

MODEL:

600 INVERTER

OPERATION MANUAL

New Version



SUITABLE MODEL : SINGLE PHASE 200V CLASS
THREE PHASE 200V/400V CLASS

PREFACE

Thank you for your purchase of LS600 IGBT space vector inverter.

The main features of LS600 inverter are beautiful appearance, handy, perspicuous interior construction, complete function, simply operation, and noiseless.

In order to sufficient bring into fully play its function, please refer to this operation manual before using.

This inverter uses advanced IGBT silent design combining with vast technology over the years to complete the IGBT space vector inverter for industry use.

Expect you will be satisfy with our LS600 and advise us for your further requirements at all times.

SAFETY SUMMARY

- To prevent any injury of member or damage of equipment, please follow the descriptions in this manual before using or operating this machine.
- Read this manual detailed before installation or operation. Call us for solutions if any question presents.
- Put the manual near the equipment or machine for convenient to consult.

SAFETY SYMBOLS



CAUTION



WARNING, DANGER



INHIBIT

SYMBOL DESCRIPTION



CAUTION

Describes a procedure which, if not performed correctly, could result in damage to data, equipment, or systems.



WARNING

Describes a potential hazard that could result in injury or death ; or a procedure which, if not performed correctly, could result in injury or death.



INHIBIT

Describes an action which, if disobey the regulation, could result in injury or death to members, or damage to equipment.

- The operators mentioned in this manual include: maintenance technical personnel, installation technical personnel, and practiced operators
- Please refer to the descriptions in P. 60 ~ P. 64 of this manual, or document file "TCF NO: INV-1-1998 DATE: FEB. 2, 1998" to see the standards of EMC and EMI that satisfy CE-conformity. The document has two copies; one is for our company and the other is for SGS United Kingdom Ltd.

PRECAUTION

1. Operate the inverter by professional technical personnel, which is familiar with the parameter setting, installation, and wiring assembly of the inverter, to avoid creating any danger accident.
2. Fix the inverter on the flat wall using the screw specified on P. 8 ~ P. 10 with appropriate shielding, to avoid the damage causing by unpredictable strike when operating.
3. Be sure to ground the ground terminals \oplus of the inverter and the motor.
4. Install an appropriate magnetic-contacted breaker in the power side of every inverter.
5. The DC voltage of the main circuit of the inverter is higher than 650VDC (400V class) or 325VDC (200V class). Do not touch the interior circuit of the inverter to avoid the danger of electric shock.
6. Cut the power supply off and confirm that the charge indicator is off, and then be sure there is not any DC voltage measured by multimeter between terminals P and N before maintenance and examination.
7. Do not touch the terminals of the inverter because there is still high DC voltage inside the inverter even when the operation switch is off.
8. Confirm the safety of the motor or the machine system before setting the output frequency more than 60 Hz.
9. Turn off the power supply of the inverter if do not use it for a long time.
10. Do not turn on/off the inverter by throwing in or cutting off the power supply.

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Please check the specifications after unpacking. If incorrect voltage source is applied, it could result in the damage of the inverter or injury of members.

1. Initial confirmation mode of LS600

Please use following methods for checking immediately after receipt of our LS600 inverter:

- Does its specification same as your order?
- Does it occur any damage during transportation?

If you have any question, please contact with our company or our distributor immediately.

There is a nameplate in right side of every inverter for user to distinguish the specifications such as input/output voltage, serial number, etc. Inspection for the specification that your order.

1-1 Nameplate for three phase inverter

Model	MODE : LS600-2001
Input specification	INPUT : AC 3PH 200-240V 50/60Hz
Output specification	OUTPUT : AC 0-240V 1.7KVA 4.5A
Manufacturing serial number	SER NO : LCA 000001

Type designation:

LS600-2001

Inverter Model

Voltage class
2 - 200-240V
4 - 380-460V

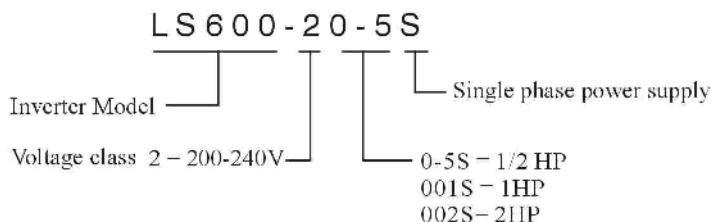
Maximum output capacity

0-5 - 1/2HP	020 - 20HP
001 - 1HP	025 - 25HP
002 - 2HP	030 - 30HP
003 - 3HP	040 - 40HP
005 - 5HP	050 - 50HP
007 - 7.5HP	060 - 60HP
010 - 10HP	075 - 75HP
015 - 15HP	100 - 100HP

1-2. Nameplate for single phase inverter

Model	→	MODE : LS600-20-5S
Input specification	→	INPUT : AC 1PH 200-240V 50/60Hz
Output specification	→	OUTPUT : AC 0-240V 1.2KVA 3.0A
Manufacturing serial number	→	SER NO : LCA 000001

Type designation: (MODEL)



Do not install the inverter in the following environments. It could result in damage of the equipment and even conflagration in the bad environments.

2. Installation method

2-1 Installation site

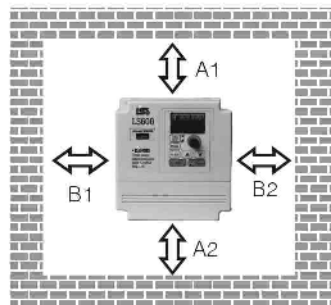


Please keep away following site:

- Sunshiny site
- With erosive vapor, liquid site
- With dust, iron powder site
- Surrounding temperature less than -10 degree C or higher than 40 degree C site
- With electric magnetic interfere site
- Vibration site
- With wind/rain, water drop, humidity site
- Above sea level 1000M site

2-2 Installation direction and space

1. This is a hanging on wall type inverter, please use M4 screw to vertically fix inverter on wall or circuit wiring board.
2. Please install according to following diagram to keep proper cooling space at inverter surrounding as revolving inverter will cause thermal.
3. Remove the side covers on both sides of the inverter for ventilating when ambient temperature is more than 40 degree C.
4. Refer to the following diagram and the descriptions in item (5) for all 600 series inverter.
5. Suggestion to install the inverter in circuit wiring board with cooling fan device below 40 degree C surrounding temperature. (Refer to the right diagram.)
6. If the inverter installs extra braking resistor, it may cause instant high temperature. Please strictly select site to install the braking resistor, or install a fan for cooling.



The minimum installation distance between the inverter and the wall (Refer to the above diagram.)

	A1	A2	B1	B2
LS600-20-5, 2001, 2002, 2003, 2005 LS600-20-5S, 2001S, 2002S, LS600-4001, 4002, 4003, 4005	More than 10 cm	More than 10 cm	More than 5 cm	More than 5 cm
LS600-2007, 2010, 2015, LS600-4007, 4010, 4015,	More than 20 cm	More than 20 cm	More than 10 cm	More than 10 cm
LS600-2020, 2025, 4020, 4030	More than 30 cm	More than 30 cm	More than 15 cm	More than 15 cm
LS600-2030, 2040, 4040, 4050	More than 40 cm	More than 40 cm	More than 20 cm	More than 20 cm
LS600-2050, 2060, 2075 LS600-4060, 4075	More than 50 cm	More than 50 cm	More than 30 cm	More than 30 cm



Failure to observe the demands above can result in overheating of the inverter and damage of the equipment.

