PETER electronic

User manual

Braking Unit for Frequency Inverter
Serie 3CV 380 – 480V 18,5 bis 55kW

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PREFACE

Braking unit is used to consume regenerative energy from motor in the braking resistor at deceleration and to improve the inverter braking ability.

Before using the braking unit, a through understanding of this manual is recommended. This instruction manual will be a great help for daily maintenance, inspection and troubleshooting.

The Braking unit can be connected as FUS … /3CV.

CONTENTS

NOTES FOR SAFE OPERATION

The following conventions are used to indicate precaution in this manual.
Failure to heed precaution provided in this manual can result in serious or possibly even fatal injury or damage to the products or to related equipment and system.

 CAUTION：Indicated precaution that, if not heeded, could result in relatively serious or minor injury , damage to the product, or faulty operation.

 DANGER：Indicated precaution that, if not heeded, could possibly result in loss of life or serious injury.

——————RECEIVING——————

 Do not install or operate any braking unit which is damaged or has missing parts.

——————INSTALLATION——————

 Lift cabinet by the base, when moving the unit, never lift by the front cover. Otherwise, the main unit may be dropped causing damage to the unit.

 Mount the braking unit and resistor on nonflammable material. Failure to observe this caution can result in a fire.

 When mounting braking unit (Individually or multiple) in an enclosure, install a fan or other cooling device to keep the intake air temperature below 40□. Over hearting may cause a fire or damage to the unit.

——————WIRING——————

 Connect the Inverter’s DC bus terminal N、P to Braking unit’s main circuit terminal N(-)、P(+) properly. Otherwise, the Inverter or Braking unit will be damaged.

Always turn OFF the input power supply and wait until the CHARGE indicator light goes out before wiring terminal. Otherwise, an electric shocks or fire can occur.

Do not touch the Braking unit and Braking resistor while power is applied to the circuit. Failure to observe this warning can result in personal injury.

Wiring should be performed only by qualified personnel. Failure to observe this warning can result in an electrical shock or a fire.

Make sure to earth the ground terminal  , Grounding resistance 200V class 100Ω or less, 400V class 10Ω or less.

When wiring the emergency stop circuit, check the wiring thoroughly before operation.Failure to observe this warning can result in personal injury.

Never touch the fins (heat-sink) of the Braking unit or discharge resistor. These can become very hot. Failure to observe this warning can result in personal injury.

Install the discharge resistor on nonflammable material, provide sufficient spaces from other devices, the 1 meter distance are recommend, Failure to observe this caution can result in a fire.

Verify that the rated voltage setting jumper of the braking unit coincides with the Inverter input supply voltage. Failure to observe this caution can result in personal injury or a fire.

Tighten terminal screws to the specified tightening torque. Failure to observe this caution can result in a fire.

Do not perform a withstand voltage test of the braking unit and braking resistor unit. It may cause braking unit inside element to be damaged.

——————————OPERATION——————————

Do not remove the cover while the power is ON, current is flowing. Failure to observe this warning can result in an electrical shock.

Do not check signals during operation. The Braking unit or the Inverter may be damaged.

 Never touch the discharge resistor. These can become very hot. Failure to observe this warning can result in personal injury.

 Never modify the product, Failure to observe this warning can result an electrical shock or personal injury and will invalidate the guarantee.

———MAINTENANCE AND INSPECTION————

 Perform maintenance or inspection only after verifying that the CHARGE LED goes OFF, after the main power supply is turn OFF. The capacitors are still charged and can be dangerous.

 Never touch high-voltage terminals in the braking unit and braking resistor. Failure to observe this warning can result in an electrical shock.

 Only authorized personnel should be permitted to perform maintenance, inspection or parts replacement. Failure to observe this warning can result in an electrical shock.

1. RECEIVING

The braking unit has been put though several tests at the factory before shipment. After unpacking, however, check and see the following.

Their model and capacity of the braking unit meet your requirement.

Is there any damage while transportation. If so, do not apply the power.

If any of above is found, contact nearest distributor or sales representatives.

2. ENVIRONMENTAL PRECATION

The environment will directly affect the proper operation and the life of the braking unit, so install the braking unit in an environment complies with the following conditions:

Ambient temperature: -10°C - +40°C; (take the dustproof cover off : -10°C - +50°C)

Avoid exposure to rain or moisture.

Avoid direct sunlight.

Avoid smoke and salinity.

