YDBU Brake Unit Series

■Preface

Thank you for choosing the YDBU series brake unit developed and produced by YOLICO Electric.

The YDBU series brake unit utilizes advanced power electronics control technology, with the core control part employing industrial-grade microprocessors and the main switching device utilizing high-performance, next-generation IGBTs, providing excellent control performance and high operational reliability. This series of products can be widely applied to various equipment such as elevators, cranes, hoists, centrifuges, etc., and functions as a brake when paired with a frequency converter.

This manual provides some usage information on the installation, operation, and maintenance of the YDBU series brake unit. To ensure correct installation and operation of the DBU series brake unit, please be sure to read this manual carefully before installation and fully understand the safety precautions outlined therein.

■Confirm the product received

When unpacking, please carefully confirm the following:

- Is the product damaged;
- Is the nameplate identification of this machine consistent with the specifications you ordered.

If any issues are found, please promptly contact our company or the corresponding supplier for resolution.

 Attention
If the product is found damaged during transportation during the unpacking inspection,

do not install or use it to avoid danger.

■Explanation of symbols related to safety

Danger

Indicates matters that may pose a threat to the user's safety if not handled according to instructions.

Attention

Indicates an item that may cause damage to equipment or render the product inoperable if not taken care of.

Important

Although there will be no serious consequences, there are still matters that users need to pay attention to and comply with.

Chapter 1 Safety Precautions

1.1 Installation precautions

Danger
• The brake unit must be installed on a non-combustible metal base plate to prevent fires
Attention
• When handling, please support the bottom of the brake unit; • It should be ensured that debris from drilling does not enter the brake unit, to prevent internal short circuits and subsequent equipment malfunctions; • If it needs to be installed inside the control cabinet, it should be ensured that the internal temperature of the control cabinet is not higher than 45℃ and that there is good ventilation

1.2 Precautions for wiring

Danger
• During installation and wiring, it is necessary to power off the brake unit and other connected equipment such as the frequency converter, wait for 5-10 minutes, and confirm that the stored electricity in the internal capacitors of all relevant equipment has been discharged before proceeding with the operation;

• The grounding terminal of the brake unit must be reliably grounded

Attention

• The positive and negative poles of the DC busbar of the brake unit cannot be connected reversely; otherwise, it will fail to operate or even cause damage to the brake unit itself and related equipment

• The control circuit board inside the brake unit utilizes CMOS integrated circuits, which should be avoided touching with hands as much as possible;

• Do not perform any wiring while the equipment is running

1.3 Operation precautions

Danger

• After being powered on, various components inside the brake unit carry dangerous high voltage, so direct human contact should be avoided

Attention

• Avoid dropping metal items such as screws and gaskets into the brake unit, as this may pose a risk of equipment damage;

• Ensure that the chassis cover is properly closed during use

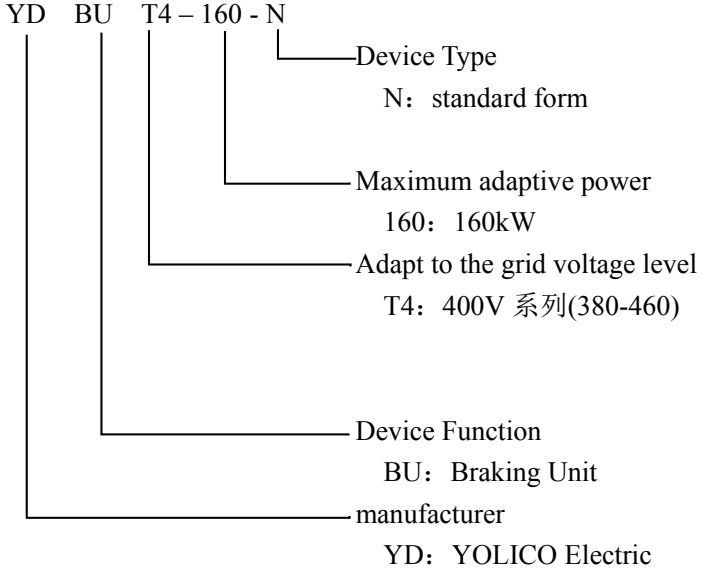
1.4 Others

 Danger
• The brake unit has undergone rigorous testing before leaving the factory. Unless necessary, please do not perform insulation testing on the equipment to avoid damaging it due to misoperation; • Scrapped machinery should be disposed of as industrial waste, and incineration is strictly prohibited, as it may pose an explosion hazard
 Attention
• Do not make any modifications to the equipment, as this may cause damage to the equipment or even pose a danger; • Wiring, operation, and maintenance tasks must be carried out by designated personnel with professional qualifications

Chapter 2 Product Specifications and Models

2.1 Product model and specification

1. Model naming convention



2、Product model rule for 400V voltage level

model	Specification Model	inverter power	average current (A)	Maximum current (A)	operating voltage (V)	Minimum load resistance (Ω)
standard load	YDBUT4-160N	L：160~185 H：132~160	97A	194A	700	4
	YDBUT4-250N	L：200~280 H：185~250	144A	288A	700	2.7
	YDBUT4-355N	L：160~185 H：280~355	216A	432A	700	1.8

note：

（1）The models with the "N" suffix are standard models, featuring forced air cooling via a fan and keyboard parameter display;

2.2 Product Technical Specifications

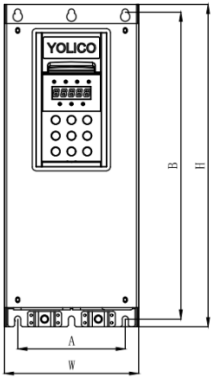
project		specification
power supply	grid voltage	400V±20%
	grid frequency	45Hz~65Hz
control	Braking method	Hysteresis control based on DC bus voltage detection
	Action Time	≤1mS
	Operating voltage setting	The action voltage can be set arbitrarily via the keyboard (-N standard type)
	Operating voltage range	400Vmodel：600~760V
	voltage hysteresis	400Vmodel：≤15V
	cooling method	Natural convection cooling or forced air cooling, depending on the model
	protection function	Overheating, overcurrent, short circuit, etc
	overheating action	When the internal radiator reaches P2-02 (default 105℃), the overheat protection action is triggered
	master-slave setting	master-slave setting
	fault output	250V/3A normally open/normally closed contact output
	status indicator	Monitoring, parameters, ready, braking, alarm
	monitor	Display the current DC bus voltage and radiator temperature
environment	installation site	Indoors, at an altitude of <1000m, without direct sunlight, conductive dust, or corrosive gases
	ambient temperature	-10~40℃, with good ventilation

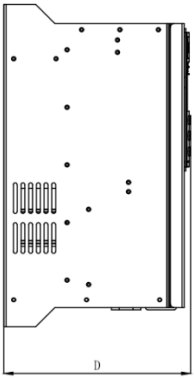
	ambient humidity	Below 90%RH (non-condensing)
	vibration degree	Within 1.0G, <20Hz; within 0.2G, 20 ~50 Hz

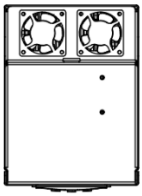
Table 2.2 Product Technical Specifications

2.3 Product installation dimensions

2.3.1 Overall dimensions of YDBU series brake unit







model	A （mm）	B （mm）	H （mm）	W （mm）	D （mm）	mounting hole （mm）
YDBUT4-160N	140	400	420	175	243.2	8
YDBUT4-250N	140	400	420	175	243.2	8
YDBUT4-355N	140	400	420	175	243.2	8

Chapter 3: Product Installation Guide

3.1 Wiring of brake unit

3.1.1 Terminal arrangement of YDBU series low-power brake unit

The terminal arrangement of the YDBU series low-power brake unit is shown in the figure below. Among them, +/- represents the DC busbar wiring terminal, and +/BR represents the brake resistor wiring terminal

The control terminals DI1/DI2, which are the input terminals of the frequency converter, can be set to the following three functions through parameter P3-00

1: Brake operation signal (valid for slave machine)