7. The installation site should be well ventilated and far away from inflammable materials.
8. Suggestion to install the inverter in circuit wiring board with cooling fan device below 40 degree C surrounding temperature.
9. If the inverter installs extra braking resistor, it may cause instant high temperature. Please strictly select site to install the braking resistor.

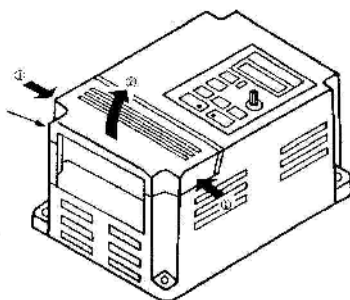
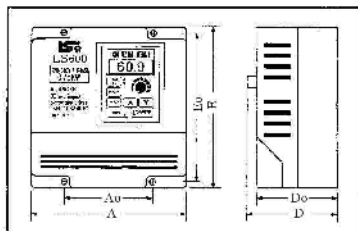
2-3 Terminal cover fixing/removing and terminal position

1. The following is specification for 0.5HP ~ 5HP inverters (single phase or three phase). For removing, grasp the terminal cover at ① on both sides and then lift in the direction of ②. Or aim the screwdriver at the button of one side and push it inward to open the cover.

For fixing, reverse the method.

2. Refer to the description in chapter 3 to see the connection position of power supply terminals.

3. Dimensions in mm



CAUTION

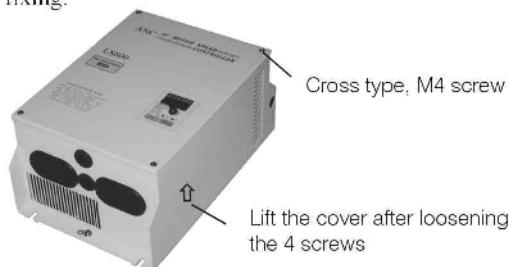
Use M4 screws to fix the inverters.

(UNIT : m/m)

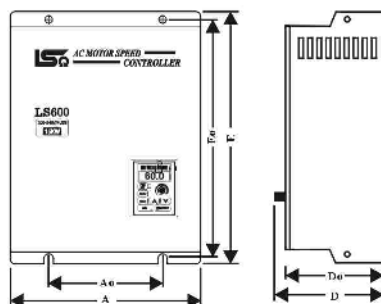
Model	Size		A	A0	E	E0	D	D0	Net weight (kg)	Gross weight (kg)	Measurement	Fix screw
	Area	Area										
LS600-20-5	LS600-2001		146	128	150	138	160	153	Approx weight		0.3	M4
LS600-2002	LS600-4001											
LS600-4002	LS600-20-5S											
LS600-2001S, LS600-2002S,												
LS600-2003	LS600-2005		146	128	200	188	160	153	2.6	3.0	0.4	M4
LS600-4003	LS600-4005											

2-4 Cover fixing/removing of inverters more than 7.5 HP

- The specifications are suitable for the following ranges.
200V ~ 240V, LS600-2007 ~ LS600-2050
380V ~ 460V, LS600-4007 ~ LS600-4050
For removing, turn the screws counterclockwise using type 107 cross-screwdriver. And turn the screws clockwise for fixing.



- Refer to the description in chapter 3, items 3-2, 3-3 to see the connection position of power supply terminals.
- Dimensions in mm



Model	Size Area	Area		E	Eo	D	Do	Net weight (Kg)	Gross weight (Kg)	Measurement	Fix screw
		A	Ao								
LS600-2007 LS600-2015 LS600-4010	LS600-2010 LS600-4007 LS600-4015	245	194	370	352	172	175	11.0	13.0	1.3	M6
LS600-2020 LS600-4020 LS600-4030	LS600-2025 LS600-4025	273	215	523	500	188	175	17.0	20.0	2.0	M6
LS600-2030 LS600-2050 LS600-4050	LS600-2040 LS600-4040	290	239	560	535	215	203	21.0	25.0	2.7	M6

2-5 Cover fixing/removing of inverters more than 50 HP

1. The specifications are suitable for the following ranges.

200V ~ 240V, LS600-2060 ~ LS600-2075

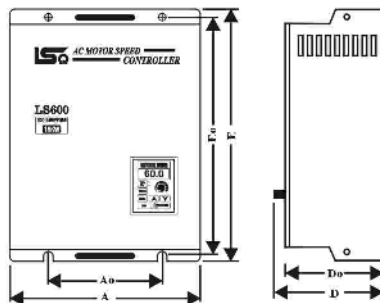
380V ~ 460V, LS600-4060 ~ LS600-4075

For removing, turn the screws counterclockwise using type 107 cross-screwdriver. And turn the screws clockwise for fixing.



2. Refer to the description in chapter 3, items 3-2, 3-3 to see the connection position of power supply terminals.

3. Dimensions in mm



Size Model	Area	Area		E		D		Net weight (Kg)	Gross weight (Kg)	Measurement	Fix screw
		A	Ao	E	Eo	D	Do				
LS600-2060	LS600-2075	354	236	670	645	285	273	42	47	5.0	M6
LS600-4060	LS600-4075										

6 WIRING METHOD



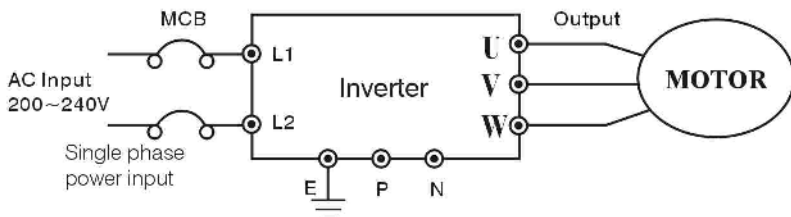
INHIBIT

The input power supply terminals (R, S, T) can not connect oppositely to the motor output terminals (U, V, W). Failure to observe the demands could result in the explosion of the inverter, lead to a fire, injury or death to members, and damage to equipment.

3. Wiring method

3-1 Single phase main circuit wiring diagram

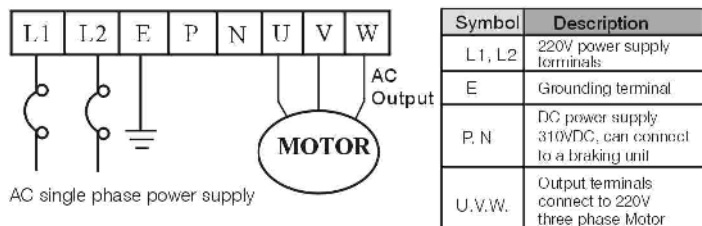
(LS600-20-5S, LS600-2001S, LS600-2002S)



CAUTION

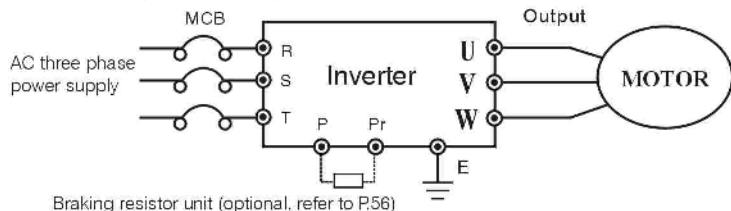
1. The single-phase series provide only DC power supply terminals P, N but not the braking units.
2. Ground the inverters to prevent the danger of lightning struck and electrical shock.
3. Only 200V-240V, 1/2 HP, 1 HP and 2 HP inverters produced for single phase series.

