Universal energy consumption brake unit

CBR600 Series

User Manual

ASTAR ELECTRONICS

1. Safety and Attentions

Users are requested to read this chapter carefully when installing, commissioning and repairing this product and perform the operation according to safety precautions as set forth in this chapter without fail. Our company will bear no responsibility for any injury and loss as a result of any violation operation.

Safety signs in this manual	
DANGER	Dangers caused by operations beyond requirements may lead to serious injury,and even death.
CAUTION	angers caused by operations beyond requirements may lead to moderate damages or minor injuries, as well equ-ipment damages.

1.1 Danger

1.1.1 Before Power-on

- Do not use damaged brake unit or missing brake unit. There is a risk of injury.
- Please use a good frequency converter when matching, otherwise there is danger of electric shock and damage to the brake unit.
- Please install on metal and other flame retardant objects; Keep away from combustibles. Otherwise it may cause fire hazard!
- Before connecting cables, ensure that the power is off. Otherwise there is a risk of electric shock!
- Please confirm that the power supply voltage level is consistent with the rated voltage of the brake unit; Input and output wiring position is correct, and pay attention to check whether there is a short circuit in the peripheral circuit. Whether the connected line is tight. Otherwise, it may cause damage to the frequency converter and brake unit!
- The brake unit can be powered on only after the cover is secured. Otherwise it may cause electric shock hazard!

1.1.2 After powering on

- Do not open the cover after power-on. Otherwise there is a risk of electric shock!
- Do not touch the brake unit and peripheral circuits with wet hands. Otherwise there is a risk of electric shock !

- Do not touch the brake terminals. Otherwise there is a risk of electric shock!
- Do not repair or maintain the equipment with power on. Otherwise there is danger of contact!
- Do not repair or maintain the brake unit and peripheral equipment without professional training personnel. Otherwise, personal injury or equipment damage may occur!
- Do not touch the brake resistance to test temperature. Otherwise it may cause burns!

1.1.3 After power failure

The inverter is powered off for 10-20 minutes, and the brake unit can be maintained and repaired only after the POWER light of the brake unit is turned off. Otherwise, the capacitor residual charge on the inverter will cause harm to people!

1.2 Caution

1.2.1 Before Power-on

- Do not allow metal objects such as wire heads or screws to fall into the brake unit. Otherwise it may cause damage to the brake unit!
- The input power cable cannot be connected to the output R+ and R-. Otherwise cause brake unit damage!
- Ensure that the cables comply with EMC requirements and local safety standards. The diameter of the conductor used is recommended in the manual. Otherwise there may be an accident!
- All peripheral accessories are connected correctly according to the circuit provided in this manual. Otherwise it may cause an accident!

1.2.2 Running

- Avoid anything falling into the equipment while the brake unit is in operation. Otherwise, the device may be damaged
- Do not use the contactor on and off to control the operation of the brake unit. Otherwise cause equipment damage!

1.2.3 Scrap time

When the brake unit is scrapped, note that the explosion may occur when the electrolytic capacitor is incinerated on the printed board. Toxic gases are produced when plastic parts are burned. Please dispose of it as industrial waste.

2. Product introduction

2.1 Naming convention

CBR600 - A - 4 - T - 132

1 2 3 4 5

Code	No.	Content
Product series name	1	CBR600 series
Design version	2	Blank: design version A B: design version B
Voltage level	3	4:380V 7:690V
Voltage classification	4	T: three-phase
Adaptive power	5	37 - 630kW 037=37kW 132=132kW

2.2 Product model and specification

Brake unit type	Voltage level (V)	Minimum allowable resistance (Ω)	Peak current (A)	Maximum adaptive inverter power (KW)	Cable cross-sectional area (mm2)
CBR600-4T037	380	24	32	37	6
CBR600-4T075	380	12	60	75	6
CBR600-4T132	380	6.8	110	132	10
CBR600-4T200	380	3.4	210	200	10
CBR600-4T315	380	2.3	310	315	16
CBR600-4T450	380	1.5	470	450	16
CBR600-4T630	380	1.0	700	630	25
CBR600-7T037	690	40	30	37	6
CBR600-7T075	690	20	60	75	6

Brake unit type	Voltage level (V)	Minimum allowable resistance (Ω)	Peak current (A)	Maximum adaptive inverter power (KW)	Cable cross-sectional area (mm2)
CBR600-7T132	690	12	90	132	10
CBR600-7T200	690	6	190	200	10
CBR600-7T315	690	4	280	315	16
CBR600-7T450	690	2.6	430	450	16
CBR600-7T630	690	1.8	630	630	25
CBR600-7T800	690	1.7	650	800	25

Peak current:

Refers to the maximum current allowed through the brake unit, which should not last more than 20 seconds.

