

# BRAKING UNIT

## OPERATION MANUAL



200V Class / 400V Class



ANC  
LS600

LSBR-4030B  
400V CLASS FOR  
U.C.W.

• DANGER  
Do not inspect  
components unless  
inside "CHARGE"  
lamp is off.

BRAKING UNIT			
RESISTOR Type Code	R R Value	WDR Resistor Type WDR	WDR Approx. Rating Range WDR
11	300.0Ω	300W 3.6A2	125
15	300.0Ω	300W 3.6A2	125
18.5	300.0Ω	300W 3.6A2	125
22	300.0Ω	300W 3.6A2	125
11	400.0Ω	400W 5.0A2	125
15	400.0Ω	400W 5.0A2	125
18.5	400.0Ω	400W 5.0A2	125
22	400.0Ω	400W 5.0A2	125
30	400.0Ω	400W 5.0A2	125

CHARGE BRAKING

LS  
LS600

LSBR-2015B  
200V CLASS FOR  
U.C.W.

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CHARGE BRAKING

**Our braking units are suitable for variant types of inverters.**

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## PREFACE

Thank you for your purchasing our braking unit and braking resistor unit series. We are specialized in automation manufacturing motor frequency speed adjuster with year's manufacturing experience. "Customer is first" and "offering best service" are our constant business scheme.

Regenerated current injects into the DC bus of the inverter and causes the situation of overvoltage when applying the fast deceleration to a rapid operating motor. The braking unit plays an important role to avoid the operation system shut down. The braking unit detects and consumes the regenerative energy through the braking resistor unit to keep the voltage level and prevent the machine shut down.

Two voltage levels are suitable for LSBR series  
200V~230V  
380V~460V

The braking unit is suitable for variant type of inverters that with output connectors P and N.

### SAFETY SUMMARY

Please read the descriptions about installation, operation, maintenance and examination in the manual. Also, attend the descriptions about the following safety symbols.



**CAUTION** : Describes a procedure which, if not performed correctly, could result in damage to data, equipment, or systems.



**WARNING** : Describes a potential hazard that could result in injury or death; or a procedure which, if not performed correctly, could result in injury or death.  
**(DANGER)**



**INHIBIT** : Describes an absolutely forbidden behavior for any installation, wiring and operation.

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**Receiving**

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Do not install or operate the braking unit or braking resistor unit which is damaged or has missing parts.

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**Installation**

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Keep the front side upward when installation and shipping.



Mount the braking unit on the cement wall, nonflammable material or inside an independent control box.



When mounting multiple units in an enclosure, install a fan or other cooling device to keep the intake air temperature below 40-degree C.

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**Wiring**

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Connect the correct polarities of the braking unit to the inverter (N-N, P-P) to prevent the braking unit burns out.



Only commence wiring after verifying that the power supply is turned off, the charge indicator inside is off and that there is not any DC voltage remained between wires P and N. Failure to observe this warning can result in an electrical shock or a fire.




Never touch high-voltage terminals in the braking unit and braking resistor unit. Failure to observe this warning can result in an electrical shock.



Only qualified personnel should perform wiring.



Make sure to ground the ground terminal. 



When wiring the emergency stop circuit, check the wiring thoroughly before operation.

### 3 SAFETY SYMBOLS

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Verify that the AC power supply voltage coincides with the rated voltage of the braking unit and the setting of jumper J7.



Tighten terminal screws to the specified tightening torque.



Do not perform a voltage test of the braking unit and braking resistor unit with an ohmmeter.

#### Operation



Only turn on the input power supply after replacing the front cover. Do not remove the cover while current is flowing. Failure to observe this warning can result in an electrical shock.



Do not check signals during operation to prevent the damage of the braking unit.



Since the temperature is very high after discharging. Never touch the heatsink or discharging resistor to prevent the burn of the body.



All the constants of the braking unit have been present at the factory. Do not change the setting unnecessarily.

#### Maintenance and inspection



Perform maintenance or inspection only after verifying that the charge indicator is off to prevent the damage of electrical shock.



Never touch high voltage terminals in the braking unit and braking resistor unit. Failure to observe this warning can result in an electrical shock.



Only authorized personnel should be permitted to perform maintenance, inspections or parts replacement.

