T-VERTER

Braking Unit

User manual

煞車控制器

使用手冊

TBU Series	TBU-230	243~400V (20A)
	TBU-430	460~800V (15A)

PREFACE

Braking unit is used with braking resistor to consume regenerative energy from motor at deceleration and to improve the inverter braking ability.

Before using the braking unit, a through understanding of this manual is recommended. This instruction manual will be a great help for daily maintenance, inspection and troubleshooting.

The Braking unit, TBU-230/430, can be connected with A510, F510, E510, N2, V2, 7200GA, 7200GS, 7200MA, 7300PA, 7300CV and 7300VA series.

前言

在馬達煞車減速時，煞車模組可搭配煞車電阻來消耗因減速所產生的回灌能量，提昇變頻器的煞車減速能力。

使用煞車模組前，必須完整充分了解本手冊所敘述的內容，本手冊將有助於日常的維護、檢查及問題的排除與解決。

本煞車模組可使用在 A510, F510, E510, N2、V2、7200GA、7200GS、7200MA、7300PA、7300CV 及 7300VA 系列的變頻器。

中文說明請參閱第十五頁。

CONTENTS

Safety Information

The following conventions are used to indicate precaution in this manual.
Failure to heed precaution provided in this manual can result in serious or possibly even fatal injury or damage to the products or to related equipment and system.

CAUTION：Indicated precaution that, if not heeded, could result in relatively serious or minor injury , damage to the product, or faulty operation.

DANGER：Indicated precaution that, if not heeded, could possibly result in loss of life or serious injury.

RECEIVING

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

INSTALLATION

Lift cabinet by the base, when moving the unit, never lift by the front cover. Otherwise, the main unit may be dropped causing damage to the unit.

Mount the braking unit and resistor on nonflammable material. Failure to observe this caution can result in a fire.

When mounting braking unit (Individually or multiple) in an enclosure, install a fan or other cooling device to keep the intake air temperature below 40℃. Over hearting may cause a fire or damage to the unit.

WIRING

Connect the Inverter's DC bus terminal N、P to Braking unit's main circuit terminal N(-)、P(+) properly. Otherwise, the Inverter or Braking unit will be damaged.

Always turn OFF the input power supply and wait until the CHARGE indicator light goes out before wiring terminal. Otherwise, an electric shocks or fire can occur.

Do not touch the Braking unit and Braking resistor while power is applied to the circuit. Failure to observe this warning can result in personal injury.

Wiring should be performed only by qualified personnel. Failure to observe this warning can result in an electrical shock or a fire.

Make sure to earth the ground terminal  , Grounding resistance 200V class 100Ω or less, 400V class 10Ω or less.

When wiring the emergency stop circuit, check the wiring thoroughly before operation.Failure to observe this warning can result in personal injury.

Never touch the fins (heat-sink) of the Braking unit or discharge resistor. These can become very hot. Failure to observe this warning can result in personal injury.

Install the discharge resistor on nonflammable material, provide sufficient spaces from other devices, the 1 meter distance are recommend, Failure to observe this caution can result in a fire.

Verify that the rated voltage setting jumper of the braking unit coincides with the Inverter input supply voltage. Failure to observe this caution can result in personal injury or a fire.

Tighten terminal screws to the specified tightening torque. Failure to observe this caution can result in a fire.

Do not perform a withstand voltage test of the braking unit and braking resistor unit. It may cause braking unit inside element to be damaged.

OPERATION

Do not remove the cover while the power is ON, current is flowing. Failure to observe this warning can result in an electrical shock.

Do not check signals during operation. The Braking unit or the Inverter may be damaged.

Never touch the discharge resistor. These can become very hot. Failure to observe this warning can result in personal injury.

Never modify the product, Failure to observe this warning can result an electrical shock or personal injury and will invalidate the guarantee.

MAINTENANCE AND INSPECTION

Perform maintenance or inspection only after verifying that the CHARGE LED goes OFF, after the main power supply is turn OFF. The capacitors are still charged and can be dangerous.

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

Only authorized personnel should be permitted to perform maintenance, inspection or parts replacement. Failure to observe this warning can result in an electrical shock.

1. RECEIVING

The braking unit has been put though several tests at the factory before shipment. After unpacking, however, check and see the following.

- Their model and capacity of the braking unit meet your requirement.
- Is there any damage while transportation. If so, do not apply the power.

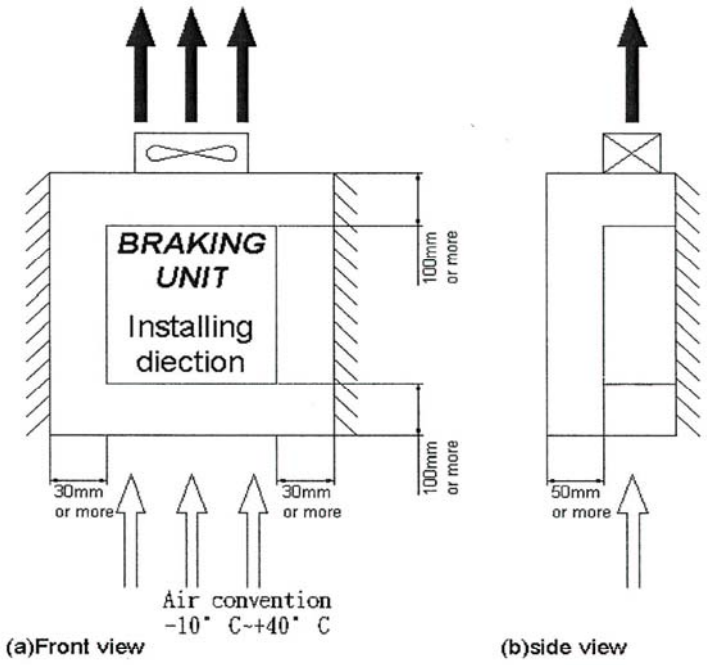
If any of above is found, contact nearest distributor or sales representatives.

2. ENVIRONMENTAL PRECATION

The environment will directly affect the proper operation and the life of the braking unit, so install the braking unit in an environment complies with the following conditions:

- Ambient temperature: -10°C - +40°C; (take the dustproof cover off : -10°C - +50°C)
- Avoid exposure to rain or moisture.
- Avoid direct sunlight.
- Avoid smoke and salinity.
- Avoid erosive liquid and gas.
- Avoid dust, bats, and small metal pieces.
- Keep away from radiative and flammable materials.
- When mounting multiple braking units placed in the same control panel, add extra heat dissipators to keep the temperature below 40°C.

