

VEICHI



Manual

Bu30 Brake Unit

Preface

Thank you for choosing BU30 series energy braking unit.

BU30 series adopts advanced power electronics technology and high-performance MCU controller, combined with a new generation of IGBT power devices, a high-performance braking products. This series of products can be applied to elevators, cranes, hoists, centrifuges, oilfield pumping machines and other occasions. It's products can release the electrical energy generated by the motor in the braking process through the power resistor (braking resistor) to produce enough braking torque to ensure the normal operation of the inverter and other equipment.

This manual provides matters such as product installation and assembly lines, parameter setting and troubleshooting. To ensure proper installation and operation of this product and to take advantage of its superior performance, please read this manual in detail before use.

This manual is a complimentary accessory, please keep it in a safe place and give it to the user of this machine.

We are always striving for continuous improvement of our products, so the information about this series is subject to change without notice. We apologize for any inconvenience this may cause.

Chapter 1 Security Information

1.1 Purchase Inspection

1. Whether the specifications and models of the products match the ordered products.
2. Our products have undergone strict testing and quality inspection before leaving the factory, please check whether there is a certificate of conformity, product manual and warranty card.
3. Check if there is any damage inside the machine. If there is obvious damage, please do not operate and use the machine and contact the distributor or our company in time to avoid accidents.

1.2 Safety and wiring considerations



- Wiring operations must be performed by professionally qualified personnel, otherwise there is a risk of electric shock.
- When installing and wiring, the brake unit and other equipment such as inverters connected to it must be disconnected and wait for more than 10 minutes to confirm that the power stored in the capacitors of each related equipment is discharged before operating to ensure safety.
- The ground terminal of the brake unit must be grounded safely and securely, otherwise the equipment cannot work properly or there is a risk of electric shock.
- Once energized, the internal parts of the brake unit carry a dangerously high voltage and direct human contact should be avoided, otherwise it will endanger lives.



- The positive and negative terminals of the DC bus of the brake unit should not be reversed, otherwise it may not work or even cause damage to the equipment itself and related equipment, and there is a fire hazard.
- The brake unit should be installed in a well-ventilated area, otherwise the equipment may not work properly or may be damaged.
- Avoid dropping screws, gaskets and other metal objects inside the brake unit, as this may cause damage to the equipment. Make sure the case box cover is closed during use.
- Frequency converter, braking unit, braking resistance between the cable connection can not exceed 10 meters, please use shielded wire parallel signal line, the line length does not exceed 0.5 meters.

Chapter 2 Product Introduction

2.1 Nameplate and type description

VEICHI BRAKE UNIT

Model: BU30-3-075

Braking Current: 75 A max

Braking Level: DC 640V~740V

Motor Cap: 18.5kW~55kW **Resistor:** R > 12Ω



2-1 Nameplate and model number description

Nameplate Configuration	Instruction
Model	Brake Unit Model
Braking Current	Maximum braking current
Braking Level	Braking voltage range
Motor Cap	Matching load power
Resistor	Minimum braking resistance

2.2 Brake unit output specifications

2-2 Type specification of energy-consuming brake units

Brake Unit Model	Minimum resistance	Peak Braking Current	Adaptable inverter power	
			Light load	Heavy load
BU30-3-075	12.5Ω	75A	55kW~75kW	22kW~45kW
BU30-3-100	9Ω	100A	90kW~32kW	55kW~75kW
BU30-3-150	6.2Ω	150A	132kW~60kW	90kW~110kW
BU30-3-300	3Ω	300A	185kW~250kW	132kW~160kW
BU30-6-075	18Ω	75A	37kW~75kW	22kW~55kW
BU30-6-100	13.5Ω	100A	90kW	75kW

BU30-6-150	9Ω	150A	110kW~132kW	90kW~110kW
BU30-6-300	4.5Ω	300A	160kW~315kW	132kW~280kW

Note:

- **Minimum resistance:** This is the minimum braking resistance value allowed to be mated to the braking unit. The actual braking resistance must be selected according to the capacity of the equipment and the required braking torque, and is not less than the minimum resistance value of the braking unit.
- **Selection of braking unit:** If the inverter is equipped with a braking unit, please follow the parameters of the inverter for braking configuration. there is no need to configure BU30 series braking unit.
- **Minimum resistance R_{\min} calculation formula:** $R_{\min}=U_{DC}/(0.8*I_p)$
 - U_{DC} : Braking voltage, 740 for T3 models, 1080 for T6 models, unit V.
 - I_p : Brake module peak current, depending on model, unit A.
 - Calculation formula for braking resistance R: $R=U_{DC}^2/(K*P)$
 - U_{DC} : Braking voltage, 740 for T3 models, 1080 for T6 models, unit V.
 - K: Calculation of coefficients, 22kW~110kW is $K=0.75$, 132kW~560kW is $K=0.88$.
 - P: Braking power, 100% braking torque takes the rated power of the motor, unit W.

380V Braking Resistor Selection :

Three-phase 380V rating					
Inverter Power (kW)	Motor power (kW)	Brake Unit Model	Recommended resistance value (at 100% braking torque, 10% braking rate)		Minimum Resistances (Ω)
			Resistor Model	Quantity	
30	30	BU30-3-075	24Ω 3.0kW	1	12.3
37	37	BU30-3-075	20Ω 3.7kW	1	12.3
45	45	BU30-3-075	16Ω 4.5kW	1	12.3
55	55	BU30-3-100	13Ω 5.5kW	1	9.3
75	75	BU30-3-100	9.7Ω 7.5kW	1	9.3
90	90	BU30-3-150	6.8Ω 9.3kW	1	6.2
110	110	BU30-3-150	6.6Ω 11.0kW	1	6.2
132	132	BU30-3-300	4.7Ω 13.0kW	1	3
160	160	BU30-3-300	3.9Ω 15.0kW	1	3
185	185	BU30-3-300*2	6.8Ω1 7.0kW	2	3 *2
200	200	BU30-3-300*2	6.2Ω 18.5kW	2	3 *2

220	220	BU30-3-300*2	5.4Ω 20.0kW	2	3 *2
250	250	BU30-3-300*2	5.0Ω 22.5kW	2	3 *2
280	280	BU30-3-300*2	4.4Ω 25.5kW	2	3 *2
315	315	BU30-3-300*2	4.0Ω 30.0kW	2	3 *2
355	355	BU30-3-300*3	5.2Ω 33.0kW	3	3 *3
400	400	BU30-3-300*3	5.0Ω 42.0kW	3	3 *3
450	450	BU30-3-300*3	4.5Ω 42.0kW	3	3 *3
500	500	BU30-3-300*3	3.6Ω 42.0kW	3	3 *3
560	560	BU30-3-300*4	4.5Ω 50.0kW	4	3 *4

660V Braking Resistor Selection:

Three-phase 660V rating					
Inverter Power (kW)	Motor power (kW)	Brake Unit Model	Recommended resistance value (at 100% braking torque, 10% braking rate)		Minimum Resistances (Ω)
			Resistor Model	Quantity	
22	22	BU30-6-100	70Ω 2.2kW	1	18
30	30	BU30-6-100	50Ω 3kW	1	18
37	37	BU30-6-100	40Ω 3.7kW	1	18
45	45	BU30-6-100	35Ω 4.5kW	1	18
55	55	BU30-6-100	30Ω 5.5kW	1	18
75	75	BU30-6-150	20Ω 7.5kW	1	13.5

90	90	BU30-6-150	18Ω 9kW	1	13.5
110	110	BU30-6-150	14Ω 11kW	1	13.5
132	132	BU30-6-300	10Ω 13.2kW	1	4.5
160	160	BU30-6-300	8.3Ω 16kW	1	4.5
185	185	BU30-6-300	7.2Ω 18.5kW	1	4.5
200	200	BU30-6-300	6.6Ω 20kW	1	4.5
220	220	BU30-6-300	6.0Ω 22kW	1	4.5
250	250	BU30-6-300	5.3Ω 25kW	1	4.5
280	280	BU30-6-300	4.7Ω 28kW	1	4.5
315	315	BU30-6-300*2	8.4Ω 31.5kW	2	4.5*2
355	355	BU30-6-300*2	7.4Ω 35.5kW	2	4.5*2
400	400	BU30-6-300*2	6.6Ω 40kW	2	4.5*2
450	450	BU30-6-300*2	5.8Ω 45kW	2	4.5*2
500	500	BU30-6-300*2	5.4Ω 50kW	2	4.5*2
560	560	BU30-6-300*2	4.8Ω 56kW	2	4.5*2

