

DBU 系列煞車模組控制器說明書

1. 注意事項

感謝您選用九德松益公司生產之 DBU 系列煞車模組控制器。本產品主要應用於當三相感應馬達由交流馬達驅動器所驅動，在減速停止時用以吸收由馬達側所回生的能量。藉由 DBU 系列煞車模組控制器將此能量以熱能的方式消耗在煞車電阻上。本產品在安裝使用前，請依照此說明書進行施工配線，以免造成機械或人員的傷害。DBU 系列煞車模組控制器適用九德松益公司生產之交流馬達驅動器。DBU 系列煞車模組控制器需搭配煞車電阻 BR 系列，才能發揮優異的制動特性，詳細的規格及使用方法請繼續參閱本說明書。當內容規格有所修正時，請洽詢代理商或至九德松益公司 (<http://www.cutes.com.tw/>) 下載最新版本。

2. 規格

DBU 煞車模組控制器規格

煞車電阻規格

適用電動機功率(kw)	11	22	22	45	220V系列	煞車電阻	380V系列	煞車電阻
電壓	220V	220V	380V-460V	380V-460V	1HP	200Ω 120W	1HP	750Ω 120W
型號	DBU302-011	DBU302-022	DBU304-022	DBU304-045	2HP	100Ω 200W	2HP	390Ω 220W
額定輸出電流(A)	30	60	30	60	3HP	65Ω 320W	3HP	160Ω 120W
輸入電壓	DC310±10%		DC540±10%		5HP	40Ω 540W	5HP	260Ω 320W
每台等效最小電阻	13Ω	6.5Ω	26Ω	13Ω	7.5HP	26Ω 800W	7.5HP	105Ω 800W
連續煞車時間	10秒				10HP	20Ω 1000W	10HP	78Ω 1200W
保護功能	過熱				15HP	13Ω 1600W	15HP	52Ω 1600W
標高限制	屋內、標高1000m以下，無腐蝕性氣體、液體、粉塵				20HP	10Ω 2200W	20HP	40Ω 2200W
操作環境溫度	-10度C~50度C				30HP	6.5Ω 3200W	30HP	26Ω 3200W
儲存環境	-20度C~60度C				40HP	4.8Ω 4500W	40HP	40Ω 4300W
振動	0.6G 以下				50HP	3.9Ω 5500W	50HP	16Ω 5500W
濕度	45%以上，90%以下(不結露場所)				60HP	3.3Ω 6400W	60HP	13Ω 6400W
保護結構	散熱鋁片				75HP	2.6Ω 8000W	75HP	11Ω 8000W
重量(Kg)	1.6				100HP	2Ω 11000W	100HP	7.8Ω 11000W