2: Fault reset input

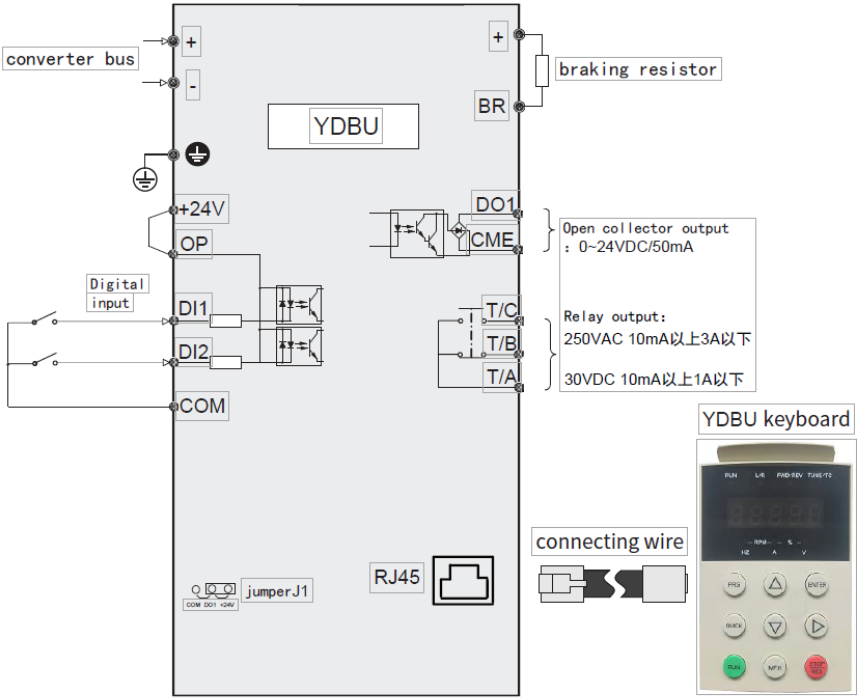
3: External fault input

The control terminal DO1, which is the output terminal of the frequency converter, can be set to perform the following two functions through parameter P3-03

1: Brake output signal (valid for the host)

2: Fault output signal

The control terminals TA/TB/TC are fault output contact wiring terminals, where terminal TA is the common terminal, TC is the normally open contact, and TB is the normally closed contact. When the YDBU series brake unit overheats due to excessive load and enters overheat protection, the brake unit stops working, and simultaneously, the normally open contact connects to the common terminal, while the normally closed contact disconnects from the common terminal.



⚠ Attention

To prevent overvoltage due to the inverter continuing to operate after the brake unit has activated its overheat protection, it is necessary to correctly utilize the fault contacts of the brake unit. It is recommended to connect the normally open contacts TA and TB of the brake unit to the external fault input terminals of the inverter, ensuring

that when the brake unit activates its overheat protection due to excessive load, the inverter simultaneously detects the fault signal and stops operating.

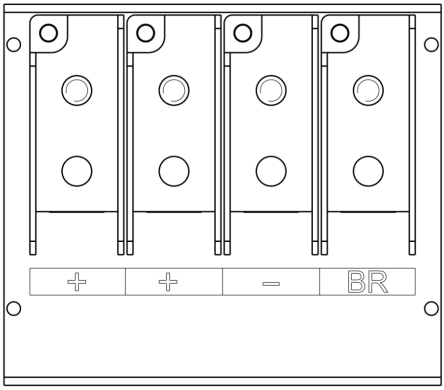
⚠ Attention

When brake units are used in parallel, the master-slave working mode of each brake unit should be correctly set, and the parallel control terminals of each brake unit should be connected via twisted-pair cables to ensure that all brake units work simultaneously. Otherwise, overheating protection may be triggered in the brake unit with a heavier load due to uneven current distribution among the brake units.

When used in parallel, only one brake unit must be set as the master mode, with the rest set as slave mode. It is not allowed to have multiple units set as master mode or all set as slave mode, otherwise the brake units may not work properly.

3.1.2 Terminal arrangement of YDBU series brake unit

The terminal arrangement of the YDBU series brake unit is shown in the figure below.

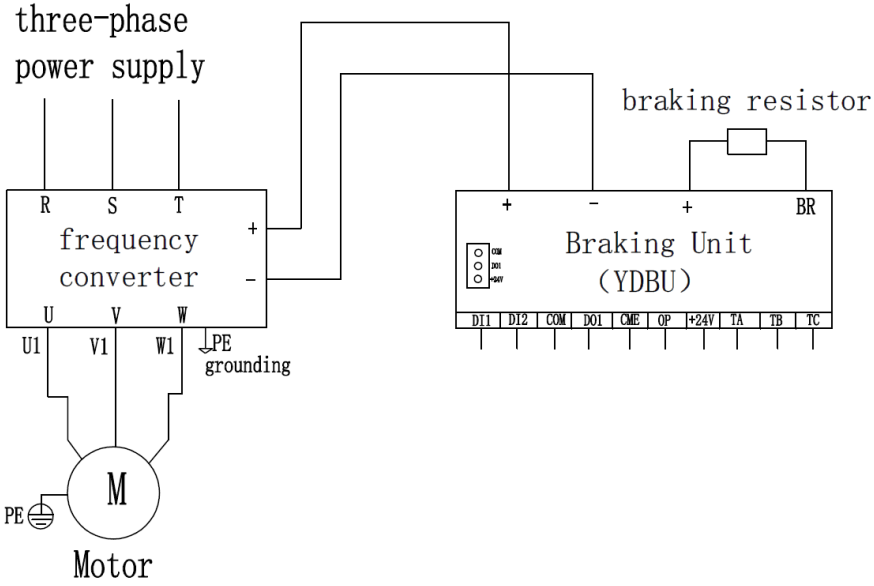


(Figure 3.2) Terminal arrangement of YDBU series brake unit

3.1.4 Main circuit wiring method

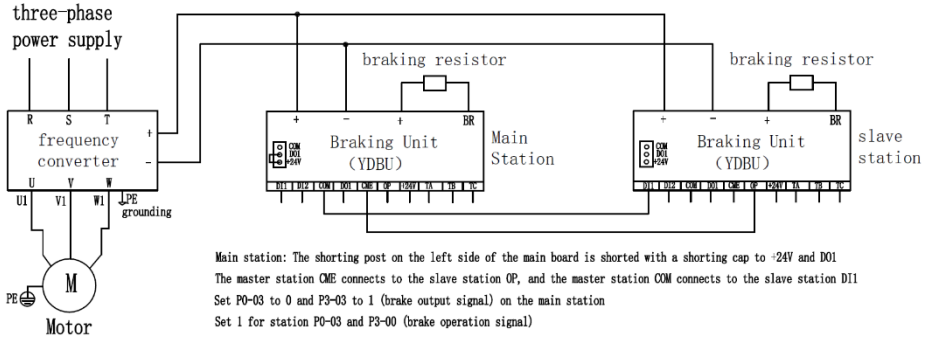
The following figure is a typical application wiring diagram for connecting a YDBU series brake unit to a frequency converter. In this actual application system, one frequency converter is used to drive one motor. The brake unit is connected to the corresponding brake resistor according to its capacity

The figure shows the typical application of the YDBU series brake unit with a voltage level of 400V.



Connection between YDBU series brake unit and frequency converter

3.1.5 Master-Slave Control Connection



⚠ Attention

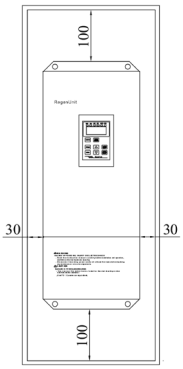
When wiring, attention should be paid to the polarity of the DC input terminals "+", "-" of the brake unit. If the polarity is reversed, it may result in equipment damage or even pose a fire hazard.

⚠ Attention

To prevent harm to the human body caused by electric leakage, the grounding terminal of the brake unit should be reliably grounded.

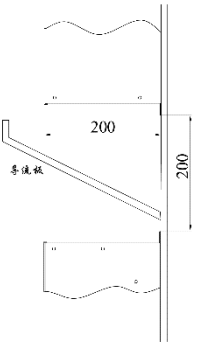
3.2 Product installation requirements

All brake units should be installed vertically on the wall or the back panel of the control cabinet. Since the brake unit itself generates heat, users must consider ventilation, heat dissipation, and personal safety during installation. Sufficient space should be left around the brake unit, with a minimum ventilation space of 100mm up and down and 30mm left and right.



(Figure 3.5) Installation space requirements for YDBU series brake units

If multiple brake units need to be installed in an up-down arrangement, the vertical distance between two brake units should be at least 200mm, and a flow guide baffle should be added to prevent the heat generated by the lower brake unit from affecting the upper one. The installation method is shown in the figure below.

