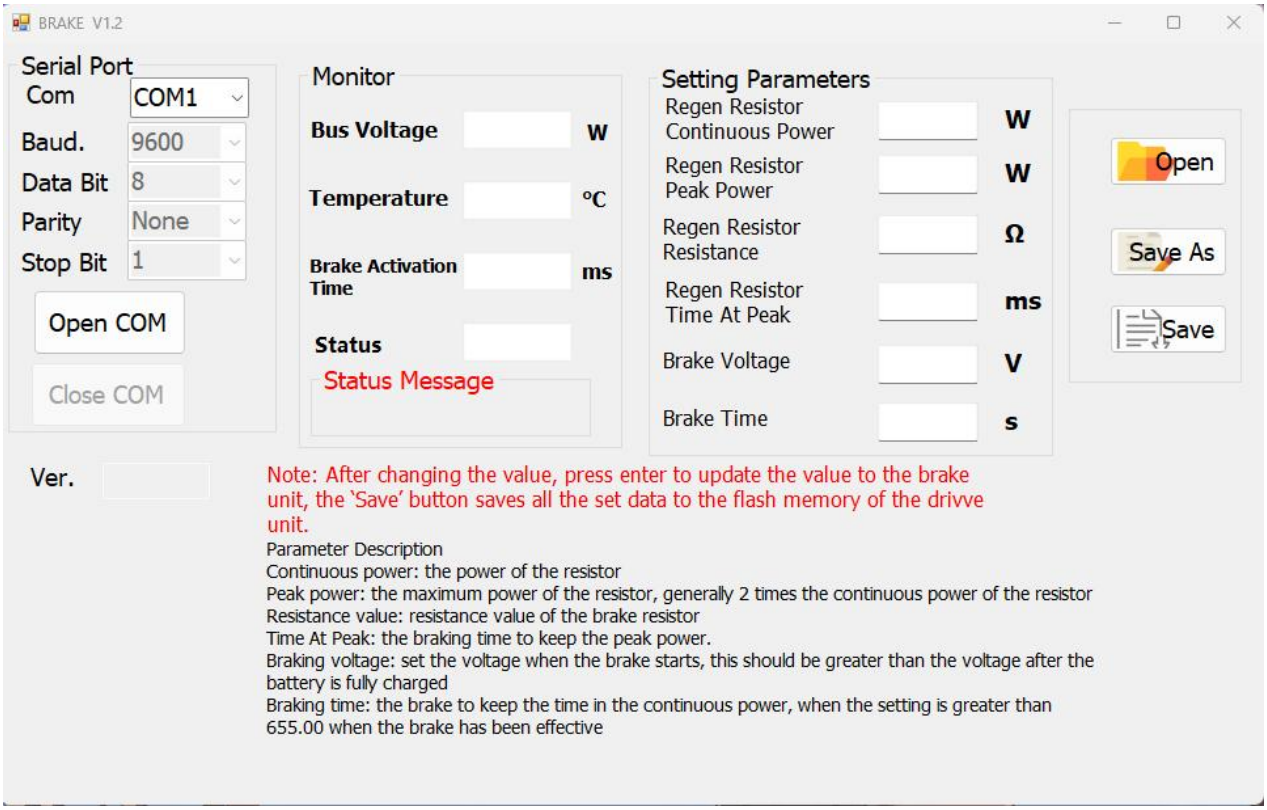
3）When a power supply supplies multiple motors, only one brake unit needs to be connected at the power supply end.

## Indicator status

| | | |
|---|---|---|
| Green flicker | normal | |
| Red Always On | Under braking | |
| Red flash 1 time | Overheating | Brake temperature is too high due to prolonged braking. Heat dissipation from the unit should be increased |
| Red flash 2 time | Overvoltage | Inability to effectively drain the voltage. Appropriate resistor selection or brake unit hardware problem |
| Red flash 3 time | Undervoltage | The voltage is too low. Check supply voltage |
| Red flash 4 time | Short-circuit | Excessive current. Appropriate resistor selection or brake unit hardware problem |
| Red flash 5 time | Overloaded | The braking time enters beyond the setting time of I2T. Increase the time of I2T appropriately |
| Red flash 6 time | Data error | Setting parameter error |

## 4、parameter testing

Open the debug software as shown below




(1) OpenCOM open serial port (9600,8,n,1)

(2) CloseCOM closes the serial port

(3) Monitor the parameters. Here it is possible to monitor the actual voltage, the temperature of the braking module, the braking time and other information.