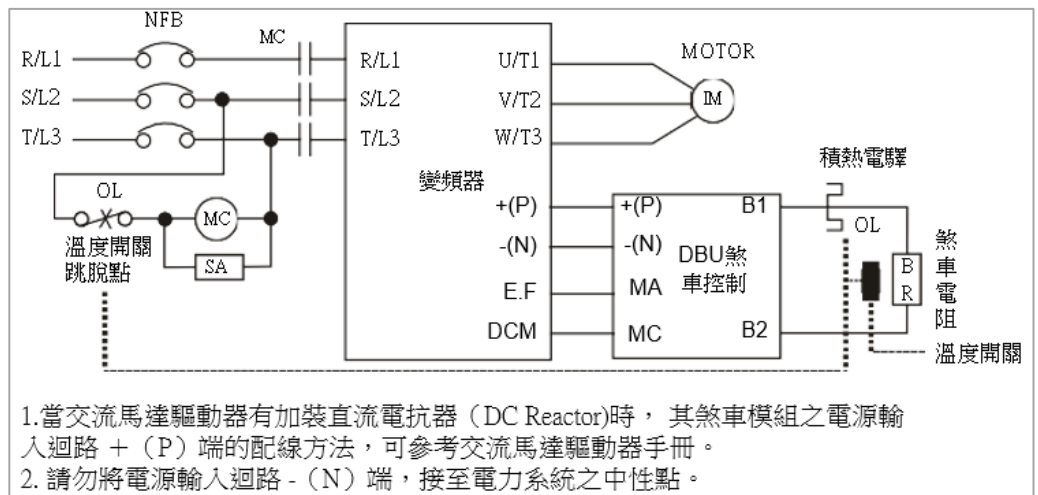
動作說明：

1. 在安裝 DBU 系列煞車模組控制器的應用中為了安全的考量，在 DBU 系列煞車模組控制器與煞車電阻之間加裝一積熱電驛 (O.L)；並與交流馬達驅動器前端的電磁接觸器 (MC) 作一連鎖的異常保護。

2. 加裝積熱電驛的主要目的是為了保護煞車電阻不因煞車頻繁過熱而燒毀，或是因輸入電源電壓異常過高導致制動單元連續導主動/連動設定端子通燒毀煞車電阻。此時只有將交流馬達驅動器的電源關閉才可避免煞車電阻燒毀。

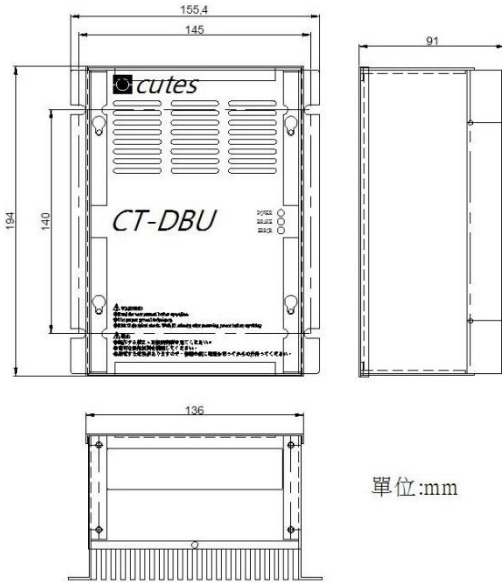
3. 積熱電驛規格的選用請參考 DBU 系列煞車模組控制器與放電電阻適用一覽表。

4. 制動單元中的故障輸出端子 (RC、RA、RB) 在散熱裝置溫度高於 95°C 時會動作，表示安裝環境溫度可能超過 50°C 以上，或是 DBU 系列煞車模組控制器 ED% 超過 10ED%；若是此類的故障請自行加裝風扇強制風冷或改善環境溫度。若非溫度原因，可能控制電路受損或溫度感測器故障，此時請送廠維修。