3-1-1 Terminal wiring diagram for single phase inverter



3-2 Three phase main circuit wiring diagram

(LS600-20-5, LS600-2001, LS600-2002, LS600-2003, LS600-2005, LS600-2007, LS600-2010, LS600-4001, LS600-4002, LS600-4003, LS600-4005, LS600-4007, LS600-4010)

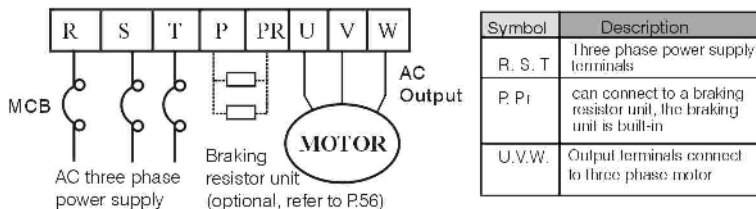




CAUTION

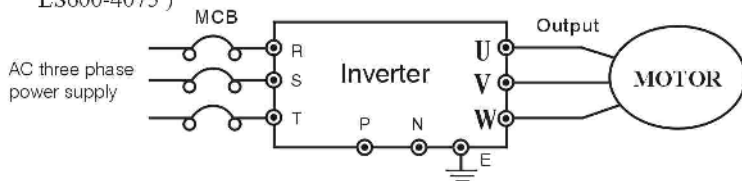
1. The braking circuits of 200V and 400V three-phase series that more than 15 HP are not built-in. Refer to P. 56 for choosing the correct resistance and wattage.
2. Ground the inverters to prevent the danger of lightning struck and electrical shock.

3-2-1 Terminal wiring diagram for three phase inverter



3-3 Three phase main circuit wiring diagram

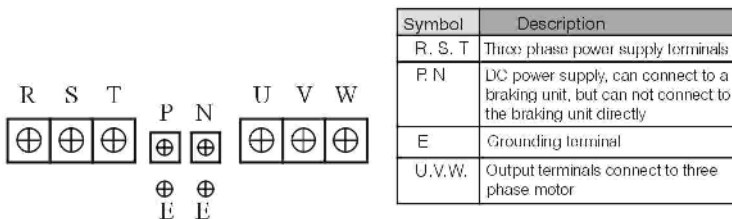
(LS600-2015, LS600-2020, LS600-2025, LS600-2030, LS600-2040, LS600-2050, LS600-2060, LS600-2075, LS600-4015, LS600-4020, LS600-4025, LS600-4030, LS600-4040, LS600-4050, LS600-4060, LS600-4075)



CAUTION

1. The braking circuits of 200V and 400V three-phase series that more than 15 HP are not built-in. Refer to P. 56 for choosing the correct resistance and wattage.
2. Ground the inverters to prevent the danger of lightning struck and electrical shock.

3-3-1 Terminal wiring diagram for three phase inverter



3-4 Attention matters for wiring



CAUTION

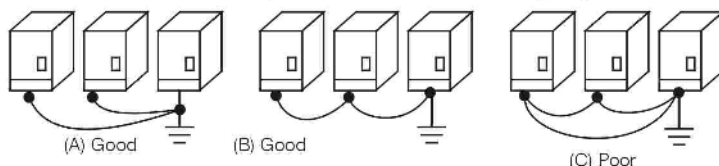
Refer to P. 61 ~ P. 64 to see the wiring specifications that C.F. confirmed

1. Main circuit wiring

1. The electric power input terminals R, S, T and output terminals U, V, W (Connected to the motor) can not be wrong connected absolutely. Otherwise, it will occur the strictly damage of the inverter.
2. It can not use the components of LC, RC noise filter and power capacitor at output terminals of the inverter.
3. The main circuit wiring of the inverter must keep away from the signal wire of other control equipment such as P.L.C to avoid any bad interference.

2. Ground connection

1. Please use third kind grounding (below $10\ \Omega$) method to ground the grounding terminal \oplus .
2. Absolutely avoid sharing and using ground pole and ground connection of the welder and power machine, and keep away from drive wiring of big power equipment.
3. Ground connection of multiple inverters as the following diagram.



3. Breaker of main circuit wiring magnetic contactor

It needs at least to install a magnetic contact breaker or magnetic contact protection circuit between input terminals R, S, T of the AC main circuit power supply and L.s600.

- * Please adjust the sensitive current of fault motion prevention more than 200 mA and the motion time more than 0.1 sec when using electric leakage breaker.

4. Surge absorber

Please shunt wire peripheral equipments of the inverter, such as coils of magnetic contactor, relay, and magnetic valve, with absorbers to prevent noise interference. Please refer to the following table for surge absorber usage.

Voltage	Use object	Specification of surge absorber
220V	Large capacity coil except for relay	AC250V 0.5uf200 Ω
	Controlling relay	AC250V 0.1uf100 Ω
380V	-Ditto-	AC500V 0.5uf220 Ω

3-5 Main circuit and control circuit wire gauge application list



- Verify that the input power supply voltage must be the same as the specification of the inverter before wiring.
- Choose the terminal screws and wires according to the electrical statute. Then screw the screws tightly.
- The wiring of the input power supply terminals does not influence the phase sequence. But the phase sequence of the output terminals U, V, W will influence the rotational direction of the motor. Interchange any two phases of the wiring for alteration.



- Proceed the wiring procedure after cutting the power source off to guarantee the operation safety.
- Install extra magnetic contacted breaker at the input side of the power supply to prevent the bomb out of the inverter or the rise of a fire.
- Ground the inverters to prevent the danger of electrical shock or a fire.

Table (1)

Contents	Specification	20-5	2001	2002	2003	2005	2007	2010	2015	2020	2025	2030	2040	2050	2060	2075
Capacity Kw/HP-200V		0.4/0.5	0.75/1	1.5/2	2.2/3	3.7/5	5.5/7.5	7.5/10	11/15	15/20	18.5/25	22/30	30/40	37/50	45/60	55/75
Rated current of three phase MCB(A)		5	10	15	20	30	50	60	75	125	150	175	225	250	300	400
Wire gauge of electrical wiring (mm ²)		2.0			3.5		5.5	8.0	14	22	22	38	60	80	100	150
Main circuit screw size		M4				M5		M6			M8			M10		
Wire gauge of control circuit (mm ²)		0.128~0.5(26~20AWG)														
Fix of control line		Plug-in (Refer to P.21 for description)														

Table (2)

Contents	Specification	4001	4002	4003	4005	4007	4010	4015	4020	4025	4030	4040	4050	4060	4075
Capacity Kw/HP-400V		0.75/1	1.5/2	2.2/3	3.7/5	5.5/7.5	7.5/10	11/15	15/20	18.5/25	22/30	30/40	37/50	45/60	55/75
Rated current of three phase MCB(A)		5	10	15	20	30	50	60	100	125	150	175	200		
Wire gauge of electrical wiring (mm ²)		2.0			3.5		5.5	14	22	38	50				
Main circuit screw size		M4			M5		M6			M8		M10			
Wire gauge of control circuit (mm ²)		0.128~0.5(26~20AWG)													
Fix of control line		Plug-in (Refer to P.21 for description)													

Table (3)

Contents	Specification	20-5S	2001S	2002S	2003S
Capacity Kw/HP-200V		0.4/0.5	0.75/1.0	1.5/2.0	2.2/3.0
Rated current of three phase MCB(A)		10	15	25	30
Wire gauge of electrical wiring (mm ²)		2.0		3.5	
Main circuit screw size		M4			
Wire gauge of control circuit (mm ²)		0.128~0.5(26~20AWG)			
Fix of control line		Plug-in (Refer to P.21 for description)			

※

Table (1) is for 200-240V class three phase power supply.

