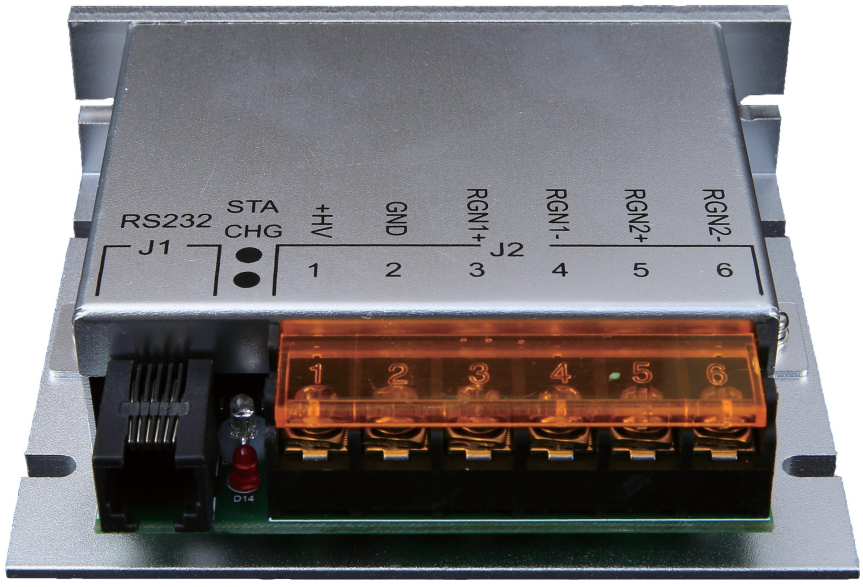
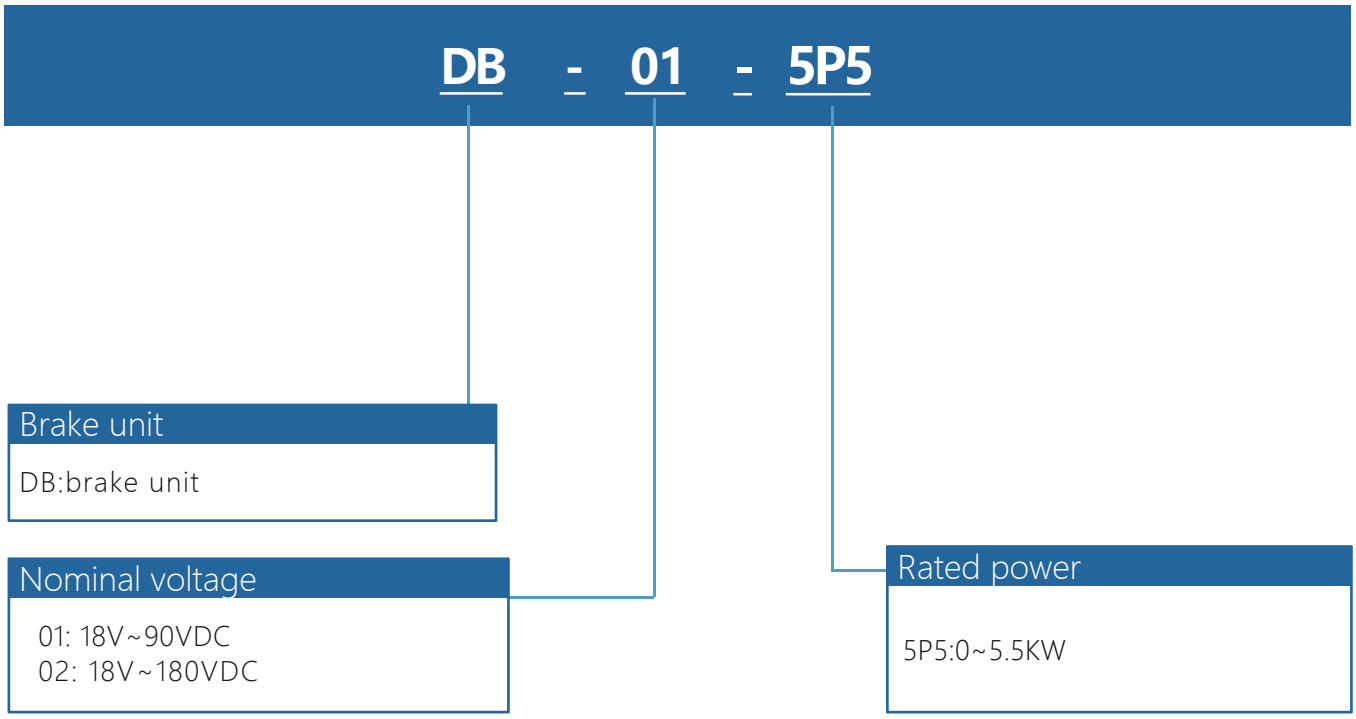
Braking unit instructions



