

INSTRUCTION MANUAL

Braking Resistor DB□□□-□C Series

■When an inverter is installed with the braking resistor in a device or control board and shipped, make sure that the actual end user of the inverter receives this manual.

■The contents of this manual are subject to changes for improvement without notice.

Preface

Thank you for purchasing our Inverter Option. Before using the option, read this manual carefully to understand how to use the option correctly. Improper use may result in abnormal operation, reduce product life, and possible failure. This manual does not describe how to use the inverter main unit. Refer to inverter main unit Instruction Manual for details about the inverter main unit. Keep this manual on hand for reference when using the option.

To Use the Option Safely

Note the following items when using the option. Improper use may result in unexpected failure, electric shock, or possible injury.

▪ WARNING

- Wait at least five minutes after turning off the power before installing or wiring the inverter option. Use a multimeter or similar instrument to check the voltage before performing installation or wiring. (Check whether the charge lamp goes off.), **as electric shock may occur**
- Discharge static electricity from your body before handling the inverter option. Never touch the Inverter option with wet hands, **as accident or electric shock may occur**
- No foreign matter such as screws, metal patches, lint, chips, and dust in the inverter option. **There is risk of fire or accident.**
- Do not damage or stress the wiring, **as accident or electric shock may occur.**
- Wait at least five minutes after turning off the power before inspecting the inverter option. (Check whether the charge lamp goes off.) **There is a risk of electric shock.**
- Never modify the inverter option, **as electric shock or injury may occur.**

▪ CAUTION

- Do not install or operate a damaged option or one that is lacking parts, **as injury may occur.**

1 Before Using This Product

Check the items described below when you receive this product. Also check whether this product has been damaged during transport. If anything is amiss, contact your distributor or our nearest branch office.

1-1 Type

Please confirm the form with the ratings signature board.