2.1 Technical specifications

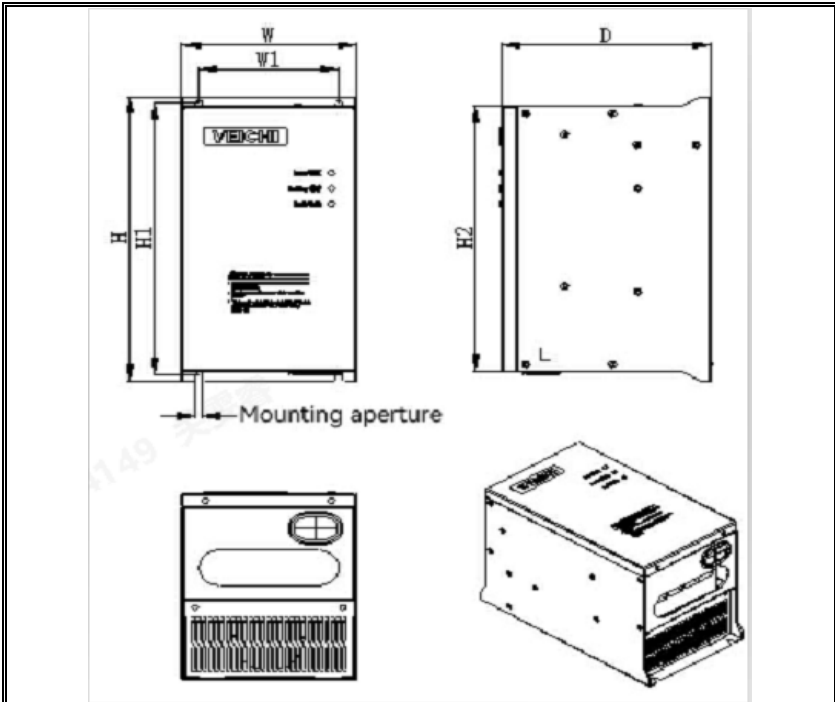
Table 2-3 Technical specifications

Project		Specification	
		T3	T6
Power	Bus voltage	DC400V~DC900V	DC600V~DC1300V
Control	Braking method	Automatic voltage tracking method	
	Reflection time	Within 1ms with multiple noise filtering algorithms	
	Operation voltage	The braking voltage point can be set arbitrarily, see section 4.1 for the setting method, and the maximum deviation of its value is $\pm 10V$	
	Hysteresis Loop Voltage	Adjustable parameters, see section 4.1 for setting method	

	Protection function	Overload, short circuit, over temperature
	Parallel input	Automatic recognition of parallel drive, no parameter setting
	Parallel output	
Display with Settings	Status indication	Power indication, working indication and fault indication
	Operation monitoring	Bus voltage can be viewed from the keypad
	Operation voltage setting	BU30 products can be set by keypad, the keypad can be used with our inverter keypad or optional.
Environment	Installation site	Indoor, not more than 1000 meters above sea level (for every 1000 meters above sea level, 10% reduction must be used), no direct sunlight, no conductive dust and corrosive gas
	Environment temperature	-10~40°C, Good ventilation
	Environmental humidity	Below 90% RH (no condensation)
	Vibration degree	0.5g or less
	Installation method	wall resignation
	Cooling method	Air-cooled

Chapter 3 Installation

3.1 Mechanical installation dimensions

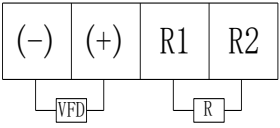
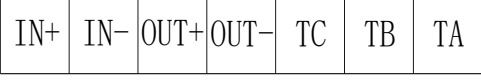


(Unit: mm)

Brake Unit Model	Dimension				Installation hole position		Aperture
	W	H	D	H2	W1	H1	
BU30-3-075	150	274	180	256	120	262	Φ6
BU30-3-100							
BU30-3-150							
BU30-3-300	190	355	210	335	130	343	Φ6
BU30-6-075	180	320	205	300	130	308	Φ6
BU30-6-100							
BU30-6-150	190	355	210	335	130	343	Φ6
BU30-6-300							