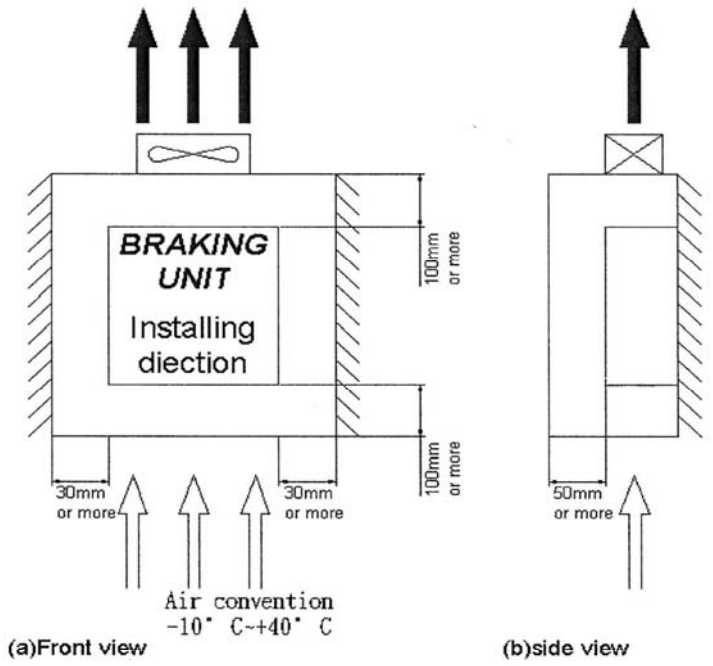
Avoid erosive liquid and gas.

Avoid dust, bats, and small metal pieces.

Keep away from radiative and flammable materials.

When mounting multiple braking units are placed in the same control panel, add extra heat dissipators to keep the temperature below 40°C.

Place the front side of the braking unit onward and top upward to help heat dissipation. Install the inverter according to the following figures: (take the dustproof cover off to help heat dissipation if installed in a box or the environment allows to do so)