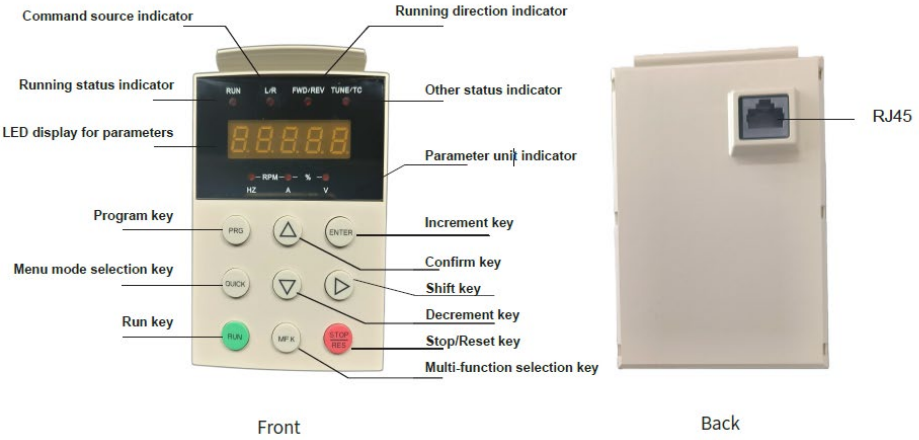


(Figure 3.6) Schematic diagram of installing two brake units one above the other

Chapter 4: Product Operation Panel

4.1 Appearance of LED operation panel

For user convenience, our YDBU series brake unit is equipped with an operation panel on high-power standard products. The operation panel consists of three parts: status indicator lights, digital display tubes for data display, and operation buttons. The appearance and layout are shown in the figure below.



4.2 Description of status indicator lights

indicator light	Function Description
RUN	Working status indication: This light is on to indicate that it is currently in working status
A	The parameter viewing status indication indicates that the current state is for current viewing
V	The parameter viewing status indicator indicates that the current state is voltage viewing

Table 4.1 Indicator Light Function Table

4.3 LED display instructions

The four or five LED data tubes on the keyboard display area are used for data display, and their display content varies according to the current display status.

When in operation monitoring mode, the digital display shows the current monitored parameter number or the corresponding parameter content; when in parameter viewing mode, the digital display shows the currently selected setting parameter number or its content.

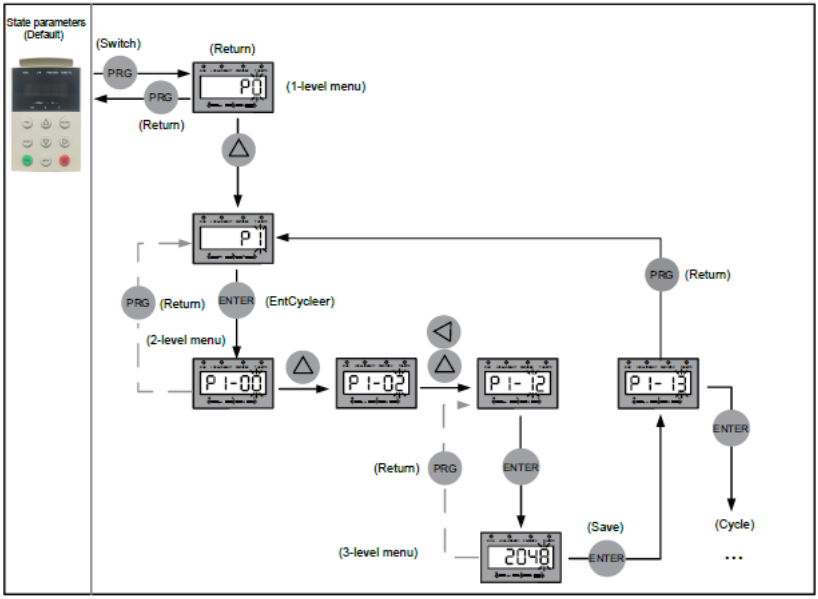
4.4 Description of button functions

Key	Key Name	Function
	Programming	● Enter or exit Levell menu. ●Return to the previous menu.
	Decrement	●Enter each level of menu interface ●Confirm displayed parameter setting
	Increment	●When navigating a menu, it moves the selection up through thescreens available. ●When editing a parameter value, it increases the displayed value. ●When the AC drive is in RUN mode, it increases the speed.
	Decrement	●When navigating a menu, it moves the selection down through the screens available. ●When editing a parameter value, it decreases the displayed value ● When the AC drive is in RUNNING mode, it decreases the speed.
	Shift	●Select the displayed parameter in the STOP or RUNNING status.Select the digit to be modified when modifying a parameter value

	RUN	●Start the AC drive when using the operating panel control modeIt is inactive when using the terminal or communication control mode.
	Stop/Reset	●Stop the AC drive when the drive is in the RUNNING status
	Multifunction	reserve
	Menu mode selection	reserve

4.5 Common keyboard operations

Parameter View：



The parameter groups are classified into the following categories

parameter group	Function Name	Instructions
U0-XX	monitoring parameters	read-only
P0-XX	Basic Parameters	
P1-XX	Record parameters	read-only
P2-XX	protection parameters	
P3-XX	terminal parameters	Parallel operation or terminal function selection

4.6 Description of parameter groups

parameter	parameter name	parameter range	default value	unit	Change method	Instructions
Group P0						
P0-00	Braking initiation voltage	P0-01~730.0V	670.0V	V	Real-time effect	Braking starts when the bus voltage exceeds this set value
P0-01	Braking stop voltage	620V~P0-00	650.0V	V	Real-time effect	Stop braking when the bus voltage falls below this set value
P0-02	braking rate	30%~100%	100%	%	Real-time effect	Braking rate during

	setting					braking
P0-03	master-slave configuration	0: Master 1: Slave	0	-	Real-time effect	Choose whether the working mode is as a master or a slave
P0-04	Continuous braking time limit	0~65535s	0	s	Real-time effect	Set continuous braking time limit, 0 to disable limit
P0-05	Restore factory settings	0: Do not restore 1: Restore user parameters (P0, P2, P3) 2: Clear record information (P1) 2222: Restore all parameters (P0-PF)	0	-	shutdown modification	Be cautious when restoring all parameters

P0-06	Fan control method	0: Operates when the brake is working or when the temperature is above 42 degrees 1: The fan keeps running	0	-	Real-time effect	When set to 0, the temperature dead zone is 2 degrees
P0-07	Load shedding protection selection	0: Invalid 1: Valid	1	-	Real-time effect	If the load shedding protection is selected as effective, when the braking starts to work, the current is less than the load shedding detection level P0-08, and the duration is
P0-08	Drop-load detection level	0%~100.0%	10.0%	%	Real-time effect	
P0-09	Drop detection time	0-60.0s	1.0s	s	Real-time effect	

						greater than the load shedding detection time P0-09, a load shedding alarm will be generated.
Group P1						
P1-00	software version number	-	-	-	read-only parameter	Manufacturer's software version number, with two decimal points
P1-01	Recent four fault messages	-	-	-	read-only parameter	The recent four fault messages: the units digit represents the latest fault code, the tens

						digit represents the previous fault code, and so on;
P1-02	Bus voltage during fault	-	-	V	read-only parameter	The bus voltage at the time of the most recent fault
P1-03	fault current	-	-	A	read-only parameter	The current at the time of the most recent fault
P1-04	Braking rate during fault	-	-	%	read-only parameter	Braking rate (duty cycle) at the time of the most recent fault
P1-05	Module temperature during fault	-	-	℃	read-only parameter	Module temperature at the time of the most recent fault

P1-06	Unit status during fault	-	-	-	read-only parameter	The unit status at the time of the most recent failure bit0：DI1 bit1：DI2 bit2：DO bit3: fan bit4: relay bit5: Brake Input/Output bit6: Braking in operation
P1-07	Accumulated power-on time - seconds	0-65535	-	s	read-only parameter	-
P1-08	Accumulated power-on time - hours	0-65535	-	h	read-only parameter	-
P1-09	Accumulated running time - seconds	0-65535	-	s	read-only parameter	-
P1-10	Accumulate	0-65535	-	h	read-only	-

	d running time - hours				parameter	
Group P2						
P2-00	overvoltage setting	650.0V~840.0V	820.0V	V	Real-time effect	An alarm is triggered for overvoltage when the bus voltage exceeds the set value
P2-01	Undervoltage setting value	210.0V~420.0V	350.0V	V	Real-time effect	Bus voltage is lower than the set value, alarming for undervoltage
P2-02	overheat setpoint	85~120℃	105	℃	Real-time effect	Alarm for overheating when the temperature exceeds the set value
Group P3						