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

The energy consumption of a Braking Unit is the process by which excess electrical energy is converted into heat or other forms of energy by means of a resistor or other means during the deceleration or braking of a motor. The following is a detailed description of the energy consumption of the Braking Unit:

1. Role of the braking unit

In a motor system controlled by an inverter, when the motor is in a power generating state (e.g., when decelerating, lowering heavy loads, or inertial loads), the motor converts the mechanical energy into electrical energy and feeds it back to the DC bus of the inverter. If this energy cannot be absorbed by other devices, the DC bus voltage will rise, which may lead to system overvoltage damage. The role of the braking unit is to detect the bus voltage, and when the voltage exceeds the set value, the excess electrical energy through the braking resistor (Braking Resistor) in the form of thermal energy consumption.

2. Physical process of energy consumption

Source of energy: Feedback power generated when the motor is braked.

Consumption method: through the braking resistor will be converted into thermal energy (Joule heat), the formula is:

$$= t$$

Among them:

- E: Energy consumed (Joules, J)
- V: DC bus voltage (volts, V)
- R: Brake resistance value (ohms, Ω)
- t: Braking time (seconds, s)

3. Factors affecting energy consumption

3-1. Load inertia: The greater the load inertia, the more feed-back energy is generated during deceleration.

3-2. Braking Frequency: Frequent start-stop or deceleration increases the working time of the braking unit.

3-3. Braking Resistor Power: The power rating of the resistor determines the maximum amount of energy that can be consumed in a short period of time.

3-4. System Efficiency: Resistor heat dissipation ability, ambient temperature and other factors affect the actual energy consumption efficiency.

4. Problems in practical application

Risk of overheating: Prolonged high-power braking may lead to overheating of the resistor, requiring the design of a heat dissipation system or intermittent operation.

Waste of energy: braking energy is dissipated in the form of heat, not recycled (can be optimised by energy return device).

Selection requirements: According to the load characteristics, braking power, duty cycle and other parameters to select the appropriate braking unit and resistor.

5. Energy-saving alternative programmes

In order to reduce energy waste, the following technologies can be used:

5-1. Energy Feedback Unit (AFE, Active Front End): Feed excess power back to the grid to improve system efficiency.

5-2. Super Capacitor Energy Storage (SCES): stores braking energy for a short period of time for subsequent use by the system.