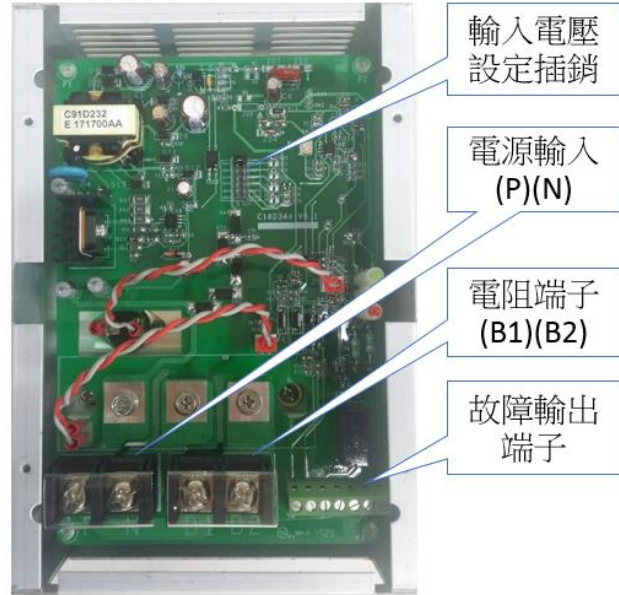


5. 本配線電路在電源開關 (NFB) 開啟時交流馬達驅動器與 DBU 系列煞車模組控制器便同時通上電源，馬達的運轉／停止的方式請參考變頻器系列的使用手冊；DBU 系列煞車模組控制器單元會在交流馬達驅動器對馬達作減速煞車時自動偵測交流馬達驅動器內部的直流電壓，自動將過多的再生能量藉由煞車電阻以熱能的方式迅速消耗 BR 煞車電阻以達平穩的減速特性。
6. 除了使用積熱電驛作為保護系統及煞車電阻外，尚可加裝溫度開關於 煞車電阻端作為保護。溫度開關的動作溫度需配合制動煞車規格，或洽詢經銷商詢問。

尺寸



功能說明

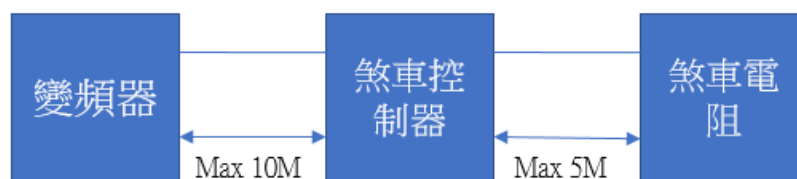


端子及電源電壓的選擇與 PN 直流電壓的動作準位

回路名稱	端子記號	220V 級 AC 電源電壓	制動開始電壓+ (P) - (N) 母線 DC 電壓	460V 級 AC 電源電壓	制動開始電壓+ (P) - (N) 母線 DC 電壓
電源輸入回路	+ (P) - (N)				
煞車電阻回路	B1、B2	190Vac	330Vdc	380Vac	660Vdc
運動回路	輸入	200Vac	345Vdc	400Vac	690Vdc
		210Vac	360Vdc	415Vac	720Vdc
	輸出	220Vac	380Vdc	440Vac	760Vdc
		230Vac	400Vdc	460Vac	800Vdc
故障回路	MA、MB、MC	240Vac	415Vdc	480Vac	830Vdc

配線注意事項:

- 進行配線施工時務必確認相關回路電源均為關閉狀態；配線的線徑及距離亦務必按照規定選用及施工。
- 交流馬達變頻器連接至煞車控制器 (DBU) 的+ (P)、- (N) 端子有極性之分，千萬要確認再確認，否則電源一開啟制動單元立即炸毀，請務必注意。
- 煞車控制器 (DBU) 在執行煞車時，+ (P)、- (N)、B1、B2 因有大電流通過所連接的導線瞬間將產生能量很大的電磁場；故在初期配線施工規劃時，應與其它低電壓的控制線路分離配線，以免造成不必要的干擾或誤動作。
- 煞車電阻安裝的場所不能有任何易燃性的物體、氣體、液體，最好能安裝在獨立的金屬箱內並加以風扇散熱。
- 在減速煞車頻繁的場合 (超過 10ED) 煞車電阻請加裝風扇強制風冷或其它冷卻設備。
- 所有的主回路端子請使用 O 型端子配線，並確認端子已鎖緊方可送電運行。
- 在通電中嚴禁修改任何配線及制動單元內部設定，更嚴禁在通電中碰觸相關配線的端子及 PCB 板中的任一元件，以免因通電中遭極度危險的直流高壓感電造成人員傷害。

