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.Its 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

Danger

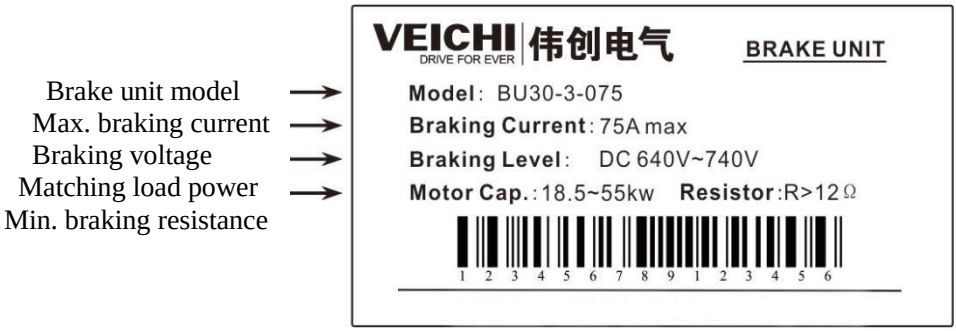
- Wiring operations must be performed by professionally qualified personnel, otherwise there is a risk of electric shock.
- When installing and wiring, the brake unit and other equipment such as inverters connected to it must be disconnected and wait for more than 10 minutes to confirm that the power 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.

Attention

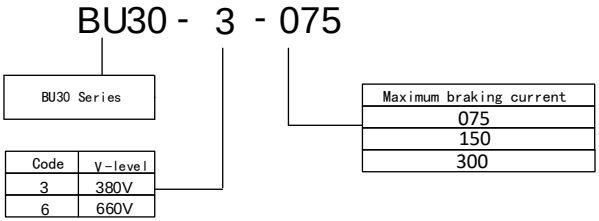
- The positive and negative terminals of the DC bus of the brake unit should not be reversed, otherwise it may not work or even cause damage to the equipment itself and related equipment, and there is a fire hazard.
- The brake unit should be installed in a well-ventilated area, otherwise the equipment 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 Name plate and model description



Model Description



2.2 Brake unit output specifications

The following table shows the recommended selection table for 380V and 660V machines.

Brake Unit Model	Minimum resistance	Peak braking current	Adaptable inverter power	
			light load	Heavy load
BU30-3-075	12Ω	75A	55~75KW	22~45KW
BU30-3-100	9Ω	100A	90~132KW	55~75KW
BU30-3-150	6.2Ω	150A	132~160KW	90~110KW
BU30-3-300	3Ω	300A	185~250KW	132~160KW
BU30-6-075	18Ω	75A	55KW~110KW	22~55KW
BU30-6-100	14Ω	100A	132~160KW	75~110KW

Table 2-1：Type specification of energy consumption brake unit

Note:

Minimum resistance: is the minimum value of braking resistance allowed to be connected to the braking unit.The actual braking resistor used must be selected according to the capacity of the equipment and the required braking torque, and not less than the minimum resistance value of the braking unit.

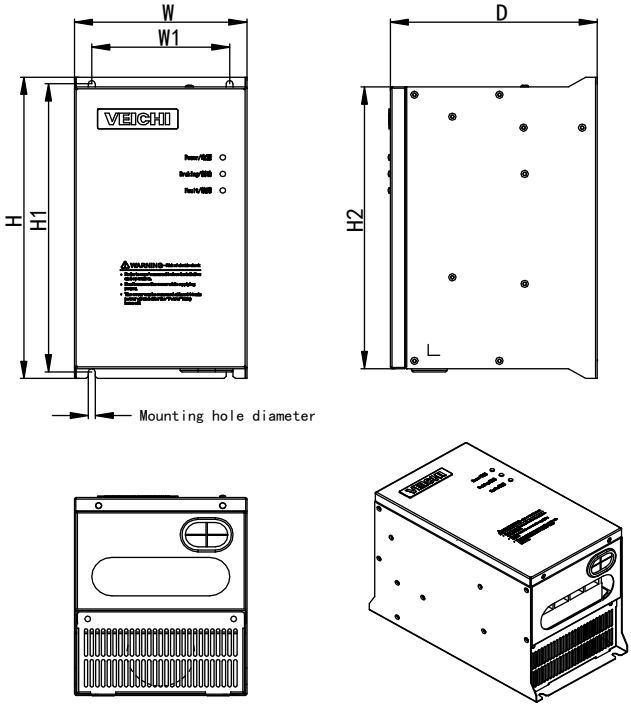
2.3 Technical Specifications

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 ±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℃，Good ventilation	
	Environmental humidity	Below 90% RH (no condensation)	
	Vibration degree	0.5g or less	
	Installation method	wall resignation	
	Cooling method	Air-cooled	

Table 2-2：Technical Specification

Chapter 3 Installation

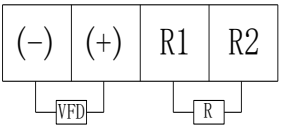
3.1 Mechanical mountin dimensions（Unit：mm）

