SIKES

Dynamic Braking unit

使用手册
MANUAL

Edition : 2020-01

Contact us

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SHENZHEN SIKES ELECTRIC CO.,LTD.

Braking unit Manual

Contents

Safety Notice

Danger

- Abuse may cause danger , personal injury & device damage.
- Make sure the input power cut off before wiring , wait until the light of the Inverter turn off.
- Wiring can only be done by electrical professionals.
- Do not touch the terminals of the braking unit during operation . Do not connect the terminals with enclosure of the braking unit , short circuit not allowed among terminals.
- Enclosure(aluminum radiator) should be properly grounded.

Cautions

- Read the manual before using the braking unit !
- In case any doubt , please contact sikes@sikes-elec.com

1. Introduction

SKS serious braking unit is designed to lead the regenerative power by the inverter during braking to the braking resistor to improve the Inverter performance and shorten braking time .

1.1 Inspection before installation

All the regenerative unit has been tested before delivery, please confirm below before installation. If any problem, please contact us within 48 hours .

- Check the model dispatched if it's the same as your order.
- Any damage for the unit during transportation ?

1.2 Selection table

Type	Inverter power (KW)	Voltage Grade	Peak Current	Default Chopper Voltage	Braking Torque	Dimension NO.	Terminal	Cable (mm²)
SKS-LN-2022	7.5-22	220V	50A	DC320V±5V (300-380V Adjustable)	100%	Fig.2	M4	6-8
SKS-LN-2037	30-37		75A		100%		M4	6-8
SKS-LN-2045	45		100A		100%	Fig.3	M5	10-16
SKS-LN-2075	55-75		150A		100%	Fig.4	M8	10-16
SKS-LN-2090	90		200A		100%		M8	25-35
SKS-LN-4022	7.5-22	400V	40A	DC660V±5V (600-760V Adjustable)	120%	Fig.1	M4	4-6
SKS-LN-4030	30		50A		120%		M4	6-8
SKS-LN-4055	45-55		75A		120%	Fig.2	M4	6-8
SKS-LN-4075	75		100A		120%		M4	10-16
SKS-LN-4110	90-110		150A		120%	Fig.3	M5	10-16
SKS-LN-4132	132		200A		120%		M8	25-35
SKS-GN-4110	55-110	400V	150A	DC660V±5V (600-760V Adjustable)	150%	Fig.4	M8	10-16
SKS-GN-4200	132-185		200A		150%			25-35
SKS-GN-4280	200-280		300A		150%			25-35
SKS-GN-4450	315-450		450A		150%			50-70
SKS-GN-5037	7.5-37	500V	75A	DC830V±5V (760-900V Adjustable)	150%	Fig.5	M10	6-8
SKS-GN-5110	45-110		150A		150%			10-16
SKS-GN-5200	132-200		200A		150%			10-16
SKS-GN-5280	220-280		300A		150%			25-35
SKS-GN-5450	315-450		450A		150%			50-70
SKS-GN-6037	11-37	660V	100A	DC1080V±5 (990-1155V Adjustable)	150%	Fig.5	M10	6-8
SKS-GN-6110	55-110		150A		150%			10-16
SKS-GN-6200	132-185		200A		150%			10-16
SKS-GN-6280	200-280		300A		150%			25-35
SKS-GN-6400	315-400		400A		150%			50-70
SKS-GN-6450	420-450		450A		150%			50-70