Table (2) is for 380-460V class three phase power supply.

Table (3) is for 200-240V class single phase power supply.

3-6 Attention matters of control circuit wiring

1. The control signal wire must separate with the power wiring to prevent fault motion.
2. The analog signal for frequency setting must use separating twist wire with well grounding.
3. The length of control signal wire must less than 10 meters.



The warning relay does not provide the power failure keeping function. If it needs to make breakdown detection, please extra install programmable controller with power failure keeping function at exterior.

4. Wiring diagram for open collector output terminals

Figure A:Wiring for DC power supply

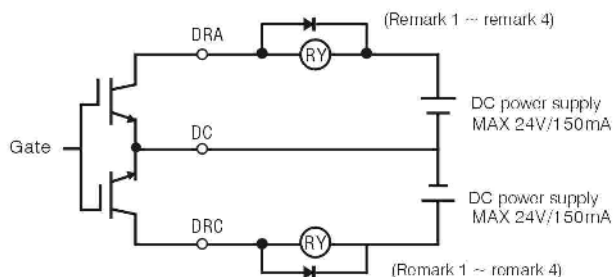
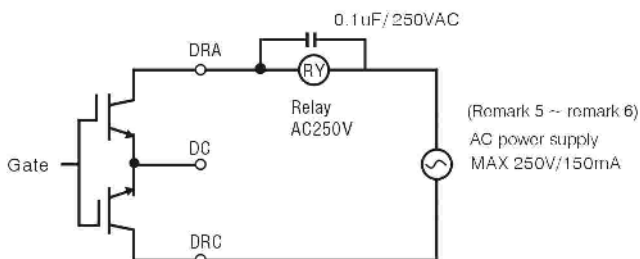


Figure B:Wiring for AC power supply



Remark 1. It needs to extra install a surge absorbing diode between the coil terminals of relay in figure A.

Remark 2. The maximum current of driving relay is 150 mA.

Remark 3. The maximum voltage for driving in figure A is DC 24V and the maximum voltage for driving in figure B is AC 250V.

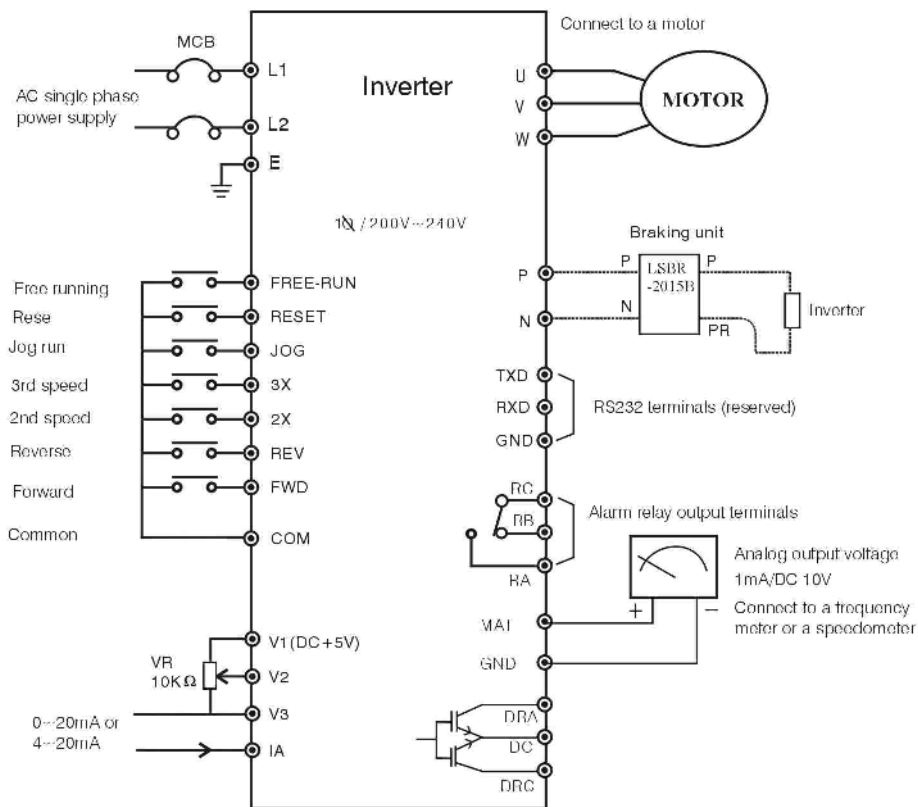
Remark 4. Terminals DRC, DRA in figure A are for positive connection input, and terminal DC is for negative connection input.

Remark 5. The maximum power supply in figure B is AC 250V/150 mA without the limitation of polarity.

Remark 6. Shunt a surge absorbing capacitor (0.1uF/250VAC) between both sides of the AC relay coil.

3-7 Wiring diagram of main circuit and control circuit

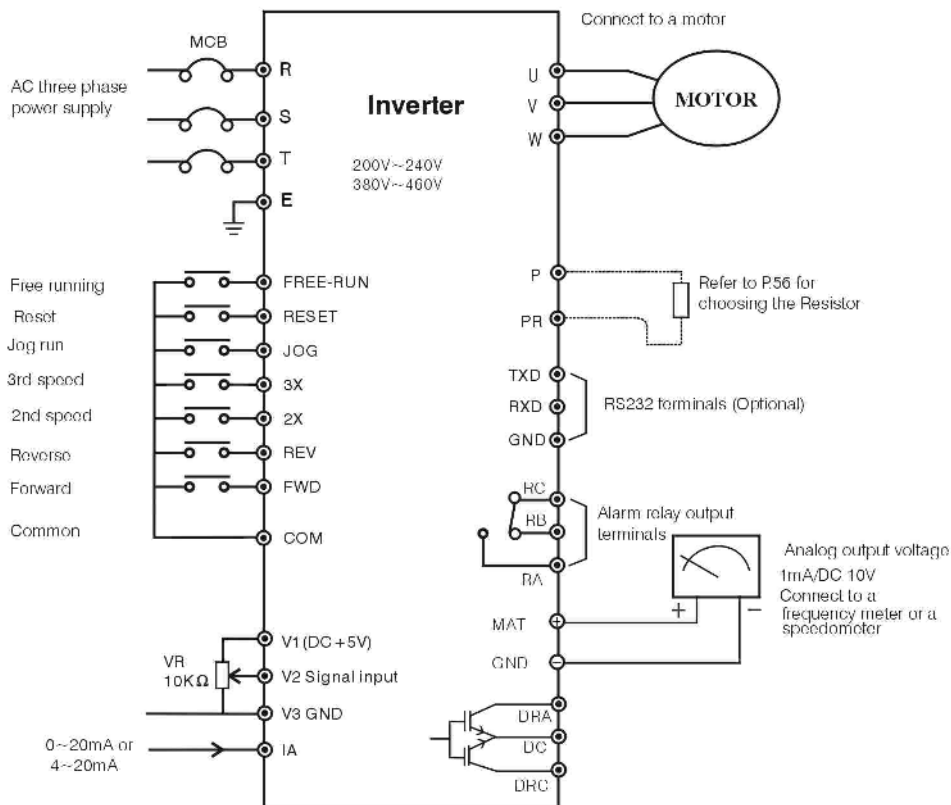
3-7-1 Wiring diagram of single phase main circuit and control circuit (suitable for single phase AC source)