P3-00	DI1 function setting	0: No function 1: Brake operation signal (valid from the slave unit) 2: Fault reset input 3: External fault input	1	-	shutdown modification	-
P3-01	DI2 function settings	Same as P3-00	2	-	shutdown modification	-
P3-02	Input attribute setting	Unit digit: DI1 attribute, 0 normally open, 1 normally closed Ten-digit: DI2 attribute, 0 normally	0	-	shutdown modification	-

		open, 1 normally closed				
P3-03	DO1 function setting	0: No function 1: Brake output signal (valid for the host) 2: Fault output signal	1	-	shutdown modification	-
P3-04	Relay function settings	Same as P3-03	2	-	shutdown modification	-
P3-05	Output attribute settings	Unit digit: DO1 attribute, 0 normally open, 1 normally closed Ten-digit: Relay attribute, 0 normally open, 1 normally closed	0	-	shutdown modification	-

PF group						
PF-00	manufacturer password	-	-	-	Real-time effect	To access other PF parameters, a password is required, The password is the same as YD58
PF-01	Bus voltage correction value	85.0%~140.0%	100.0%	%	Real-time effect	The calibration method is the same as that of YD580
PF-02	Current current correction value	85.0%~115.0%	100.0%	%	Real-time effect	The calibration method is the same as that of YD580
PF-03	power encoding	0-4	-	-	shutdown modification	0-4 correspond to 55, 110, 160, 250, and 355 kW respectivel

						y
PF-04	Verify TOKEN	-	-	-	read-only parameter	For internal use within the software, not for external use
PF-05	alarm shielding	0-0xFFFF	0	-	Real-time effect	bit0: Mask ERR01 bit1: Mask ERR02 The rest can be deduced by analogy
Group U0						
U0-00	bus voltage	-	-	V	read-only parameter	
U0-01	current	-	-	A	read-only parameter	
U0-02	IGBT temperature	-	-	℃	read-only parameter	
U0-03	braking rate	-	-	%	read-only parameter	

U0-04	alarm code	-	-	-	read-only parameter	ERR01: Hardware short circuit alarm ERR02: Hardware overcurrent alarm ERR03: Overvoltage alarm ERR04: Overheat alarm ERR05: Software overcurrent alarm ERR06: Reserved ERR07: Load loss alarm ERR08: Overload alarm ERR09: IGBT shoot-through ERR10:

						EEPROM abnormality ERR11: External fault ERR12: Under-voltage ERR13: Continuous braking timeout fault
U0-05	IO status	-	-	-	read-only parameter	bit0：DI1 bit1：DI2 bit2：DO bit3: fan bit4: relay bit5: Brake IO bit6: Braking in operation

Chapter 5: Selection of Braking Unit

The basis for selecting a brake unit is to ensure that the current flowing through the brake unit does not exceed its maximum current under any circumstances, thereby preventing damage to the brake unit due to overcurrent. Additionally, the average current flowing through the brake unit should be less than its average current, to avoid overheating protection due to excessive heat generation. For loads with periodic braking, the appropriate brake unit can be selected according to the following method.

1. Determine the required braking current Imax for the system

The required braking current refers to the braking current flowing through the braking unit when ensuring that the system can operate normally and the load obtains sufficient braking torque.

(1) For a 380V speed regulation system, when the required braking torque during braking is 100% of the rated torque, the maximum braking current can be estimated according to the following formula:

Imax ≈ motor power (kW)

(2) For large inertial loads that require emergency stopping, the required braking torque may exceed 100%. In this case, a larger peak braking current may be necessary. Based on the required braking torque, the calculated current mentioned above can be multiplied by a factor of 1.1 to 1.5.

II. Determine the average braking current Iav of the system

(1) Firstly, the braking frequency Kc of the system needs to be determined. Kc is defined as the proportion of the system's braking time to the total braking cycle time.

Kc = Braking duration / Braking cycle × 100%

The actual braking frequency Kc varies depending on different load types. Therefore, it is recommended to determine the value of Kc based on the actual operating conditions of the speed regulation equipment

as much as possible. When the actual load operating conditions cannot be determined, the following empirical values can be used as a reference. The braking frequencies for common load types are as follows:

Elevator Kc=10-15%

Oil field bumper Kc=10-20%

Uncoiling and coiling Kc=50-60%

Centrifuge Kc=5-20%

For cranes with a lowering height exceeding 100 meters, Kc=20-40%

Occasional braking load, Kc=5%

Others: Kc=10%

(2) Determine the average braking current Iav of the system, which can be approximately calculated using the following formula:

Iav = Kc × Imax

III. Select the brake unit based on the maximum braking current Imax and the average braking current Iav

Once Iav and Imax are determined, an appropriate brake unit can be selected based on these two parameters. When selecting the model, it should be ensured that both the rated current and peak current of the selected brake unit are greater than the calculated Iav and Imax.

4. Select the appropriate braking resistor Rb based on the braking current

(1) Select the power Pb of the braking resistor, which can be calculated according to the following formula:

Pb ≈ Kc * motor power (kW)

(2) Select the resistance value Rb of the braking resistor, which can be calculated according to the following formula:

Rb ≈ Braking Voltage / Imax

The calculated resistance value may not necessarily be the standard resistance value. Therefore, during actual engineering selection, a braking resistor with a similar resistance value can be chosen based

on the calculation results, typically within the range of 0.8 to 1.1 times the calculated value.

(3) Check the capacity of the brake unit based on the selected brake resistor

Calculate the magnitude of the pulse current when the brake unit is operating:

Ipeak = Braking Voltage (V.DC) / Braking Resistance (Ω)

It is necessary to ensure that the Ipeak value is less than the maximum discharge current of the brake unit.

Chapter 6: Troubleshooting of Common Faults

alarm number	alarm name	Instructions
ERR01	Hardware short circuit alarm	Hardware SC signal triggering
ERR02	Hardware overcurrent alarm	Hardware OC signal triggering
ERR03	Overvoltage alarm	The bus voltage exceeds P2-00 (default 820.0V)
ERR04	Overheat alarm	The temperature exceeds P2-02 (default 105℃)
ERR05	Software overcurrent alarm	The current exceeds 1.15 times the maximum current
ERR06	retain	-
ERR07	Load shedding alarm	If the load shedding protection option is enabled, when the braking system starts to operate, and the current is less than the load shedding detection level P0-08 (i.e., P0-08 multiplied by the rated current), and the duration exceeds the load shedding detection time P0-09, a load shedding alarm will be generated。

ERR08	Overload alarm	1. The braking current exceeds the maximum current for more than 100ms; 2. The braking current reports overload within 10 seconds when it is between the rated current and the maximum current;;
ERR09	IGBT shoot-through	1. The detection of zero drift failed after power-on; 2. When the brake IGBT is not turned on, the detected current is greater than 25% of the rated current
ERR10	EEPROM Abnormal	EEPROM Abnormal
ERR11	external fault	When the DI terminal is set to 3 external fault input and there is an external input signal, an alarm is triggered
ERR12	undervoltage	The bus voltage is less than P2-01 (default 350.0V) in operation status
ERR13	Continuous braking timeout fault	The continuous braking time limit function is turned on (P0-04 is not 0), and an alarm is triggered when the continuous braking time exceeds P0-04

Chapter 7 Quality Assurance

Our products are designed in accordance with commonly used international standards. However, it is possible that different local standards may apply in various regions and countries.

Our company solemnly promises that from the date the user purchases products from our company (hereinafter referred to as the manufacturer), the user will enjoy the following after-sales warranty services for the products.

1. If this product experiences any quality issue from the date of purchase from the manufacturer, it is eligible for a replacement within 3 months and a free repair within 18 months (excluding products exported abroad or non-standard machines).

2. Exemption clauses (the following situations are not within the scope of free services):

(1) Those that have exceeded the warranty period;

(2) Damage caused by failure to use, maintain, and store the product in accordance with the instructions in the product manual;

(3) Damage caused by self-disassembly;

(4) Without valid warranty certificate and valid invoice (except for those that can prove the product is within the warranty period) or with altered warranty certificate without authorization;

(5) The relevant information on the warranty certificate does not match the actual product;

(6) The product has damaged appearance or internal parts;

(7) Damage caused by force majeure.