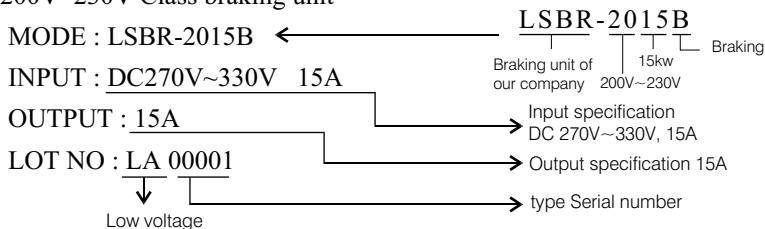
## 1. Inspection

**1-1** All braking units and braking resistor units have been passed the strict quality control. However, they might have damaged by shocking and striking in shipping. Check and see the following after unpacking. If any malfunction is found, notify our company or the service department immediately.

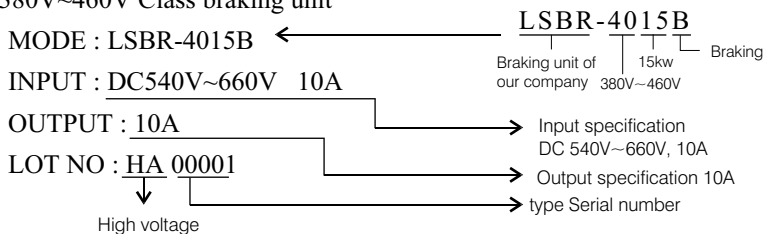
1. The nameplate data meet your requirements.
2. They have sustained no damage while in transit.
3. The package has no vestige of rain or greasy dirt.
4. Fastening bolts and screws are not loose.
5. The PC board is not loose and the case is not deformed.

### 1-2 Nameplate description

(1) 200V~230V Class braking unit



(2) 380V~460V Class braking unit



## 2. Installation

### 2-1 Installation site

Please keep away following site:

- \* Sunshiny site
- \* With erosive vapor, liquid site
- \* With dust, iron powder site
- \* Surrounding temperature less than -10 degree C or higher than 40 degree C site
- \* With electric magnetic interfere site
- \* Vibration site
- \* With wind/rain, water drop, humidity site

### 2-2 Installation direction and space

The installation of the braking unit and braking resistor unit must satisfy the following safety conditions.

- (1) This is a hanging on wall type braking unit, please use M5 screw to vertically fix the braking unit on wall or circuit wiring board.
- (2) The braking unit will cause thermal when keeping the on-state or operating. Reserve proper cooling space to install the braking unit.



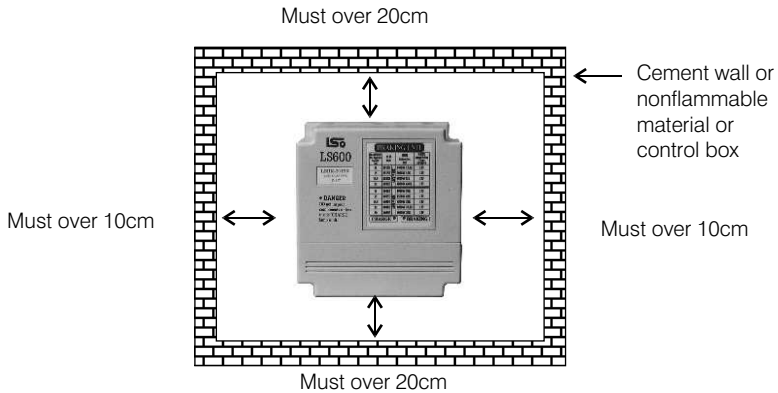
Specification of  
LSBR-2015B  
LSBR-2022B