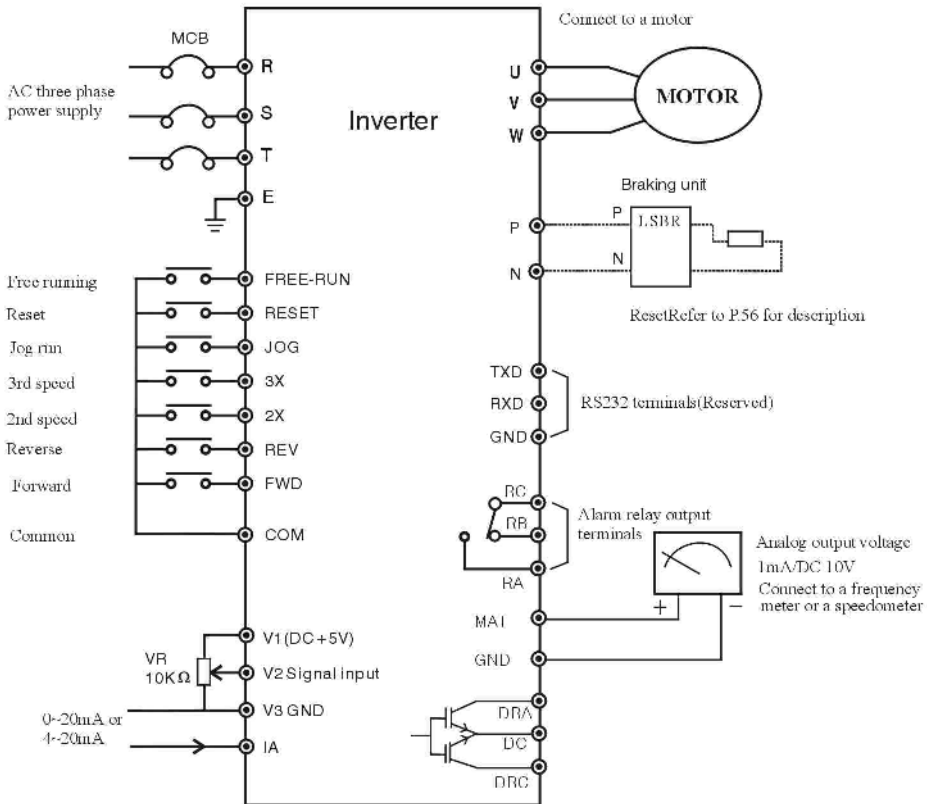
6 WIRING METHOD

3-7-2 Wiring diagram of three phase main circuit and control circuit Suitable for the following models :

LS600-20-5, LS600-2001, LS600-2002, LS600-2003,
LS600-2005, LS600-2007, LS600-2010, LS600-4001,
LS600-4002, LS600-4003, LS600-4005, LS600-4007,
LS600-4010

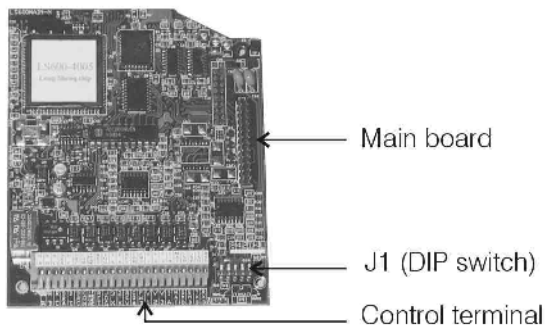


3-7-3 Wiring diagram of three phase main circuit and control circuit Suitable for the following models : LS600-2015, LS600-4015 or above

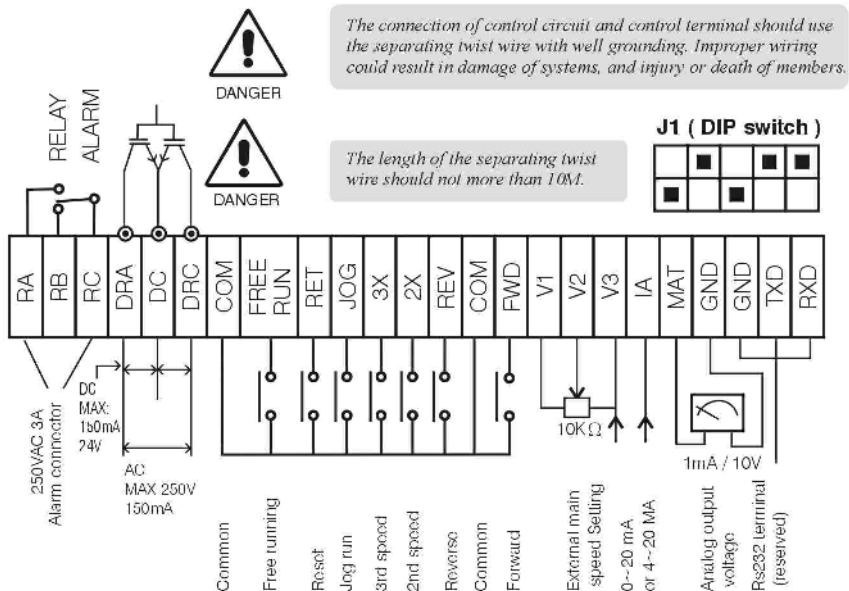


4 Description of control terminal and DIP switch J1

4-1 Position of control terminal and DIP switch J1

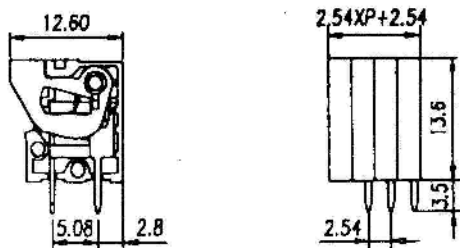


4-2 Description of control terminal wiring

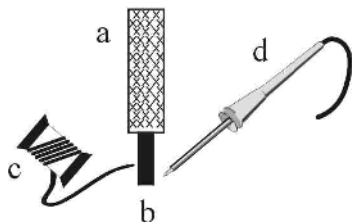


4-3 Specification and method of control terminal wiring

1. Internal construction of terminal

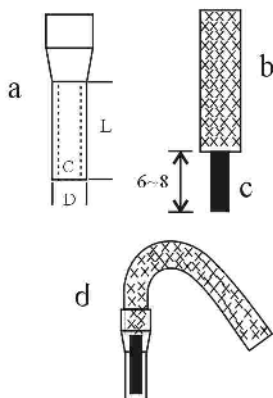


2. Peel 10mm ~ 12mm off the line, and weld it with tin



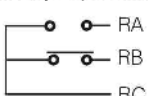
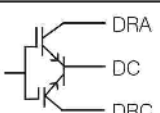
- Use electrical signal wire of 20-26 wire gauge with 150V/2A rating
- Peel 10mm ~ 12mm off the line, and weld it with tin
- Use 0.8mm welding rod
- Use 40W welding iron