3. MODEL-IDENTIFICATION

Model name **TBU - 4 30**

Series — Applicable Inverter voltage — Applicable motor rated capacity

4: 380 - 480V

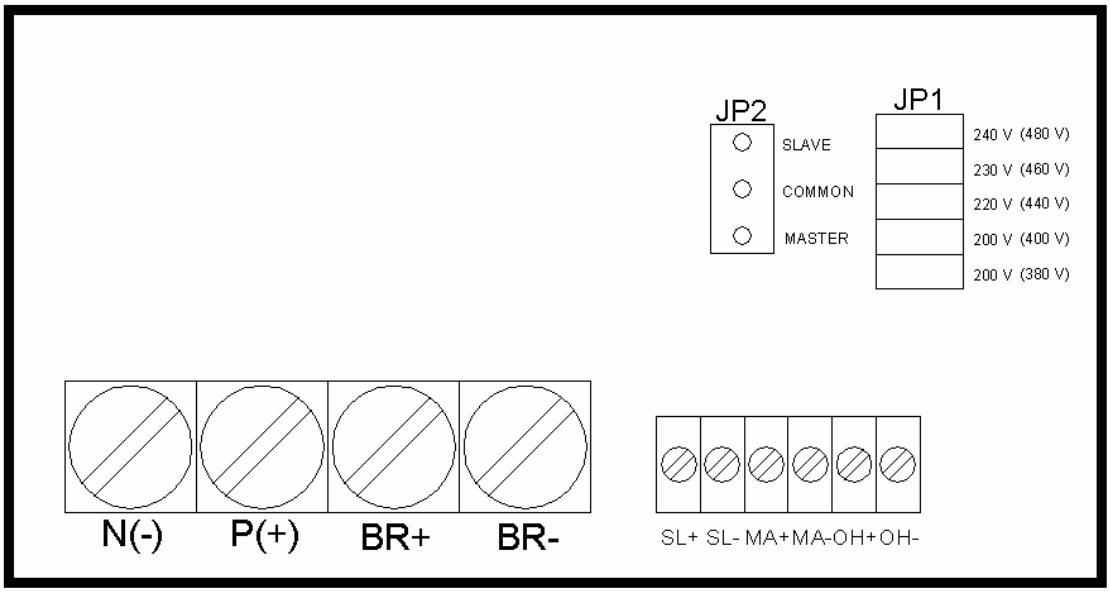
30: 30Hp

4. SPECIFICATION

Applicable Inverter voltage		380V - 480V
Braking unit model		TBU-430
Output Characteristics	Applicable Motor Output	18,5kW – 55kW
	Rated Discharge Current (A)	15
	Max Discharge Current (A)	40
	Braking Start Voltage (VDC)	618/651/716/748/781VDC →±6V
Power Supply	Inverter Input Voltage	380 - 480VAC
	Inverter DC BUS Voltage	460 - 800VDC
Prot. Function	Overheat	Thermostat (with contact output)
	Power Charge Indication	Charge lamp stays ON until bus voltage drops below 50VDC
Environment Conditions	Location	Indoor (Protected from corrosive gases and dust)
	Ambient Temperature	- 10°C - + 40°C
	Storage Temperature	- 20°C - + 70°C
	Humidity	0 - 95%RH (non-condensing)
	Vibration	1g less than 20Hz ; up to 0.3g at 20 - 50Hz
	Enclosure	IP20
	Safety level	CE/UL/cUL
	Installation	Screw mounted
	Parallel connection	Parallel connection of braking unit is possible to use in the inverter with bigger horsepower
	Dimension (W*H*D)	149mm * 184mm * 146mm

● Loading time rate can be used below 10%ED (max. 10s)

5. SECTION NAME



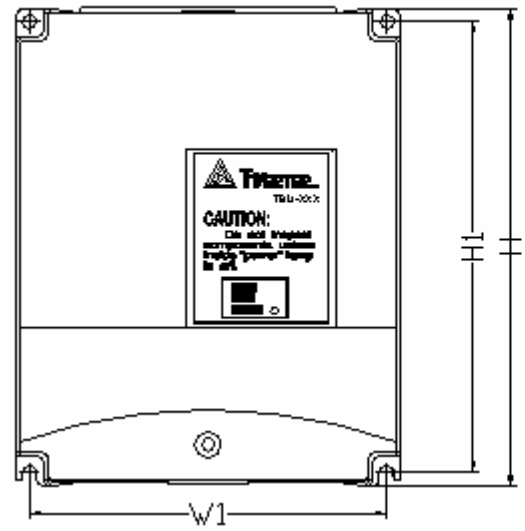
5.1 Circuitry terminal description

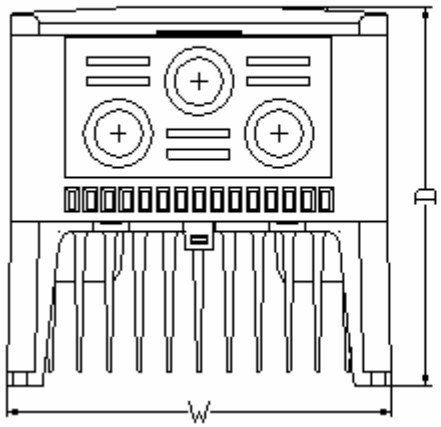
Purpose	Terminal Symbol	Description
Main circuit power input	P(+)	DC-Bus power input terminals (P(+) positive terminal, N(-) negative terminal)
	N(-)	
	BR+	Braking resistor output terminals. (Resistor specification please refer to braking resistor list)
	BR-	
	⏚	Grounding terminal
Control circuit	SL+	Parallel connect Slave input positive terminal
	SL-	Parallel connect Slave input negative terminal
	MA+	Parallel connect Master input positive terminal
	MA-	Parallel connect Master input negative terminal
	OH+	Braking unit over-heat protection relay output terminal (1A/125VAC, 2A/ 30VDC)
	OH-	

5.2 Jump function description

	Description
JP1	Braking unit power supply voltage selection; selected the properly voltage level to make the braking start level corrected.
JP2	Master / Slave station selection Master station: MASTER-COM, (Factory default) Slave station: SLAVE-COM (Only multiple braking units needed)