If you encounter any issues with our company's products,

please promptly contact our company or the corresponding supplier.

YDBU 制动单元系列

■前言

感谢您选用优利康电气研发和生产的 YDBU 系列制动单元。

YDBU 系列制动单元采用了先进的电力电子控制技术，核心控制部分采用了工业级微处理器，主开关器件采用高性能的新一代 IGBT，具有优异的控制性能与极高的工作可靠性。本系列产品可广泛应用于电梯、起重机、提升机、离心机等各种设备，与变频器配合起到制动的作用。

本手册提供了 YDBU 系列制动单元安装、运行、维护等方面的一些使用信息。为确保能正确安装及操作 DBU 系列制动单元，请务必在装机之前详细阅读本使用手册，并详细了解其中的安全注意事项。

■确认拿到的产品

在开箱时，请认真确认以下内容：

- 产品是否有破损；
- 本机的铭牌标识是否与您订货规格一致。

若发现任何任何问题，请速与我公司或相应的供货商联系解决。

注意
如果开箱检查时发现产品在运输过程中受损，切勿再安装使用，以免发生危险。

■与安全有关的符号说明

危险
表示若不安照指示操作可能会使用者的安全产生损害的事项。

注意
表示若不加注意可能会对设备产生损害或产品无法运行的事项。

重要
虽然不会产生严重的后果，但仍然需要用户注意和遵守的事项。

第一章　安全注意事项

1.1 安装注意事项

危险
• 制动单元必须安装在不易燃烧的属底板上，以免火灾
注意
• 搬运时，请托住制动单元的底部； • 应确保钻孔的碎屑不会进入制动单元，以免造成设备内部短路造成故障； • 如需安装在控制柜内部，应保证控制柜内部温度不高于 45℃并通风良好

1.2 接线注意事项

危险
• 安装和接线时，必须把制动单元和与之相连接的变频器等其它设备断电并等待 5~10 分钟，并确认各相关设备内部电容上所存储的电量泄放完毕再进行操作； • 必须将制动单元的接地端子可靠接地
注意
• 制动单元的直流母线正、负极不能接反，否则将无法工作甚至造成制动单元本身和相关设备损坏 • 制动单元内部的控制电路板上采用了 CMOS 集成电路，应尽量避免用手接触； • 不要在设备运行的时候进行任何接线

1.3 运行注意事项

危险
• 通电后，制动单元内部各部件就带有危险的高电压，应避免人体直接接触
注意
• 避免将螺钉、垫片等金属物品掉入制动单元内部，否则会有引起设备损坏的危险； • 使用过程中应确保机箱箱盖合好

1.4 其它

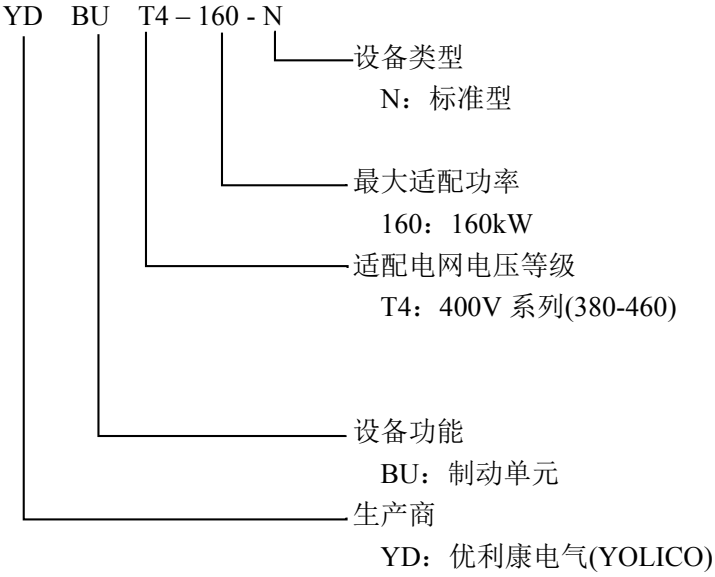
危险

• 制动单元出厂前已经进行了严格的检测，如非必要请勿再对设备进行绝缘测试，以免因误操作损坏设备； • 机器报废应按工业废物处理，严禁焚烧，否则可能会有爆炸的危险
 注意
• 不要对设备进行任何改装，以免引起设备损坏甚至造成危险； • 必须由具有专业资格的指定人员进行配线和操作、维护作业

第二章　产品规格型号

2.1 产品型号规格

1、型号命名规则



2、400V 电压等级产品型号规则

机型	规格型号	变频器功率	平均电流(A)	最大电流(A)	动作电压(V)	最小负载电阻(Ω)
标准负载	YDBUT4-160N	L：160~185 H：132~160	97A	194A	700	4
	YDBUT4-250N	L：200~280 H：185~250	144A	288A	700	2.7
	YDBUT4-355N	L：160~185 H：280~355	216A	432A	700	1.8

注：

（1）N 后缀机型为标准机型，该系列机型带风扇强制风冷、键盘参数显示;

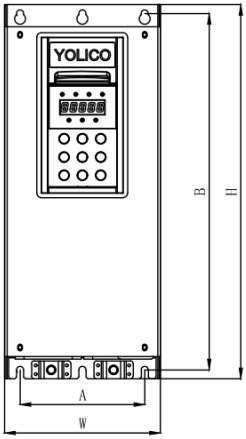
2.2 产品技术规格

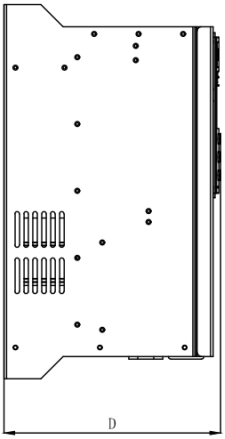
项目		规范
电源	电网电压	400V±20%
	电网频率	45Hz~65Hz
控制	制动方式	基于直流母线电压检测的回差控制
	动作时间	≤1mS
	动作电压设定	动作电压可通过键盘任意设定(-N 标准型)
	动作电压范围	400V 机型：600~760V
	电压回差	400V 机型：≤15V
	散热方式	自然对流冷却或强制风冷，视机型而定
	保护功能	过热、过流、短路等
	过热动作	机内散热器达到 P2-02(默认 105℃)时过热保护动作
	主从设定	板上三针跳线设定
	故障输出	250V/3A 常开/常闭接点输出
	状态指示	监控、参数、就绪、制动、告警
	监控	显示当前直流母线电压、散热器温度
环境	安装场所	室内、海拔<1000m，无阳光直射，无导电性粉尘及腐蚀性气体
	环境温度	-10~40℃，通风良好
	环境湿度	90％RH 以下（不结露）
	振动度	1.0G 以内，<20Hz；0.2G 以内，20 ~50 Hz

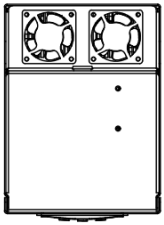
表 2.2 产品技术规格

2.3 产品安装尺寸

2.3.1 YDBU 系列制动单元的外形尺寸







型号	A（mm）	B（mm）	H（mm）	W（mm）	D（mm）	安装孔（mm）
YDBUT4-160N	140	400	420	175	243.2	8
YDBUT4-250N	140	400	420	175	243.2	8
YDBUT4-355N	140	400	420	175	243.2	8

第三章　产品安装指南

3.1 制动单元的接线

3.1.1 YDBU 系列小功率制动单元端子排列

YDBU 系列小功率制动单元端子排列见下图。其中+/-为直流母线接线端子，+/BR 为制动电阻接线端子

控制端子 DI1/DI2 为变频器输入端子可通过参数 P3-00 设置以下三个功能

1：刹车工作信号(从机有效)