1-2 Outlines

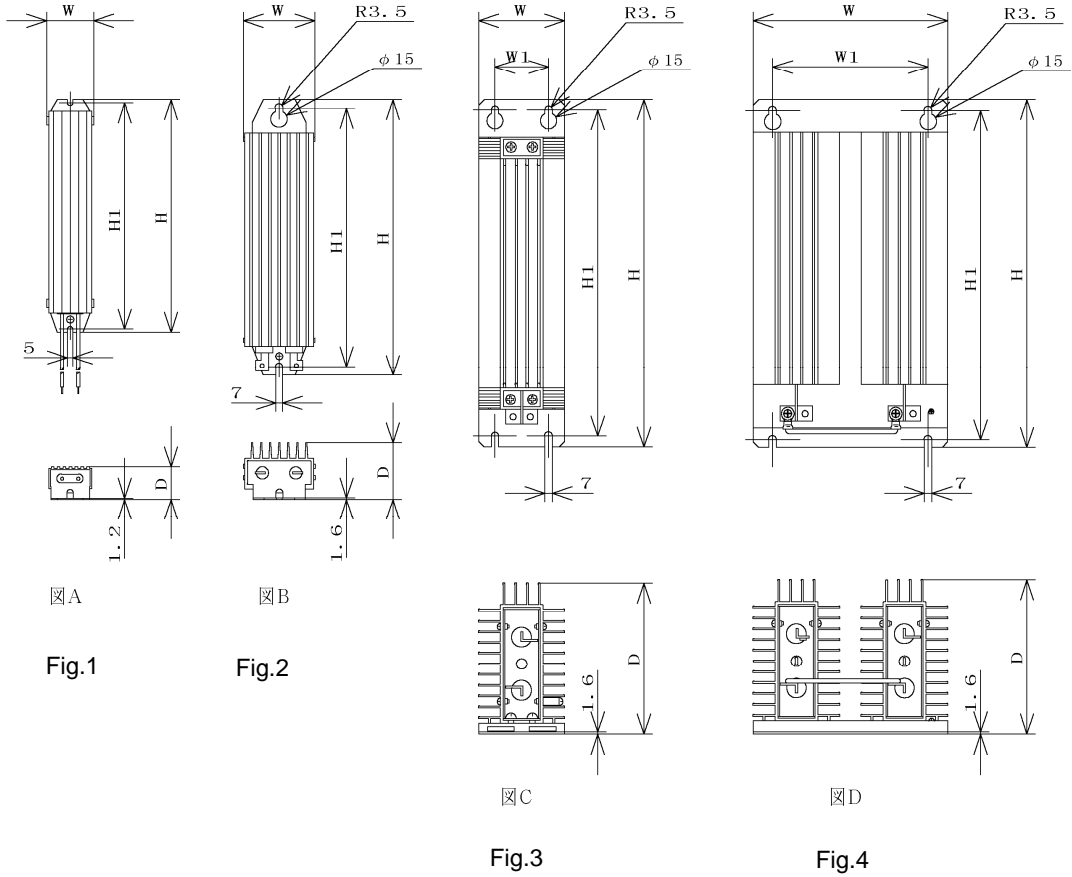


Table 1-2-1 Outlines.

Model	Fig	Size (mm)				
		W	W 1	H	H1	D
DB0.75-2C/4C	1	43	-	221	215	30.5
DB2.2-2C/4C	2	67	-	188	172	55
DB3.7-2C/4C	2	67	-	328	312	55
DB5.5-2C/4C	2	80	-	378	362	78
DB7.5-2C/4C	2	80	-	418	402	78
DB11-2C/4C	3	80	50	460	440	140
DB15-2C/4C	3	80	50	580	560	140
DB22-2C/4C	4	180	144	400	383	145

1-3 Keeping

Table 1-3-1

Item	Specification	
Storage temperature	-20~+70°C	Place where be dewy and freezing by rapid temperature change are not caused.
Relative humidity	5~95% ^{Note 1}	
Atmosphere	There must be dust, direct sunshine, corroded gas, oil mist, steam or neither drop of water nor a vibration. Salinity must not be included so much.	

Note 1: Even if humidity meets the specification, the be dewy and freezing are caused in the place where the temperature change is hard much. Please avoid such a place.

① Please do not put on ground.

② Please cover with the vinyl seat when atmosphere is bad.

③ Please put a dry medicine internally, and, besides, wrap ② item procedure when the influence of moisture is large.

2 Product guidance

2-1 Product Warranty

This product is guaranteed against defects in workmanship for 18 months from the manufacturing date indicated on the nameplate. However, the troubles caused by the following reasons are not covered by this warranty even in warranty period.

- (1) Problems caused by incorrect operation or by unauthorized repairs or modifications.
- (2) Problems resulting from using the inverter in the range outside the standard specification.
- (3) Damage to the inverter after purchase or during delivery.
- (4) Damage caused by earthquakes, fire, floods, lightning, abnormal voltage fluctuations or other natural disasters.

3 Installation

3-1 Installation Environment

The installation environment for the inverter in which this product is being installed is listed Table 3-1-1

Table 3-1-1 Installation Environment.

Item	Specifications	Remarks
Location	Indoors	-
Ambient temperature	-10 to 50°C	-
Ambient relative humidity	5 to 95%	-
Environment	The place should be away from direct sunlight and free from dust, corrosive gases, inflammable gases, oil mists, steam, dripping water or vibration. Salty environments should preferably be avoided. Avoid places where sudden changes in temperature occur which could cause condensation or freezing.	-
Altitude	Up to 1000m	-

3-2 Installation method

- ① Please set up so that power terminal may become the lower side. Please set up vertically on a strong building with the bolt. Please do not turn upside down and do not set up in a horizontal plane.
- ② This option generates heat, and install space more than each of 100 mm the top and bottom and the right and left to secure the passage of the cooling style, please. The generated heat is radiated up. Please do not install under a weak equipment to heat. Moreover, installation respect must use the one of the material that the temperature rise can be endured enough.
- ③ Please consider enough to ventilation so that the ambient temperature of the inverter and the braking resistor should not exceed the specification value when storing in the control board etc. Please do not store in a small sealing up box where heat radiation is bad.

▪ WARNING

- The surface temperature of resistance becomes 400°C or less by the use state.
There is risk of fire or burn.
- Please install in a nonflammable thing such as the metals.
There is risk of fire.
- Please do not arrange the combustible in surroundings.
There is risk of fire.