2.3 Selection introduction

When the frequency converter controls the motor fast deceleration or when the motor overspeeds due to mechanical inertia in operation, the feedback energy generated by the motor will make the frequency converter report overvoltage failure. The braking unit is to prevent the frequency converter from overvoltage failure in such field work, so that the frequency converter can achieve stable operation of electronic equipment. Its mode of operation is intermittent and cannot work for a long time under large current. The resistance value, power and specification of brake unit must be reasonably selected.

2.3.1 Brake resistance value selection

When the brake unit is working, the energy returned by the motor is basically consumed on the brake resistance :

$$R=U2/Pb$$

U:

The working voltage of the brake unit, usually 700V for the 380V inverter brake unit ;

Pb:

braking power; Pb= motor rated power x required braking torque (%).

Note: When the system inertia is large, the braking torque is generally selected to be 100%. When the demand for braking torque is not 100%, the resistance value of the above table resistance can be adjusted inversely according to the actual torque requirements (that is, how much the braking torque is increased on the basis of 100%, and how much the braking resistance is reduced accordingly). And vice versa). The brake torque selection should generally be less than or equal to 150% of the rated torque of the motor. Otherwise, please contact our technical support personnel.

2.3.2 Brake resistance power selection

Theoretically, the braking resistance has the same power as the braking power, but it needs to be derated by 70% in actual use:

According to the formula: 0.7×Pr=Pb×D ;

Pr: Resistance power;

D: braking frequency (the proportion of energy regeneration process in the whole working process).

The braking frequency D for common load types is as follows:

Elevator	D=20-25%
Unwrap and unwrap	D=20-30%
Centrifuge	D=40-60%
Accidental braking of the load	D=5%
Normal	D=20%

The parameters in the table above are guidance data; When the inertia of the system is large, the braking time is short, and the braking work is frequent, the energy consumption resistance of the braking unit needs to select the larger power and the smaller the resistance value. The user can select the brake resistance according to the actual situation, but the resistance value of the brake resistance can not be less than the recommended value in the following table, and the power can be higher than the recommended value in the table.

Please select the braking resistance value, power and brake unit model according to the braking torque, as shown in the table below.

Different application industries, its braking torque is different:

② The general deceleration process braking, the braking torque is 50% (such as: machine tools, punches, spindle servo, brick machine, etc.);

② The vertical load drops during the braking, the braking torque is between 100%-150% (such as: construction elevator, tower crane, passenger elevator, centrifuge, etc.)

Inverter power (4T)	Recommended resistance power, resistance value and brake unit model		
	Braking torque 150%, 5S	Braking torque 100%, 15S	Braking torque 50%, 15S
18.5kW	≧24Ω，4kW	≧24Ω，4kW	≧40Ω，3kW
	CBR600-4T037	CBR600-4T037	CBR600-4T037
22kW	≧13.6Ω，6kW	≧24Ω，4kW	≧40Ω，3kW
	CBR600-4T075	CBR600-4T037	CBR600-4T037
30kW	≧13.6Ω，6kW	≧24Ω，4kW	≧24Ω，4kW
	CBR600-4T075	CBR600-4T037	CBR600-4T037
37kW	≧6.8Ω，12kW	≧13.6Ω，6kW	≧24Ω，4kW
	CBR600-4T132	CBR600-4T075	CBR600-4T037
45kW	≧6.8Ω，12kW	≧13.6Ω，6kW	≧13.6Ω，6kW
	CBR600-4T132	CBR600-4T075	CBR600-4T075
55kW	≧6.8Ω，12kW	≧13.6Ω，6kW	≧13.6Ω，6kW
	CBR600-4T132	CBR600-4T075	CBR600-4T075
75kW	≧6.8Ω，12kW	≧13.6Ω，6kW	≧13.6Ω，6kW
	CBR600-4T132	CBR600-4T075	CBR600-4T075
93kW	2×6.8Ω，12kW	≧6.8Ω，12kW	≧6.8Ω，12kW
	CBR600-4T315	CBR600-4T132	CBR600-4T132
110kW	2×6.8Ω，12kW	≧6.8Ω，12kW	≧6.8Ω，12kW
	CBR600-4T315	CBR600-4T132	CBR600-4T132
132kW	2×6.8Ω，12kW	≧6.8Ω，12kW	≧6.8Ω，12kW
	CBR600-4T315	CBR600-4T132	CBR600-4T132