6. DIMENSION





unit:mm

MODEL	W	H	D	W1	H1	Weight
TBU-230	149	184	145.7	138	174	2.3Kg
TBU-430						

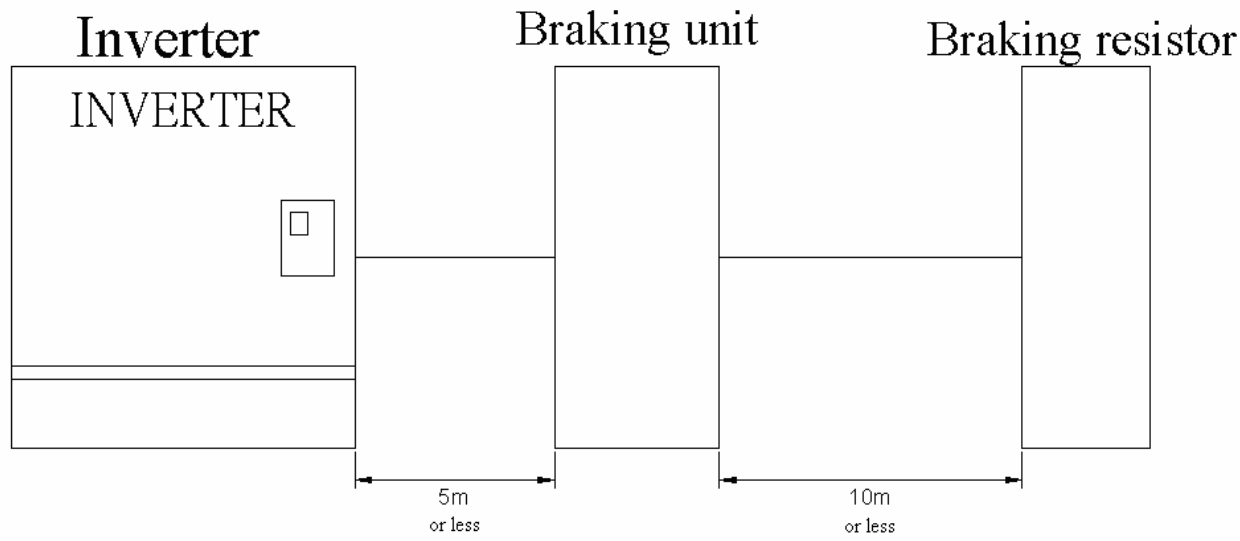
7. WIRE PRECATION

7.1 Circuits and wire specification

Braking unit	Purpose	Terminal Symbol	Wire sizes AWG (mm²)	Wire type	Terminal Screws
TBU-430	Main circuit	N(-) , P(+) BR+ , BR- ⏚	12-10 (3.5-5.5 mm²)	Power cables, e.g., 600V, vinyl power cables	M4
	Control circuit	SL+ ,SL-, MA+, MA-, OH+, OH-	18-14 (0.75-2 mm²)		M3

7.2 Wire distance

Since the braking unit and braking resistor generates heat, provide sufficient spaces from other devices which are weak against heat.



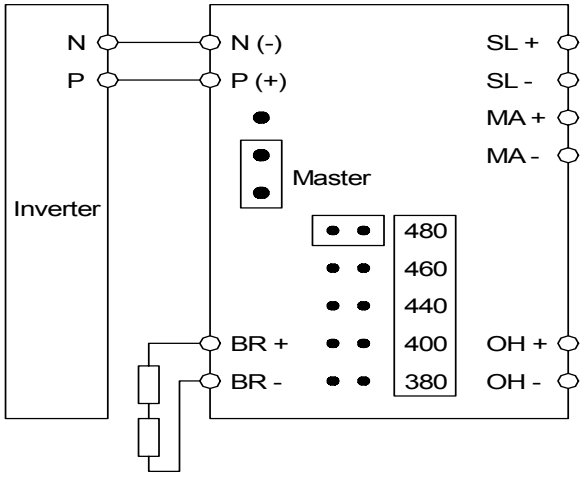
⚠ Make sure to ground the grounding terminal ⏚ , use the properly wire and tighten M4 terminal screws to the specified tightening torque.

8. INTERCONNECTION

Braking units have a master/slave selection connector, the master side selected prior to shipment, for using more than one parallel connected braking unit, selected slave side for braking units second unit and above.

