

Emotron VSA Brake Unit



Instruction manual
English

emotron[®]
DEDICATED DRIVE

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1. Preface

The Brake Units from this BU-series are used to consume regenerative energy from the to a VSA-series connected motor in the external mounted brake resistor during deceleration and to improve the inverter braking capability.

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

2. Safety Information

The following symbols are used to indicate precautions in this manual.

Failure to pay heed to the precautions 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: Indicate precaution that, if not heeded, could result in relatively serious or minor injury, damage to the product, or faulty operation.



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

2.1 Receiving



Do not install or operate a Brake Unit which is damaged or has missing parts.

2.2 Installation



Lift the unit 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 Brake Unit and resistor on non-flammable material. Failure to observe this caution can result in a fire.



For safety reason, it is necessary to install a thermal switch on the brake resistor. Devices sensitive to heat should be kept away from the brake resistor generating heat.



When mounting the Brake Unit (individually or multiple) in an enclosure, install a fan or other cooling device to keep the inside air temperature below +50°C. Over heating may cause fire or damage to the unit.

2.3 Wiring



Connect the VSA-series DC bus terminal N and P properly to the Brake Unit's main circuit terminal  , . Otherwise, the VSA or Brake Unit will be damaged



Always switch OFF the input power supply and wait until the POWER indicator LED is off, before wiring terminals. Otherwise, an electric shock or fire can occur.



Do not touch the Brake Unit and brake 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 PE, 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 Brake Unit or brake resistor. These surfaces can become very hot. Failure to observe this warning can result in personal injury.



Install the brake resistor on non-flammable material, provide sufficient space from other devices, at least 0,25 meter distance is recommended. Failure to observe this caution can result in a fire.



Verify that the rated voltage setting jumper of the Brake Unit fits with the VSA 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 high voltage isolation test on the Brake Unit and brake resistor unit. This may cause damage to the unit.

2.4 Operation



Do not remove the cover while the power is switched on and the POWER indicator LED is on. Failure to observe this warning can result in an electrical shock.



Do not check signals during operation. The Brake Unit or the VSA unit may be damaged.



Never touch the brake resistor. This can become very hot. Failure to observe this warning can cause personal injury.



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

2.5 Maintenance and inspection



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



Never touch high-voltage terminals in the Brake Unit and brake 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.

3. Receiving

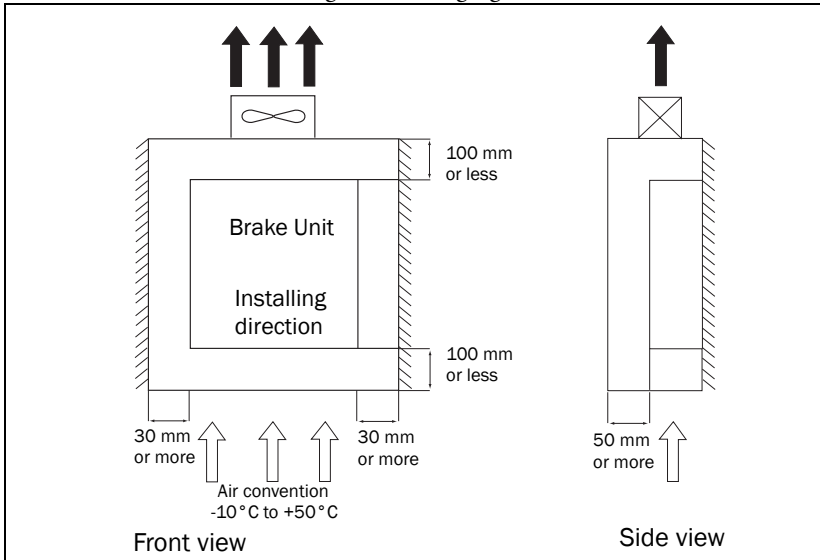
The Brake Unit has been put through several tests at the factory before shipment. After unpacking, however, check the following.