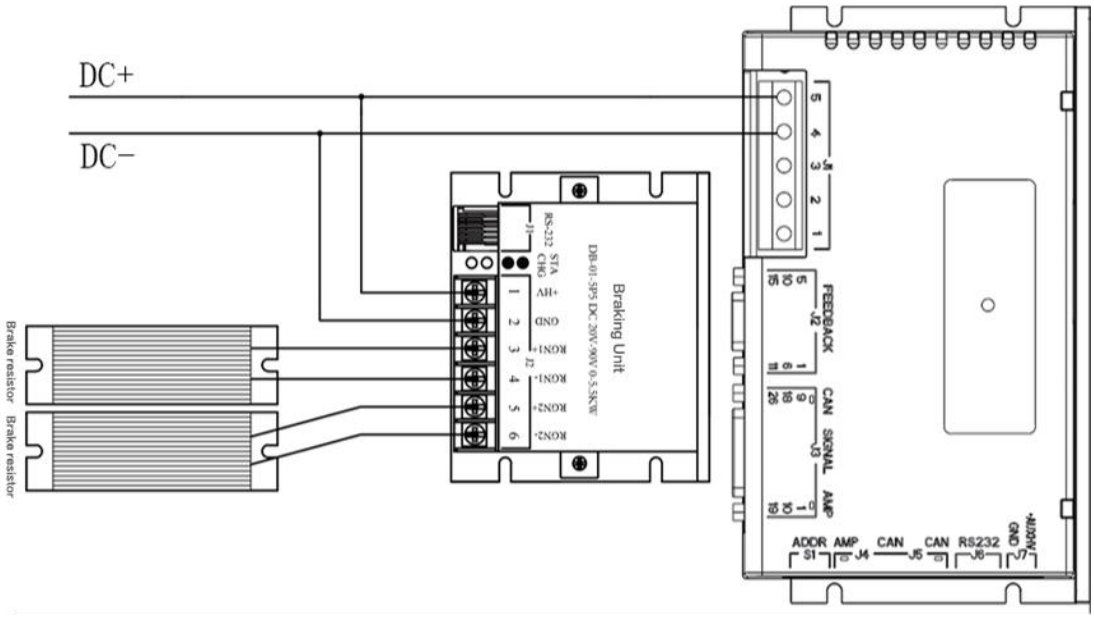
5-3. DC bus common bus system: multiple inverters share the DC bus to balance the energy distribution.

6. Summary

The energy consumption of the braking unit is a necessary part of the motor control system. By reasonably designing the parameters of the braking resistor, optimising the braking strategy or adopting the energy feedback technology, the energy consumption can be reduced and the system efficiency can be improved. When selecting and applying, load characteristics, environmental conditions and cost factors should be considered comprehensively.

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 a. +HV Connect the positive end of the bus b. GND Connect the negative end of the bus 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.

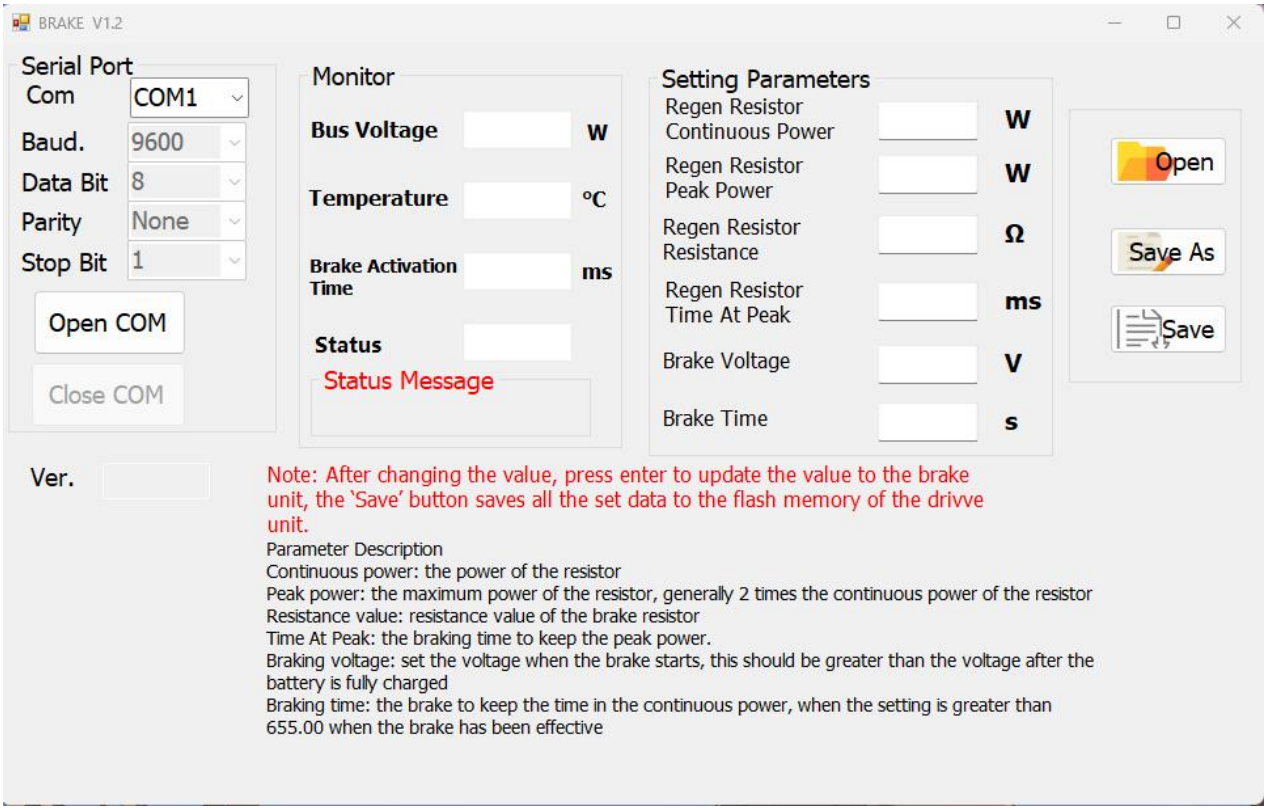
3）When a power supply supplies multiple motors, only one brake unit needs to be connected at the power supply end.