- Place the front side of the braking unit onward and top upward to help heat dissipation.
- Install the inverter according to the following figures: (take the dustproof cover off to help heat dissipation if installed in a box or the environment allows to do so)



3. Model name **TBU** - **2** **30**

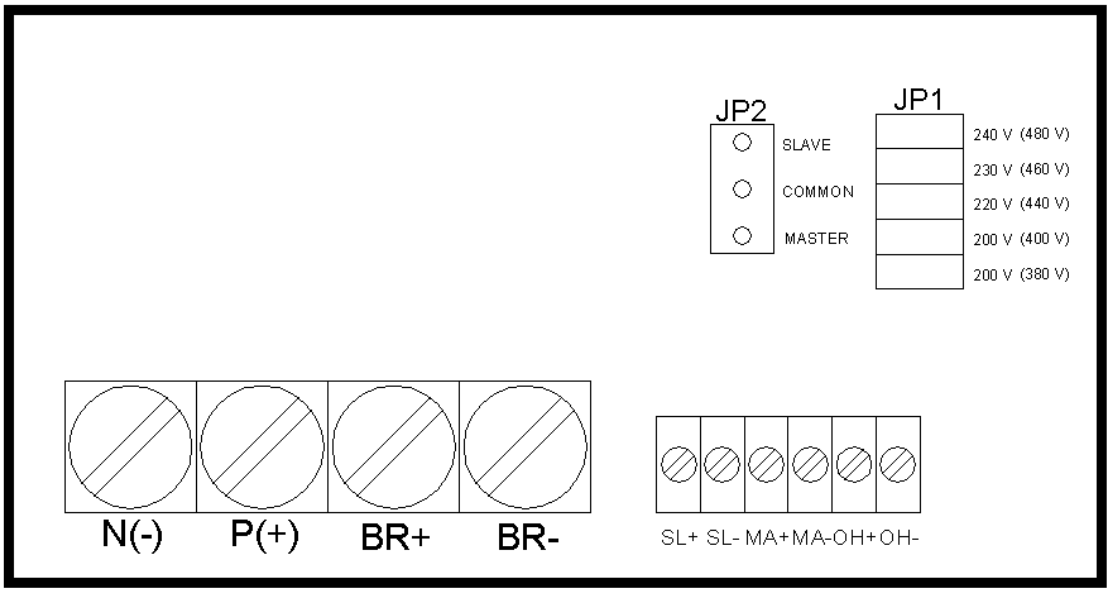
Series	Applicable Inverter voltage	Max. applicable motor rated capacity per unit
	2: 220V, 4: 440V	30:30Hp

4. Specification

Applicable Inverter voltage		200V ~ 240V	380V ~ 480V
Braking unit model		TBU-230	TBU-430
Output Characteristics	Max. applicable motor rated capacity per unit KW (HP)	22KW (30HP)	22KW (30HP)
	Rated Discharge Current (A)	20	15
	Max Discharge Current (A)	70	40
	Braking Start Voltage (VDC)	DC325/358/374/390V →±3V	DC618/651/716/748/781V →±6V
Power Supply	Inverter Input Voltage	50/60Hz 200 ~ 240VAC	50/60Hz 380 ~ 480VAC
	Inverter DC BUS Voltage	243 ~ 400 VDC	460 ~ 800VDC
Protective Function	Overheat	Thermostat (with contact output)	
	Power Charge Indication	Charge lamp stays ON until bus voltage drops below 50VDC	
Environment Conditions	Location	Indoor (Protected from corrosive gases and dust)	
	Ambient Temperature	- 10℃ ~ + 40℃	
	Storage Temperature	- 20℃ ~ + 70℃	
	Humidity	0 ~ 95%RH (non-condensing)	
	Vibration	1G less than 20Hz；up to 0.3G at 20 ~ 50Hz	
	Enclosure	IP20	
	Safety level	UL/cUL	CE/UL/cUL
	Installation	Screw mounted	
	Parallel connection	Parallel connection of braking unit is possible to use in the inverter with bigger horsepower	
	Dimension (W*H*D)	149 * 184 * 145.7 mm	

● Loading time rate has to be below 10% ED and max 10 seconds on the max discharge current.

5. SECTION NAME



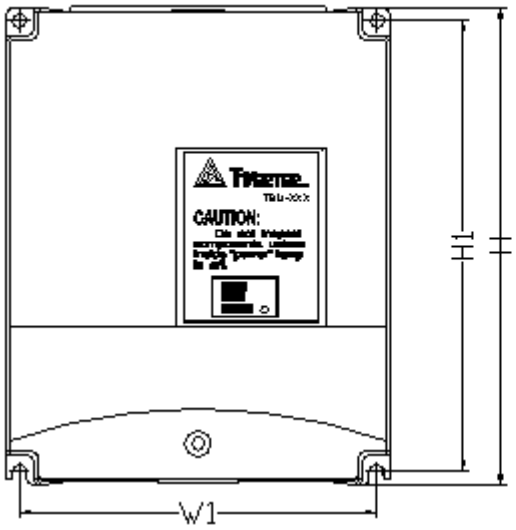
5.1 CIRCUITRY TERMINAL DESCRIPTION

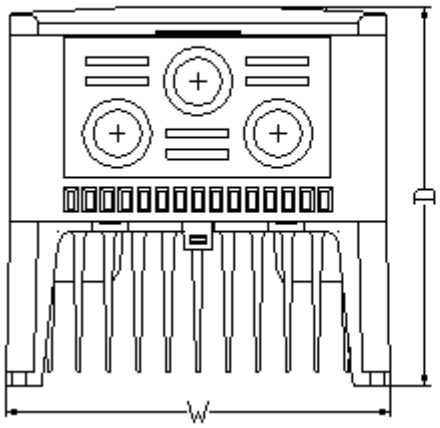
Purpose	Terminal Symbol	Description
Main circuit power input	P(+)	DC Bus power input terminals (P(+) positive terminal, N(-) negative terminal)
	N(-)	
	BR+	Braking resistor output terminals. (Resistor specification please refer 8.3 braking resistor list)
	BR-	
	⏚	Grounding terminal
Control circuit	SL+	Slave input positive terminal when using parallel connection
	SL-	Slave input negative terminal when using parallel connection
	MA+	Master input positive terminal when using parallel connection
	MA-	Master input negative terminal when using parallel connection
	OH+	Braking unit over-heat protection relay output terminal, (1A/125VAC, 2A/ 30VDC)
	OH-	

5.2 JUMP FUNCTION DESCRIPTION

	Description
JP1	Braking unit power supply voltage selection. Selected the properly voltage level to make the braking start level corrected.
JP2	Master/ Slave station selection. Master station: MASTER-COM, (Factory default) Slave station: SLAVE-COM (Only multiple braking units needed)