- Make sure that the model and capacity of the Brake Unit meet your requirement.
- If there is any damage caused during transportation. If so, do not apply the power. Contact your supplier.

4. Environmental precaution

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

- Ambient temperature: $-10^{\circ}\text{C} \sim +50^{\circ}\text{C}$
- Avoid exposure to rain or moisture.
- Avoid smoke and salinity.
- Avoid dust, bats, and small metal pieces.
- When mounting multiple Brake Units, placed in the same control panel, take appropriate measures to keep the temperature below 50°C .
- Avoid direct sunlight.
- Avoid erosive liquid and gas.
- Keep away from radiative and flammable materials.
- Place the front side of the braking unit onward and top upward to help heat dissipation.
- Install the inverter according to following figures:



5. Model name

Table 1

BU	23 -	08
Series	Applicable Inverter voltage 23: 230V, 48: 400V	Applicable rated current 08: 7,5A (2,2kW / 3HP @230V) 03: 3A (2,2kW / 3HP @400V)

6. Specification

Table 2

Applicable Inverter voltage		200V ~ 240V	380V ~ 480V
Brake unit model		BU23-08	BU48-03
Output Characteristics	Applicable Motor Output KW (HP)	2.2KW (3HP)	2.2KW (3HP)
	Rated Discharge Current (A)	7.5	3
	Max Discharge Current (A)	15	7.5
	Braking Start Voltage (VDC)	DC358/390V ¹⁾ ± 3%	DC716/781V ¹⁾ ± 3%
Power Supply	Inverter Input Voltage	50/60Hz 200 ~ 240VAC	50/60Hz 380 ~ 480VAC
	Inverter DC BUS Voltage	243 ~ 400VDC	460 ~ 800VDC
Protective Function	Overheat	LED indication and the Brake unit will stop.	
	Power Charge Indication	Charge LED stays ON until bus voltage drops below 50 VDC	
Environment Conditions	Location	Indoor (Protected from corrosive gases and dust)	
	Ambient Temperature	- 10° ~ + 50°C	
	Storage Temperature	- 20° ~ + 70°C	
	Humidity	0 ~ 95%RH (non-condensing)	
	Vibration	1G less than 20Hz up to 0.3G at 20 ~ 50Hz	
	Enclosure	IP20	
	Safety level	UL/cUL	
Installation	Screw mounted		

Table 2

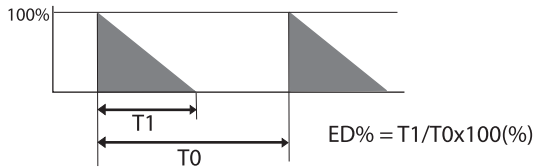
Applicable Inverter voltage		200V ~ 240V	380V ~ 480V
Brake unit model		BU23-08	BU48-03
Environment Conditions	Parallel connection	Parallel connection of Brake Unit is possible to use in combination with inverter with higher power	
	Dimension (W*H*D)	77 * 132 * 130 mm	

1)Level depends on position of jumper JP201, see chapter 7.2 page 12

Loading Time rate

- Loading time rate can be used below 10% ED (Max 10 seconds).

Explanation:

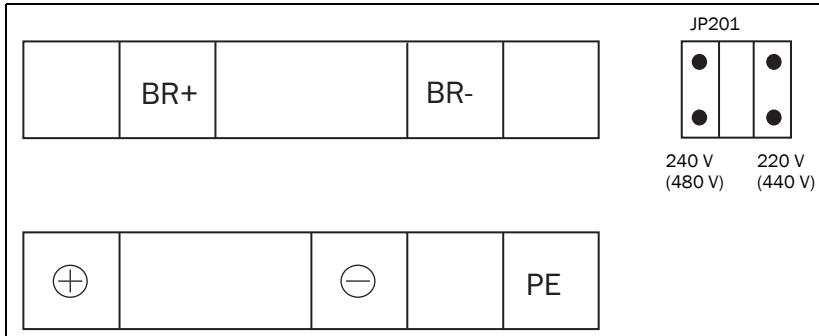


T0= Cycle time

T1= Braking time

ED= Effective braking period

7. Connection and setting



7.1 Terminal description

Table 3

Purpose	Terminal Symbol	Description	Tightening torque Nm/ft lbf
Main circuit power terminals	⊕	DC Bus power input terminals (⊕ positive terminal ⊖ negative terminal)	1,3 / 1
	⊖		
	BR+	Brake resistor output terminals. (Resistor specification please refer to section 10.2)	
	BR-		
	PE	Grounding terminal	