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

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

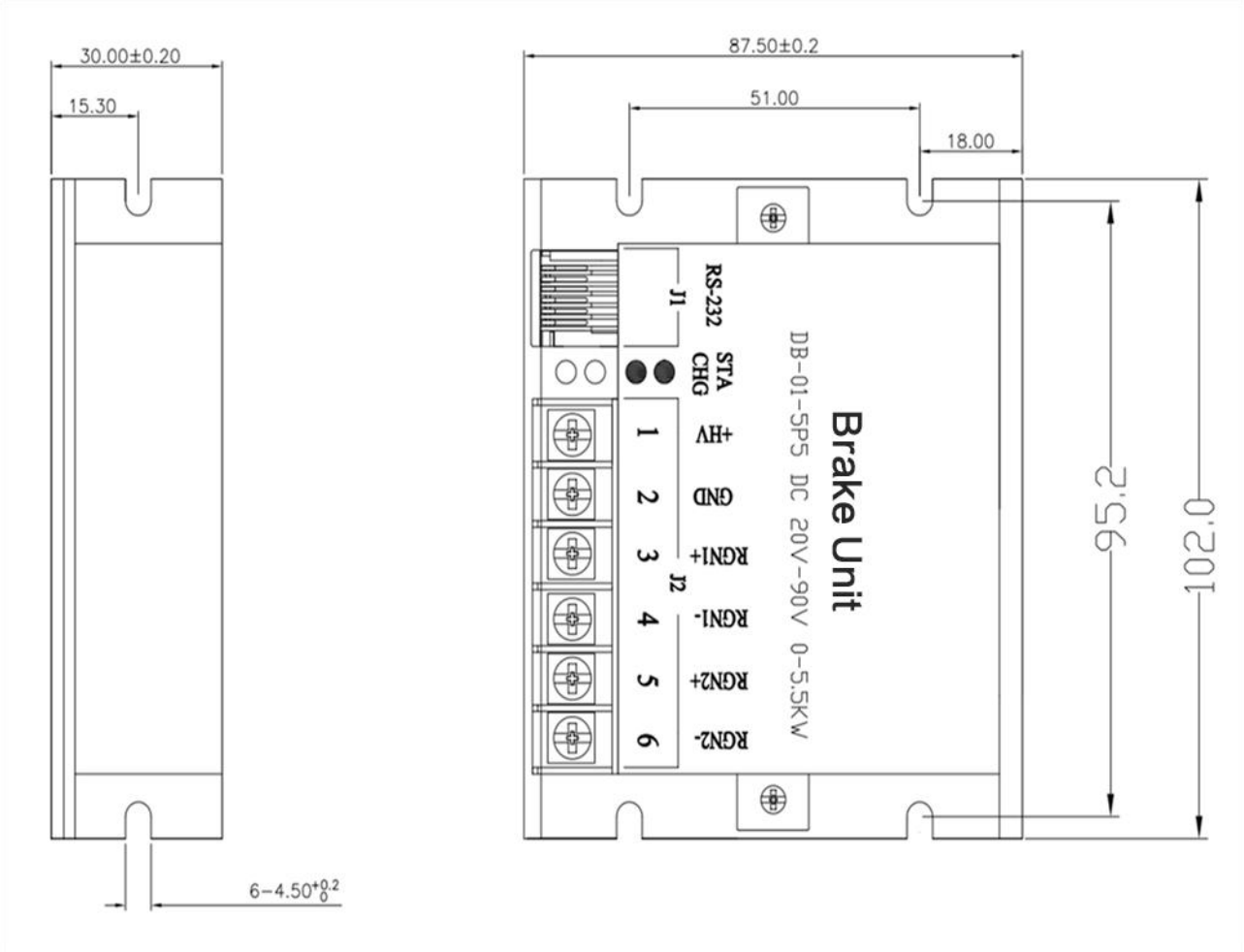
4) Brake voltage. Set the voltage at the start of braking.