Specification of  
LSBR-4015B  
LSBR-4030B

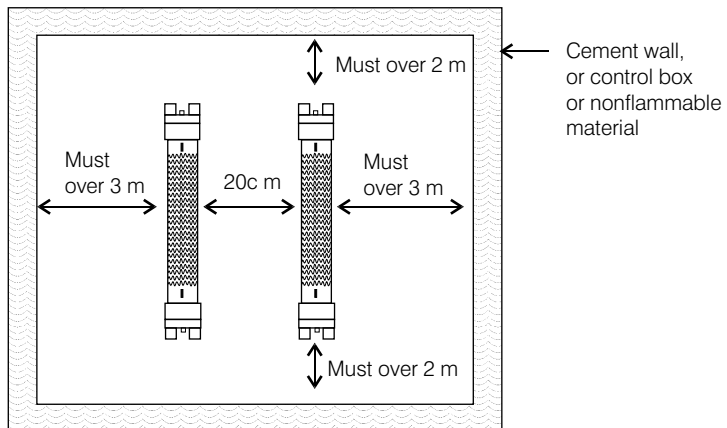


(3) Installation diagram



*It is appropriate to install the braking unit by hanging on wall. There should be enough space for heat emission. Otherwise the braking unit and the inverter could be damaged or cause a fire that result in injury.*

(4) The surface of the resistors may cause thermal by continuous discharge. Install the resistors on the cement wall or control box according to the following diagram to keep proper cooling space.



## 5 INSTALLATION

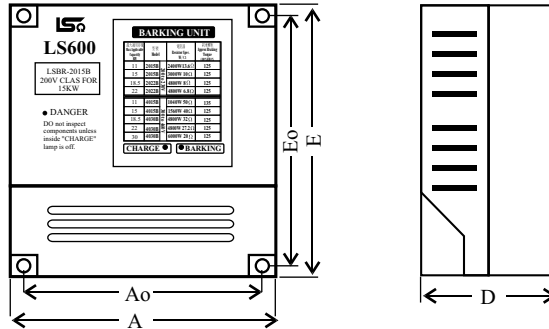


The surface of the resistors may cause thermal by continuous discharge. Never touch them by hand or body to prevent a burn or any other injury.



Install the braking unit by keeping sufficient spaces away from devices which are weak against heat. Any object should not near the installation space less than 1 meter or be installed in the independent control box.

### (5)Braking unit dimensions (mm)



### Size

Size / Model	Area	A	Ao	E	Eo	D
LSBR-2015B	146	146	128	150	138	153
LSBR-2022B						
LSBR-4015B	146	146	128	200	188	153
LSBR-4030B						

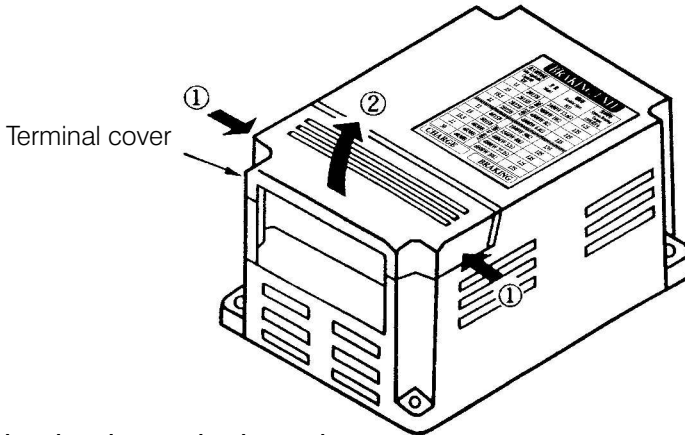
### Weight and Volume

Model	Net weight	Gross weight	Volume	Tighten screw
LSBR-2015B	1.8	2.0	0.3	M5
LSBR-2022B				
LSBR-4015B	2.6	3.0	0.4	M5
LSBR-4030B				

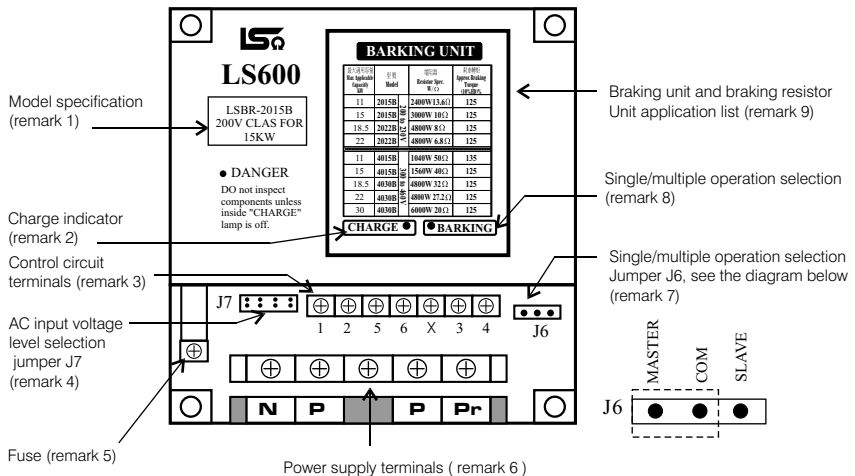
### 3. Wiring

#### 3-1 Terminal cover fixing and moving

For removing, grasp the terminal cover at ① on both sides and then lift in the direction of ②. Or aim the screwdriver at the button of one side and push it inward to open the cover. For fixing, reverse the method.



