YDBU Brake Unit Series



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■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

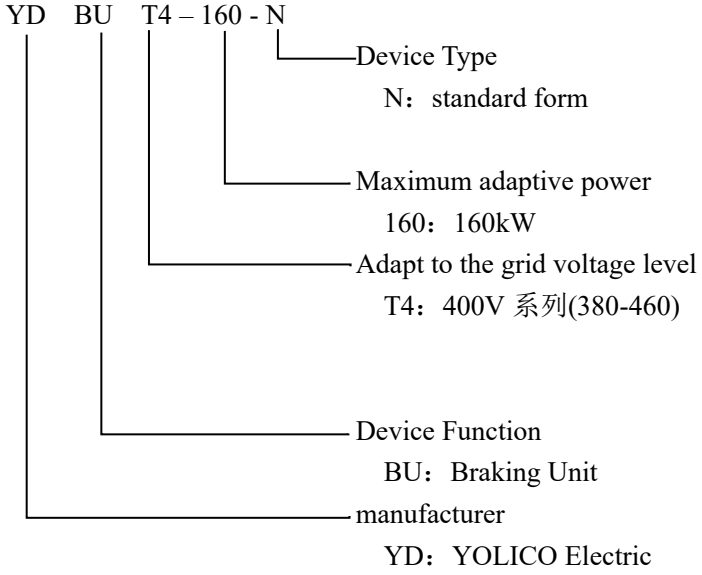
1.4 Others

 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：315~400 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

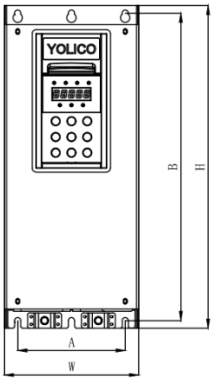
project		specification
power supply	grid voltage	400V±20%
	grid frequency	45Hz~65Hz
control	Braking method	Hysteresis control based on DC bus voltage detection
	Action Time	≤1mS
	Operating voltage setting	The action voltage can be set arbitrarily via the keyboard (-N standard type)
	Operating voltage 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

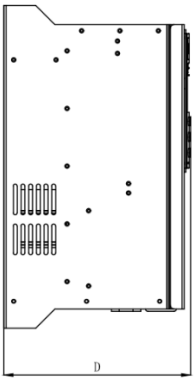
	ambient humidity	Below 90%RH (non-condensing)
	vibration degree	Within 1.0G, <20Hz; within 0.2G, 20 ~50 Hz

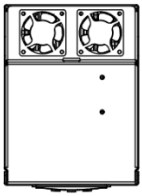
Table 2.2 Product Technical Specifications

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

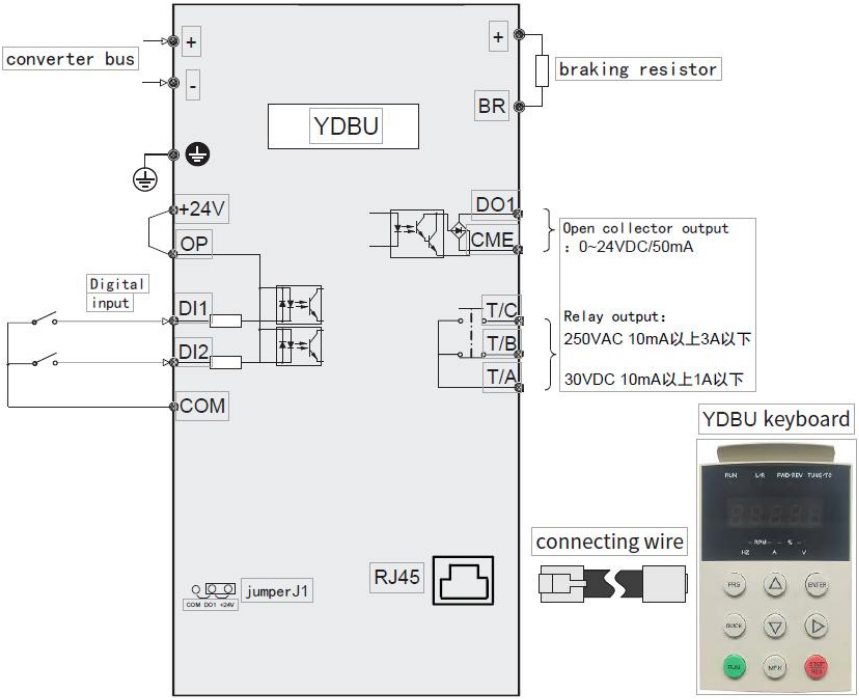
3: External fault input

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.