1.3 Dimensions and mounting dimensions

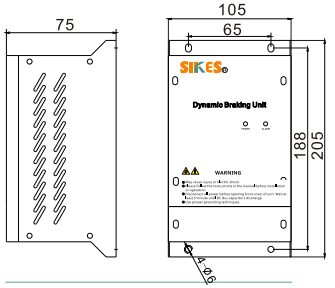


Fig. 1

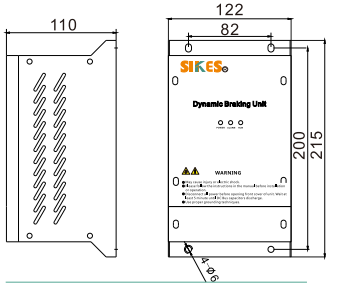


Fig. 2

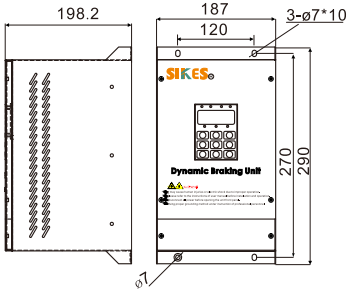


Fig. 3

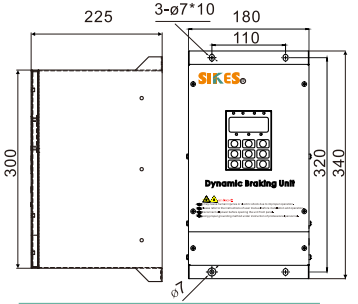


Fig. 4

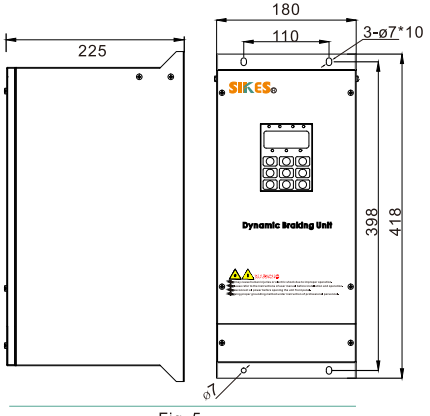


Fig. 5

1.4 How to select braking resistor to match braking unit?

For 400V Inverter (10%-50%ED)

Inverter power（kw）	ED	Braking torque	Braking unit suggestion	Single/multi	Resistor power	Resistance Ω	Resistor type
0.4	10%	150%	Build in	/	40W	1100	Resistor
	20%				80W	1100	Resistor
	30%				120W	1100	Resistor
	40%				160W	1100	Resistor
	50%				200W	1100	Resistor
0.75	10%	150%	Build in	/	75W	600	Resistor
	20%				150W	600	Resistor
	30%				250W	600	Resistor
	40%				300W	600	Resistor
	50%				400W	600	Resistor
1.5	10%	150%	Build in	/	150W	300	Resistor
	20%				300W	300	Resistor
	30%				450W	300	Resistor
	40%				600W	300	Resistor
	50%				800W	300	Resistor
2.2	10%	150%	Build in	/	250W	200	Resistor
	20%				450W	200	Resistor
	30%				700W	200	Resistor
	40%				900W	200	Resistor
	50%				1100W	200	Resistor
3.7	10%	150%	Build in	/	400W	120	Resistor
	20%				800W	120	Resistor
	30%				1100W	120	Resistor
	40%				1500W	120	Resistor
	50%				1850W	120	Resistor
5.5	10%	150%	Build in	/	600W	80	Resistor
	20%				1100W	80	Resistor
	30%				1650W	80	Resistor
	40%				2200W	80	Resistor
	50%				2750W	80	Resistor

Inverter power（kw）	ED	Braking torque	Braking unit suggestion	Single/multi	Resistor power	Resistance Ω	Resistor type
7.5	10%	100%	SKS-LN-4022	Single unit	1kw	89	Resistor
	20%	120%			2kw	73	Resistor
	30%	130%			3kw	68	Resistor
	40%	140%			3kw	63	Resistor
	50%	150%			4kw	60	Resistor
11	10%	100%	SKS-LN-4022	Single unit	1kw	61	Resistor
	20%	120%			2kw	51	Resistor
	30%	130%			3kw	47	Resistor
	40%	140%			4kw	43	Resistor
	50%	150%			6kw	41	Resistor
15	10%	100%	SKS-LN-4022	Single unit	2kw	45	Resistor
	20%	120%			3kw	37	Resistor
	30%	130%	SKS-LN-4055		5kw	34	Resistor
	40%	140%			6kw	32	Resistor
	50%	150%			8kw	30	Resistor
18.5	10%	100%	SKS-LN-4022	Single unit	2kw	36	Resistor
	20%	120%			4kw	30	Resistor
	30%	130%	SKS-LN-4055		6kw	28	Resistor
	40%	140%			8kw	26	Resistor
	50%	150%			10kw	24	Resistor box
22	10%	100%	SKS-LN-4022	Single unit	2.2kw	30	Resistor
	20%	120%			4.5kw	25	Resistor
	30%	130%	SKS-LN-4055		6.6kw	23	Resistor
	40%	140%			9kw	22	Resistor box
	50%	150%			11kw	20	Resistor box
30	10%	100%	SKS-LN-4055	Single unit	3kw	22	Resistor
	20%	120%			6kw	18.6	Resistor
	30%	130%			9kw	17.2	Resistor box
	40%	130%			12kw	17.2	
	50%				15kw	17.2	
37	10%	100%	SKS-LN-4055	Single unit	4kw	18.1	Resistor
	20%	120%			8kw	15.1	Resistor
	30%	130%			11kw	13.9	Resistor box
	40%	130%			15	13.9	
	50%				20	13.9	