#### 3-2 Main circuit terminals and control circuit terminals position diagram



## 7 REMARKS

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Statements :

**Remark 1 :**

LSBR- x x x x B	→	Model specification
x x x V CLASS For	→	AC input voltage level
x x kw	→	Capacity for inverter application

**Remark 2 :** Charge indicator The red LED will light if there is DC voltage in side the braking unit.

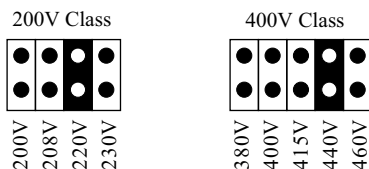
### Remark 3 : Control circuit terminals


**Terminals 1, 2 :** Terminals 1,2 are passive inputs and terminals 5,6 are main outputs when multiple operation.

**Terminals 3, 4 :** The output terminals for overheating. Open when normally run and closed when overheating. The capacity of the circumscribed fan is 125 VAC/1A, 30 VDC/2A.

**Terminals 5, 6 :** The braking unit outputs the precise voltage from terminals 5, 6 to terminals 1,2 of the secondary one by the time it reaches the voltage level of discharge when multiple operation.

**Remark 4 :** Exactly choose the selection jumper of the input voltage of the inverter. Short it to reach the correct voltage level of discharge.



 The mark in black represents the selection jumper of voltage level. Choose the input voltage level of the inverter by appropriately select the jumper.

For example: short the terminals labeling 220V by selection jumper for 220 VAC input voltage of the inverter.

**Remark 5 :** Specifications of the quick fuse for protecting the braking unit

LSBR-2015B : 50A/240V

LSBR-2022B : 75A/240V

LSBR-4015B : 35A/660V

LSBR-4030B : 45A/660V

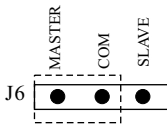
**Remark 6 :** Power supply terminal



N, P — Connect to terminals P, N (P-to-P, N-to-N) of the inverter. The wrong connection could result in the burn of the braking unit.

P, Pr — Connect to the braking resistor unit. Refer to P. 12 for the specifications of the power lines connecting to terminals N, P and P, Pr.

**Remark 7 :** Selection of single/multiple operation of the braking unit



Short terminals MASTER, COM by selection jumper for single operation

Short terminals MASTER, COM of the main braking unit and terminals SLAVE, COM of the others for multiple operation.

**Remark 8 :** The braking unit flashes the white LED to indicate the braking action. The more the energy discharges, the quicker the flash frequency.

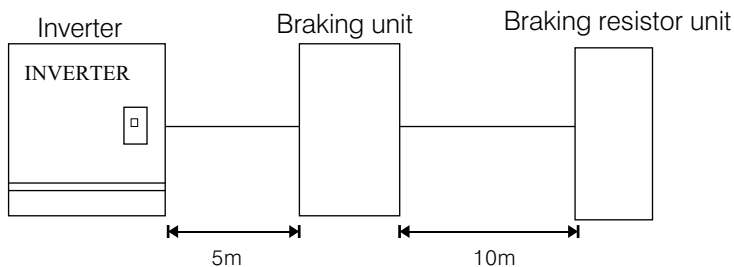
**Remark 9 :** Refer to P.14, 15 for the application list of the specifications of the braking unit, braking resistor unit and braking torque.