2：故障复位输入

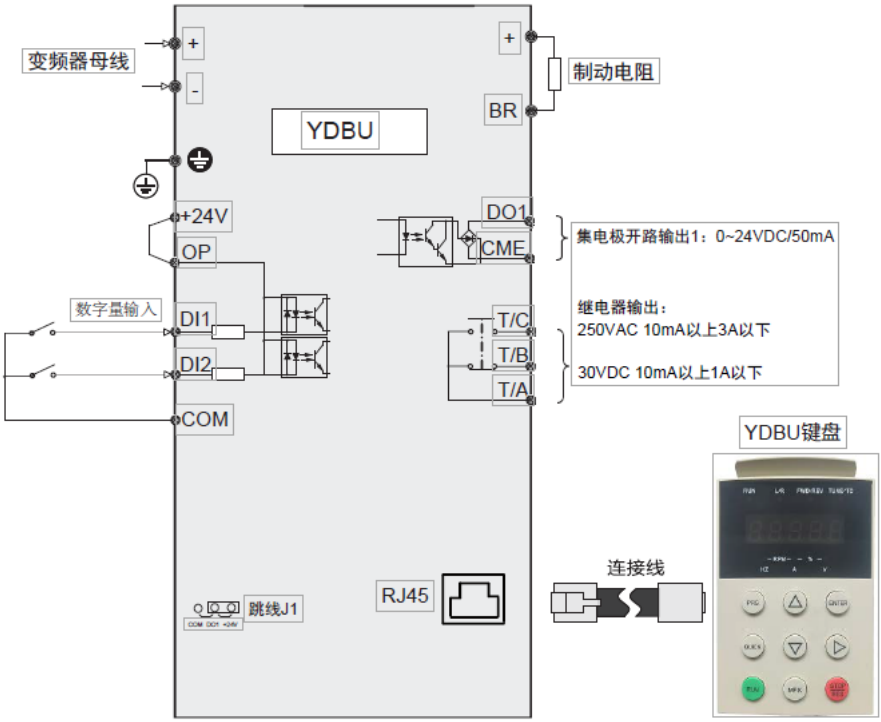
3：外部故障输入

控制端子 DO1 为变频器输出端子可通过参数 P3-03 设置以下二个功能

1：刹车输出信号(主机有效)

2：故障输出信号

控制端子 TA/TB/TC 为故障输出接点接线端子，其中 TA 端子为公共端，TC 为常开触点，TB 为常闭触点。当 YDBU 系列制动单元因负载过重而过热保护时，在制动单元停止工作的同时，常开触点与公共端之间会接通，常闭触点与公共端之间会断开。



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注意

为了防止制动单元过热保护后变频器继续工作而过压，应**正确使用制动单元的故障接点**。推荐使用制动单元的常开触点 TA 与 TB 连接到变频器的外部故障

输入端子，确保当制动单元因负载过重而过热保护时，变频器也同时检测到故障信号而停止工作。

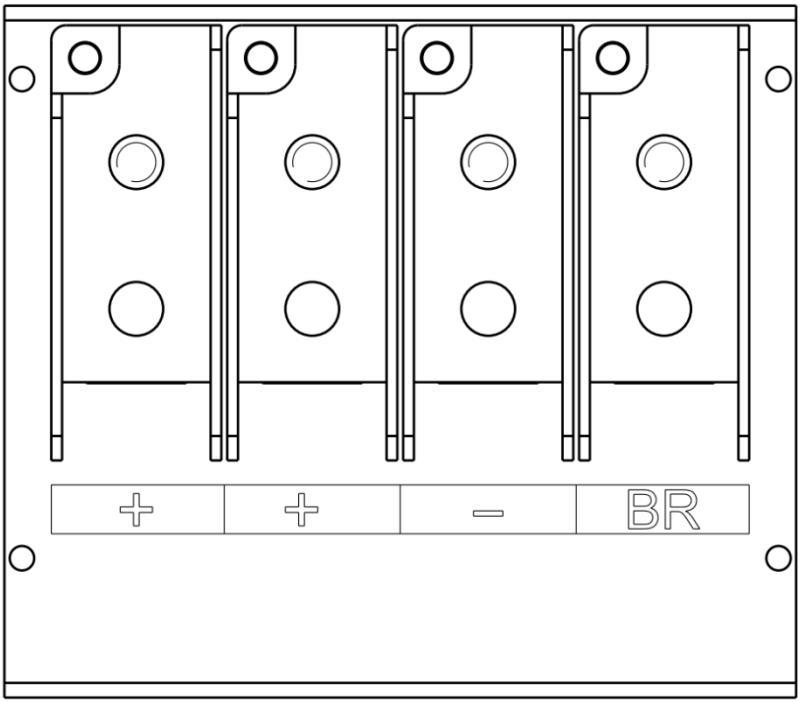
注意

制动单元并联使用时，应正确设置各台制动单元的主从工作模式，并通过双绞线连接各制动单元的并联控制端子，以保证各台制动单元同时工作。否则，可能会因各台制动单元之间的电流不均衡而引起负载较重的制动单元过热保护。

并联使用时，必须要有且只能有一台制动单元设为主模式，其余的设为从模式。不允许多台设为主模式或全部设为从模式的情况，否则制动单元可能无法正常工作。

3.1.2 YDBU 系列制动单元端子排列

YDBU 系列制动单元端子排列见下图。



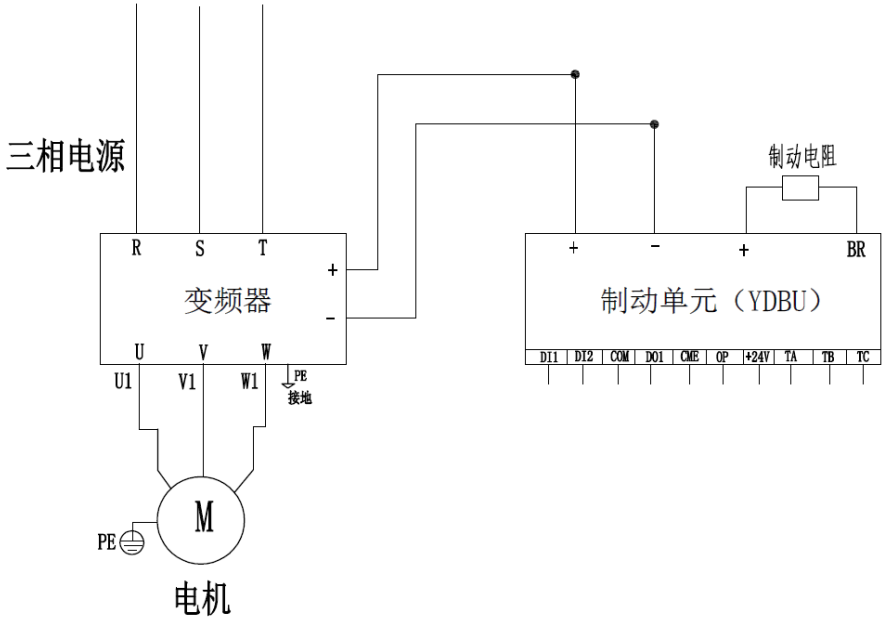
(图 3.2) YDBU 系列制动单元端子排列

3.1.4 主回路接线方法

下图是一个 YDBU 系列制动单元与变频器连接的典型应用接线图。在该实

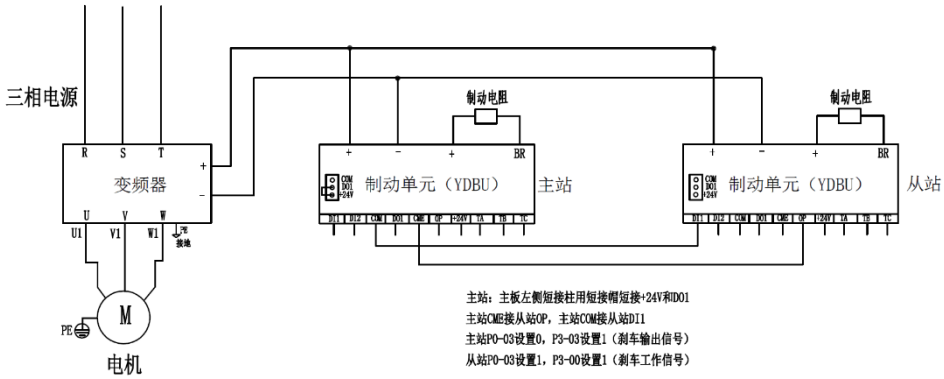
际应用的系统中，采用一台变频器驱动一台电机。制动单元根据容量大小连接相应的制动电阻