3. With needle terminal



- Needle terminal
L: 10mm length
D: 1.3mm external diameter
C: 1.0mm internal diameter
- Electrical signal wire
150V/2A rating
26-20 wire gauge
($0.128 \text{ mm}^2 \sim 0.5 \text{ mm}^2$)
- 6-8 mm peel off

4-4 Description of control circuit terminal

Symbol	Terminal name	Description		
Control circuit input terminal	V1	Power supply terminal used for frequency setting	DC 1.5V power supply connect with potentiometer pin #3	
	V2	Input terminal used for frequency Setting	DC 0~5V signal input terminal, connect with potentiometer pin #2	
	V3	Ground terminal used for frequency setting	Ground terminal used for frequency setting, connect with potentiometer pin #1	
	TXD	RS232 output terminal	RS232 signal output terminal	Reserved
	RXD	RS232 input terminal	RS232 signal input terminal	
	GND	RS232 ground terminal	RS232 signal ground terminal	
	FWD	Forward instruction terminal	Short circuit between FWD-COM, inverter will forward running	
	REV	Reverse instruction terminal	Short circuit between REV-COM, inverter will reverse running	
	FREE RUN	Free-run stop terminal	Short circuit between FREE-RUN and COM, inverter will stop outputting immediately, motor will stop by inertia	
	JOG	Jogging operation terminal	Short circuit between JOG-COM, motor will make jogging running, the frequency is variable	
	COM	Common ground terminal	Common ground for input and control signals, same as interface 12V	
	2X	2nd speed terminal	Short circuit between 2X-COM, motor will running with 2nd speed	
	3X	3rd speed terminal	Short circuit between 3X-COM, motor will running with 3rd speed	
	RESET	Reset signal terminal	Short circuit between RESET-COM, protection status will release	
	IA	Electric current signal terminal	Input 0~20mA or 4~20mA current signal to terminal V3	
Control circuit output terminal	MAT	Analog signal output	0~10V, 1mA analog output	
	GND	Analog ground		
	RA		Relay acts when inverter trips Alarm relay capacity: 250V/3A For normal: RA-RC open, RB-RC closed For fault: RA-RC closed, RB-RC open	
	RB			
	RC			
	DRA		Crystal output. Inverter acts when frequency setting more than 1 Hz, and the output terminals are closed. Inverter stops when frequency setting less than 1 Hz, and the output terminals are open. Rating between DRA-DRC is AC 250V/150mA. Rating between DRA-DC and DRC-DC are DC 24V/150mA.	
	DC			
DRC				



The control terminals have the characteristics of dead end. Connect to signals with any voltage source could result in the damage of the inverter.

4-5 Prompts

V1, V2, V3

Correctly connect to a 10 K Ω potentiometer. The wrong connection of terminals V1 and V3 will reverse the speed adjustment. Both terminals V3 and GND are ground of +5V.

TXD, RXD, GND

Reserved RS232 signal input terminals.

FWD-COM

Terminals for clockwise operation. (Change any two phase of terminals U, V, W if inverted.) Dead end that can not connect to any voltage source.

REV-COM

Terminals for counterclockwise operation. (Change any two phase of terminals U, V, W if inverted.) Dead end that can not connect to any voltage source.

FREE RUN-COM

Inverter will stop outputting immediately after having the two terminals shorted, and the motor will free run to stop. The motor reverts to original speed operation after opening the terminals for a while. (The time it reverts depends on the accelerating time length of main speed.) Dead end that can not connect to any voltage source.

JOG-COM

Discontinuous jog operation. Dead end that can not connect to any voltage source.

2X, 3X-COM

Exterior 2nd and 3rd speed terminals. Well preset the parameters for normal operation. Dead end that can not connect to any voltage source.

RESET-COM

Reset terminal for releasing the protection status. Do not reset the inverter when high speed operating. Dead-end that can not connect to any voltage source.

IA-V3 (GND)

Electrical current input terminal. C01-1, 3 for 0~20mA input and C01-4, 5 for 4~20mA input. The first switch of J1 must set to ON and the others to OFF.

MAT-GND

0~10VDC/1mA analog output terminal. Can connect to a tachometer or a frequency meter.



WARNING

MAT-GND are terminals for output only and can not connect to any input signal. Connect to any input signal could result in burn of main board, a fire, damage of equipment and injury of member.

RA, RB, RC

Alarm relay output terminals. The maximum voltage rating is AC 250V and the maximum current rating is 3A. RC-RA terminals are normally open and RC-RB terminals are normally closed. RC is common ground terminal.

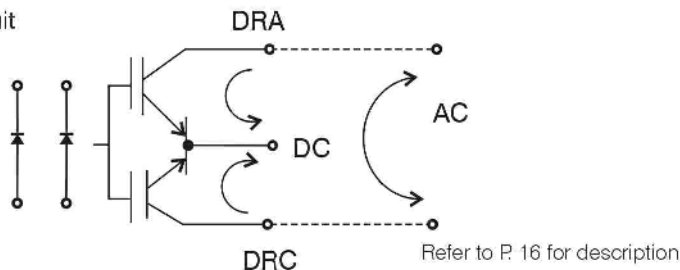
DRA, DC, DRC

Crystal open collector output terminals. Closed when frequency setting more than 1Hz and open when frequency setting less than 11Hz.

(1) Characteristics table

Symbol	Over 1Hz	Under 1Hz	Capacity	Polarity
DRA-DRC	Closed	Open	AC250V//150MA	-
DRA-DC	Closed	Open	DC24V//150MA	DRA for positive input DC for negative input
DRC-DC	Closed	Open	DC24V//150MA	DRC for positive input DC for negative input