6. DIMENSION





unit:mm

MODEL	W	H	D	W1	H1	Weight
TBU-230	149	184	145.7	138	174	2.3Kg
TBU-430						

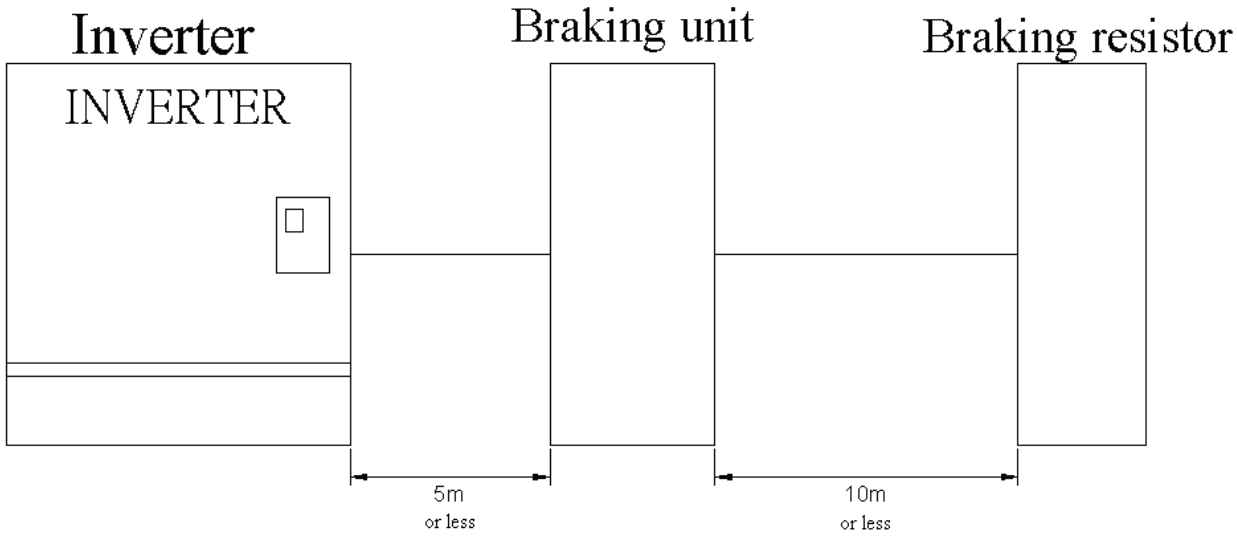
7. WIRE PRECATION

7.1 CIRCUITS AND WIRE SPECIFICATION

Braking unit	Purpose	Terminal Symbol	Wire sizes AWG (mm²)	Wire type	Terminal Screws
TBU-230 TBU-430	Main circuit	N(-)，P(+) BR+，BR- ⏚	12-10 (3.5-5.5 mm²)	Power cables, e.g., 600V, vinyl power cables	M4
	Control circuit	SL+ ,SL-, MA+, MA-, OH+, OH-	18-14 (0.75-2 mm²)		M3

7.2 WIRE DISTANANCE

Since the braking unit and braking resistor generates heat, provide sufficient spaces between each other devices.

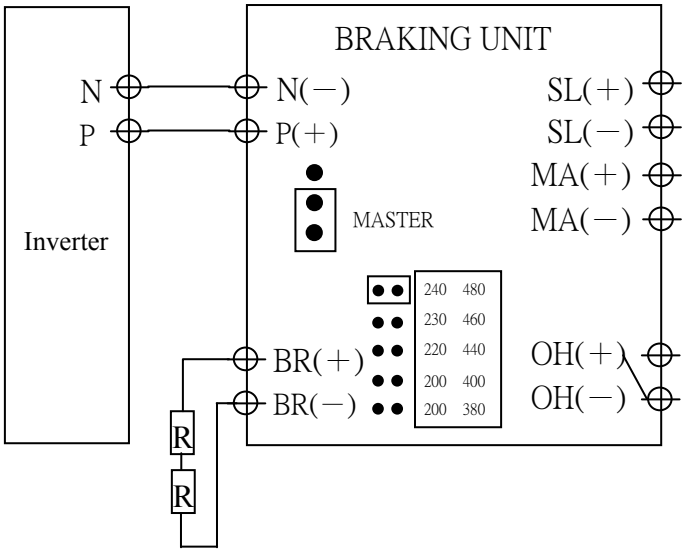


⚠ Make sure to ground the grounding terminal ⏚, use the properly wire and tighten M4 terminal screws to the specified tightening torque.

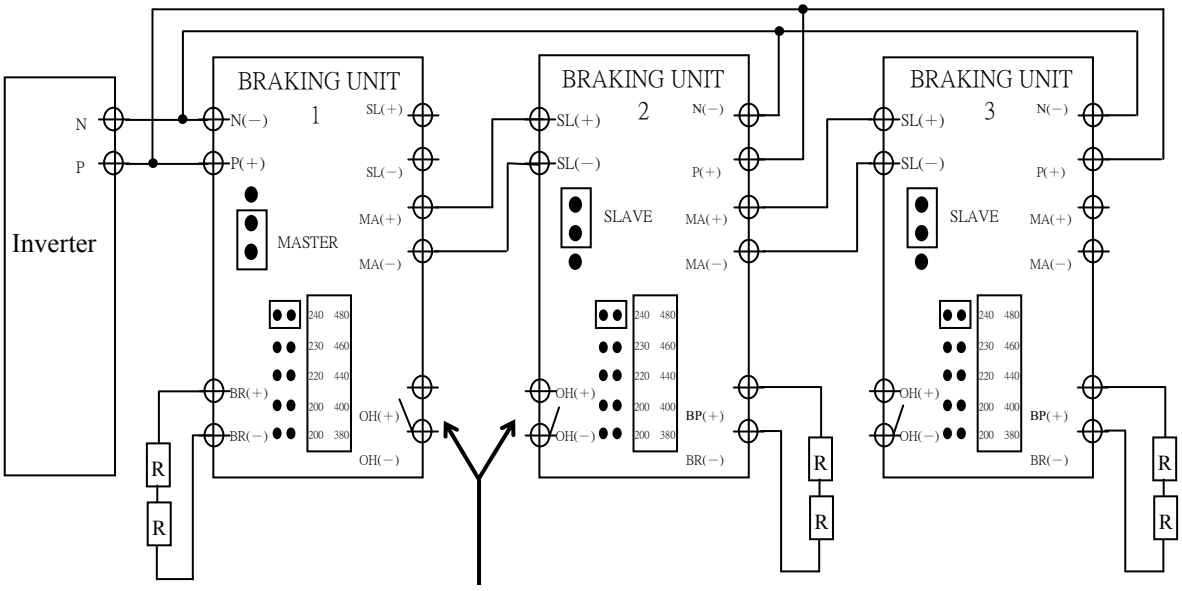
8. INTERCONNECTION

Braking units have a master/slave selection connector; master side is selected prior to shipment, for using more than one parallel connected braking unit, selected slave side for second, third, and the rest of the units.

8.1 One braking unit installation (One Inverter connected to one braking unit)



8.2 Parallel connection of braking units (One Inverter connected to multiple braking units)



Thermostat with relay：

1A/125VAC

2A/30VDC

For using multiple braking units, it need to be parallel connected; the barking units' main circuit terminal and selector the jumper 2(JP2) as follows.

