

# Foreword

Thank you for choosing POWTRAN Brake Unit.

This manual provides user the relevant precautions on model no and specification, installation, wiring, function, routine maintain, abnormal diagnosis and remove, and how to select brake resistor etc. The manual can be used for system designer reference.

In order to ensure correct installation and operation of the frequency converter, please carefully read this manual before installing it.

POWTRAN is committed to the continuous improvement of the product performance, if any change of this information without prior notice

Powtran

August, 2014

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## Section I Safety Precautions

Please read the manual before the installation, operation and inspection of the product. For the safe operation, remind you to pay special attention to the “Warning” and “Attention” in the manual.

### \*Attention:

The potential danger will lead to slight or medium life harm or equipment damage. It could also warn the violate operation.

### Warning:

**The potential danger could lead to life harm or private loss!**

**Statement:** When the brake unit is used with other brand frequency inverter together, our company is only undertake the product quality problems of 3 packets of responsibility; If the customer need other projects of joint liability guarantee, Please cover insurance of the related domestic property insurance company yourself, In order to obtain relatively good liability to pay compensation.

### \*Attention:

- Do not use any brake unit and brake resistor lack of or with damaged spares.
- Do not touch the internal spares for there are CMOS spares on the control card of the brake unit. Otherwise it will damage the spares.
- Please add the fan or other cooling equipment when multiple brake units installed parallel in the one cabinet.

### \*Attention:

- Ensure the right setting of brake unit and brake resistor.
- Do not make voltage resistance test on the brake unit, or it will lead semiconductor spares damaged in the main circuit of the brake unit.
- Fix the screw when connecting, or the loose connection will lead fire or creepage.

**\*Attention:**

- Do not touch the brake unit, the internal spares and printing board after the brake unit is connected, otherwise it will lead to electric shock. There is high voltage direct current inside.

**\*Attention:**

- Do not touch the heat sink of the brake unit and the brake resistors, otherwise it will lead to scald or electric shock. There is high temperature and heated spares inside after the brake unit is connected.

**\* Attention:**

- The brake resistor should be with temperature and other protection. Because the brake unit is defective when the brake resistor keeps heated, it should have been isolated itself. Powtran will not take the responsibility of such accident caused by no automatic isolation.

 **Warning:**

- The unit and brake resistor should be installed on the medium with flame retardancy.
- Connection is allowed only when the power is switched off and completely out of power.
- Only well-trained personnel are allowed to use this unit.

 **Warning:**

- Ensure the correct connection before running.
- Ensure the right host and slave selection and voltage class before running.

 **Warning:**

- Only when the charge light is off and ensure the charge voltage is 0 with the multimeter, the brake unit could be adjusted and repaired.
- During the running, do not touch any spares inside.

 **Warning:**

- Please refer to the content in the manual when analyze and manage the fault of the brake unit. Any modification to the brake unit is not allowed otherwise the life harm and property loses will not be burdened by Powtran.

 **Warning:**

- This product is the accessories of the inverter, if it is used improperly which would not only do damage to itself but also to the inverter. Please pay much attention to this.

## **Section II Inspection**

Powtran Brake Unit has been tested and inspected before leaving the manufacturer. Before unpacking the product, please check if the package is damaged due to careless transportation, and if the specifications and type of the product complies with the order. Please contact the supplier of Powtran products if any problems are found.

Only the well-trained personnel are allowed to use this unit, and such personnel must read through the parts of this manual relating to the safety, installation, operation and maintenance before using the unit. The safe operation of this unit depends on correct transport, installation, operation and maintenance.

## Section III Installation

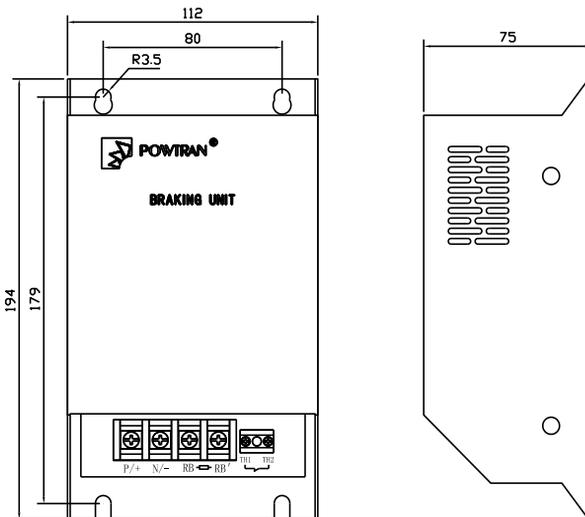
### 3-1. Conditions for Use

Hanging Brake unit should be installed inside the house where is ventilative.