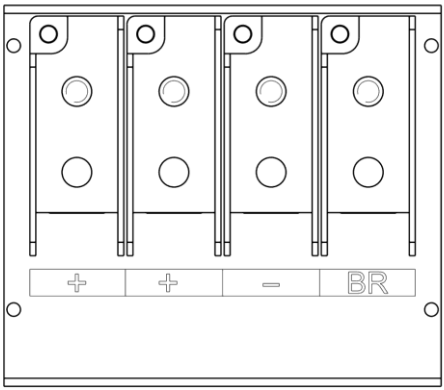
⚠ Attention

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.

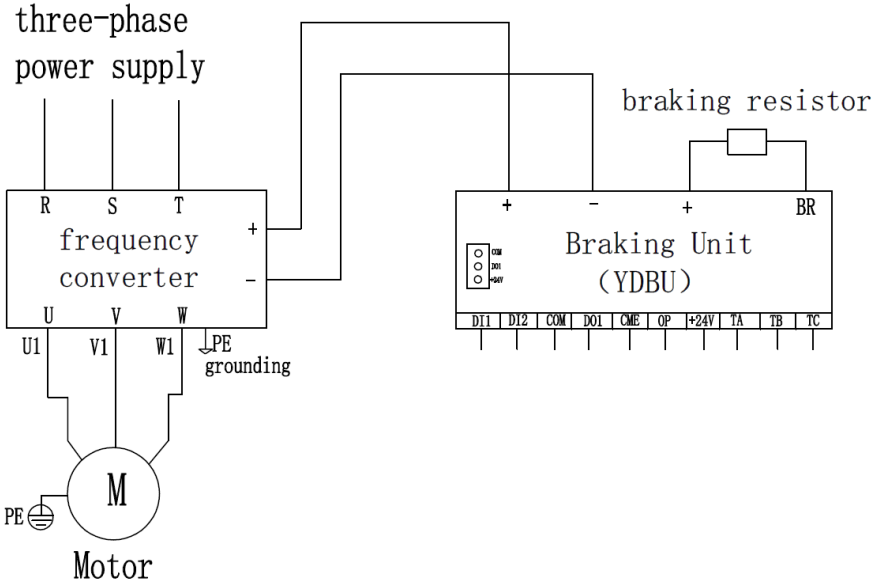


(Figure 3.2) Terminal arrangement of YDBU series brake unit

3.1.4 Main circuit wiring method

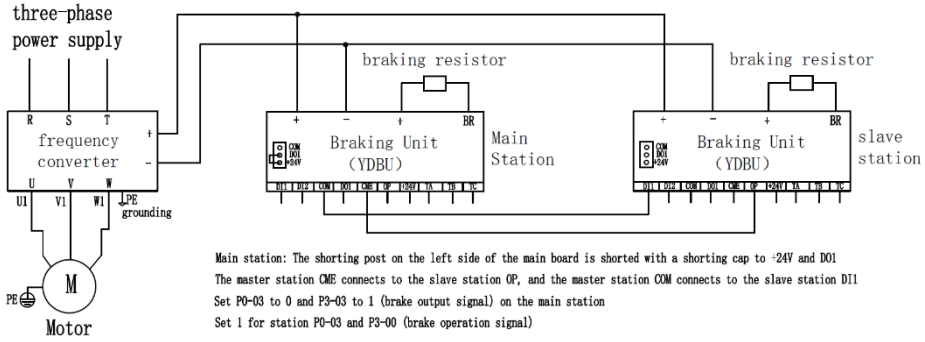
The following figure is a typical application wiring diagram for connecting a YDBU series brake unit to a frequency converter. In this actual application system, one frequency converter is used to drive one motor. The brake unit is connected to the corresponding brake resistor according to its capacity