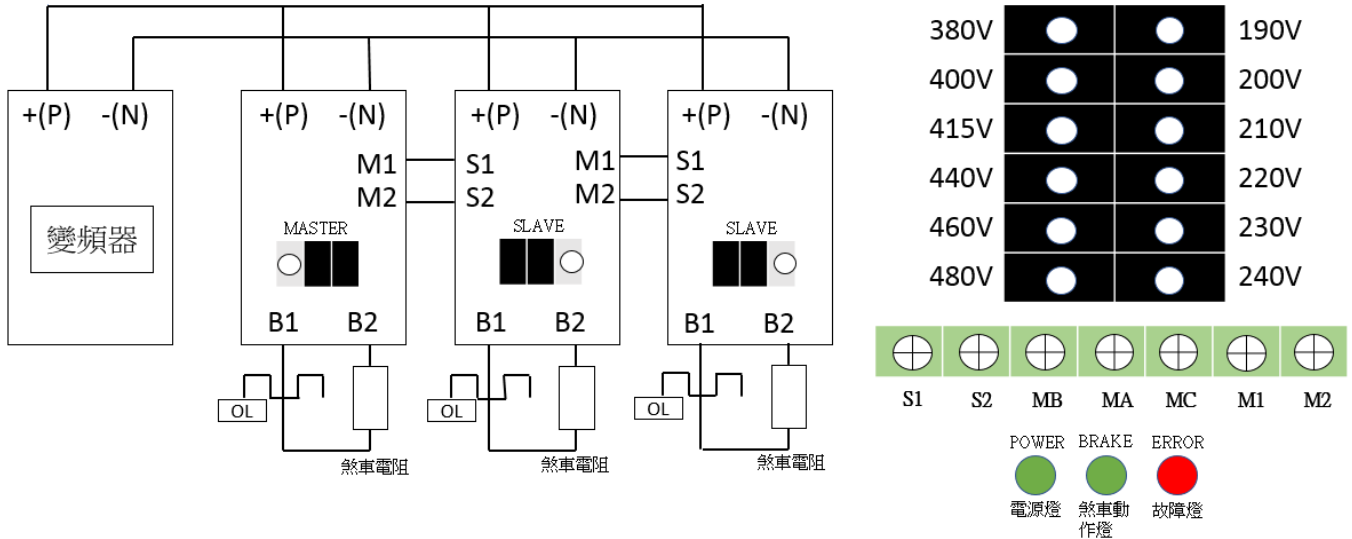


設定和調整

1. 電源電壓的調整：煞車控制器（DBU）的電力來源是接受交流馬達變頻器+ (P)、- (N)兩端供應的直流電源。因此在配線完成準備運轉時，依交流馬達變頻器的輸入電源來設定煞車控制器（DBU）的電源電壓是非常重要的步驟；此設定將會影響煞車控制器（DBU）動作電壓的位準，表(端子及電源電壓的選擇與 PN 直流電壓的動作準位)為各個電壓動作準位。

2. 主動/連動的設定：煞車控制器（DBU）在出廠時均設定在“MASTER”主動煞車的位置。“SLAVE”連動位置的功能主要是應用於兩台

以上煞車控制器（DBU）並聯組合的應用，可使每一台煞車控制器（DBU）同時動作同時截止，如此每一台的消耗功率均為相等充份發揮每台的制動功能。



Dynamic Braking Unit Installation Manual

1. Preface

Thank you for choosing CUTES's braking module. DBU30 braking unit helps dissipate regenerative energy from the three-phase induction motor when in applications that required sudden deceleration. With DBU30 Braking Unit, the regenerative energy will be dissipated in dedicated braking resistor. To prevent electrical fire or human injury, follow the instruction manual before wiring. The DBU30 braking unit is designed for use with the CUTES's VFD models. The Braking Resistor is designed for use with DBU30 braking unit (Refer to this manual for more information). When ordering new copies of the manual, contact a CUTES representative or download on our documentation website (<http://www.cutes.com.tw/>) .