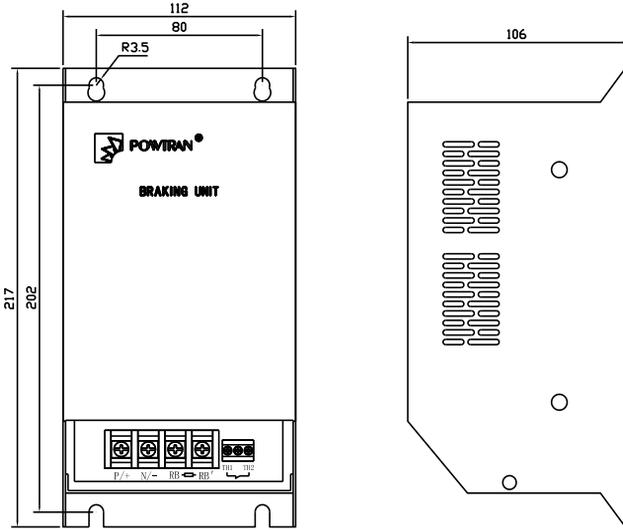
Ambient condition should accord with the followings:

- (1). Environmental temperature  $-10^{\circ}\text{C}$  to  $50^{\circ}\text{C}$  Above  $40^{\circ}\text{C}$ , the capacity will decrease 3% by each  $1^{\circ}\text{C}$ . So it is not advisable to use inverter above  $50^{\circ}\text{C}$
- (2). Preventing electromagnetic interference, away from the interference sources
- (3). Prevent dropping dust, powder, cotton fiber or fine metal powder from entering it.
- (4). Prevent oil, salt and corrosive gas from entering it.
- (5). Avoid vibration.
- (6). Avoid high temperature and moisture and avoid being wetted due to raining, with the humidity below 90%RH (not dewing).
- (7). Prohibit the use in the dangerous environment where inflammable or combustible or explosive gas, liquid or solid exists.