Inverter power（kw）	ED	Braking torque	Braking unit suggestion	Single/multi	Resistor power	Resistance Ω	Resistor type
45	10%	100%	SKS-LN-4055	Single unit	5kw	14.9	Resistor
	20%	120%			9kw	12.4	Resistor box
	30%	130%			14kw	11.5	
	40%	130%	SKS-LN-4075		18kw	11.5	
	50%				23kw	11.5	Resistor
55	10%	100%	SKS-LN-4055	Single unit	6kw	12.2	Resistor
	20%	120%			11kw	10.2	Resistor box
	30%	130%	SKS-LN-4075		17kw	9.4	Resistor box
	40%	130%			22kw	9.4	
	50%	130%			28kw	9.4	
75	10%	100%	SKS-LN-4075	Single unit	8kw	8.9	Resistor
	20%	120%			15kw	7.4	Resistor box
	30%	130%	SKS-GN-4110		23kw	6.9	
	40%	130%			30kw	6.9	
	50%				38kw	6.9	Cabinet
90	10%	100%	SKS-LN-4075	Single unit	9kw	7.4	Resistor box
	20%	120%			18kw	6.2	
	30%		SKS-GN-4110		27kw	6.2	
	40%				36kw	6.2	Resistor cabinet
	50%	130%			45kw	5.7	
110	10%	100%	SKS-LN-4075	Single unit	11kw	6.1	Resistor box
	20%	120%	SKS-GN-4110		22kw	5.1	
	30%				33kw	5.1	
	40%				44kw	5.1	Resistor cabinet
	50%	130%			55kw	4.7	
132	10%	100%	SKS-LN-4075	Single unit	13kw	5.1	Resistor box
	20%	120%	SKS-GN-4200		26kw	4.2	
	30%				40kw	4.2	Resistor cabinet
	40%				53kw	4.2	
	50%	130%			66kw	3.9	
160	10%	100%	SKS-GN-4200	Single unit	16kw	4.2	Resistor box
	20%	120%			32kw	3.5	
	30%				48kw	3.5	Resistor cabinet
	40%				64kw	3.5	
	50%	130%			80kw	3.2	