(2) Circuit



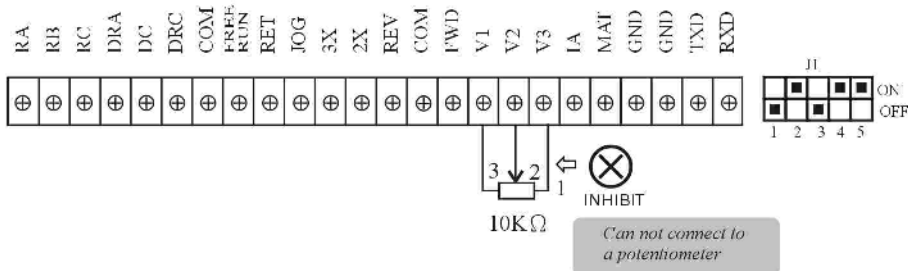
4-6 Description of DIP switch J1

J1	Signal	Description	Step
	DC 0~5V Potentiometer on board, factory Preset	Preset standard mode in factory. Take voltage source from inverter itself and tune the speed from potentiometer in keypad.	A
	DC 0~5V Exterior potentiometer	Control terminals V1, V2, V3 separately connect to pins #3, #2, #1 of exterior potentiometer, and set C01=1, 3.	B
	DC 0~5V Exterior signal	Take voltage source from PC or PLC transformer. Connect terminal V2 to positive part, terminal V3 to negative part, and set C01=1, 3.	C
	DC 0~10V Exterior potentiometer and voltage source	0~10V exterior voltage source. Connect positive part to terminal V1 and potentiometer pin #3, negative part to terminal V3 and potentiometer pin #1, signal input part to terminal V2 and potentiometer pin #2, and set C01=1, 3.	D
	DC 0~10V Exterior signal	Take voltage source from PC or PLC transformer. Connect terminal V2 to positive part, terminal V3 to negative part, and set C01=1, 3.	E
	0~20mA Current signal	0~10mA current source. The analog signal control has changed to current signal control. Set C01=1, 3.	F
	4~20mA Current signal	4~20mA current source. Set C01=4, 5.	G

4-7 Step description

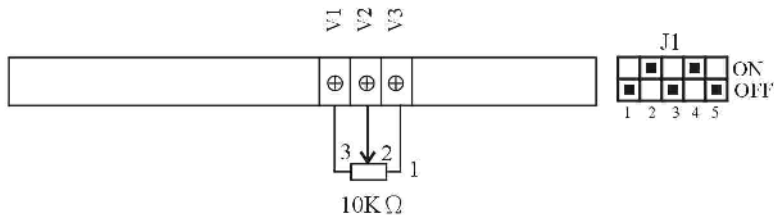
STEP A

1. Use interior DC 0~5V voltage of the inverter.
2. Set DIP switch-J1 pins #1, #3 off (downward) and pins #2, #4, #5 on (upward).
3. Set C01=0, 1, 2, 3, 4 or 5.
 Remark C01-4: Keypad + analog signal control
 C01-5: Control terminal + analog signal control
4. Position diagram



STEP B.

1. Connect to an exterior potentiometer.
 (Use interior DC 0~5V voltage of the inverter.)
2. Set DIP switch-J1 pins #1, #3, #5 off and pins #2, #4 on.
3. Set C01=1 or 3.
4. Position diagram

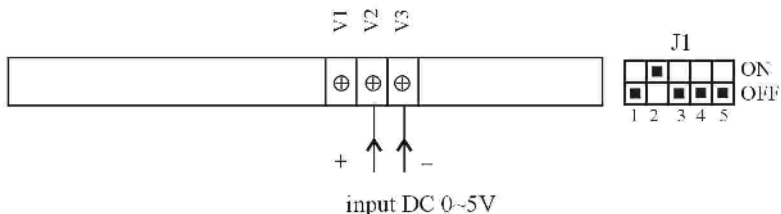


7

DESCRIPTION OF CONTROL TERMINAL AND DIP SWITCH J1

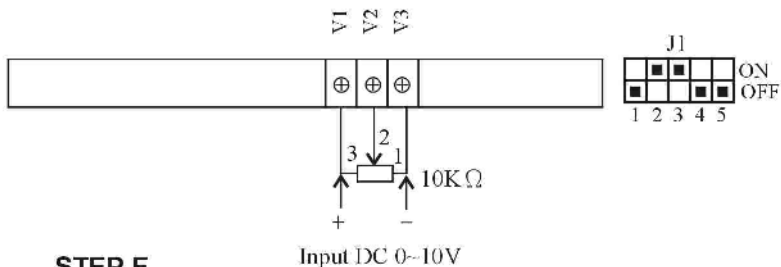
STEP C.

1. Connect to DC 0~5V exterior voltage source.
2. Set DIP switch-J1 pins #1, #3, #4, #5 off and pin #2 on.
3. Set C01-1 or 3.
4. Position diagram



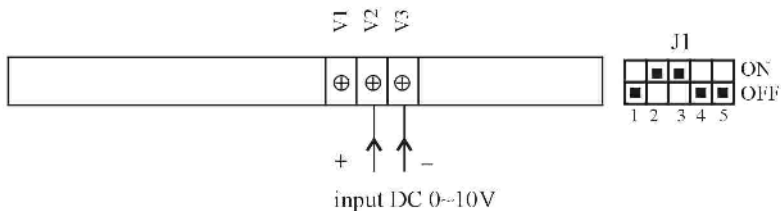
STEP D.

1. Connect to DC 0~10V voltage source by an exterior potentiometer.
2. Set DIP switch-J1 pins #1, #4, #5 off and pins #2, #3 on.
3. Set C01-1 or 3.
4. Position diagram



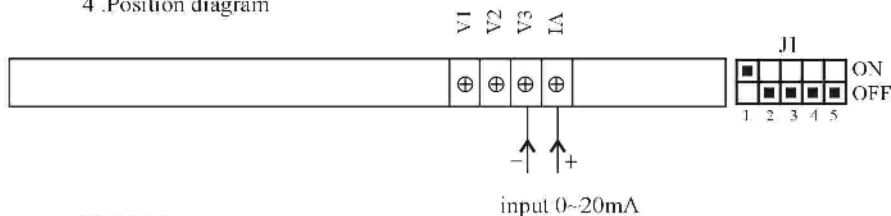
STEP E.

1. Connect to DC 0~10V exterior voltage source.
2. Set DIP switch-J1 pins #1, #4, #5 off and pins #2, #3 on.
3. Set C01-1 or 3.
4. Position diagram

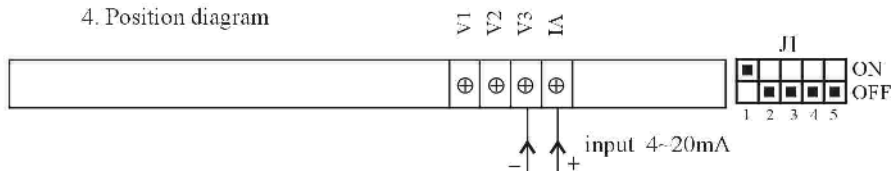


STEP F.

1. Connect to 0~20mA exterior current source.
2. Set DIP switch-J1 pins #2, #3, #4, #5 off and pin #1 on.
3. Set C01=1 or 3.
4. Position diagram

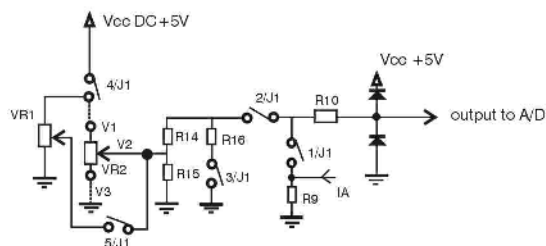
**STEP G.**

1. Connect to 4~20mA exterior current source.
2. Set DIP switch-J1 pins #2, #3, #4, #5 off and pin #1 on.
3. Set C01=4 or 5.
4. Position diagram

**4-8 Construction of DIP switch circuit**

(1) Refer to P.24 ~ P.27 descriptions to set parameter C01=1, 2, 3, 4 or 5.