Inverter power (4T)	Recommended resistance power, resistance value and brake unit model		
	Braking torque 150%, 5S	Braking torque 100%, 15S	Braking torque 50%, 15S
160kW	≧3×6.8Ω，12kW	≧2×6.8Ω，12kW	≧2×6.8Ω，12kW
	CBR600-4T315	CBR600-4T200	CBR600-4T200
185kW	≧3×6.8Ω，12kW	≧2×6.8Ω，12kW	≧2×6.8Ω，12kW
	CBR600-4T315	CBR600-4T200	CBR600-4T200
200kW	≧3×6.8Ω，12kW	≧2×6.8Ω，12kW	≧2×6.8Ω，12kW
	CBR600-4T315	CBR600-4T200	CBR600-4T200
220kW	≧3×6.8Ω，12kW	≧2×6.8Ω，12kW	≧2×6.8Ω，12kW
	CBR600-4T315	CBR600-4T315	CBR600-4T315
250kW	≧3×6.8Ω，12kW	≧2×6.8Ω，12kW	≧2×6.8Ω，12kW
	CBR600-4T315	CBR600-4T315	CBR600-4T315
280kW	≧3×6.8Ω，12kW	≧2×6.8Ω，12kW	≧2×6.8Ω，12kW
	CBR600-4T315	CBR600-4T315	CBR600-4T315
315kW	≧3×6.8Ω，12kW	≧2×6.8Ω，12kW	≧2×6.8Ω，12kW
	CBR600-4T315	CBR600-4T315	CBR600-4T315
355kW	≧5×6.8Ω，20kW	≧4×6.8Ω，20kW	≧3×6.8Ω，20kW
	CBR600-4T630	CBR600-4T450	CBR600-4T450
400kW	≧5×6.8Ω，20kW	≧4×6.8Ω，20kW	≧3×6.8Ω，20kW
	CBR600-4T630	CBR600-4T450	CBR600-4T450
450kW	≧5×6.8Ω，20kW	≧4×6.8Ω，20kW	≧3×6.8Ω，20kW
	CBR600-4T630	CBR600-4T450	CBR600-4T450
500kW	≧6×6.8Ω，20kW	≧5×6.8Ω，20kW	≧4×6.8Ω，20kW
	CBR600-4T630	CBR600-4T630	CBR600-4T630
550kW	≧6×6.8Ω，20kW	≧5×6.8Ω，20kW	≧4×6.8Ω，20kW
	CBR600-4T630	CBR600-4T630	CBR600-4T630
630kW	≧6×6.8Ω，20kW	≧5×6.8Ω，20kW	≧4×6.8Ω，20kW
	CBR600-4T630	CBR600-4T630	CBR600-4T630