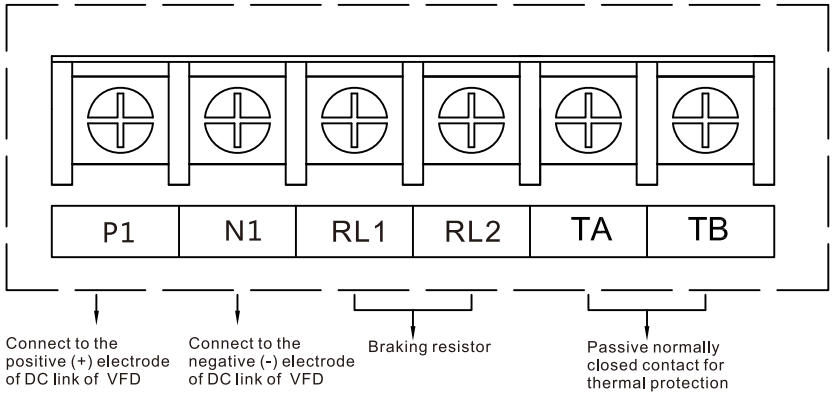
Inverter power（kw）	ED	Braking torque	Braking unit suggestion	Single/multi	Resistor power	Resistance Ω	Resistor type
185	10%	100%	SKS-GN-4200	Single unit	19kw	3.6	Resistor box
	20%	120%			37kw	3.0	Resistor cabinet
	30%				56kw	3.0	
	40%				74kw	3.0	
	50%	130%			93kw	2.8	
200	10%	100%	SKS-GN-4200	Single unit	20kw	3.4	Resistor box
	20%	120%			40kw	2.8	Resistor cabinet
	30%		SKS-GN-4280		60kw	2.8	
	40%				80kw	2.8	
	50%	130%			100kw	2.6	
220	10%	100%	SKS-GN-4200	Single unit	22kw	3.0	Resistor box
	20%	120%			44kw	2.5	Resistor cabinet
	30%		SKS-GN-4280		66kw	2.5	
	40%				88kw	2.5	
	50%	130%			110kw	2.3	
250	10%	100%	SKS-GN-4200	Single unit	25kw	2.7	Resistor box
	20%	120%	SKS-GN-4280		50kw	2.2	Resistor cabinet
	30%				75kw	2.2	
	40%				100kw	2.2	
	50%	130%			125kw	2.1	
280	10%	100%	SKS-LN-4280	Single unit	28kw	2.4	Resistor box
	20%	120%			56kw	2.0	Resistor cabinet
	30%				84kw	2.0	
	40%				112kw	2.0	
	50%	130%	SKS-GN-4400		140kw	2.0	
315	10%	100%	SKS-GN-4280	Single unit	32kw	2.1	Resistor box
	20%	120%			63kw	1.8	Resistor cabinet
	30%				95kw	1.8	
	40%		SKS-GN-4400		126kw	1.8	
	50%	130%			158kw	1.6	
400	10%	100%	SKS-GN-4400	Single unit	40kw	1.68	Resistor box
	20%	120%	SKS-GN-4280	Two in parallel	80kw	1.4	Resistor cabinet
	30%				120kw	1.4	
	40%				160kw	1.4	
	50%	130%	SKS-GN-4280		200kw	1.3	
500	10%	100%	SKS-GN-4280	Two in parallel	50kw	1.3	Resistor box
	20%	120%	SKS-GN-4400		100kw	1.1	Resistor cabinet
	30%				150kw	1.1	
	40%				200kw	1.1	
	50%	130%	SKS-GN-4400		250kw	1.0	

2.0 Installation

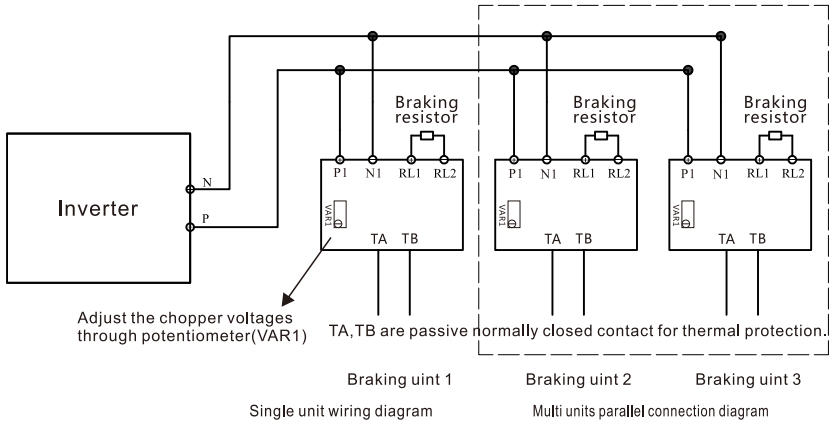
2.1 Mounting dimensions (On page 4)

2.2 Internal terminals and wiring diagrams.

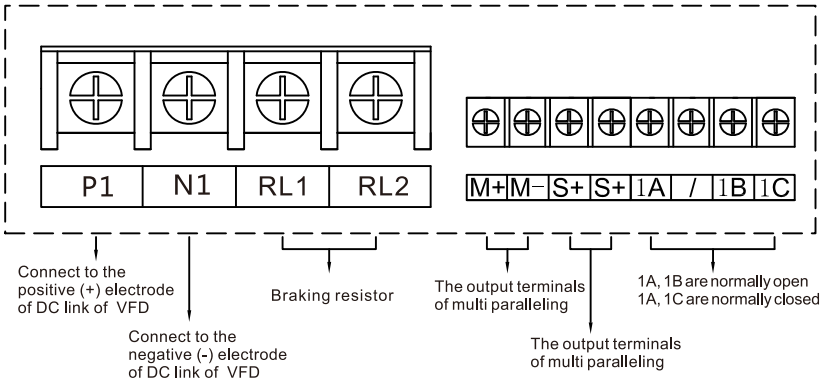
Terminals (for: LN-4022, LN-4030)