2. Specifications

DBU Braking Unit Selection

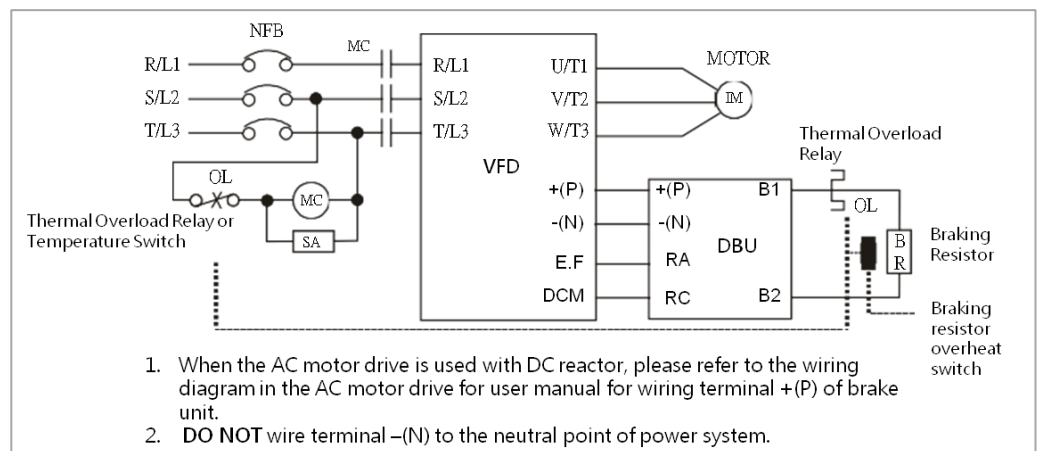
Applicable Motor Output Capacity(KW)	11	22	22	45
Voltage Class	220V		380V~460V	
Model Number	DBU302-011	DBU302-022	DBU304-022	DBU304-045
Rated Output Current(Amps)	30	60	30	60
Nominal S _n (KVA)	11	22	11	22
Power Supply (VDC)	DC310 ± 10%		DC540 ± 10%	DC620 ± 10%
Min. Equivalent Resistor for each Braking Unit	13Ω	6.5Ω	26Ω	13Ω
Continuous Braking time	10 seconds			
Protection	Overheat Alarm Output			
Installation Location	Indoor · Above 1000m , Free from corrosive gases ,liquids and dust			
Operation Temperature	-10°C~50°C			
Storage Temperature	-20°C~60°C			
Vibration	Above 0.6G			
Humidity	90% RH or less and free of condensation			
Overheat Protection	Heatsink			
Weight	1.6 KG			

Braking Resistor Selection

220V Series	Braking Resistor	380V Series	Braking Resistor
1HP	200Ω 120W	1HP	750Ω 120W
2HP	100Ω 200W	2HP	390Ω 220W
3HP	65Ω 320W	3HP	160Ω 120W
5HP	40Ω 540W	5HP	260Ω 320W
7.5HP	26Ω 800W	7.5HP	105Ω 800W
10HP	20Ω 1000W	10HP	78Ω 1200W
15HP	13Ω 1600W	15HP	52Ω 1600W
20HP	10Ω 2200W	20HP	40Ω 2200W
30HP	6.5Ω 3200W	30HP	26Ω 3200W
40HP	4.8Ω 4500W	40HP	40Ω 4300W
50HP	3.9Ω 5500W	50HP	16Ω 5500W
60HP	3.3Ω 6400W	60HP	13Ω 6400W
75HP	2.6Ω 8000W	75HP	11Ω 8000W
100HP	2Ω 11000W	100HP	7.8Ω 11000W

Operation Explanation :

- For safety consideration, install an overload relay between the braking unit and the braking resistor. In conjunction with the magnetic contactor (MC) prior to the drive, it can perform complete protection against abnormality.
- The purpose of installing the thermal overload relay is to protect the braking resistor