Inverter power (7T)	Recommended resistance power, resistance value and brake unit model		
	Braking torque 150%, 5S	Braking torque 100%, 15S	Braking torque 50%, 15S
30kW	≧12Ω，12kW	≧24Ω，6kW	≧2×12Ω，12kW
	CBR600-7T132	CBR600-7T075	CBR600-7T037
37kW	≧12Ω，12kW	≧24Ω，6kW	≧2×12Ω，12kW
	CBR600-7T132	CBR600-7T075	CBR600-7T037
45kW	≧12Ω，12kW	≧24Ω，6kW	≧2×12Ω，12kW
	CBR600-7T132	CBR600-7T075	CBR600-7T075
55kW	≧12Ω，12kW	≧24Ω，6kW	≧2×12Ω，12kW
	CBR600-7T132	CBR600-7T075	CBR600-7T075
75kW	≧12Ω，12kW	≧24Ω，6kW	≧2×12Ω，12kW
	CBR600-7T132	CBR600-7T075	CBR600-7T075
93kW	≧2×12Ω，12kW	≧12Ω，12kW	≧2×12Ω，12kW
	CBR600-7T315	CBR600-7T132	CBR600-7T132
110kW	≧2×12Ω，12kW	≧12Ω，12kW	≧2×12Ω，12kW
	CBR600-7T315	CBR600-7T132	CBR600-7T132
132kW	≧2×12Ω，12kW	≧12Ω，12kW	≧2×12Ω，12kW
	CBR600-7T315	CBR600-7T132	CBR600-7T132
160kW	≧3×12Ω，12kW	≧2×12Ω，12kW	≧2×12Ω，12kW
	CBR600-7T315	CBR600-7T200	CBR600-7T200
185kW	≧3×12Ω，12kW	≧2×12Ω，12kW	≧2×12Ω，12kW
	CBR600-7T315	CBR600-7T200	CBR600-7T200
200kW	≧3×12Ω，12kW	≧2×12Ω，12kW	≧2×12Ω，12kW
	CBR600-7T315	CBR600-7T200	CBR600-7T200
220kW	≧3×12Ω，12kW	≧2×12Ω，12kW	≧2×12Ω，12kW
	CBR600-7T315	CBR600-7T315	CBR600-7T315
250kW	≧3×12Ω，12kW	≧2×12Ω，12kW	≧2×12Ω，12kW
	CBR600-7T315	CBR600-7T315	CBR600-7T315

Inverter power (7T)	Recommended resistance power, resistance value and brake unit model		
	Braking torque 150%, 5S	Braking torque 100%, 15S	Braking torque 50%, 15S
280kW	≧3×12Ω , 12kW	≧2×12Ω , 12kW	≧2×12Ω , 12kW
	CBR600-7T315	CBR600-7T315	CBR600-7T315
315kW	≧3×12Ω , 12kW	≧2×12Ω , 12kW	≧2×12Ω , 12kW
	CBR600-7T315	CBR600-7T315	CBR600-7T315
355kW	≧5×12Ω , 12kW	≧4×12Ω , 20kW	≧3×12Ω , 20kW
	CBR600-7T630	CBR600-7T450	CBR600-7T450
400kW	≧5×12Ω , 12kW	≧4×12Ω , 20kW	≧3×12Ω , 20kW
	CBR600-7T630	CBR600-7T450	CBR600-7T450
450kW	≧5×12Ω , 12kW	≧4×12Ω , 20kW	≧3×12Ω , 20kW
	CBR600-7T630	CBR600-7T450	CBR600-7T450
500kW	≧6×12Ω , 20kW	≧5×12Ω , 20kW	≧4×12Ω , 20kW
	CBR600-7T630	CBR600-7T630	CBR600-7T630
550kW	≧6×12Ω , 20kW	≧5×12Ω , 20kW	≧4×12Ω , 20kW
	CBR600-7T630	CBR600-7T630	CBR600-7T630
630kW	≧6×12Ω , 20kW	≧5×12Ω , 20kW	≧4×12Ω , 20kW
	CBR600-7T630	CBR600-7T630	CBR600-7T630
710kW	≧6×12Ω , 20kW	≧5×12Ω , 20kW	≧4×12Ω , 20kW
	CBR600-7T800	CBR600-7T800	CBR600-7T630
800kW	≧6×12Ω , 20kW	≧5×12Ω , 20kW	≧4×12Ω , 20kW
	CBR600-7T800	CBR600-7T800	CBR600-7T630

2.3.3 Braking voltage setting

B2-04	Brake resistance on voltage	Scope: 4T: 330.0V-800.0V 7T: 970.0V-1200.0V	Factory value: 4T: 690.0V 7T: 1160.0V

The value is 360.0V for 220V voltage level, 690.0V for 380V voltage level, and 1160.0V for 690V voltage level.