1) Braking unit 1 as the Master station, check the JP2 selection is in MSTER-COM.
2) Braking unit 2 & 3 as the Slave station. Make sure the JP2 selection is in SLAVE-COM.
3) Connect braking unit 1 terminal MA+，MA- to braking unit 2 terminal SL，SL-, Braking unit 2 terminal MA+，MA- to braking unit 3 terminal SL+，SL-.
4) Braking unit terminal BR+，BR- connect to braking resistor.
5) Make sure all the braking unit JP1 (voltage selection) is selected correctly, and then the parallel connection braking units start level will coincide.

8.3 Braking unit and braking resistor unit application list

INVERTER		**Braking Unit**		**Braking Resistor**				
Voltage	**HP**	**Braking Unit**	**Q'ty**	**MODEL NO.**	**Braking Resistor Specification**	**Q'ty**	**Approx. Braking Torque (10%ED)**	**Min Ohm Value**[*1]
220V	15	TBU-230	1	JNBR-2R4KW13R6	2400W/13.6Ω	1	117%(10%ED)	5.5Ω
	20	TBU-230	1	JNBR-3KW10	3000W/10Ω	1	119%(10%ED)	5.5Ω
	25	TBU-230	1	JNBR-4R8KW8	4800W/8Ω	1	119%(10%ED)	5.5Ω
	30	TBU-230	1	JNBR-4R8KW6R8	4800W/6.8Ω	1	117%(10%ED)	5.5Ω
	40	TBU-230	2	JNBR-3KW10	3000W/10Ω	2	119%(10%ED)	5.5Ω
	50	TBU-230	2	JNBR-3KW10	3000W/10Ω	2	99%(10%ED)	5.5Ω
	60	TBU-230	2	JNBR-4R8KW6R8	4800W/6.8Ω	2	117%(10%ED)	5.5Ω
	75	TBU-230	2	JNBR-4R8KW6R8	4800W/6.8Ω	2	98%(10%ED)	5.5Ω
	100	TBU-230	3	JNBR-4R8KW6R8	4800W/6.8Ω	3	108%(10%ED)	5.5Ω
	125	TBU-230	4	JNBR-4R8KW6R8	4800W/6.8Ω	4	113%(10%ED)	5.5Ω
	150	TBU-230	4	JNBR-4R8KW6R8	4800W/6.8Ω	4	98%(10%ED)	5.5Ω

INVERTER		Braking Unit		Braking Resistor				Min Ohm Value*1
Voltage	HP	Braking Unit	Q'ty	MODEL NO.	Braking Resistor Specification	Q'ty	Approx. Braking Torque (10%ED)	
440V	15	TBU-430	1	JNBR-1R6KW50	1600W/50Ω	1	126%(10%ED)	19.2Ω
	20	TBU-430	1	JNBR-1R5KW40	1500W/40Ω	1	119%(10%ED)	19.2Ω
	25	TBU-430	1	JNBR-4R8KW32	4800W/32Ω	1	119%(10%ED)	19.2Ω
	30	TBU-430	1	JNBR-4R8KW27R2	4800W/27.2Ω	1	117%(10%ED)	19.2Ω
	40	TBU-430	1	JNBR-6KW20	6000W/20Ω	1	119%(10%ED)	19.2Ω
	50	TBU-430	2	JNBR-4R8KW32	4800W/32Ω	2	119%(10%ED)	19.2Ω
	60	TBU-430	2	JNBR-4R8KW27R2	4800W/27.2Ω	2	117%(10%ED)	19.2Ω
	75	TBU-430	2	JNBR-6KW20	6000W/20Ω	2	126%(10%ED)	19.2Ω
	100	TBU-430	3	JNBR-6KW20	6000W/20Ω	3	139%(10%ED)	19.2Ω
	125	TBU-430	3	JNBR-6KW20	6000W/20Ω	3	115%(10%ED)	19.2Ω
	150	TBU-430	4	JNBR-6KW20	6000W/20Ω	4	125%(10%ED)	19.2Ω
	175	TBU-430	4	JNBR-6KW20	6000W/20Ω	4	111%(10%ED)	19.2Ω
	215	TBU-430	5	JNBR-6KW20	6000W/20Ω	5	112%(10%ED)	19.2Ω
	250	TBU-430	5	JNBR-6KW20	6000W/20Ω	5	99%(10%ED)	19.2Ω
	300	TBU-430	6	JNBR-6KW20	6000W/20Ω	6	99%(10%ED)	19.2Ω
	350	TBU-430	7	JNBR-6KW20	6000W/20Ω	7	99%(10%ED)	19.2Ω
	375	TBU-430	8	JNBR-6KW20	6000W/20Ω	8	105%(10%ED)	19.2Ω
	400	TBU-430	8	JNBR-6KW20	6000W/20Ω	8	99%(10%ED)	19.2Ω
	425	TBU-430	9	JNBR-6KW20	6000W/20Ω	9	104%(10%ED)	19.2Ω
	500	TBU-430	10	JNBR-6KW20	6000W/20Ω	10	99%(10%ED)	19.2Ω

Select the braking resistor by this list. Failure to observe this warning can damage to the unit.

*1：Min Ohm Value is the acceptable min value of the braking resistor for single braking unit.

8.4 NOTES

1) Small horsepower inverter has built-in braking transistor, only need to connect the braking resistor to consume the regenerative energy, A510 2025 below as an example.
2) If the regenerative energy from motor is huge, parallel connection of braking unit is possible up to a maximum of 10 units.

9. TROUBLESHOOTING

Fault Status	Cause	Corrective Action
Braking unit or resistor acted when the Inverter was during the acceleration or constant speed. Make the resistor over load	Without braking unit: Inverter built-in braking discharge transistor is in short circuited.	● Repair the Inverter's braking circuit. ● Replace the Inverter
	With braking unit: Braking unit discharge transistor is in short circuited.	● Repair the braking unit's braking circuit. ● Replace the Braking unit
	Improper selection the input voltage level J2, (Power supply voltage > braking unit's power supply voltage selection).	Set the correct JP2 position.
	Input power voltage high than the voltage specification.	Improved the input power voltage.
Inverter trips at over voltage (O.V)	Insufficient braking capacity	● Check the braking capacity. ● Increase inverter's deceleration time
	Improper wiring	Check the wire
	Braking unit malfunction	Replace the Braking unit
Braking unit trips by heat sink over heat	Inverter Start/Stop frequently	Check the operating condition
	Load inertia too heavy	
	Improper combination of braking unit and resistor	Select proper braking unit and resistor.
	Ambient temperature above 40℃	Reinstall unit to a better environment.