3.2 Definition of terminal arrangement

Terminal arrangement order :

Terminal Sign	Terminal name	Terminal Function Definition
(-)	DC power input terminal	(-) Inverter bus negative
(+)		(+) Inverter bus positive
R1	Brake resistor terminal	Separately connected to the braking resistor terminal
R2		
IN+	Parallel drive input	Connect to host OUT+
IN-		Connect to host OUT-
OUT+	Parallel drive output	Connect to slave IN+
OUT-		Connect to slave IN-
TC-TB	Fault output relay	Relay normally closed contact
TC-TA		Relay normally open contact

3.3 Brake units in parallel

When more than one brake unit is used in parallel, it is necessary to connect OUT+ and OUT- on the host control board with other parallel slave INT+ and INT-, set parameter F4.13=1 (host mode) for the host and parameter F4.13=0 (slave mode) for the slave, and then when the bus voltage reaches the point of braking voltage, the host will run and then output signal from the OUT terminal to make the slave run so that the master and slave can brake the power balance, the braking unit connection diagram is shown in Figure 3-1 below. When the bus voltage reaches the braking voltage point, the OUT terminal outputs a signal to make the slave machine run after the host machine runs, so that the master and the slave machine can balance the braking power.

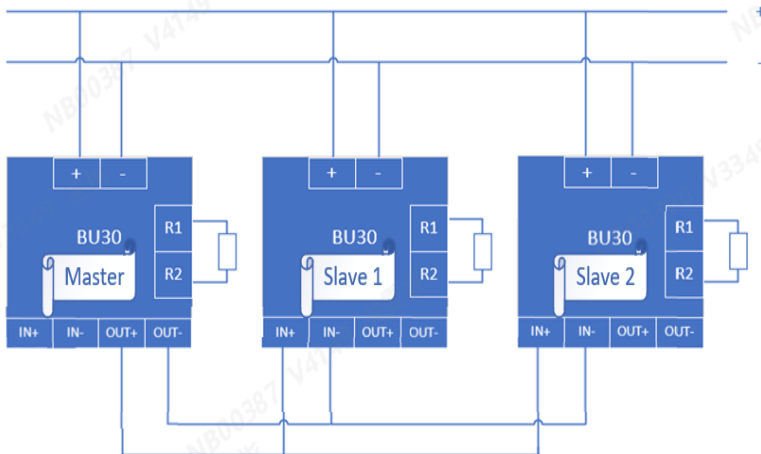


Table 3-1 Schematic diagram of parallel connection of brake units

Note: When only one brake unit is operating, F4.13 must be set to 1 for proper operation.

Chapter 4 Keyboard Functions

4.1 Basic parameter setting

Function Code Number	Function Code Name	Setting value range and definition		Factory setting	
		T3	T6	T3	T6
F4.00	Braking Voltage	640V-740V	1070V-1170V	680V	1120V
F4.01	Hysteresis Voltage	1V-40V		5V	
F4.02	Fan start point	50°C-75°C		50°C	
F4.03	Overheat protection point	75°C-85°C		75°C	
F4.04	Fault alarm selection	0- Selection OL is active 2- Selection OC is active 3- OL OC active at the same time 55- Disable all fault alarms		2	
F4.05	Reserved	5-9999		5	
F4.06	Fault Output Logic Selection	0- Positive Logic 1- Opposite Logic		0	
F4.07	Previous fault type	-		-	
F4.08	Previous two fault types	-		-	
F4.09	Fan switch selection	0- Start point on 1- Power on		0	
F4.10	Restore Factory Parameters	0- Disable by default 1- Restore factory values		0	
F4.11	Fault self-recovery times	0-3		0	

F4.12	Fault self-recovery waiting time	0.1s-20.0s	1.0s
F4.13	Master-slave mode selection	0-1	1

4.2 Monitor parameters

Function code	Function Code Name	Setting value range and definition
C-00	Temperature	0.1°C
C-01	Voltage	1V
C-02	Current	0.1A
C-03	Software Version	-