This value is the starting voltage point of the brake resistance. When there is a brake resistance and the bus voltage is greater than B2-04, the frequency converter will release excess braking energy through the brake resistance to prevent the frequency converter from overvoltage.

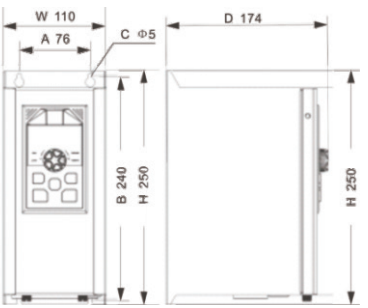
Note:

① Warning: The resistance value of the brake resistance should not be less than the resistance value recommended in Table 2-2. If it is less than that, the brake unit may be damaged.

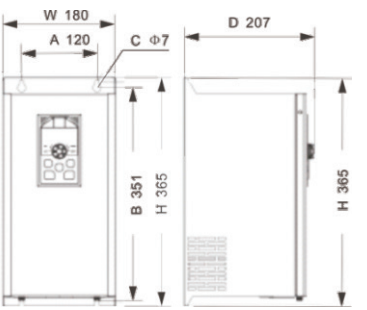
③ ××(×=2,3,4,5,6) in the table means that × group brake resistors are used in parallel (when your system inertia is small, and the brake unit is not often in working state, one set can be reduced. When the inertia of the system is large, the braking time required is very short, and the braking work is very frequent, please add a set of parallel use, remember that the total braking resistance value can not be less than the minimum allowable resistance of the selected braking unit);

③ 5S and 15S listed in the table refer to continuous braking time.

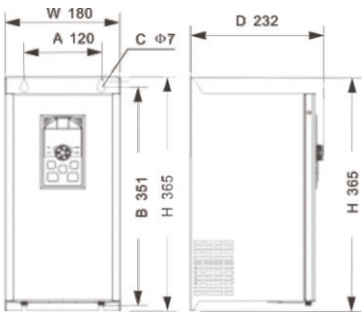
2.4 Dimensions of mounting holes



CBR600-4T132/CBR600-7T132 and below installation dimensions hole position diagram



CBR600-4T200 and below installation dimensions hole position diagram



CBR600-7T200 and below installation dimensions hole position diagram

Model	Installation size (mm)		Dimensions (mm)			Aperture
	A	B	H	W	D	d
CBR600-4T037	76	240	250	110	174	Φ5
CBR600-4T075	76	240	250	110	174	Φ5
CBR600-4T132	76	240	250	110	174	Φ5
CBR600-4T200	120	351	365	180	207	Φ7
CBR600-4T315	120	351	365	180	207	Φ7
CBR600-4T450	120	351	365	180	207	Φ7
CBR600-4T630	120	351	365	180	207	Φ7
CBR600-7T037	76	240	250	110	174	Φ5
CBR600-7T075	76	240	250	110	174	Φ5
CBR600-7T132	76	240	250	110	174	Φ5
CBR600-7T200	120	351	365	180	207	Φ7
CBR600-7T315	120	351	365	180	207	Φ7
CBR600-7T450	120	351	365	180	207	Φ7
CBR600-7T630	120	351	365	180	207	Φ7

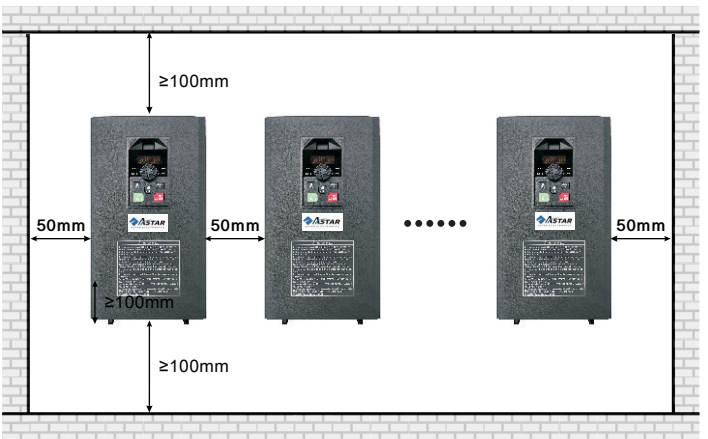
3. Product Installation Guide

3.1 Installation environment of brake unit

The installation environment must meet the following conditions:

Place of use	Indoor, free from direct sunlight, no dust, corrosive gas, flammable gas, oil mist, water vapor, dripping water or salt
Altitude	Below 1000m
Ambient temperature	-10°C to + 40°C (Ambient temperature is 40°C to 50°C, please use the reduced rate)
Humidness	Less than 95%RH, no condensation
Vibration	Less than 5.9m/s^2 (0.6g)
Storage temperature	-20℃~+60℃
Pollution level	2

3.2 Brake unit installation diagram



Note: The upper and lower reserve more than 100mm, the left and right spacing is not less than 50mm.

3.3 Brake unit terminal arrangement

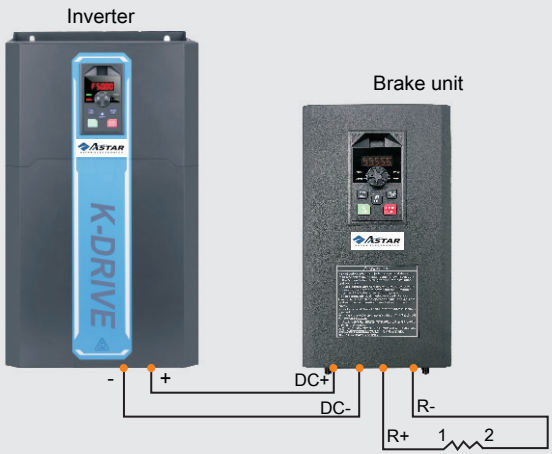
DC+	DC-	R+	R-

Main loop terminal

TC	COM	DI
TB	24V	DO

Control loop terminal

3.3.1 CBR600 main loop terminal diagram

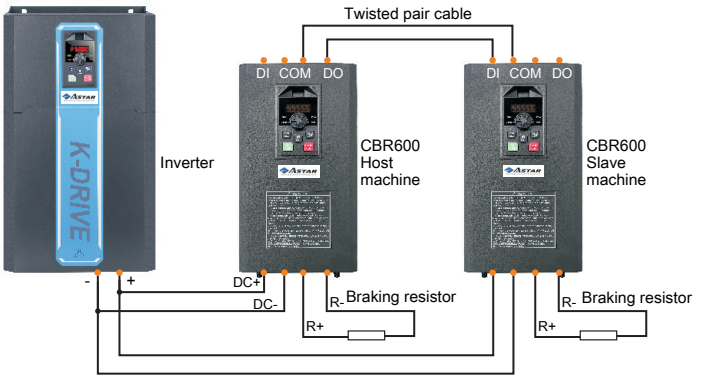


3.3.2 CBR600 master-slave control wiring terminal diagram

Just set the slave parameters, the master parameter DO output is already factory default.

Slave settings only require setting 3 function codes	
1	Turn off power on automatic operation P7-41=0
2	Command source selection terminal. Terminal driven P0-04=1
3	Turn on brake slave function P1-18=1

3. Product Installation Guide



4.Troubleshooting of Common Faults

Fault name	Panel display	Troubleshooting	Troubleshooting Countermeasures
Overvoltage fault	Err09	◆ The braking resistance is too large to consume the feedback energy ◆ Brake unit selection error ◆ The+and - lines are too long	◆ Recalculate the braking resistance value ◆ Tingchang deceleration time ◆ Recalculate the power of the braking unit ◆ Seeking technical support
Undervoltage fault	Err12	◆ Abnormal bus voltage ◆ Abnormal rectification bridge and buffer resistance	◆ Adjust the voltage to the normal range ◆ Seeking technical support
Over temperature fault	Err15	◆ Poor ventilation and high ambient temperature ◆ Fan damage	◆ Reduce ambient temperature ◆ Replacing the inverter module ◆ Replacing the fan ◆ Seeking technical support
Overcurrent fault	Err04 Err06	◆ Resistance short circuit ◆ The resistance value of the braking resistor is too small, and the braking torque is too large	◆ Increase the braking resistance value and extend the deceleration time ◆ Recalculate the power of the braking unit ◆ Seeking technical support