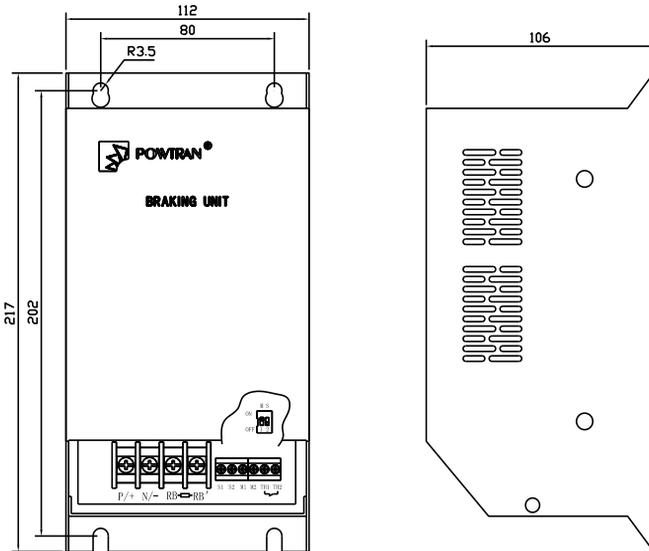
### 3-2. Sharp size



(A)PB6012/PB6014

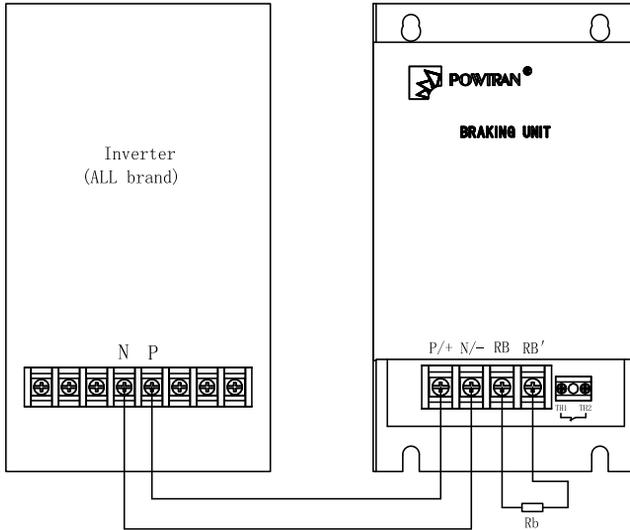


(B) PB6022/PB6024



(C) PB6032/PB6034

**3-3.Main circuit specification:**



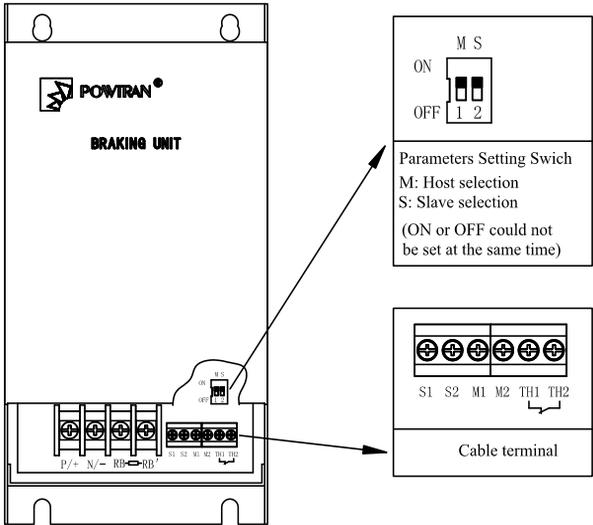
Connection diagram of Brake unit and Inverter

**\*NOTE:**

- (1) Cable length of the frequency converter and braking unit is less than 5 m
- (2) Cable length of the Braking resistor (Rb) and brake unit is less than 10 m, and must use heat-resisting conductors
- (3) P, N is the terminal "+" "-" of the frequency inverter dc bus, P is the positive terminal, e, N is a negative terminal "-"
- (4) P, N line must be twisted together, Rb and Rb ' line must be twisted together..

**⚠ Warning: Incorrect connection of the main circuit will lead the damage to the brake unit and inverter.**

## Section IV Function Parameter Description



Parameter setting switch and control terminal

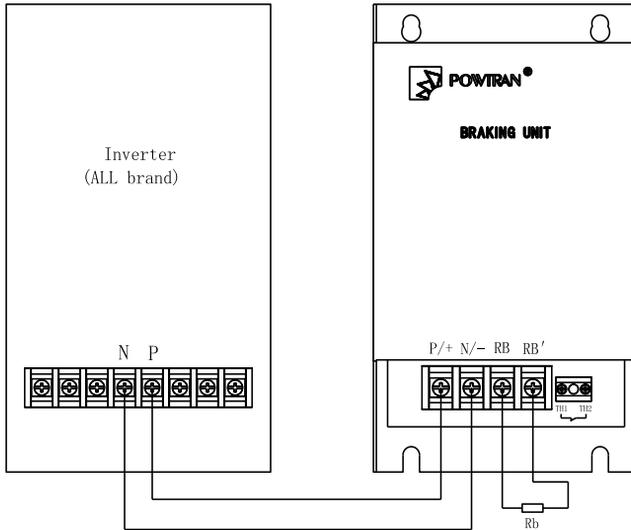
Note: Only PB6032, PB6034 have M, S slave and host selection, but other type no. The voltage class is set OK during the factory setting.

**Warning: Incorrect selection of the slave and host will lead abnormal running and damage!**

Description of control circuit terminal of the brake unit

Terminal	Specification	Note
Parameter Setting switch	1	Slave and host selection switch, when M is ON, the brake unit is set to be host brake unit
	2	Slave and host selection switch, when S is ON, the brake unit is set to be slave brake unit.
Control	M1/M2	Slave and host control terminal
	S1/S2	Slave and host control terminal
	TH1/TH2	OH protection switch(always close)

## Section V Single Unit Running



Connection diagram of single brake unit and inverter

When 1 unit is used, please refer to the above diagram, connect the inverter, brake unit and brake resistor and run it.

### 200V grade

Voltage selection	the input power supply voltage of the frequency inverter	Brake starting voltage (PN voltage)
220V	220VAC	365VDC $\pm$ 3%

### 400V grade

Voltage selection	the input power supply voltage of the frequency inverter	Brake starting voltage (PN voltage)
380V	380VAC~415VAC	690VDC $\pm$ 3%

\* NOTE:

(1) if the grid voltage 20% higher than the normal voltage supply, please set the larger voltage.

(2) please confirm starting braking voltage match the device .