4.3 Fault information

Keypad display	Type of fault	Possible Cause of Fault	Fault Countermeasure
E.oL1	Brake Overload	<ul style="list-style-type: none"> ● Short-circuited braking resistor or short-circuited braking resistor connecting wire. 	<ul style="list-style-type: none"> ● Check if the braking resistor or wiring is normal, press “RESET” key to reset or re-power on.
E.oC1	Brake Overcurrent	<ul style="list-style-type: none"> ● Sudden change or abnormality of feed back energy ● Low power of the braking unit ● Low resistance of the braking resistor 	<ul style="list-style-type: none"> ● Check the load variation and eliminate it. ● Select a braking unit with a higher power rating. ● Select the appropriate braking resistor value.
E.oH2	Brake Overheat	<ul style="list-style-type: none"> ● High ambient temperature ● Clogged air duct ● Loose fan cable insert ● Damaged fan ● Temperature detection circuit failure ● Brake unit power is low 	<ul style="list-style-type: none"> ● Reduce the ambient temperature ● Unclog the air duct ● Check and reconnect the wiring ● Replace the fan with the same model ● Seek technical support from the manufacturer

E.HAL	Abnormal current detection	<ul style="list-style-type: none"> ● Current Detection Circuit Malfunction 	<ul style="list-style-type: none"> ● Seek technical support from manufacturers
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Remarks:

1. E.OL1 alarm indicator flashes 1 time at 2 seconds interval;
2. E.OC1 alarm indicator flashes 3 times at 2-second intervals;
3. E.OH2 alarm indicator flashes 5 times at 2 seconds intervals.
4. E.HAL alarm indicator is always on.
5. When setting parameters, it is necessary to dismantle the panel of the braking unit and insert the standard keyboard of our inverter into the DB9 keyboard port of the PCB board of the braking unit in order to carry out parameter setting and related parameter detection.

Appendix I: External Keyboard Models

Model: KBD70-25 (Unit: mm)

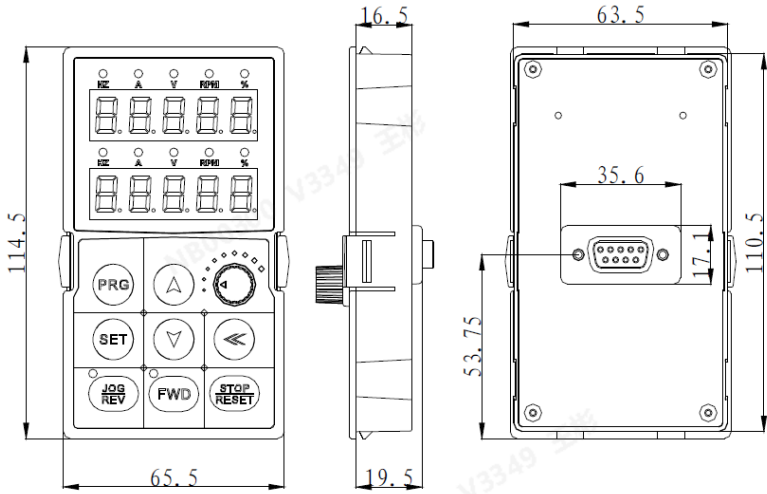


Fig. Appendix I Dimensions of the BU30 Brake Unit External Ledged Dual Line Keypad

Version Change Log

Date	Version after change	Content of change
2018.04	V1.1	First Edition Release
2019.02	V1.2	Added description of keyboard control content
2019.07	V1.3	Optimized the documentation section
2020.04	V1.4	Added BU30-6 product system.
2024.08	V1.5	1.Adding BU30-6-300 products 2.Adding BU30 parallel connection program and instructions 3.Adding braking unit, braking resistor selection recommendation table

VEICHI

SUZHOU VEICHI ELECTRIC Co.,Ltd.

Address:No.1000 Songjia road,Wuzhong Economic and Technological Development Zone,Suzhou

Phone:+86-512-6617 1988

Facebook:<https://www.facebook.com/veichiglobal/>

Whatsapp:+86-138 2881 8903

E-mail:overseas@veichi.com Web:<https://www.veichi.com/>



Official Website

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