目次

安全通告

使用煞車控制器及煞車電阻前，請詳讀本手冊中描述有關安裝操作、保養、檢查之各項說明並注意下列安全標誌之說明。

注意標誌：此標誌之後所敘述之內容，將提醒操作人員不可疏忽，若操作不當，將對人體造成傷害及財物損失。

危險標誌：此標誌之後所敘述之內容將提醒操作人員不可疏忽，否則將對人體造成傷亡。

產品檢查

煞車控制器如有發現因運輸過程而有所損壞時，請勿安裝操作。

安裝

安裝時正面朝上，搬運或運輸中，請勿直接提取正面，應由散熱座提起，避免煞車控制器掉落，而造成人員受傷或產品損害。

煞車電阻器會因發熱而產生高溫，必須安裝於水泥牆或不燃性金屬、不燃性物體之獨立控制機箱內。

安裝煞車控制器多台並聯使用，必須裝置於開放空間，或加裝風扇， 使周圍溫度降到 40℃以下

配線

變頻器之 N、P 和煞車控制器之 N(-)、P(+)必須接法正確，N 對 N(-)，P 對 P(+)，絕對禁止接錯，接錯時將導致煞車控制器立即故障燒毀。

開始配線時，確認變頻器已切斷電源，內部 Charge 指示燈熄滅，並測量 P，N 端無殘餘直流電壓。若違反本項要求，將會損壞變頻器及煞車控制器，安裝人員可能觸電造成意外及財物損失。

送電之後絕對不可用手觸摸煞車控制器或電阻器，否則可能會受到電擊意外，造成傷亡。

全部安裝配線必須由經過專業訓練之電氣技術人員負責。

請務必確定接妥地線  ，TBU-230 其接地電阻需小於 100Ω，TBU-430 其接地電阻小於 10Ω。

安裝緊急停止配線，操作使用之前，請先確認該項功能是否正常。

電阻器持續放電立即產生高溫，絕不容許以手或身體觸碰其表面，否則會立即灼傷，嚴重傷害身體及造成意外。

電阻器四周必須遠離任何易燃、可燃物品，安裝空間不容許一米內有任何物品、物體靠近或安裝於獨立控制箱體內。

請確認變頻器輸入端電壓及煞車控制器額定電壓之 Jump 設定是否相符。

端子螺絲之旋轉固定，必須使用額定扭力之起子旋轉鎖緊。

不可用電錶之歐姆檔測量煞車控制器或電阻器兩端之電壓。

操作

電源在 ON 狀態時，煞車控制器開始動作時，切勿打開前端蓋板，否則易遭到電擊危險。

煞車控制器開始動作之後，切勿用電錶測量電路訊號，否則會損壞煞車控制器，造成煞車控制器燒毀。

切勿用手觸摸電阻器之表面，因放電之後會產生高溫，容易灼傷身體。

煞車控制器內部參數在工廠時已設定完成，使用前請勿設定或改變。

保養和檢查

變頻器和煞車控制器 Change 指示燈爲熄滅之前，不可進行內部測量、保養、檢查工作，否則會有觸電之危險。

煞車控制器和電阻器端子上，存有高壓而勿用手觸摸，否則稍有不慎會有觸電危險造成人體傷害。

保養和檢查必須由專業技術人員和熟悉本機器之技術人員負責。

1. 產品檢查

每台煞車控制器在出廠前均做過功能測試，客戶於煞車控制器送達拆封後，請執行下列檢查步驟。

- 煞車控制器的機種型號是否正確符合您所訂購之型號與容量。
- 煞車控制器是否因運送不慎造成損傷，若有損壞請勿接入電源。

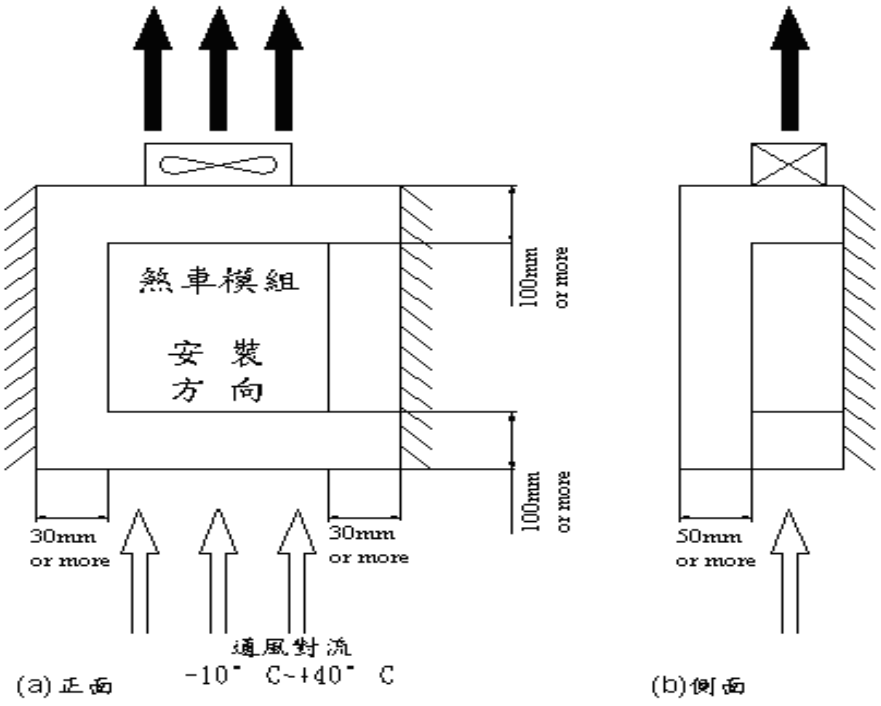
當您發現有上述問題時請立即通知本公司各區業務人員。

2. 使用環境

煞車控制器安裝的環境對煞車控制器正常功能的發揮及其使用壽命有直接的影響，因此煞車控制器的安裝環境必須符合下列條件：

- 周圍溫度： -10℃~+40℃； 拆除防塵上蓋可達 +50℃
- 防止雨水滴淋或潮濕環境。
- 避免直接日曬。
- 防止油霧、鹽分侵蝕。
- 防止腐蝕性液體、瓦斯
- 防止粉塵、棉絮及金屬細屑侵入。
- 遠離放射性物質及可燃物
- 數台煞車控制器安裝於控制盤內時，請注意擺放位置以利散熱，另請外加配置散熱風扇，以使煞車控制器周溫低於 40℃為原則。

- 安裝時請將煞車控制器正面朝前，頂部朝上以利散熱。
- 安裝空間必須符合下列規定：(若安裝於盤內或周圍環境許可時，可取下煞車控制器之防塵上蓋以利散熱通風)