 **Warning: in the CHARGE indicating lamp before fully extinguished (there is voltage between PN) not allowed to adjust the settings!**

## Section VI Paralleled running

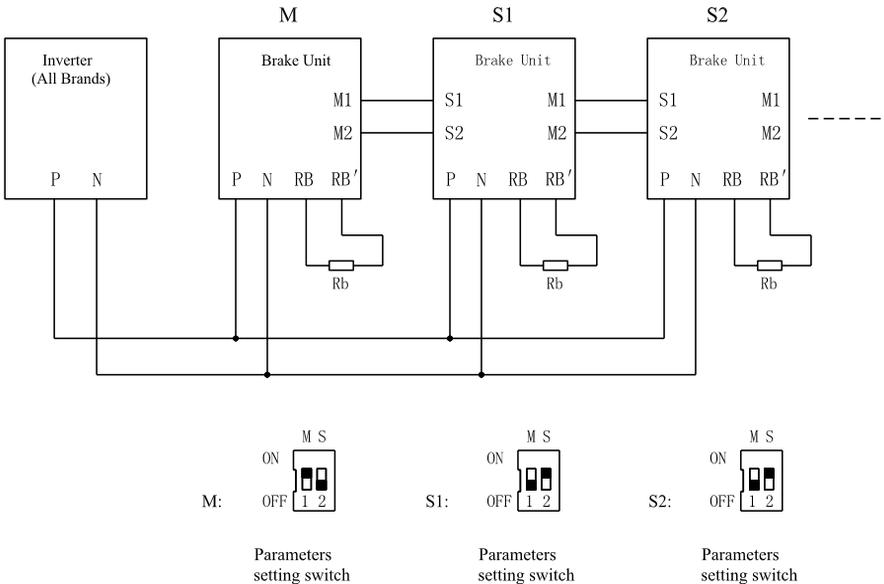


Diagram of the connection of paralleled running brake unit and inverter (Only PB6032,PB6034 with this function)

If 2 or more over brake units are paralleled, please refer to the above diagram and connect the inverters, multiple brake units and brake resistors.

### 6-1、Host and slave select of function setting

- (1) The factory setting of the brake unit is set to be the host (M), do not modify the factory setting if only one brake unit is used.
- (2) When 2 or more over brake units are paralleled, the control terminal (S) is used. Please refer to the “Host and slave control connection”.

### 6-2、Host and slave control connection

- (1) The brake unit has host/slave switch. Set the brake unit 1 to be “M”, the brake unit 2 and 3 to be “S”
- (2) Connect separately M1, M2 of the brake unit 1 with S1, S2 of the brake unit 2;  
Connect separately M1, M2 of the brake unit 2 with S1, S2 of the

brake unit 3. Etc.

**\*Note:**

Double wind the M1, M2 and S1, S2, and please make it as short as you can; the maximum paralleled brake units is only 10.

## Section VII Fault Diagnosis and Solutions

NO.	Fault state	Reason	Processing method
1	The brake resistor heated badly when it brakes.	Main circuit power IGBT of the unit short circuit	Change brake unit
		Incorrect selection of the brake unit voltage	Choose suit voltage brake unit
		Brake unit faulted	Change brake unit
2	Inverter OU	Lack of braking of the brake resistor	check the brake condition
		Not suited brake unit voltage	braking unit voltage too high
		Brake unit faulted	Change brake unit
3	relay action over heat protection	Heat sink temperature over 80℃	Braking rate is too high, forced air cooling

**\*NOTE:**

The electric net voltage is too high, please select the high voltage setting.

**⚠ Warning: Open the P and N, ensure there is no voltage between PN when use and inspect the unit! This unit control circuit is not isolated circuit.**

## Section VIII Standard specification

### 8-1、 Model specification:

200V level (200/220/240V)

Type	Sharp size	Allowed max. brake current (65°C)*
PB6012	A	40A
PB6022	B	70A
PB6032	B	140A

400V level (380/415V)

Type	Sharp size	Allowed max. brake current (65°C)*
PB6014	A	40A
PB6024	B	70A
PB6034	B	140A

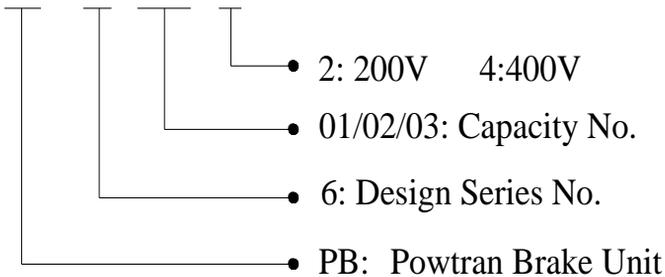
#### \*NOTE:

The allowed maximum current of the power spares IGBT inside the brake unit with the certain temperature.