图中所示的是 YDBU 系列 400V 电压等级制动单元的典型应用。



YDBU 系列制动单元与变频器的连接

3.1.5 主从控制连接



⚠ 注意

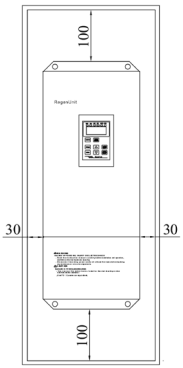
接线时，应注意制动单元直流输入端子“+”、“-”的极性，如果极性接反，可能会导致设备损坏甚至有引起火灾的危险。

⚠ 注意

为了防止漏电对人体的伤害，应该将制动单元的接地端子可靠接地。

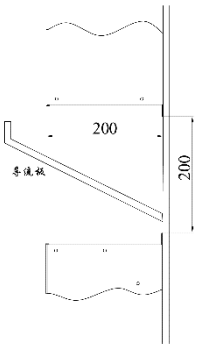
3.2 产品安装要求

所有制动单元均应竖直安装在墙上或控制柜的背板上。由于制动单元本身会产生热量，因此，用户在安装时一定要考虑通风、散热和人身安全，在制动单元的周围应留有足够的空间，最小的通风空间是:上下 100mm，左右 30mm。



(图 3.5) YDBU 系列制动单元的安装空间要求

若有多台制动单元需要上下排列安装，则两台制动单元之间的竖直距离至少是 200mm，并加上导流挡板以防止下方制动单元所产生的热量对上方制动单元的影响。安装方法如下图所示。

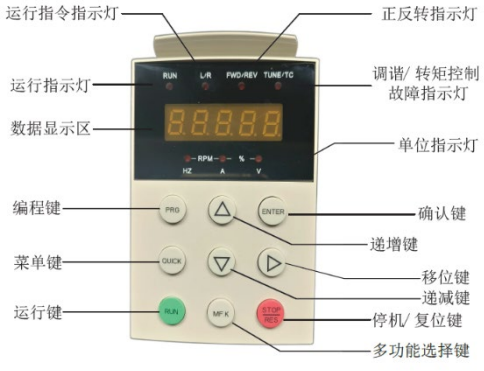


(图 3.6) 两台制动单元上下安装示意图

第四章　产品操作面板

4.1 LED 操作面板的外观

为了用户使用方便，我司 YDBU 系列制动单元在大功率标准型产品上提供了操作面板。操作面板由状态指示灯、数据显示数码管和操作按键三个部分组成，外观与布局如下图所示。



正面图

背面图

4.2 状态指示灯说明

指示灯	作用说明
RUN	工作状态指示，此灯亮表示当前处于工作状态
A	参数查看状态指示，表示当前为电流查看状态
V	参数查看状态指示，表示当前为电压查看状态

表 4.1 指示灯功能表

4.3 LED 显示说明

键盘显示区上的四位或五位 LED 数据管用于数据显示，根据当前显示状态的不同其显示的内容也不同。

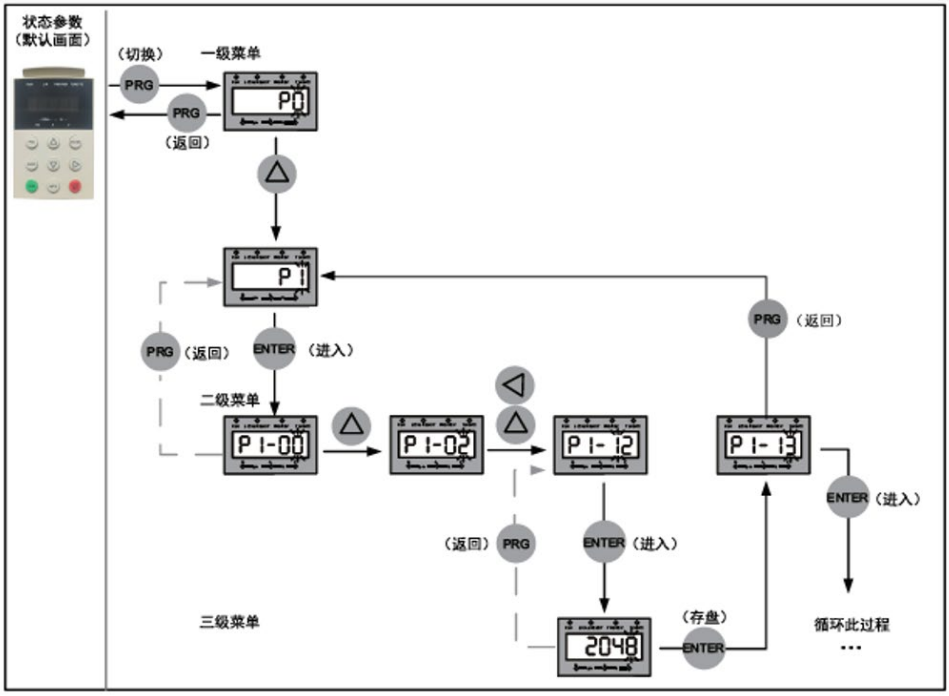
在运行监控状态时，数码管显示的是当前所监控的参数号码或相应的参数内容；在参数查看状态时，数码管显示的是当前所选择的设置参数编号或其内容。

4.4 按键功能说明

按键	按键名称	按键功能
PRG	编程键	一级菜单进入或退出。
ENTER	确认键	逐级进入菜单画面、设定参数确认。
△	递增键	数据或参数的递增。
▽	递减键	数据或参数的递减。
▷	移位键	在停机显示界面和运行显示界面下，可循环选择显示参数； 在修改参数时，可以选择参数的修改位。
RUN	运行键	在“操作面板”启停控制方式下，用于运行操作。
STOP RES	停止 / 复位	运行状态时，按此键可以停止运行操作，此特性受参数 P7-02 制约； 故障报警状态时，可用来复位操作。
MF.K	多功能选择键	根据 P7-01 的设定值，在选择的功能之间切换。详细操作方法见 4.3 中“多功能按键操作”
QUICK	菜单模式选择键	根据 PP-03 中值切换不同的菜单模式（默认为一种菜单模式）。

4.5 常用键盘操作

参数查看：



参数群分以下几类

参数群	功能名称	说明
U0-XX	监控参数	仅读
P0-XX	基本参数	
P1-XX	记录参数	仅读
P2-XX	保护参数	
P3-XX	端子参数	并机或端子功能选择

4.6 参数群说明

参数	参数名称	参数范围	默认值	单位	更改方式	说明
P0 组						
P0-00	制动起始电压	P0-01～730.0V	670.0V	V	实时生效	母线电压大于此设定值时开始制动
P0-01	制动停止电压	620V～P0-00	650.0V	V	实时生效	母线电压低于此设定值时停止制动
P0-02	制动率设置	30%～100%	100%	%	实时生效	制动时的制动率
P0-03	主从设置	0：主机 1：从机	0	-	实时生效	选择工作模式为主机还是从机
P0-04	连续制动时间限制	0～65535s	0	s	实时生效	设定连续制动时间限制,0 关闭限制
P0-05	恢复出厂设置	0：不恢复 1：恢复用户参数(P0 P2 P3) 2：清除记录信息	0	-	停机修改	恢复所有参数要谨慎操作

		(P1) 2222：恢复所有参数(P0-PF)				
P0-06	风扇控制方式	0：刹车工作时或温度高于 42 度时运转 1：风扇一直运转	0	-	实时生效	设置为 0 时，温度死区为 2 度
P0-07	掉载保护选择	0：无效 1：有效	1	-	实时生效	如果掉载保护选择有效，则当制动开始工作，电流小于掉载检测水平 P0-08，且持续时间大于掉掉载检测时间 P0-09 时，产生掉载报警。
P0-08	掉载检测水平	0%~100.0%	10.0%	%	实时生效	
P0-09	掉载检测时间	0-60.0s	1.0s	s	实时生效	
P1 组						
P1-00	软件版本号	-	-	-	只读参数	厂家软件版本号，两个小数点
P1-01	最近四次故障信息	-	-	-	只读参数	最近四次故障信息：个位为最近一次故障编码，十位为上一次故障编码，依

						此类推；
P1-02	故障时母线电压	-	-	V	只读参数	发生最近一次故障时的母线电压
P1-03	故障时电流	-	-	A	只读参数	发生最近一次故障时的电流
P1-04	故障时制动率	-	-	%	只读参数	发生最近一次故障时的制动率（占空比）
P1-05	故障时模块温度	-	-	℃	只读参数	发生最近一次故障时的模块温度
P1-06	故障时单元状态	-	-	-	只读参数	发生最近一次故障时的单元状态 bit0：DI1 bit1：DI2 bit2：DO bit3：风扇 bit4：继电器 bit5：刹车 IO bit6:制动工作中
P1-07	累计上电	0-65535	-	s	只	-