7.2 Jumper function description

Table 4

	Description
JP201	Brake Unit power supply voltage selection, Select the right voltage level to assure the correct braking start level.

With jumper JP201, the Brake Unit can be adjusted to the real mains voltage on which the connected VSA23/48 unit is operated. For optimal operation, set

- JP201 in position “220V(440V)” :
 - when VSA23 supply voltage is between 200-220VAC for BU23-08
 - when VSA48 supply voltage is between 380-440VAC for BU48-03
- JP201 in position “240V(480V)” :
 - when VSA23 supply voltage is between 220-240VAC for BU23-08
 - when VSA48 supply voltage is between 440-480VAC for BU48-03

8. Dimension and LED indications

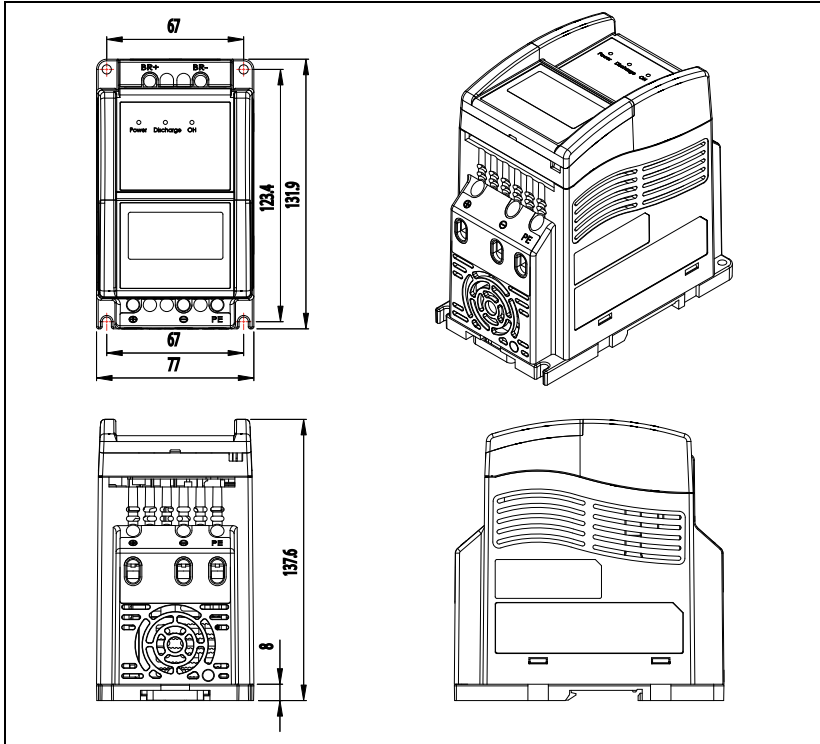



Table 5

LED indication:	
Power:	power on situation
Discharge:	activated brake chopper
OH:	Overheat protection active