CAUTION

- Check the wiring again before operating the inverter. Improper wiring may cause unexpected inverter operation or device operation. **There is a risk of accident or injury.**
- Since noise is generated by the inverter, motor, and wiring, carefully monitor surrounding sensors and devices for abnormal operation. **There is a risk of accident.**

Applicable

Table 3-3-1

Model	Use electric wire size
DB0.75-2C	2mm ²
DB2.2-2C/DB3.7-2C	2mm ²
DB5.5-2C/DB7.5-2C	3.5mm ²
DB11-2C~DB22-2C	5.5mm ²
DB0.75-4C	2mm ²
DB2.2-4C~DB22-4C	2mm ²

Note 1: The size of the use electric wire is based on 600V vinyl electric wire. (Please use heatproof 75°C or more.)

Note 2: The wiring length is assumed to be 5m or less.

Recommended connection method

Terminal for braking resistor connection

Table 3-3-2

Type	Terminal form	Connection method
DB0.75-2C DB0.75-4C	0.75mm ² Electric wire (CFGE) The wiring for 500mm is attached.	Please connect the terminal with wiring.
DB2.2-2C/DB3.7-2C DB2.2-4C/DB3.7-4C DB5.5-2C/DB7.5-2C DB5.5-4C/DB7.5-4C	Connected bar Board thickness 2mm Φ4.3mm Installation hole	Please connect wiring in connected bar with the bolt and the nut.
DB11-2C~DB22-2C DB11-4C~DB22-4C	Connected bar Board thickness 2mm Φ6mm Installation hole	

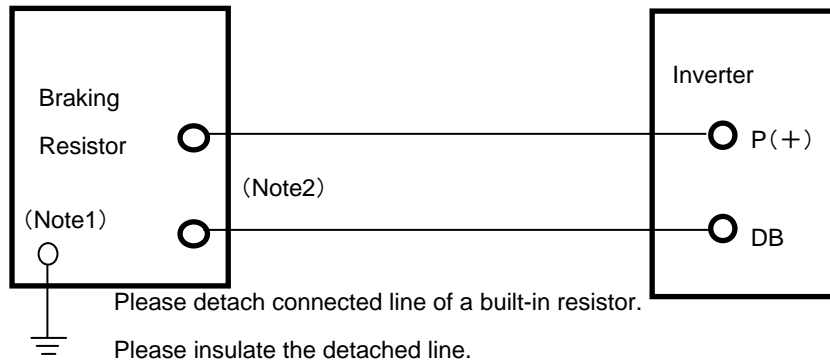
Earth terminal

Table 3-3-3

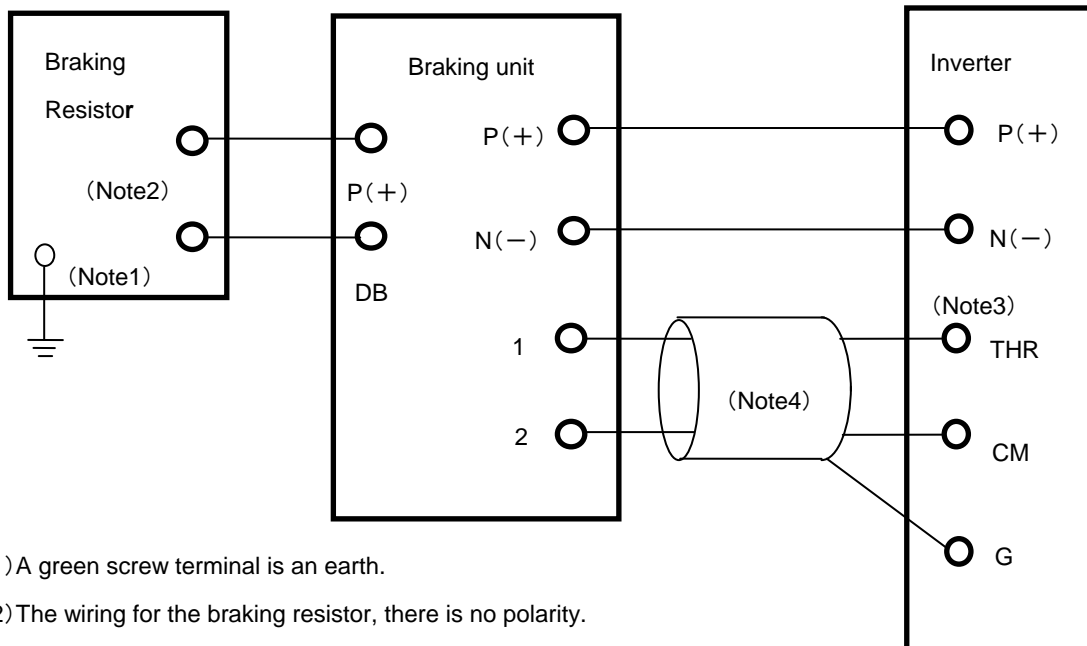
Type	Terminal form	Connection method
All models	M 4 Terminal (With screw)	Please connect wiring with the earth terminal.