## 3-3 Wiring specification

Model type	Wiring type	Symbol of terminal	Wiring gauge AWG(mm <sup>2</sup> )	Wire type	Tighten screw
LSBR-2015B LSBR-2022B LSBR-4015B LSBR-4030B	Main circuit	N, P P, Pr	12-10 (3.5-5.5mm <sup>2</sup> )	600V rating, rubber sheathed wire or heat resistance wire	M4
	Control circuit	1, 2, 3 4, 5, 6	18-14 (0.75-2mm <sup>2</sup> )	600V rating, rubber sheathed wire or heat resistance wire	M3

## 3-4 Wiring distance

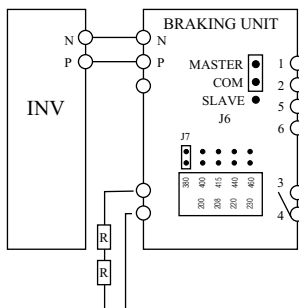
There will be noise and high temperature when the braking unit and braking resistor unit discharge. Refer to the following diagram for installation.



*Make sure to ground the braking unit. Fix the ground terminal in the lead wire terminal  $\oplus$  with M4 screw to prevent injury of members.*

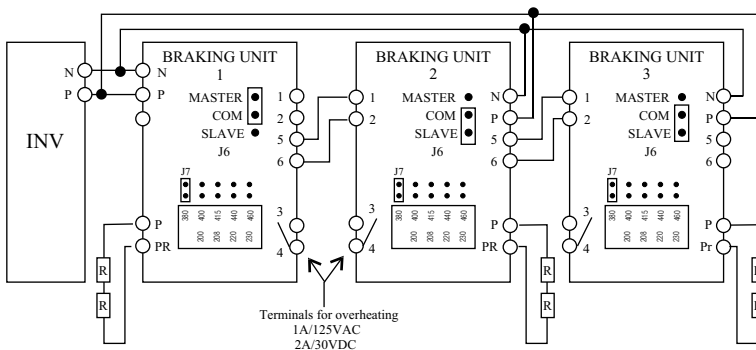
### 3-5 Wiring of single/multiple operation

#### (1)Wiring of single operation



- ⊙ Connect terminals P, N of the inverter to terminals P, N of the braking unit (P-to-P, N-to-N).
- ⊙ Short terminals MASTER, COM of J6 with jumper.
- ⊙ Choose the voltage level of the braking unit with selection jumper J7 after verifying the correct voltage level of the inverter.

#### (2)Wiring of multiple operation



**Example:** Braking unit 1 is MasterConnect MASTER, COM of J6

Braking unit 2 is SlaveConnect SLAVE, COM of J6

Braking unit 3 is SlaveConnect SLAVE, COM of J6

Parallel connect more than one braking unit for coincident discharge action.

The voltage level of discharge action of all slave braking units is according to the one of the master braking unit. (Connect terminals 5, 6 of the braking unit 1 to terminals 1, 2 of the braking unit 2, and connect terminals 5, 6 of the braking unit 2 to terminals 1, 2 of the braking unit 3)

Refer to the descriptions in P.14, 15 for the connections between terminals P, Pr and the braking resistor unit.

According the standard of the AC input power supply of the inverter for the setting of the selection jumper J7

	200V Class				400V Class				
Inverter input power supply (AC)	200	208	220	230	380	400	415	440	460
Braking unit start voltage (DC)	327	345	365	380	620	655	680	720	760





### 4-3 Braking unit for 400V class application list

Model	Capacity (KW)	Resistance (Ω)	Wattage (W)	Unit quantity	Braking torque	○:Aluminum resistor, △:Wire-wound resistor	Braking unit Model
LS600-4001	0.75	300	200	1	200	○	Built-in
LS600-4002	1.5	300	200	1	200	○	Built-in
LS600-4003	2.2	150	300	1	130	○	Built-in
LS600-4005	3.7	100	500	1	130	○	Built-in
LS600-4007	5.5	80	800	1	150	△	Built-in
LS600-4010	7.5	60	1000	1	150	△	Built-in
LS600-4015	11	50	1040	1	135	△	LSBR-4015B One set
LS600-4020	15	40	1560	1	125	△	LSBR-4015B One set
LS600-4025	18.5	32	4800	1	125	△	LSBR-4030B One set
LS600-4030	22	27.2	4800	1	125	△	LSBR-4030B One set
LS600-4040	30	20	6000	1	125	△	LSBR-4030B One set
LS600-4050	37	32	4800	2	125	△	LSBR-4030B Two sets
LS600-4060	45	20	6000	2	135	△	LSBR-4030B Two sets
LS600-4075	55	20	6000	2	135	△	LSBR-4030B Two sets
LS600-4100	75	20	6000	3	125	△	LSBR-4030B Three sets

### 4-4 Cautions

- (1) Take our inverters for example, the braking circuit is built inside the inverter that less than 10HP. It is not necessary to install extra braking unit but only aluminum resistor.
- (2) It is necessary to install the braking unit for the inverters more than 15HP. The range of the braking capacity is wide. It is better for parallel-connected operation that it has the ability of coincided braking start levels to prevent overheating causing by the excessive discharge energy of single operation.