9. Cabling and installation

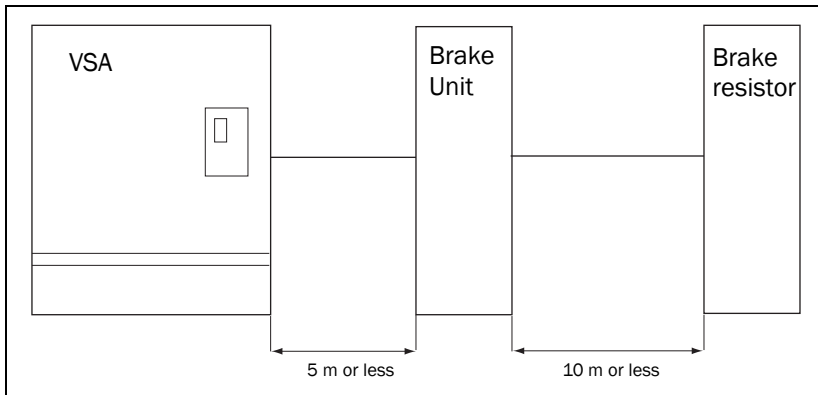
9.1 Circuits and wire specification

Table 6

Brake unit	Purpose	Terminal Symbol	Wire sizes mm ² (AWG)	Wire type	Terminal Screws
BU23-08 BU48-03	Main circuit	 BR+, BR-, PE	2 mm ² (14AWG)	Power cables, e.g., 600V, vinyl power cables	M4

9.2 Wire distance

Since the Brake Unit and brake resistor generates heat, provide sufficient spaces from other devices which are sensitive for heat.

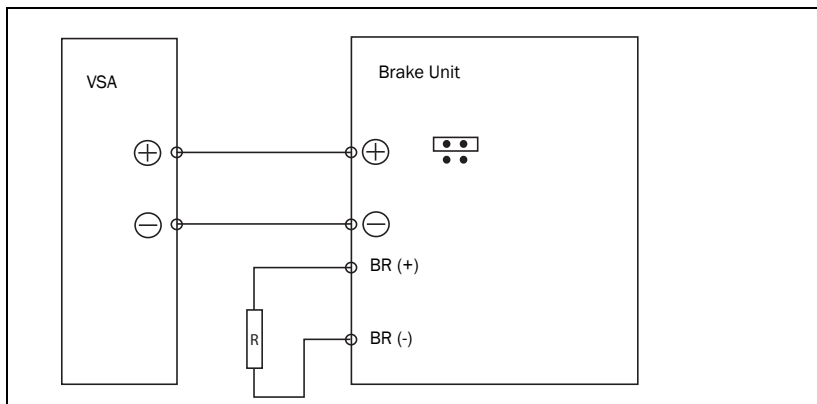


Make sure to ground the grounding terminal PE, use the properly wire and tighten M4 terminal screws to the specified tightening torque.

10. Interconnection

The Brake Unit can only be connected to one main unit.

10.1 Brake Unit installation



10.2 Brake Unit and brake resistor application list



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

Table 7

VSD type		Brake Unit model	Brake resistor specification	Min Ohm value	Approx. Brake torque (10%ED)
VSA23-	01	BU23-08	150W/750Ω	25Ω	120% (10%ED)
	03	BU23-08	150W/400Ω	25Ω	113% (10%ED)
	04	BU23-08	150W/200Ω	25Ω	113% (10%ED)
	07	BU23-08	150W/100Ω	25Ω	113% (10%ED)
	10	BU23-08	260W/70Ω	25Ω	109% (10%ED)
VSA48-	002	BU48-03	150W/750Ω	100Ω	120% (10%ED)
	004	BU48-03	150W/400Ω	100Ω	113% (10%ED)
	005	BU48-03	260W/250Ω	100Ω	120% (10%ED)

11. Troubleshooting

Table 8

Fault Status	Cause	Corrective Action
Brake Unit or resistor activated during acceleration or constant speed. Causes overload to the resistor	Wrong selection of input voltage level by JP201	1. Improve power source quality 2. Confirm input voltage and adjust JP201
	Input power voltage higher than the voltage specification.	Improve the input power voltage.
Inverter trips on over voltage (O.V)	Insufficient braking capacity	1. Check the braking capacity. 2. Increase inverter's deceleration time
	Brake Unit malfunction	Replace the Brake Unit
Brake Unit trips by over heat of heat sink	Inverter Start/Stop frequently	Examine the operating condition
	Improper combination of Brake Unit and resistor	Select right type according specification
	Ambient temperature above 50°C	Check the location conditions



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