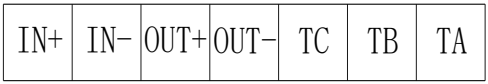


Brake Unit Model	Dimension				Installation hole position		Aperture
	W	H	D	H2	W1	H1	
BU30-3-075	150	274	180	256	120	262	Φ6
BU30-3-100							
BU30-3-150							
BU30-3-300	190	355	210	335	130	343	Φ6
BU30-6-075	180	320	205	300	130	308	Φ6
BU30-6-100							

3.2 Definition of terminal arrangement

Terminal arrangement order：

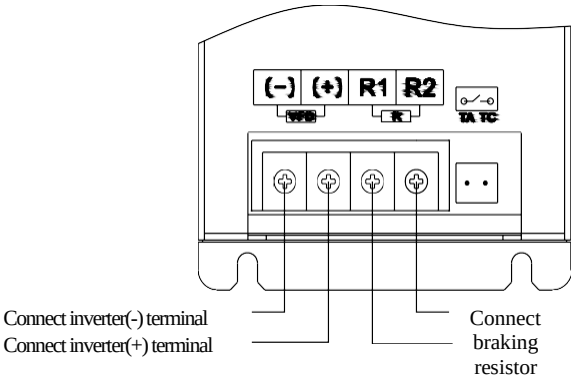




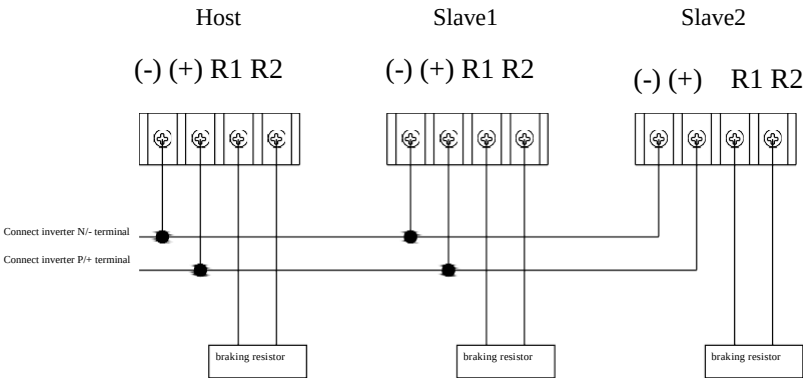
Terminal Sign	Terminal name	Terminal Function Definition
(-)	DC power input terminal	(-)Inverter bus negative
(+)		(+)Inverter bus positive
R1	Brake resistor terminal	Separately connected to the braking resistor terminal
R2		
IN+	Parallel drive input	Connect to host OUT+
IN-		Connect to host OUT-
OUT+	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 Wiring diagram

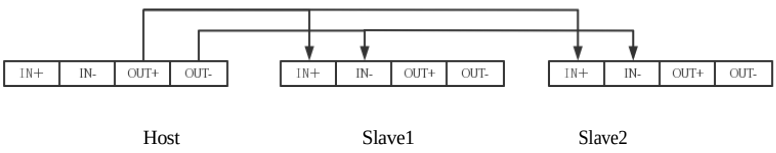
1、Single machine wiring diagram



2、Wiring diagram for parallel operation of multiple machines



Main circuit wiring diagram



Control circuit wiring diagram

Note：

The BU30 is able to adapt automatically when the brake unit is connected in parallel. In the few cases where automatic adaptation is not possible, it is necessary to adjust F4.00 (Braking Voltage) with the keyboard, For example, if the + - bus voltages of two units do not match, then we can adjust the braking voltage of either brake unit to accommodate.

The keypad of AC70T can be used on BU30 to adjust the keypad of the brake unit as follows：

Chapter 4 Keyboard Function

4.1 Basic parameter setting

NO.	Function code name	Setting value range and definition		Factory setting		Properties
		T3	**T6**	**T3**	**T6**	
F4.00	Braking Voltage	640V-740V	1070V-1170V	680V	1120V	○
F4.01	Hysteresis Loop Voltage	1V-40V		5V		○
F4.02	Fan start point	50℃-75℃		50℃		○
F4.03	Overheat protection point	75℃-85℃		75℃		
F4.04	Fault alarm selection	0- Select OL valid 2- Selecting OC valid 3- OL OC is valid at the same time 55- Turn off all fault alarms		2		
F4.05	Reserved	5 - 9999		5		
F4.06	Fault output logic selection	0- Positive logic 1- Inverse logic		0		
F4.07	Previous fault type					

F4.08	First two failure types			
F4.09	Fan switch selection	0- Start point on 1- Power up and turn on	0	
F4.10	Restore factory parameters	0- Forbidden by default 1- Restore factory values	0	
F4.11	Fault self-recovery times	0 - 3	0	
F4.12	Fault self-recovery waiting time	0.1 - 20.0s	1.0s	

"○": Indicates that the parameter cannot be changed while the drive is running.