3. 型號說明

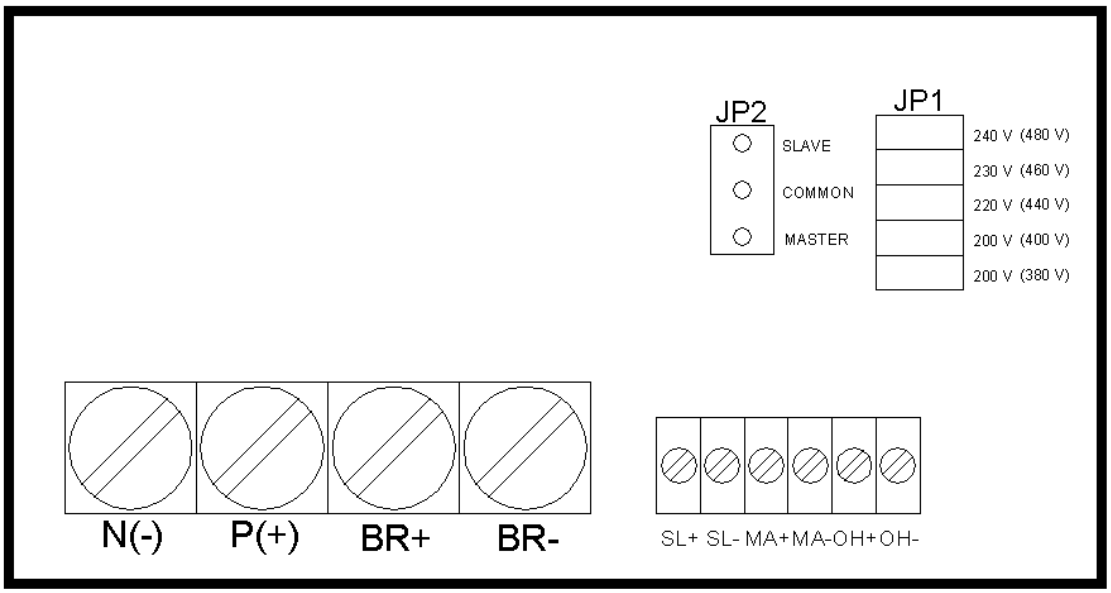
TBU	-	2	30
系列別		適用變頻器電源電壓 2：220V, 4：440V	單台適用變頻器最大額定容量 30：30Hp

4. 規格

變頻器輸入電壓		200V ~ 240V	380V ~ 480V
煞車控制器型號		TBU-230	TBU-430
輸出特性	單台最大適用馬達容量 KW(HP)	22KW (30HP)	22KW (30HP)
	額定連續放電電流(A)	20	15
	最大峰值放電電流(A)	70	40
	制動開始電壓(VDC)	DC325/358/374/390V →±3V	DC618/651/716/748/781V →±6V
電源範圍	變頻器輸入側電壓	50/60Hz 200 ~ 240VAC	50/60Hz 380 ~ 480VAC
	變頻器直流側 BUS 電壓	243 ~ 400 VDC 峰值	460 ~ 800VDC 峰值
保護功能	過熱保護	溫度開關偵測檢出(具接點輸出指示)	
	放電表示	主迴路直流電壓 50VDC 以上，LED 常亮顯示	
環境規格	使用場所	室內(無腐蝕性氣體或粉塵處所)	
	操作溫度	- 10℃ ~ + 40℃	
	儲存溫度	- 20℃ ~ + 70℃	
	溼度	0 ~ 95%RH(不結露)	
	耐振動	20Hz 以下爲 1G；20 ~ 50Hz 爲 0.2G	
其它規格	保護構造	IP20	
	安全認證	UL/cUL	CE/UL/cUL
	安裝方式	壁掛，鎖螺絲	
	多台連線	可多台並聯控制，因應較大馬力使用	
	外型尺寸 (W*H*D)	149*184*145.7 mm	

●以最大峰值電流連續放電時，導通時間率需低於 10%以下且最長時間爲 10 秒鐘。

5. 電源端子控制端子台位置圖



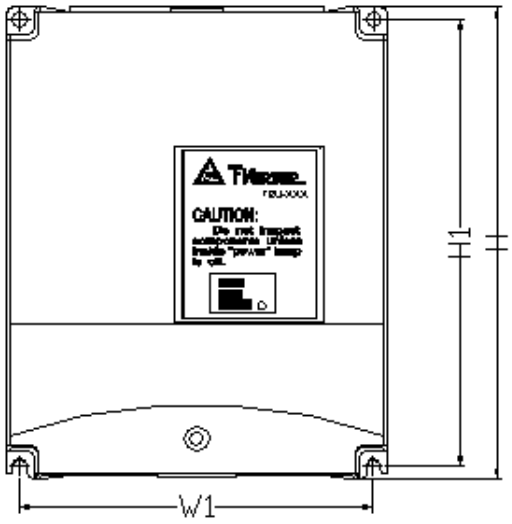
5.1 端子說明

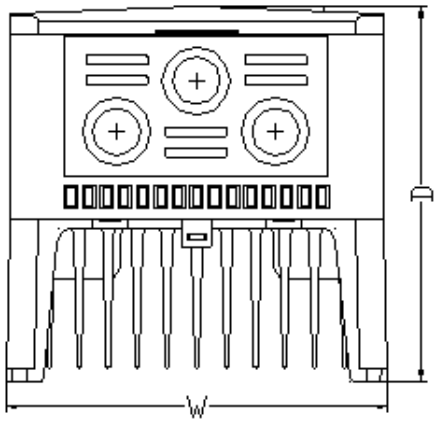
配線類別	端子符號	功能說明
主回路	P(+)	變頻器直流電壓連接端子
	N(-)	(P(+)接正電壓、N(-)接負電壓)
	BR+	煞車電阻連接端子
	BR-	(參照煞車電阻規格)
	⏚	接地端子
控制回路	SL+	並聯使用時之子機輸入正端子
	SL-	並聯使用時之子機輸入負端子
	MA+	並聯使用時之主機輸出正端子
	MA-	並聯使用時之主機輸出負端子
	OH+	煞車控制器過熱保護之 Relay 輸出端子
	OH-	(1A/125VAC, 2A/ 30VDC)

5.2 JUMPER 的功能說明

	選擇功能說明
JP1	輸入電壓位準選擇，依據變頻器輸入電壓，選擇短路片之位置
JP2	主機子機選擇： 主機：選擇 MASTER-COM, 子機：選擇 SLAVE-COM