Connection diagram

DB0.75-2C/4C~DB7.5-2C/4C



DB11-2C/4C~DB22-2C/4C



(Note1) A green screw terminal is an earth.

(Note2) The wiring for the braking resistor, there is no polarity.

(Note3) Please connect with either of inverter side control terminal X1-X9 for the G11 series. At this time, please set the connected terminal function data in 9 among function codes E01-E09.

(Note4) Please use the shield line for the wiring for the braking unit. Please connect the shield of the shield line with the earth terminal of the inverter. (Another shield edge side is opened.)

4 Specification

4-1 Electric characteristic

For 200V series

Model No.		DB0.75-2C			DB2.2-2C		DB3.7-2C		DB5.5-2C		DB7.5-2C		DB11-2C		DB15-2C		DB22-2C		
Applicable Inverter		FRN0.2G11S-2 FRN0.4G11S-2 FRN0.75G11S-2			FRN1.5G11S-2 FRN2.2G11S-2		FRN3.7G11S-2 FRN5.5P11S-2		FRN5.5G11S-2 FRN7.5P11S-2		FRN7.5G11S-2 FRN11P11S-2		FRN11G11S-2 FRN15P11S-2		FRN15G11S-2 FRN18.5P11S-2		FRN18.5G11S-2 FRN22G11S-2 FRN22P11S-2		
Resistance	Capacity(kW)	0.2			0.4		0.4		0.8		0.9		1.4		1.4		1.8		
	Resistance Value(Ω)	100			40		33		20		15		10		8.6		5.8		
Motor output(kW)		0.2	0.4	0.75	1.5	2.2	3.7	5.5	5.5	7.5	7.5	11	11	15	15	18.5	18.5	22 (G11S)	22 (P11S)
Allowable braking characteristics	Allowable brake duty cycle(%)	10	10	10	10	10	10	7	10	7	10	7	10	7	10	7	10	10	7
	Allowable continuous braking time(sec)	90	45	45	45	30	20	15	10	15	10	7	10	7	10	7	10	10	7
Braking unit required		NO										Yes							