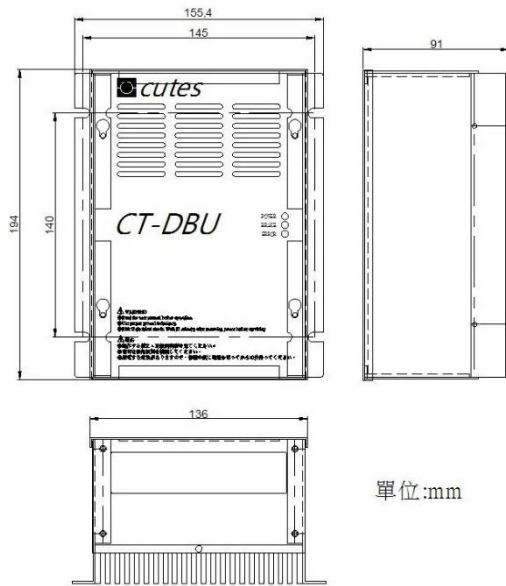


- from damage due to frequent braking, or due to braking unit keeping operating resulted from unusual high input voltage. Under such circumstance, just turn off the power to prevent damaging the braking resistor.
- Please refer to the specification of the thermal overload relay.
- The alarm output terminals (RA, RC) of the braking unit will be activated when the temperature of the heat sink exceeds 95°C. It means that the temperature of the installation environment may exceed 50°C or the braking %ED may exceed 10%ED.

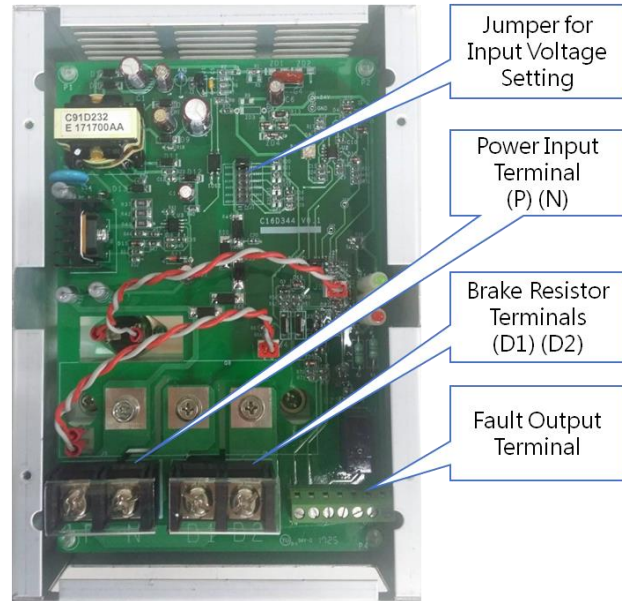
With this kind of alarm, please install a fan to force air-cooling or reduce the environment temperature. If the condition isn't due to the temperature, the control circuit or the temperature sensor may have been damaged. At this time, please send the braking unit back to the manufacturer or agency for repair.

- The AC Motor Drive and braking unit will be electrified at the same time while turning on the NFB (No-fuse breaker). For the operation/stop method of the motor, please refer to the user manual of the AC Motor Drives VFD Series. The braking unit will detect the inner DC voltage of the AC motor drive when it stops the motor by deceleration. The extra regeneration will be dissipated away rapidly by the braking resistor in the form of heat. It can ensure the stable deceleration characteristic.
- Besides using thermal overload relay to be the protection system and braking resistor, temperature switch can be installed on braking resistor side as the protection. The temperature switch must comply with the braking resistor specification or contact your dealer.

Dimension



DBU Braking Unit Front View

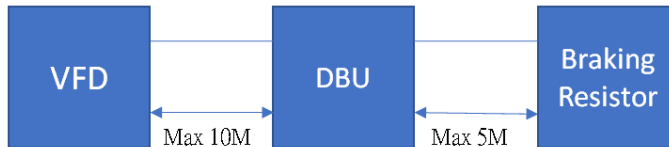


Terminal No./ The Selection of Power Voltage and Braking Voltage Activation Level