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.

Brake unit size diagram



Brake resistor model description

300W - 8R

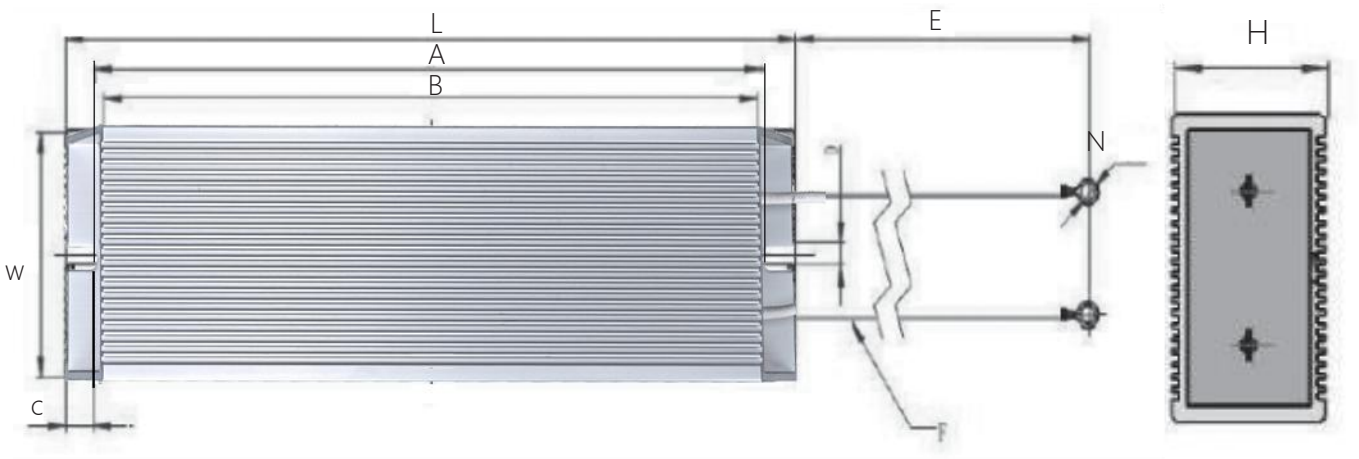
power	resistance value
300W:300W 60W、80W、100W、300W、500W 600W、780W、1000W、1200W可选	8R:8R 2R、4R、8R、15R、30R、42R、 50R、60R、70R、100R

Brake resistance model summary

Model	Power	Resistance value
100W 8R	100W	8R
300W 2R	300W	2R
300W 4R	300W	4R
300W 8R	300W	8R
600W2R	600W	2R
600W4R	600W	4R
1000W 4R	1000W	4R
1500W 2R	1500W	2R

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



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Revision record

Date	Version number	Revised content	
		Modify location	Modify content
20250210	V0.1	/	New edition