4.2 Monitoring parameters

N0.	Function code name	Setting value range and definition
C-00	Temperature	0.1℃
C-01	Voltage	1V
C-02	Current	0.1A
C-03	Software Version	

4.3 Fault Information

Keyboard display	Fault Type	Possible failure causes	Troubleshooting
E.oL1	Brake overload	●Brake resistor short circuit or brake resistor connection wire short circuit; ●Abrupt or abnormal feedbacks; ●The power of the brake unit is low; ●The resistance value of the braking resistor is small;	●Check whether the brake resistor or connection is normal, press the "RESET" key to reset or reapply power. ●Checking for load variations and eliminating them. ●Selection of a brake unit with one higher power level. ●Selection of the appropriate resistance value of the braking resistor.
E.oC1	Brake overcurrent		
E.oH2	Brake overheating	●High ambient temperature; ●Blocked air duct; ●Loose fan connection inserts. ●Fan damage; ●Temperature detection circuit failure; ●The power of the brake unit is low;	●Lowering the ambient temperature. ●Unclogging of air ducts; ●Checking and reconnecting ●Replacement of the fan of the same type. ●Seeking technical support from manufacturers. ●Seeking technical support from manufacturers.
E.HAL	Abnormal current detection	●Fault in the current detection circuit.	●Seeking technical support from manufacturers.

Note:

1. E.oL1 Alarm indicator flashes once at 2-second intervals.
2. E.oc1 alarm indicator flashes 3 times at 2-second intervals.
3. E.Oh2 alarm indicator flashes 5 times at 2-second intervals.
4. E.HAL alarm indicator is always on.
5. When setting parameters, you need to disassemble the brake unit panel and insert the standard keyboard of our inverter into the DB9 keyboard port of the brake unit PCB to set parameters.

Chapter 5 Braking Resistor Selection

The braking resistor selection is based on the power generated by the motor in the actual application. It is related to the system inertia, deceleration time, bit energy load, etc. It needs to be selected by the customer according to the actual situation. The larger the inertia of the system, the shorter the deceleration time and the more frequent the braking, the larger the power of the braking resistor required and the smaller the resistance value.

5.1 Selection of resistance value of braking resistor

It can be based on the formula： $\mathrm{PD} = U^2/\mathrm{R}$

The formula U - the selected brake voltage grade

PD-Braking power

5.2 Braking resistor power selection

The braking resistor needs to be derated by 70% when used. According to the formula.PR=PD*KC/0.7

In the formula PR - braking resistor power

PD-Braking power

KC-Braking frequency

The braking frequency of common load types takes the following values for Kc in general

Elevator Kc＝10～15%

Lowering height of more than 100m crane Kc＝20～40%

Oilfield head knocker Kc＝10～20%

Unwinding and winding Kc＝50～60%

Centrifuge　Kc＝5～20%

Occasional braking of loads Kc＝5%

Other　Kc＝10%

The following table describes the braking resistor resistance, resistance power for the recommended value, if you need to use in the large inertia, long time frequent braking and special occasions, please provide the formula calculation and the selected inverter specifications, the rated parameters of the braking unit, appropriate adjustment of the braking resistor resistance and resistance power

Three-phase 380V level				
Motor power (kW)	Resistance value (Ω)	Ordinary inertia resistance power（W）	Large inertia recommended resistive power	Braking torque (%)
22 kW	21Ω	2,200W	2,200W*2	150%
30 kW	16Ω	3,000W	3,000W*2	150%
37 kW	13Ω	3,700W	3,700W*2	150%
45 kW	11Ω	4,500W	4,500W*2	150%
55 kW	8.2Ω	5,500W	5,500W*2	150%
75 kW	6.0Ω	7,500W	7,500W*2	150%
90 kW	5.0Ω	9,300W	9,300W*2	150%
110 kW	4.1Ω	11,000W	11,000W*2	150%
132 kW	3.4Ω	13,000W	13,000W*2	150%
160 kW	2.8Ω	15,000W	15,000W*2	150%
185 kW	2.5Ω	17,000W	17,000W*2	150%
200 kW	2.3Ω	18,500W	18,500W*2	150%
220 kW	2.1Ω	20,000W	20,000W*2	150%
250 kW	1.8Ω	22,500W	22,500W*2	150%
280 kW	1.6Ω	25,500W	25,500W*2	150%
315 kW	1.4Ω	30,000W	30,000W*2	150%
355 kW	1.3Ω	33,000W	33,000W*2	150%
400 kW	1.1Ω	42,000W	42,000W*2	150%

450 kW	1Ω	42,000W	42,000W*2	150%
500 kW	1Ω	42,000W	42,000W*2	150%
560 kW	1Ω	50,000W	50,000W*2	150%