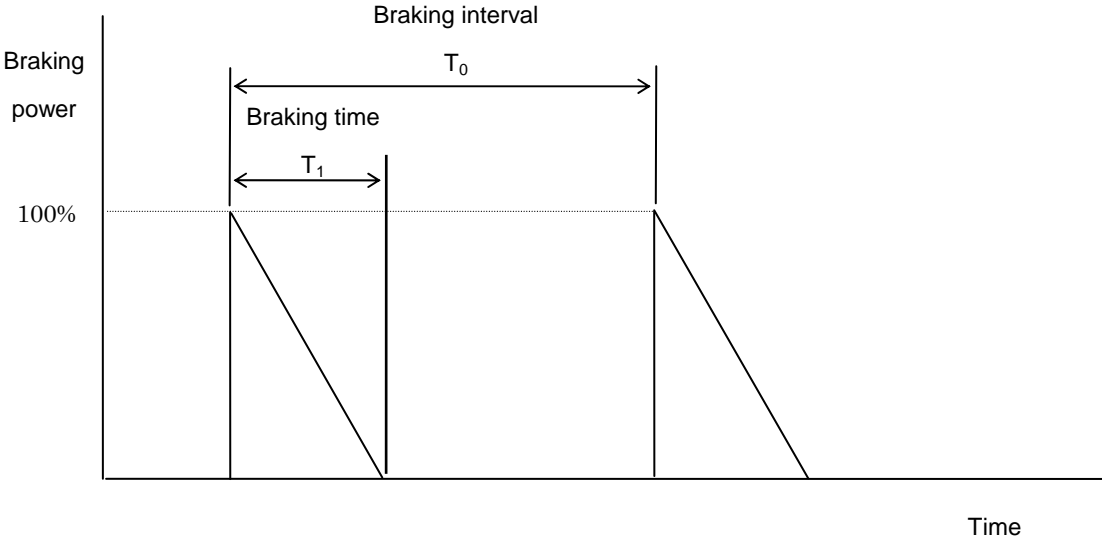
For 400V series

Model No.		DB0.75-4C			DB2.2-4C		DB3.7-4C		DB5.5-4C		DB7.5-4C		DB11-4C		DB15-4C		DB22-4C		
Applicable Inverter		FRN0.4G11S-4 FRN0.75G11S-4			FRN2.2G11S-4		FRN3.7G11S-4 FRN5.5P11S-4		FRN5.5G11S-4 FRN7.5P11S-4		FRN7.5G11S-4 FRN11P11S-4		FRN11G11S-4 FRN15P11S-4		FRN15G11S-4 FRN18.5P11S-4		FRN18.5G11S-4 FRN22G11S-4 FRN22P11S-4		
Resistance	Capacity(kW)	0.2			0.4		0.4		0.8		0.9		1.4		1.4		1.8		
	Resistance Value(Ω)	200			160		130		80		60		40		34.4		22		
Motor output(kW)			0.4	0.75	1.5	2.2	3.7	5.5	5.5	7.5	7.5	11	11	15	15	18.5	18.5	22 (G11S)	22 (P11S)
Allowable braking characteristics	Allowable brake duty cycle(%)		10	10	10	10	10	7	10	7	10	7	10	7	10	7	10	10	7
	Allowable continuous braking time(sec)		45	45	45	30	20	15	10	15	10	7	10	7	10	7	10	10	7
Braking unit required		NO										Yes							

Note 1: The use rate will decrease because of the undermentioned model when Electric thermal O/L relay setting (for braking resistor).

1.5~7.5G11S-2/4 7 % E D
5.5~11P11S-2/4 5 % E D

$$\text{Duty cycle}[\% \text{ E D}] = \frac{T_1}{T_0 (100 \text{ sec As follows})} * 100$$



4-2 Supplementation

* Duty cycle(%ED)

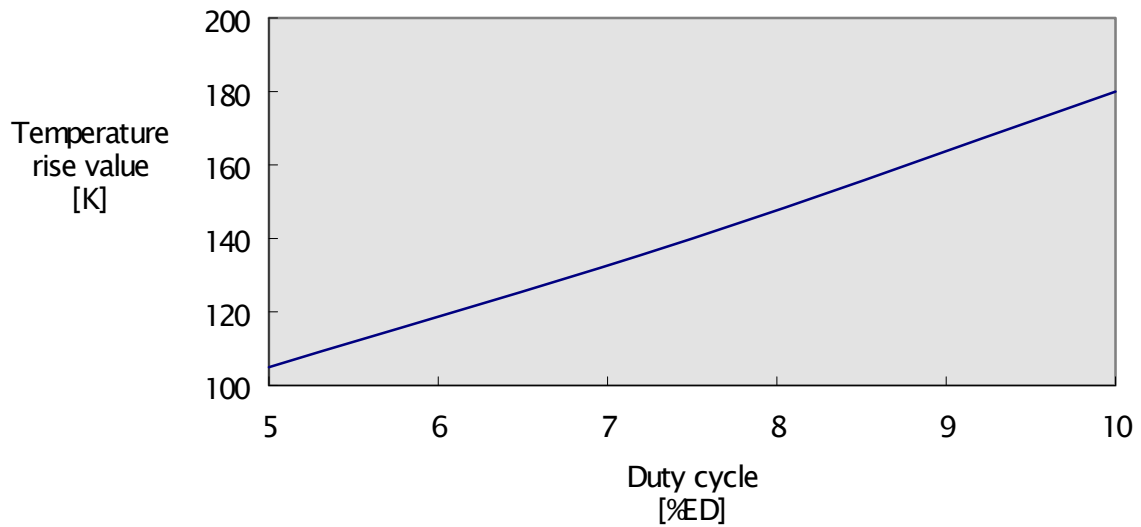
Frequency which can be repeatedly used.

* Continuous braking time

Time which can be continuously braked. (Use of limit from state of normal temperature once.)

* Surface temperature of resistance by use rate.

The surface temperature is 230°C or less (50°C in surroundings temperature time). I will describe the surface temperature rise value by the use rate of DB22-2C as a reference value.



NOTE