Circuit	Terminal No.	220V Class AC Power Voltage	Braking Voltage Activation Level	460V Class AC Power Voltage	Braking Voltage Activation Level
Power Input Circuit	+ (P) · - (N)				
Braking Resistor	D1 · D2	190Vac	330Vdc	380Vac	660Vdc
		200Vac	345Vdc	400Vac	690Vdc
Master/Slave Circuit	Input	SLAVE	210Vac	360Vdc	415Vac
		MASTER	220Vac	380Vdc	440Vac
	Output	230Vac	400Vdc	460Vac	800Vdc
Fault Circuit	MA · MB · MC	240Vac	415Vdc	480Vac	830Vdc

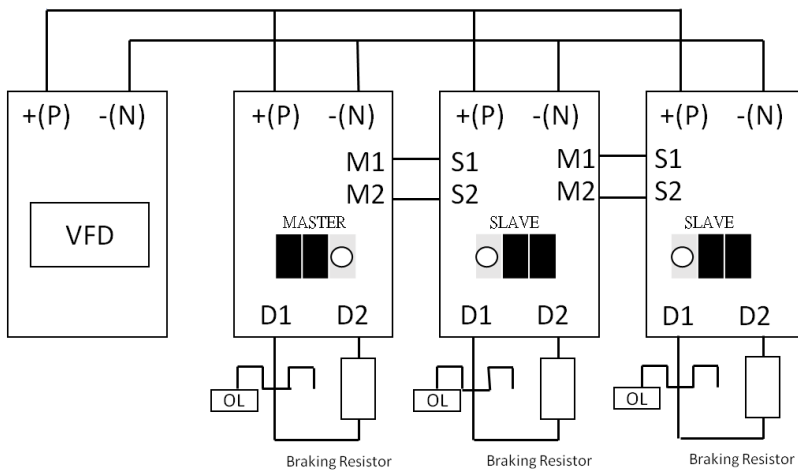
Wiring Notice:

- Do not proceed with wiring while power is applied to the circuit. The wiring gauge and distance must comply with the electrical code
- The +(P), -(N) terminals of the AC motor drive (VFD Series), connected to the braking unit (VFDB), must be confirmed for correct polarity lest the drive and the braking unit be damaged when power on.
- When the braking unit performs braking, the wires connected to DC+, DC-, B1 and B2 would generate a powerful electromagnetic field for a moment due to high current passing through. These wires should be wired separately from other low voltage control circuits lest they make interference or mis-operation.
- Inflammable solids, gases or liquids must be avoided at the location where the braking resistor is installed. The braking resistor had better be installed in individual metallic box with forced air-cooling.
- Please install the braking resistor with forced air-cooling or the equivalent when frequent deceleration braking is performed (over 10%ED).
- The ring terminals are suggested to be used for main circuit wiring. Make sure the terminals are fastened before power on.
- To prevent personal injury, do not connect/disconnect wires or regulate the setting of the braking unit while power on. Do not touch the terminals of related wiring and any component on PCB lest users be damaged by extreme dangerous DC high voltage.

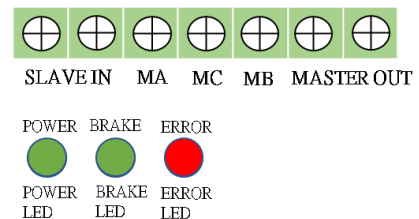


Setting and Confirming DBU30 Braking Unit Operation

1. Regulation of power voltage: The power source of the DBU is DC voltage from +(P) - (N) terminal of the AC motor drive. It is very important to set the power voltage of the braking unit based on the input power of the AC motor drive before operation. The setting has a great influence on the potential of the operation voltage for the braking unit. Refer to the table().
2. MASTER/SLAVE setting: The MASTER/SLAVE jumper is set "MASTER" as factory setting. The "SLAVE" setting is applied to two or more braking units in parallel, making these braking units been enabled/disabled synchronously. Then the power dissipation of each unit will be equivalent so that they can perform the braking function completely.



380V			190V
400V			200V
415V			210V
440V			220V
460V			230V
480V			240V



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