6. 外型尺寸





單位:mm

MODEL	W	H	D	W1	H1	重量
TBU-230	149	184	145.7	138	174	2.3Kg
TBU-430						

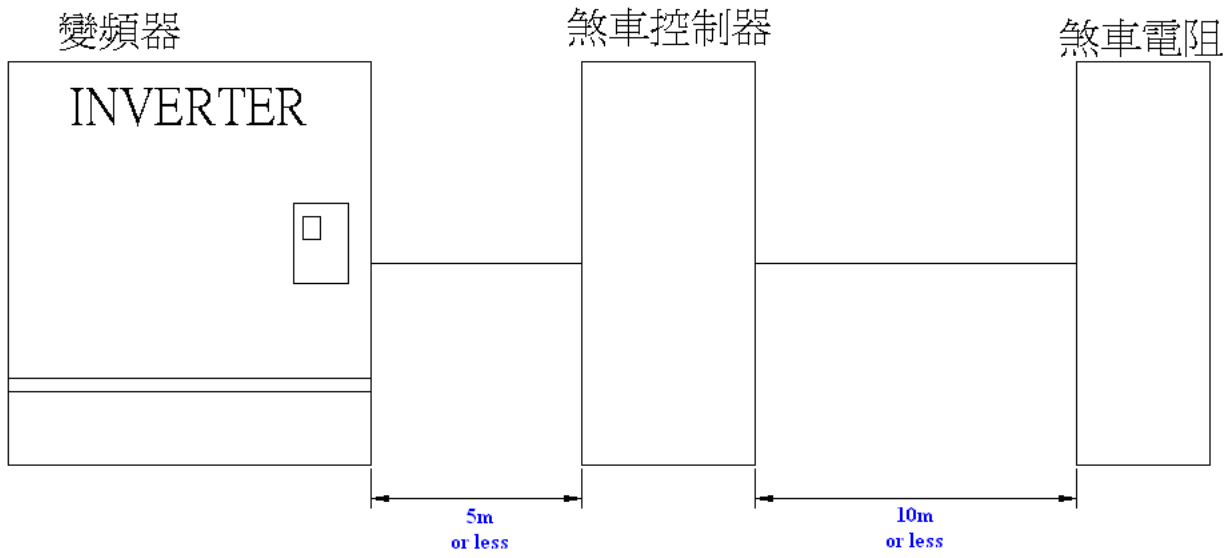
7. 配線

7.1 配線規格

煞車控制器名稱	配線類別	端子台符號	線徑規格 AWG(mm²)	線別	端子台螺絲
TBU-230 TBU-430	主迴路	N(-)，P(+) BR+，BR- ⏚	12-10 (3.5-5.5 mm²)	耐壓 600V，一般塑膠電線或耐熱電線	M4
	控制迴路	SL+ ,SL-, MA+, MA-, OH+, OH-	18-14 (0.75-2 mm²)	耐壓 600V，一般塑膠電線或耐熱電線	M3

7.2 安裝建議

煞車控制器及煞車電阻於放電動作時，易產生噪音，且會產生很高溫度，請參考下列建議安裝距離。

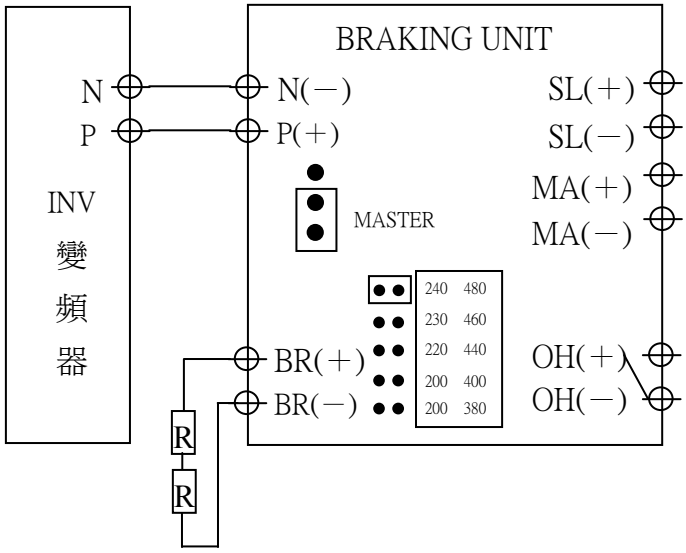


煞車控制器務必做好接地措施，TBU-230 其接地電阻小於 100Ω，TBU-430 其接地電阻小於 10Ω，預防漏電傷及人體，出線端板左下方有 ⏚ 接地端子，用 M4 螺絲固定旋緊。

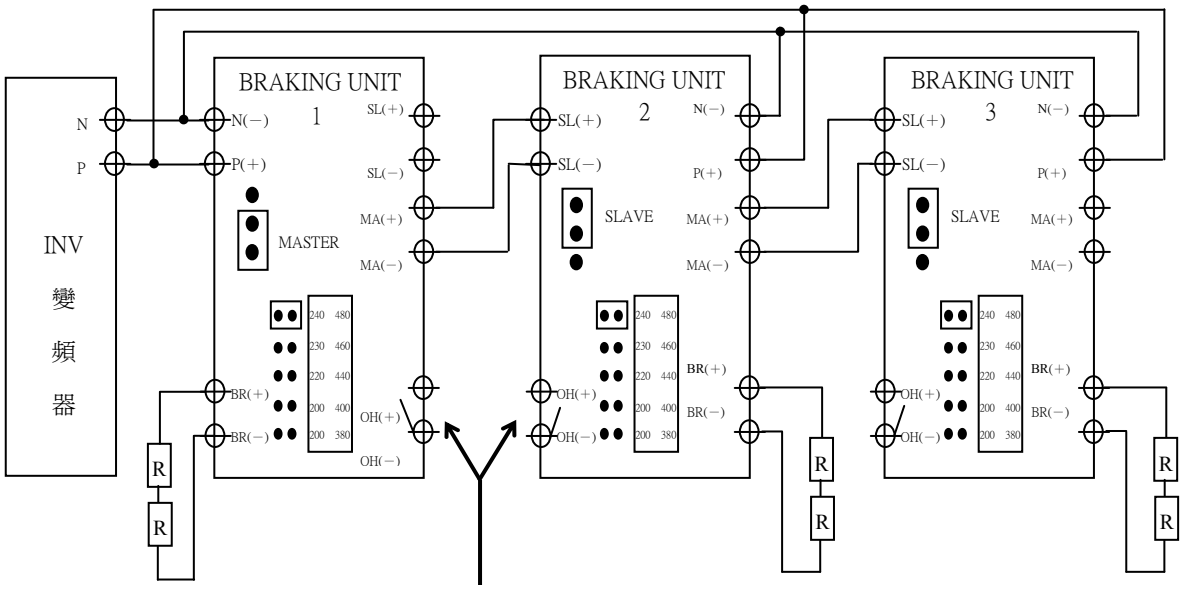
8. 接線圖

煞車控制器可以單台主機(MASTER)模式連接變頻器或可以接多組爲主機+子機(MASTER+SLAVE) 模式連接變頻器，使煞車容量更具彈性化。

8.1連線架構 1 (1台變頻器接1台煞車控制器)



8.2連線架構 2 (1台變頻器接多台煞車控制器)