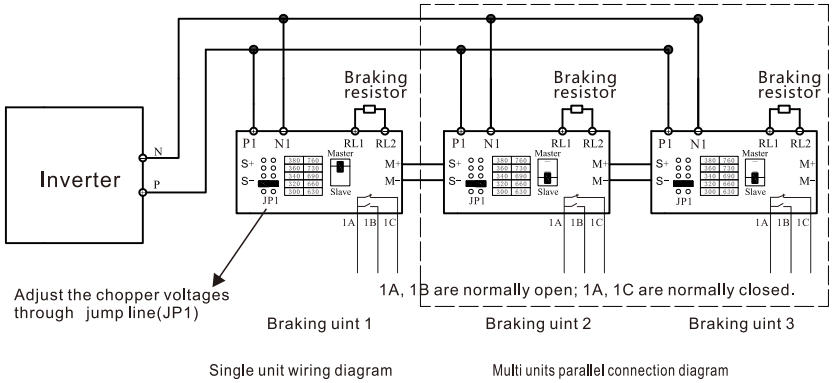
Wiring diagram (for LN-4022 , LN-4030)



Terminals (for: LN-2022, LN-2037, LN-4055, LN-4075)

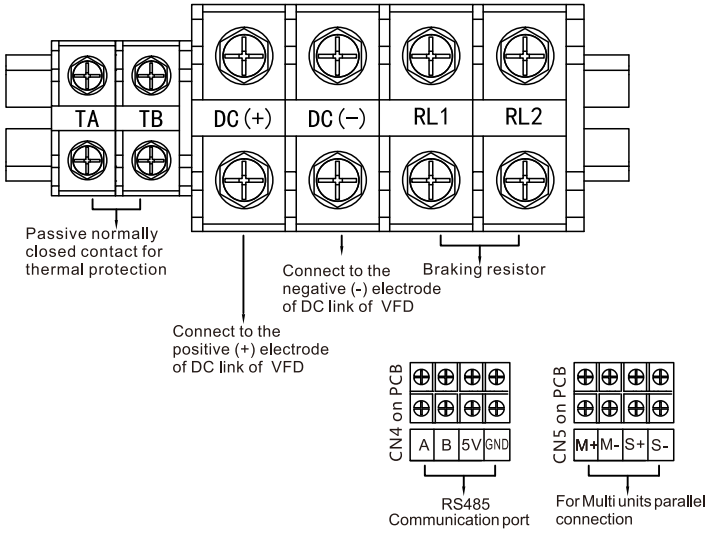


Wiring diagram (for: LN-2022 , LN-2037, LN-4055 , LN-4075)

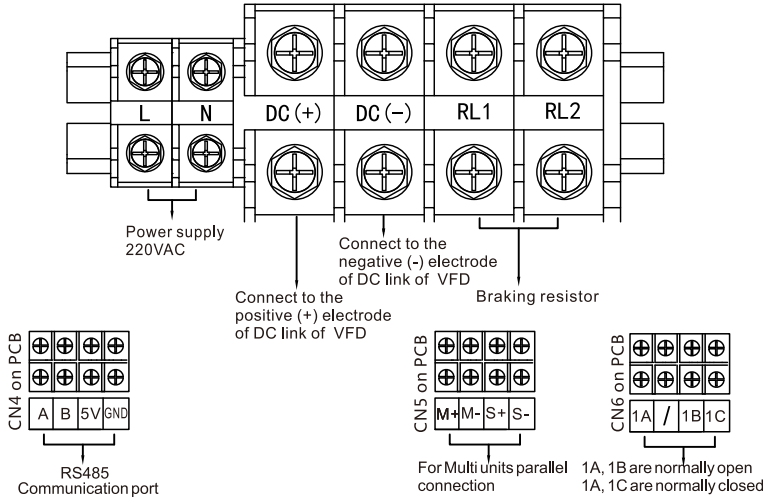


During multi units parallelling, please connect the master-slave synchronous signal lines well, then place the 2 and N pin of braking units to the SLAVE position.