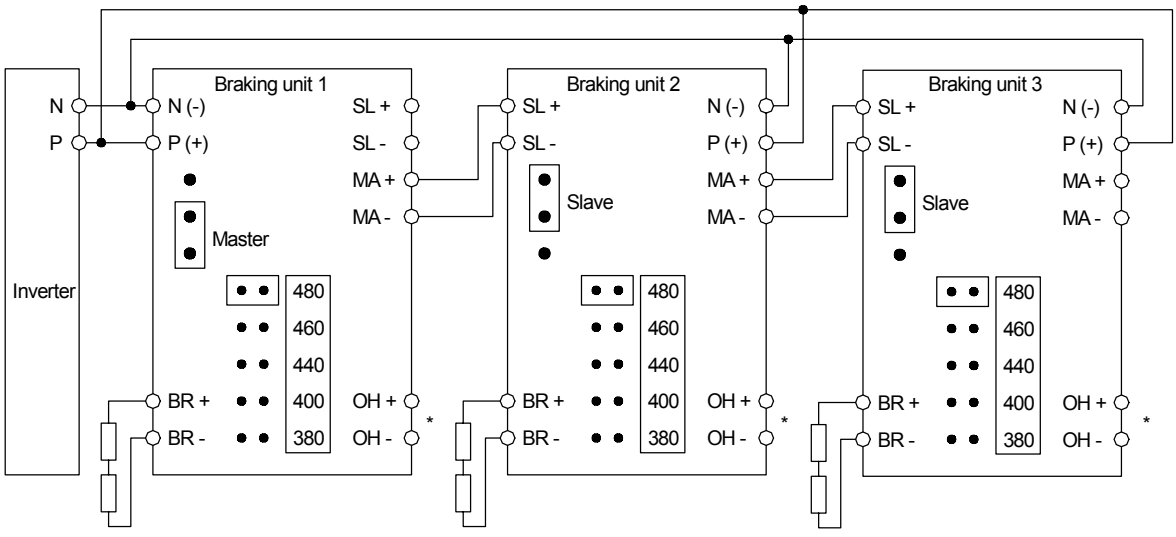
8.1 One braking unit installation

(One Inverter connected to one braking unit)



8.2 Parallel connection of braking units

(One Inverter connected to multiple braking units)



* Thermostat with relay:
1A/125VAC
2A/30VDC

For using multiple braking units need to parallel connected the barking units' main circuit terminal and selector the jumper 2(JP2) as follows:

1) Braking unit 1 as the Master station, check the JP2 selection is in MASTER-COM.
2) Braking unit 2 & 3 as the Slave station. Make sure the JP2 selection is in SLAVE-COM
3) Connect braking unit 1 terminal MA+，MA- to braking unit 2 terminal SL+，SL-,

   Braking unit 2 terminal MA+，MA- to braking unit 3 terminal SL+，SL-.

4) Braking unit terminal BR+，BR- connect to braking resistor.
5) **Make sure all the braking unit JP1 (voltage selection) selected corrected, then the parallel connection braking units start level will coincide.**

8.3 Braking unit and braking resistor unit application list

INVERTER		Braking Unit		Braking Resistor				Approx. Braking Torque (10%ED)
Voltage	kW	Braking Unit	Q'ty	MODEL NO.	Braking Resistor Specification	Q'ty	Min Ohm Value	
380V – 480V	18,5	TBU-430	1		1200W/30Ω	4	19.2Ω	119%(10%ED)
	22	TBU-430	1		1200W/30Ω	4	19.2Ω	117%(10%ED)
	30	TBU-430	1		1500W/20Ω	4	19.2Ω	119%(10%ED)
	37	TBU-430	2		1200W/30Ω	8	19.2Ω	119%(10%ED)
	45	TBU-430	2		1200W/30Ω	8	19.2Ω	117%(10%ED)
	55	TBU-430	2		1500W/20Ω	8	19.2Ω	126%(10%ED)

 Select the braking resistor by this list. Failure to observe this warning can damage to the unit.

9. TROUBLESHOOTING

Fault Status	Cause	Corrective Action
Braking unit or resistor acted when the Inverter during the acceleration or constant speed. Make the resistor over load	Without braking unit: Inverter built-in braking discharge transistor is in short circuited.	Repair the Inverter's braking circuit. Replace the Inverter
	With braking unit: Braking unit discharge transistor is in short circuited.	Repair the braking unit's braking circuit. Replace the Braking unit
	Improper selection the input voltage level J2, (Power supply voltage > braking unit's power supply voltage selection).	Set the correct JP2 position.
	Input power voltage high than the voltage specification.	Improved the input power voltage.
Inverter trips at over voltage (OV)	Insufficient braking capacity	Examine the braking capacity. Increase inverter's deceleration time
	Improper wiring	Check the wire
	Braking unit malfunction	Replace the Braking unit
Braking unit trips by heat sink over heat	Inverter Start/Stop frequently	Examine the operating condition
	Load inertia too heavy	
	Improper combination of braking unit and transistor	Selective by specification
	Ambient temperature above 40°C	Check the location conditions