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

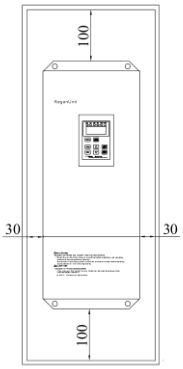
When wiring, attention should be paid to the polarity of the DC input terminals "+", "-" of the brake unit. If the polarity is reversed, it may result in equipment damage or even pose a fire hazard.

⚠ Attention

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

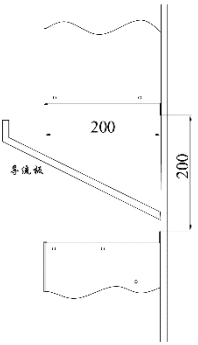
3.2 Product installation requirements

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.

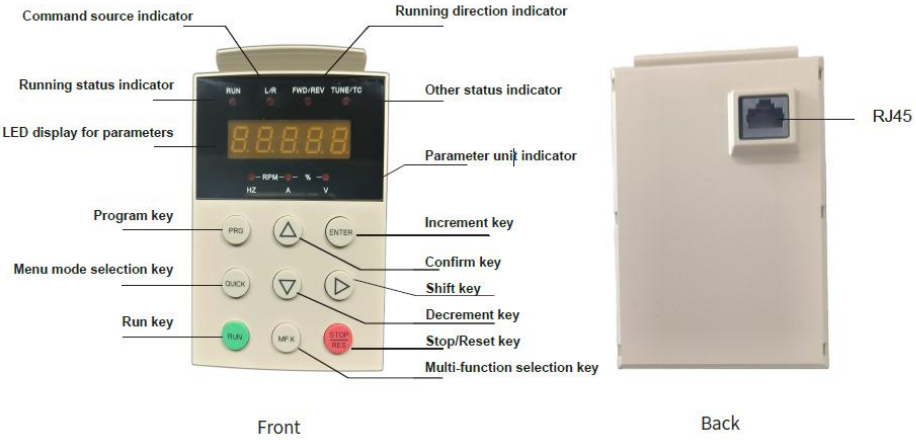


(Figure 3.6) Schematic diagram of installing two brake units one above the other

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.

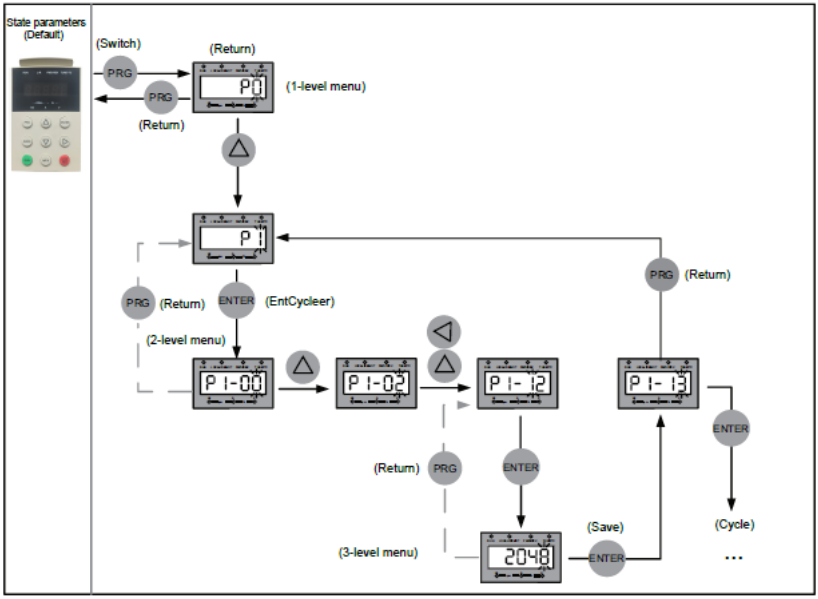
4.4 Description of button functions

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.