# 11 CHARACTERISTICS OF BRAKING UNIT

## 4-5 Characteristics of braking unit

Braking unit model LSBR-		200V~230V		380V~460V	
		2015B	2022B	4015B	4030B
Output characteristics	Applicable motor output HP (kW)	20HP 30HP 15kw 22kw		20HP 40HP 15kw 30kw	
	Rated discharge current (A)	15	20	10	15
	Maximum discharge peak current (A)	40	60	27	40
	Braking start voltage	AC200V 208V 220V 230V ↓ DC327V 345V 365V 380V ± 3V		380V 400V 415V 440V 460V ↓ 620V 655V 680V 720V 760V ± 6V	
	Maximum hysteresis error	8V maximum		16V maximum	
Power supply	Inverter input AC power supply	50HZ 60HZ AC200V~230V		50HZ 60HZ AC380V~460V	
	Inverter DC bus voltage	243V~400V peak		460V~800V peak	
Protective functions	Fin overheat	Thermal switch detects terminals 3, 4 outputs Normally open			
	Power charge indicator	Charge indicator stays on until bus voltage drop below 50V			
Environmental conditions	Location	Indoor that protected from corrosive gases and dust			
	Ambient temperature	-10~+40°C			
	Humidity	90% RH, non-condensing			
Protective configuration	Vibration	1G less than 20 Hz, up to 0.2G at 20 to 50 Hz			
	Protective configuration	Wall-mounted enclosed type			



CAUTION

The braking unit can be used below 10% rated current for 10 minutes maximum when continuous discharge.

## 5. Troubleshooting

Fault status	Cause	Corrective action
Braking resistor unit overload, or relay trips when not decelerating	<ul style="list-style-type: none"> <li>Without braking unit (0.5HP~10HP) Inverter built-in main circuit discharging transistor short circuited</li> </ul>	<ul style="list-style-type: none"> <li>Fix the inverter circuit</li> <li>Replace the inverter</li> <li>Replace the IGBT module</li> </ul>
	<ul style="list-style-type: none"> <li>With braking unit (more than 15HP) Braking unit main circuit discharging transistor short circuited</li> </ul>	<ul style="list-style-type: none"> <li>Fix the braking unit</li> <li>Replace the braking unit</li> </ul>
	<ul style="list-style-type: none"> <li>Improper braking unit power supply selection connector J7 setting Power supply should more than discharge voltage Level</li> </ul>	<ul style="list-style-type: none"> <li>Set selection connector J7 the same as the input power supply of the inverter</li> </ul>
	<ul style="list-style-type: none"> <li>Discharge with high input voltage when not decelerating</li> </ul>	<ul style="list-style-type: none"> <li>Improve power quality</li> </ul>
Inverter trips at overvoltage (OU)	<ul style="list-style-type: none"> <li>Insufficient braking resistor unit capacity</li> </ul>	<ul style="list-style-type: none"> <li>Examine the braking condition again</li> <li>Extend the decelerating time if possible</li> </ul>
	<ul style="list-style-type: none"> <li>Improper wiring</li> </ul>	Check again
	<ul style="list-style-type: none"> <li>Braking unit fault</li> </ul>	Replace the braking unit
Braking unit trips at overheat	<ul style="list-style-type: none"> <li>Excessive start/stop switching frequency</li> </ul>	Examine the operating condition again
	<ul style="list-style-type: none"> <li>Excessive load inertia</li> </ul>	
	<ul style="list-style-type: none"> <li>Improper combination of braking unit and braking resistor unit</li> </ul>	Reset
	<ul style="list-style-type: none"> <li>Ambient temperature more than 40 degree C</li> </ul>	Reduce it

\* If any technical problem about the braking unit occurs, please contact with our company or our distributor immediately.