(4) setup parameter

1) Sustained power. Input the rated power of the brake resistor

2) Peak power. Peak power of the input brake resistor

3) I2T. Set the time to brake

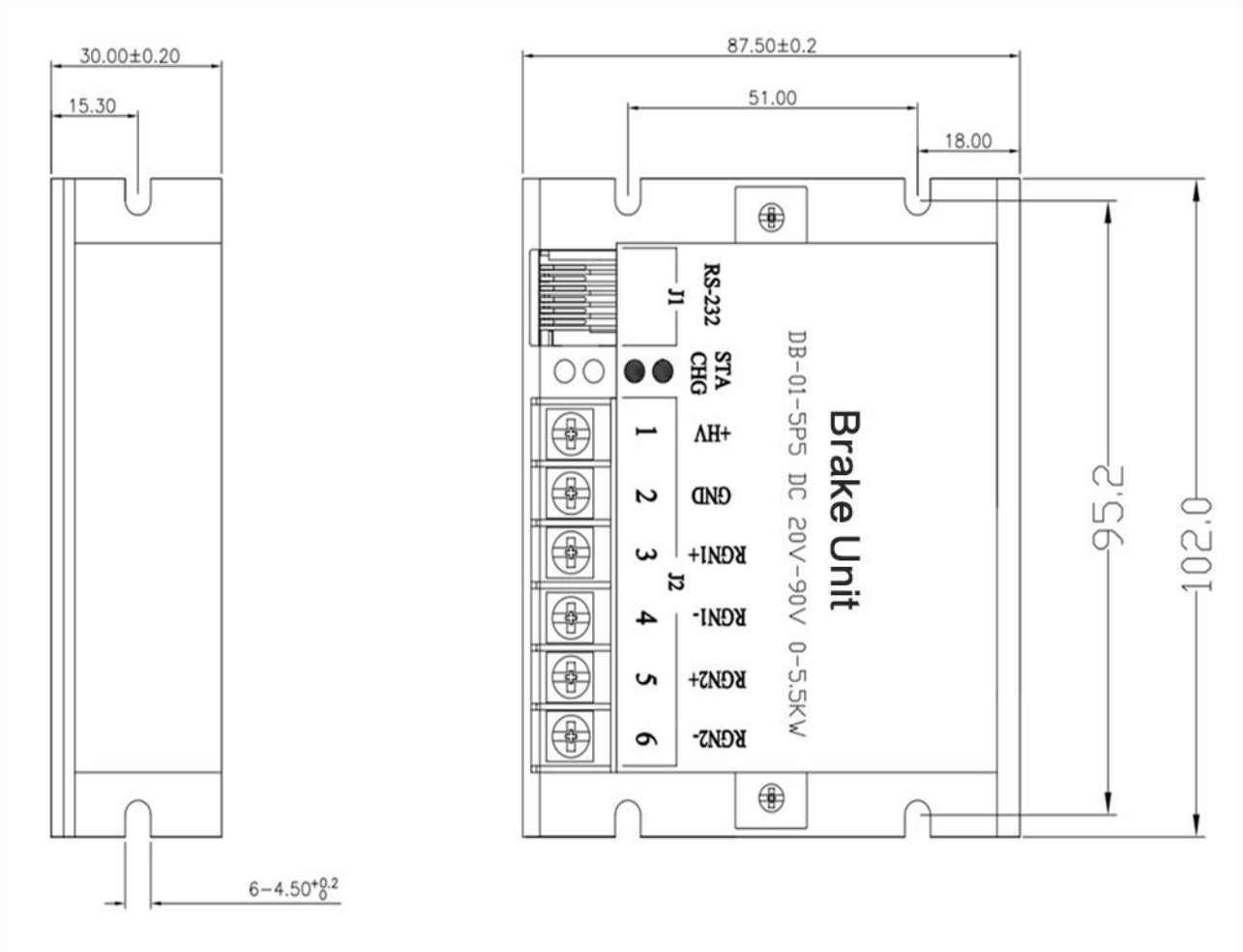
4) Brake voltage. Set the voltage at the start of braking.

5) Open it. Open the saved data

6) Write. When the data is modified or opened, press "Write data" to write the parameters to flash.

7) Save as. Save the set data to your computer.

## 5、Brake unit size diagram




# Brake resistor model description

**300W - 8R**

| power | resistance value |
|---|---|
| 300W:300W<br>60W、80W、100W、300W、500W<br>600W、780W、1000W、1200W可选 | 8R:8R<br>2R、4R、8R、15R、30R、42R、<br>50R、60R、70R、100R |

# Brake resistance model summary

| model | power | resistance value |
|---|---|---|
| 60W 100R | 60W | 100R |
| 80W 60R | 80W | 60R |
| 100W 8R | 100W | 8R |
| 300W 2R | 300W | 2R |
| 300W 4R | 300W | 4R |
| 300W 8R | 300W | 8R |
| 300W 50R | 300W | 50R |
| 300W 150R | 300W | 150R |
| 500W 30R | 500W | 30R |
| 600W2R | 600W | 2R |
| 600W4R | 600W | 4R |
| 780W70R | 780W | 70R |
| 1000W 4R | 1000W | 4R |
| 1200W 42R | 1200W | 42R |
| 1500W 2R | 1500W | 2R |
| 1500W 25R | 1500W | 25R |

## 1、Introduction to brake resistance

Brake resistance is a kind of aluminum shell resistance. It is mainly used in the mechanical system of the servo driver to control the motor to stop quickly. It helps the motor to convert the regenerative electric energy generated by the fast stop to heat energy.

## 2、Principle of brake resistance：

When the working frequency of the motor decreases, it will be in the state of regenerative braking. The kinetic energy of the driving system will be fed back to the DC circuit, so that the DC voltage UD keeps rising, and may even reach a dangerous point. Therefore, the energy regenerated into the DC circuit must be consumed to keep the UD within the allowable range. The brake resistance is used to consume this energy.

## 3、Brake unit + resistor：

The brake unit consists of high power transistor MOS and its driving circuit. Its function is to discharge current IB through the brake resistance supply path.

# 4、Resistance selection and size

| Power(W) | Resistance value (Ω) | Bottom length (L) | Breadth(W) | altitude(H) | Length of front(B) | pitch row(A) | groove width(D) | Length of cable(E) |
|---|---|---|---|---|---|---|---|---|
| 300 | 2 | 215 | 60 | 30 | 175 | 195 | 5.5 | 300 |
| 300 | 4 | 215 | 60 | 30 | 175 | 195 | 5.5 | 300 |
| 300 | 8 | 215 | 60 | 30 | 175 | 195 | 5.5 | 300 |
| 600 | 4 | 300 | 60 | 30 | 260 | 280 | 5.5 | 300 |
| 600 | 8 | 300 | 60 | 30 | 260 | 280 | 5.5 | 300 |
| 1000 | 4 | 330 | 60 | 30 | 290 | 310 | 5.5 | 300 |