### 8-2、 Model designation:

e.g.:

PB 6 01 2



**8-3、200V specification and selection reference:**

Capacity no. HP(kW)	Brake Unit		Brake resistor (150% brake torque)	
	Type	Qty(pc)	Type	Qty(pc)
7.5(5.5)	PB6012	1	30Ω/520W	1
10(7.5)		1	20Ω/780W	1
15(11)		1	13.6Ω/2400W	1
20(15)		1	10Ω/3000W	1
25(18.5)	PB6022	1	8Ω/4800W	1
30(22)		1	6.8Ω/4800W	1
40(30)		1	5Ω/6000W	1
50(37)		1	5Ω/6000W	1
60(45)	PB6032	1	3.4Ω/9600W	1
75(55)		1	3.4Ω/9600W	1
100(75)	PB6032	2	5Ω/6000W	2
125(93)	PB6032	3	5Ω/6000W	3
150(110)		3	5Ω/6000W	3

**8-4、400V specification and selection reference:**

Capacity no. HP(kW)	Brake Unit		Brake resistor (150% brake torque)	
	Type	Qty(pc)	Type	Qty(pc)
7.5(5.5)	PB6014	1	75Ω/780W	1
10(7.5)		1	50Ω/1040W	1
15(11)		1	50Ω/1040W	1
20(15)		1	40Ω/1560W	1
25(18.5)		1	32Ω/4800W	1
30(22)		1	27.2Ω/4800W	1
40(30)	PB6024	1	20Ω/6000W	1
50(37)		1	16Ω/9600W	1
60(45)		1	13.6Ω/9600W	1
75(55)		1	10Ω/12000W	1
100(75)	PB6034	1	6.8Ω/12000W	1
125(93)		1	6.8Ω/12000W	1

150(110)		1	6.8Ω/12000W	1
175(132)	PB6034	2	6.8Ω/12000W	2
200(160)		2	6.8Ω/12000W	2
250(187)	PB6034	3	6.8Ω/12000W	3
300(220)		3	6.8Ω/12000W	3

**8-5、 Brake resistor selection:**

- (1) The best braking resistance with no sense of resistance, in order to reduce the inductance.
- (2) Braking resistor grounded is strictly prohibited, otherwise it will lead the serious damage to the unit and inverter
- (3) Selection of the brake resistor capacity is for reference, it depends on the load inertia, brake frequency, etc characteristic. Please inquire Powtran when you have questions

**\*NOTE:**

- (1) Parallel braking unit can improve the braking capability.
- (2) Braking ability of 2 sets brake unit parallel is 2 times for single one.

Example:  $PB6032 = PB6022 \times 2 = PB6012 \times 4.$

## **Section IX Warranty**

The product quality shall comply with the following provisions:

### 1. Warranty terms

1-1. The product from the user the date of purchase, the warranty period of 12 months (limited to domestic market).

1-2. Export products and non-standard products warranty period is 12 months or according to the agreement of warranty execution.

1-3. The product from the user the purchase date, guarantee to return, replacement, repair service, within one month after the date of shipment.

1-4. The product from the user the date of purchase, replacement, repair within three months after the date of shipment.

1-5. The product from the user the purchase date, enjoy lifelong compensable service.

### 2. Exceptions clause

If belongs to the quality problems caused by following reasons products, not within the warranty.

2-1. The user is not in accordance with the "products manual" is used method of operation caused the failure.

2-2. Users without permission to repair or alteration caused by product failure.

2-3. Users beyond the standard specifications require the use of the inverter caused by product failure.

2-4. Users to buy and then fell loss or damage caused by improper handling.

2-5. Because the user use environment device caused by aging lead to product failure.

2-6. Due to the fault cause of earthquake, fire, lightning, wind or water disaster, abnormal voltage irresistible natural disasters.

2-7. Damaged during shipping (Note: the transport mode specified by the customer, the company to assist to handle cargo transfer procedures).

3. The following conditions, manufacturers have the right not to be warranty

3-1. No product nameplate or product nameplate blurred beyond recognition.

3-2. Not according to the purchase contract agreement to pay the money.

3-3. For installation, wiring, operation, maintenance and other users can not describe the objective reality to the company's technical service center.

4. In return, replacement, repair service, shall be returned the company, confirmed the attribution of responsibility, can be returned or repair