內部過載過熱接點：

1A/125VAC

2A/30VDC

並列接線範例：

煞車控制器 1 爲主機，JP2 選用 MASTER-COM。

煞車控制器 2 與煞車控制器 3 爲子機，JP2 選用 SLAVE-COM。

可並接多組煞車控制器：煞車制動放電準位皆以主機爲主。

(煞車控制器 1 端子 MA+、MA-接至煞車控制器 2 之端子 SL、SL-

煞車控制器 2 之端子 MA+、MA-接至接至煞車控制器 3 之端子 SL+、SL-)

BR+、BR-接煞車電阻器選擇之標準請參考下列之說明。

JP1 之設定以變頻器輸入電源 AC 之電壓爲標準，對應 JUMP 選用。

8.3 煞車電阻值選定表

選擇電阻值必須照本表所列，不得低於本表之阻值(Ω)，選擇錯誤，將損壞煞車控制器。

變頻器		煞車檢出模組		煞車電阻				最小電阻值*1
電壓	HP	產品型號	並聯個數	產品型號	規範	使用個數	概略煞車轉矩	
220V	15	TBU-230	1	JNBR-2R4KW13R6	2400W/13.6Ω	1	117%(10%ED)	5.5Ω
	20	TBU-230	1	JNBR-3KW10	3000W/10Ω	1	119%(10%ED)	5.5Ω
	25	TBU-230	1	JNBR-4R8KW8	4800W/8Ω	1	119%(10%ED)	5.5Ω
	30	TBU-230	1	JNBR-4R8KW6R8	4800W/6.8Ω	1	117%(10%ED)	5.5Ω
	40	TBU-230	2	JNBR-3KW10	3000W/10Ω	2	119%(10%ED)	5.5Ω
	50	TBU-230	2	JNBR-3KW10	3000W/10Ω	2	99%(10%ED)	5.5Ω
	60	TBU-230	2	JNBR-4R8KW6R8	4800W/6.8Ω	2	117%(10%ED)	5.5Ω
	75	TBU-230	2	JNBR-4R8KW6R8	4800W/6.8Ω	2	98%(10%ED)	5.5Ω
	100	TBU-230	3	JNBR-4R8KW6R8	4800W/6.8Ω	3	108%(10%ED)	5.5Ω
	125	TBU-230	4	JNBR-4R8KW6R8	4800W/6.8Ω	4	113%(10%ED)	5.5Ω
	150	TBU-230	4	JNBR-4R8KW6R8	4800W/6.8Ω	4	98%(10%ED)	5.5Ω

變頻器		煞車檢出模組		煞車電阻				最小電阻值*1
電壓	HP	產品型號	並聯個數	產品型號	規範	使用個數	概略煞車轉矩	
440V	15	TBU-430	1	JNBR-1R6KW50	1600W/50Ω	1	126%(10%ED)	19.2Ω
	20	TBU-430	1	JNBR-1R5KW40	1500W/40Ω	1	119%(10%ED)	19.2Ω
	25	TBU-430	1	JNBR-4R8KW32	4800W/32Ω	1	119%(10%ED)	19.2Ω
	30	TBU-430	1	JNBR-4R8KW27R2	4800W/27.2Ω	1	117%(10%ED)	19.2Ω
	40	TBU-430	1	JNBR-6KW20	6000W/20Ω	1	119%(10%ED)	19.2Ω
	50	TBU-430	2	JNBR-4R8KW32	4800W/32Ω	2	119%(10%ED)	19.2Ω
	60	TBU-430	2	JNBR-4R8KW27R2	4800W/27.2Ω	2	117%(10%ED)	19.2Ω
	75	TBU-430	2	JNBR-6KW20	6000W/20Ω	2	126%(10%ED)	19.2Ω
	100	TBU-430	3	JNBR-6KW20	6000W/20Ω	3	139%(10%ED)	19.2Ω
	125	TBU-430	3	JNBR-6KW20	6000W/20Ω	3	115%(10%ED)	19.2Ω
	150	TBU-430	4	JNBR-6KW20	6000W/20Ω	4	125%(10%ED)	19.2Ω
	175	TBU-430	4	JNBR-6KW20	6000W/20Ω	4	111%(10%ED)	19.2Ω
	215	TBU-430	5	JNBR-6KW20	6000W/20Ω	5	112%(10%ED)	19.2Ω
	250	TBU-430	5	JNBR-6KW20	6000W/20Ω	5	99%(10%ED)	19.2Ω
	300	TBU-430	6	JNBR-6KW20	6000W/20Ω	6	99%(10%ED)	19.2Ω
	350	TBU-430	7	JNBR-6KW20	6000W/20Ω	7	99%(10%ED)	19.2Ω
	375	TBU-430	8	JNBR-6KW20	6000W/20Ω	8	105%(10%ED)	19.2Ω
	400	TBU-430	8	JNBR-6KW20	6000W/20Ω	8	99%(10%ED)	19.2Ω
	425	TBU-430	9	JNBR-6KW20	6000W/20Ω	9	104%(10%ED)	19.2Ω
	500	TBU-430	10	JNBR-6KW20	6000W/20Ω	10	99%(10%ED)	19.2Ω

*1：最小電阻值爲每台煞車檢出模組可連接的最小煞車電阻值。

注意事項

（1）以本公司生產之 A510 變頻器爲例，25HP 以下之煞車電路已設計內藏，不需加裝煞車控制器，僅加煞車電阻即可。

（2）若外加煞車控制器，可多台並聯使用，其具有同等電位同時觸發的功能，不因單台放電能量過大，而發生異常發熱之問題。

9. 故障處理

故障狀況	原　　因	排除方法
變頻器送電之後，於加速、定速中，煞車晶體或煞車控制器動作，造成煞車電阻器發熱	煞車晶體爲內藏型，則爲變頻器內部煞車晶體已故障短路。	1. 修理煞車晶體電路 2. 更換新變頻器
	煞車控制器爲外加型，則煞車控制器內部煞車晶體已故障。	1. 修理煞車控制器 2. 更換新煞車控制器
	JP1 選擇變頻器電壓等級錯誤，電源電壓(AC)必須大於放電電壓準位。	將 JP1 之 Jump 調到和變頻器輸入側相同電壓。
	輸入側電壓太高，未減速即行放電。	改善電源品質。
變頻器發生跳機顯示 O.V(過電壓)	煞車電阻值容量不足	1. 檢查煞車能量重新選擇煞車控制器 2. 在減速可允許延長之下，可延長減速時間，則可改善
	配線錯誤	再次檢查確認
	煞車控制器故障	更換新煞車控制器
煞車控制器因過熱而跳機	啓動/停止放電次數太頻繁	重新檢查操作條件
	慣性太大	
	煞車控制器、煞車電阻匹配錯誤	依照本手冊重新選擇
	周圍溫度超過 40℃以上	重新安裝，改善環境。

※ 任何煞車控制器技術問題請洽本公司各地經銷商或本公司解決。

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