	时间-秒				读参数	
P1-08	累计上电时间-小时	0-65535	-	h	只读参数	-
P1-09	累计运行时间-秒	0-65535	-	s	只读参数	-
P1-10	累计运行时间-小时	0-65535	-	h	只读参数	-
P2 组						
P2-00	过压设定值	650.0V~840.0V	820.0V	V	实时生效	母线电压高于设定值报警过压
P2-01	欠压设定值	210.0V~420.0V	350.0V	V	实时生效	母线电压低于设定值报警欠压
P2-02	过热设定值	85~120℃	105	℃	实时生效	温度高于设定值报警过热
P3 组						

P3-00	DI1 功能设定	0：无功能 1：刹车工作信号(从机有效) 2：故障复位输入 3：外部故障输入	1	-	停机修改	-
P3-01	DI2 功能设定	同 P3-00	2	-	停机修改	-
P3-02	输入属性设置	个位：DI1 属性， 0 常开，1 常闭 十位：DI2 属性， 0 常开，1 常闭	0	-	停机修改	-
P3-03	DO1 功能设定	0：无功能 1：刹车输出信号(主机有效) 2：故障输出信号	1	-	停机修改	-
P3-04	Relay 功能设定	同 P3-03	2	-	停机修改	-
P3-05	输出属性设置	个位：DO1 属性， 0 常开，1 常闭 十位：Relay 属性，0 常开，1 常闭	0	-	停机修改	-
PF 组						

PF-00	厂家密码	-	-	-	实时生效	访问其他 PF 参数需要输入密码，密码和 YD580 相同
PF-01	母线电压校正值	85.0%~140.0%	100.0%	%	实时生效	校正方法和 YD580 相同
PF-02	当前电流校正值	85.0%~115.0%	100.0%	%	实时生效	校正方法和 YD580 相同
PF-03	功率编码	0-4	-	-	停机修改	0-4 分别对应 55 110 160 250 355kw
PF-04	校验 TOKEN	-	-	-	只读参数	软件内部使用，不对外
PF-05	报警屏蔽	0-0xFFFF	0	-	实时生效	bit0：屏蔽 ERR01 bit1：屏蔽 ERR02 后面依此类推
U0 组						
U0-00	母线电压	-	-	V	只读参	

					数	
U0-01	电流	-	-	A	只读参数	
U0-02	IGBT 温度	-	-	℃	只读参数	
U0-03	制动率	-	-	%	只读参数	
U0-04	**报警代码**	**-**	**-**	**-**	**只读参数**	**ERR01：硬件短路报警 ERR02：硬件过流报警 ERR03：过压报警 ERR04：过热报警 ERR05：软件过流报警 ERR06：保留 ERR07：掉载报警 ERR08：过载报警 ERR09：IGBT 直通**

						ERR10：EEPROM 异常 ERR11：外部故障 ERR12：欠压 ERR13：连续制动超时故障
U0-05	IO 状态	-	-	-	只读参数	bit0：DI1 bit1：DI2 bit2：DO bit3：风扇 bit4：继电器 bit5：刹车 IO bit6：制动工作中

第五章　制动单元的选型

制动单元选型的依据，是确保任何情况下，流过制动单元的电流都不超过制动单元的最大电流，避免制动单元因过流而损坏。同时流过制动单元的电流平均值小于其平均电流，避免制动单元因发热太多而导致过热保护。对于周期性制动的负载，可以按照下述的方法来选择合适的制动单元。

一、确定系统所需的制动电流 Imax

所需制动电流是指在保证系统能正常工作、负载获得足够制动转矩时流过制动单元的制动电流。

(1) 对于 380V 调速系统，当制动时所需的制动力矩为 100%额定转矩时，最大制动电流可按下式估算：

Imax ≈电机功率(kW)

(2) 对于需要急性停车的大惯性负载，所需的制动力矩可能大于 100%，此时可能需要更大的峰值制动电流，可以根据所需制动力矩的大小在上述计算出的电流基础上乘以一个 1.1~1.5 倍的系数。

二、确定系统的平均制动电流 Iav

(1)首先需确定系统的制动频率 Kc，Kc 定义为系统制动时间占总制动周期的时间比例。

Kc = 制动持续时间/制动周期×100%

不同的负载类型，其实际制动频率 Kc 也会有所不同，因此请尽可能根据实际调速设备的运行状况来确定 Kc 的值。在无法确定实际负载运行情况时，可以参考以下的经验取值。常见负载类型的制动频率如下：

电梯	Kc=10-15%
油田磕头机	Kc=10-20%
开卷和卷取	Kc=50-60%
离心机	Kc=5-20%
下放高度超过 100 米的吊车	Kc=20-40%
偶然制动的负载	Kc=5%
其他	Kc=10%

(2)确定系统的平均制动电流 Iav，平均制动电流 Iav 则可由下式近似计算

得出：

Iav ＝ Kc×Imax

三、根据制动电流 Imax 和平均制动电流 Iav 选择制动单元

得出 Iav 和 Imax 后，即可根据此两个参数选择合适的制动单元。选择型号时，应该保证所选取制动单元的额定电流和峰值电流都大于所计算出的 Iav 和 Imax。

四、根据制动电流选取合适的制动电阻 Rb

(1)选择制动电阻的功率 Pb，制动电阻的功率可以按下式计算：

Pb ≈ Kc*电机功率(kW)

(2)选择制动电阻的阻值 Rb，制动电阻的阻值可以按下式计算：

Rb≈ 制动电压/Imax

计算出的阻值不一定是标准阻值，所以实际工程选型时，可以根据计算结果选择相近阻值的制动电阻，一般可以在计算值的 0.8~1.1 倍之间选择。

(3) 根据选定的制动电阻检查制动单元的容量

计算制动单元工作时脉冲电流的大小：

Ipeak=制动电压（V.DC）/制动电阻(Ω)

必须确保 Ipeak 值小于制动单元的最大放电电流的大小。

第六章　常见故障的排除

报警号	报警名称	说明
ERR01	硬件短路报警	硬件 SC 信号触发
ERR02	硬件过流报警	硬件 OC 信号触发
ERR03	过压报警	母线电压超出 P2-00(默认 820.0V)
ERR04	过热报警	温度超过 P2-02(默认 105℃)
ERR05	软件过流报警	电流超出最大电流的 1.15 倍
ERR06	保留	-
ERR07	掉载报警	如果掉载保护选择有效，则当制动开始工作，电流小于掉载检测水平 P0-08(即 P0-08*额定电流)，且持续时间大于掉掉载检测时间 P0-09 时，产生掉载报警。
ERR08	过载报警	1、制动电流大于最大电流超过 100ms； 2、制动电流在额定电流与最大电流之间 10s 报过载；
ERR09	IGBT 直通	1、上电后检测零漂失败； 2、制动 IGBT 没有开通时，检测到电流大于额定电流的 25%
ERR10	EEPROM 异常	EEPROM 异常
ERR11	外部故障	当 DI 端子被设置为 3 外部故障输入且有外部输入信号时报警
ERR12	欠压	运行状态下母线电压小于 P2-01(默认 350.0V)
ERR13	连续制动超时故障	连续制动时间限制功能打开(P0-04 非 0)，连续制动时间超过 P0-04 时报警

第七章　质量保证

我公司产品按照通用的国际标准设计。但是不排除在不同地区和国家可能使用不同的当地标准。

本公司郑重承诺，自用户从我公司（以下简称厂家）购买产品之日起，用户享有如下产品售后保修服务。

1、本产品自用户从厂家购买之日起如果出现质量问题， 3 个月内包换、18 个月免费保修（出口国外/非标机产品除外）。

2、 免责条款（下列情况不属于免费服务范围）：

（1）超过保修有效期的；

（2）未按产品使用说明书的要求使用、维护、保管而造成破坏的；

（3）自行折卸造成破坏的；

（4)无有效保修凭证及有效发票的(能够证明该商品保修有效期内的除外）或擅自涂改保修凭证的；

（5）保修凭证上的相关信息与商品实物不相符合的；

（6）产品外观或内部损坏的；

（7）因不可抗力造成损坏的。

如果您所使用的我公司产品出现问题，请及时与本公司或相应的供货商联系。