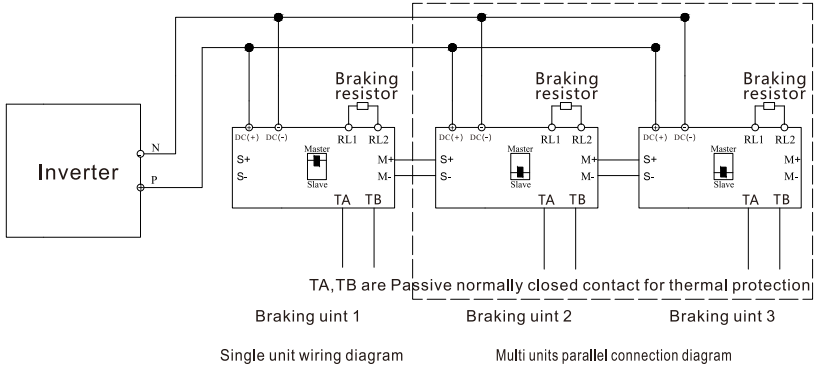
Terminals (for: LN-2075, LN-2090, LN-4110, LN-4132, GN-4110,GN-4200, GN-4280,GN-4400)



Terminals (for: GN-5037,GN-5110-GN-5200,GN-5280,GN-5450,GN-6037, GN-6110,GN-6200, GN-6280, GN-6400,GN-6450).

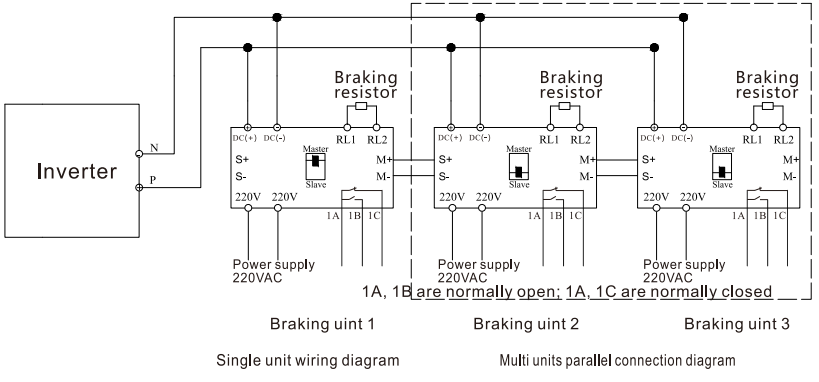


Wiring diagram (for:LN-2075,LN-2090,LN-4110,LN-4132,GN-4110, GN-4200,GN-4280,GN-4400)



During multi units parallelling, please connect the master-slave synchronous signal lines well, then place the 2 and N pin of braking units to the SLAVE position.

Wiring diagram (for: GN-5037,GN-5110-GN-5200,GN-5280,GN-5450,GN-6037, GN-6110, GN-6200, GN-6280, GN-6400,GN-6450)



During multi units parallelling, please connect the master-slave synchronous signal lines well, then place the 2 and N pin of braking units to the SLAVE position.

2.3 Safety precautions & installation environment

Safety:

Braking unit are working at high DC voltage , wrong operation & installation may cause human injure and poverty loss .

When doing installation and wiring , do cut off the power supply of VFD and WAIT 5 ~10 MINUTES , when the VFD build in capacitors have been fully discharged ! Please check the red LED of VFD , when it' s on means capacitor discharging not finish , operation not allowed.

Heat radiation:

Braking unit generative heat when working , should be away from explosive ,flammable item . Proper ventilation space should be left for radiation , minimum size , 100mm up & down , 30mm left & right .

Please install the unit on the metal board , when more than two Braking unit installed in one control cabinet , please install cooling fan and make sure air inlet temperature ≤+40℃.

Grounding:

Ground connection is to prevent damage due to current leakage and malfunction and reduce interface between equipment .

Cable:

Suggest using Heat-resisting flexible cable or flame-retardant cable.

Protection:

Please add over heat protection device for the load resistor when installing Braking unit , in case IGBT problem create high current and damage the VFD or cause fire danger .

Environment Requirement:

This device will have best performance & service life under below condition

Indoor Application:

+14°F to 104°F (-10℃ to +40℃) No Frost ; Humidity 90%RH ;

Vibration 1G at 10-20Hz, 0.2G at 20-50Hz;

No solids ; No corrosive gas ; No metal powder.

This device is NOT EXPLOSION PROOF ,IP20 protection class

2.4 Operation Instruction

- Check cable wiring before power on (wrong wiring for + & - may cause damage to Inverter and braking unit) Check if terminals are fixed tightly .
- To set chopper voltage , pls remove panel controller , braking unit has five working range (300/630V,320/660V,340/690V,360/730V,380/760V) , put the pin at the closed position to your power grid (default set 320/660V) .
- Pls ref diagram above for parallel connection , after connect the signal cable between master unit and slave unit , pls put the N pin at SLAVE position of the Unit 2 .
- Do not touch the Braking unit after power on , high voltage shock risk !

2.4.1 Setting method for the chopper voltages of braking units without keyboard

When products are out of factory, the chopper voltages are set to the suitable values, it is unnecessary to modify the values in case of normal working situation.

It is needed to remove the front panel of braking units first, then to adjust the chopper voltages through potentiometer(VAR1) or jump line(JP1) on the control panel.

Reference table for chopper voltage range of our braking unit .

Voltage grade	Default chopper voltage	Chopper voltage range
220V	DC320V±5V	300-380V
400V	DC660V±5V	600-760V
500V	DC8300V±5V	760-900V
660V	DC1080V±5V	990-1155V

2.4.2 Keyboard function illustration. Only for braking units with keyboard.

2.4.2.1 Indication light illustration.

Light	Function
DC	Running status monitoring
V	Data checking status
AC	Device ready for work
RUN	Device running
A	Device fault,running problem
F1	Keyboard lock

2.4.2.2 LED display illustration

Different codes will show to indicate current status.

2.4.2.3 Keyboard button illustration

Button	Function
PRG	Shift between "Running monitoring" "data checking" status,hold button for 2 sec for status display
▲	To add value of the parameter , hold to increase continuously
▼	To reduce value of the parameter , hold to decrease continuously
ENTER	Read or save set data
FAULT	Page turning forward ,hold for continuously
RUN	Page turning backward , hold for continuously
STOP	When device malfunction , press button for restart
FUNC.	Function 1: Hold 2 sec. for locking and unlocking the keyboard; function 2: changing parameter when setting.

2.4.2.4 Common keyboard operation

Operation	Method
Shift display status	Press "PRG"
Change monitor item	Press " FAULT" or " RUN" to change
Read monitor item data	Monitor status,after data changed , system will show current data after one sec.Press " ENTER" to review current data immediately to cross check with setting data
Review data	Press " FAULT" or " RUN" during data view status
Read setting data	Press " ENTER" during data setting page
Change setting parameter	During parameter setting status press "ENTER" ,data will flash press " ▲ " or " ▼ " to change value , press "FUNC." can change flash position to edit.After finish editing , press "ENTER" to save .
Save setting	Press " ENTER" during setting status

2.4.2.5 Monitor data illustration

Code	Units	Monitor content
C1000	V	Current DC input voltage
C1001	℃	Current temperature inside unit

2.4.2.6 Setting data illustration

Code	Function	Unit	Range /default value	Change
D1000	Voltage	V(AC)	Depending on model	N/A
D1001	**Chopper voltage**	V(DC)	Depending on model	Allowed

NOTE: Default chopper voltage and Chopper voltage range see the table on page 14.

2.4.2.7 Example of keyboard operation (setting chopper voltage)

Press FUNC. and hold 2 sec.(Unlock the keyboard, F1 indicator goes off) →Press PRG (display C1000) →Press PRG again (display D1000) → Press FAULT (display D1001) → Press ENTER (display default chopper voltage) → Press ▲ or ▼ (modify chopper voltage) → Press ENTER (Save the setting) →Press PRG (Display the current bus voltage) →Press FUNC. and hold 2 sec. (Lock the keyboard).

2.5 Wiring matters

● Threading method:

Lead wire should be through the hole on the bottom of the Braking unit.

● Unit isolation from signal line:

Because of harmonic and noise created by unit , the DC side cable should be stranded to reduce radiation and inductance . Signal cable nearby should be shielded.

● Wire connection distance:

The cable between VFD and Braking unit should less than 5 Meters . Enclosure(aluminum radiator) should be grounded properly.

3.0 Faults & solutions:

Problem 1:Braking unit power light is on , but braking unit is not working.
Solution: Please remove control panel , check if the Pin position on MASTER (for single usage , must put on MASTER position).

Problem 2: When braking unit not working , resistor temperature very high.
Solution: IGBT of the braking unit is broken , pls change new braking unit .