(2) Circuit



VR1: Potentiometer B10K Ω /16 Φ on control box.

VR2: Exterior potentiometer connect to control terminals V1, V2, V3.
Refer to P.24 ~ P.27 for setting.

Connect to 0~20mA exterior current source when C01=1, 3. Set DIP switch-J1 pins #2, #3, #4, #5 off and pin #1 on.

Connect to 4~20mA exterior current source when C01=4, 5. Set DIP switch-J1 pins #2, #3, #4, #5 off and pin #1 on.

8 OPERATION

5 Operation



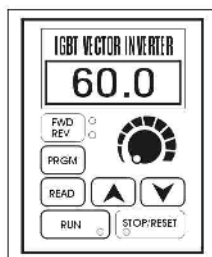
Observe the safety specifications mentioned in above sections before operation.

5-1 Important point checking before revolution

When you complete wiring, please check follows again before revolution.

1. Is wiring corrective? Be sure that electric power must input from terminals L1, L2 for single phase and terminals R, S, T for three phase.
2. Verify that motor is normal and without problems of lock and creepage.
3. Does it make any short circuit due to improper wiring?
4. Do terminal screws tightly lock?
5. Is there any phenomenon of wire gap or short circuit between output sides of inverter and exterior control circuit?
6. The electric line connects inverter and motor should less than 12M.

5-2 Operation panel explanation



Keep panel dry and prevent water infiltration. Water infiltration could result in the stall of the inverter, the damage of machine and injury of member.



Press the key lightly to prevent the damage of its elasticity.

Function key	Function explanation
FWD/REV	Forward/reverse key
▲ ▼	Function selection key ▲:Increase key ▼:Decrease key
PRGM	Programmable key
READ	Read key
RUN	Inverter starting key
STOP/RESET	Stop/reset key (Reset when inverter fault)

The read key of 600 series is not established. It will be automatically read-in after 5 seconds.

5-3 Pre-revolution setting

LS600 model inverter setting has completed before shipment. It adjusts speed by a potentiometer and operates forward, reverse, start and stop actions by keyboard. If it needs to change parameter value, it can free to change by professional personnel.



DANGER

Only authorized personnel should be permitted to perform the parameter setting to prevent damage of machine and injury of member.

5-4. Testing revolution

1. Turn on the electric power switch after verifying the installation of MCB and magnetic breakers, then the indicator will display 0.0.



WARNING

Confirm the turning direction of motor before revolution. Wrong turning direction could result in the damage of machine transmission and injury of member.

2. The run indicator will flash after pressing the **RUN** key. Turn right the variable resistor knob until the monitor display is more than 1Hz, then the operation indicator stops flashing, the stop indicator goes out and the motor starts to run.
3. Confirm the turning direction of motor. It can change by directly pressing the **FWD/REV** key (or change wiring of terminals U, V, W) if reversed direction. The **FWD/REV** indicator will light for forward revolution and the **FWD/REV** indicator will light for reversed revolution.



CAUTION

The forward/reverse function setting by the **FWD/REV** key is not retainable. The inverter will return to forward revolution mode after restarting the power supply. Set C21 for memory if necessary.

4. Press **STOP/RESET** key, motor stop running. **STOP/RESET** Indicating lamp light, **RUN** indicating lamp off.



WARNING

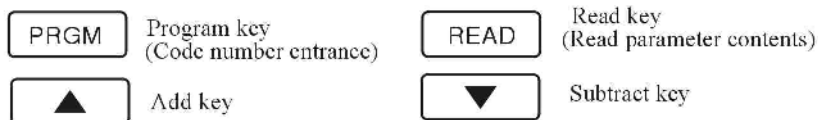
Do not turn on/off the inverter by throw in or cut off the power supply. Failure to observe the warning could result in the damage of inverter; the reduction of inverter life, a fire or the loss of effects.

- ① Turn the variable resistor knob until the monitor displays 0.0, then the run indicator flashes and the stop indicator keeps on. The run indicator goes off and the stop indicator keeps on after stop key pressed.
- ② The stop indicator will flash after pressing the **STOP/RESET** key. The run indicator keeps on and the frequency decreases. When monitor display is less than 1Hz, the run indicator goes off, the

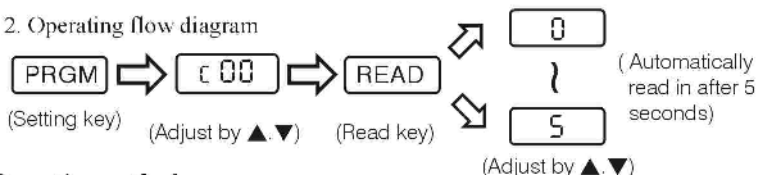
6 Parameter setting method

6-1 Parameter setting steps and descriptions







1. The parameter setting of 600 series is easy. Notice the following descriptions



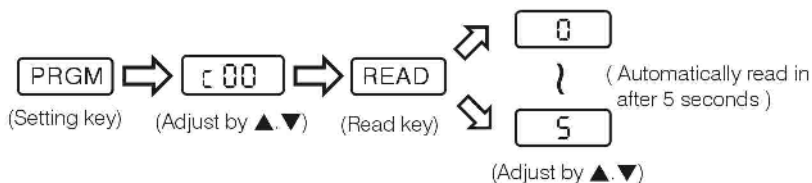
2. Operating flow diagram





Operating method:

The monitor displays 0.0 after the power is on. The monitor displays C00 after pressing the  key. The code number can be changed by increase key  and decrease key . Choose the desired parameter and press the  key, then choose the desired value by increase key  and decrease key .

Monitor display content selection

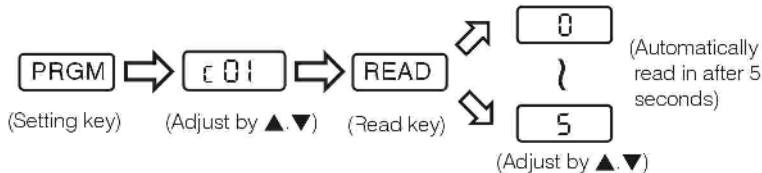


- $C00=0$: Frequency (Hz) display, maximum for 240Hz. The display resolution is 0.5Hz for normal revolution and 0.1Hz for accelerating/decelerating time more than 20 seconds.
- $C00=1$: 2-pole motor revolution speed rpm(1:10) display, maximum for 999
- $C00=2$: 4-pole motor revolution speed rpm(1:10) display, maximum for 999
- $C00=3$: 6-pole motor revolution speed rpm(1:10) display, maximum for 999
- $C00=4$: $C30$ unlock, $C30$ is for carrier wave setting.
- $C00=5$: The monitor display will immediately flash once per Second when the frequency decreases to zero (on the status of stop) after pressing the  key. And the frequency will immediately increase from 0Hz to the setting value after pressing the  key.



Set the carrier wave according to the initial factory value and do not change it arbitrarily. The improper setting could in the abnormal heat of inverter thus the damage of inverter.

€01 Control mode selection



€01 = 0 : Speed mode operation controlled by keyboard.
Acceleration or deceleration adjust by ▲, ▼

€01 = 1 : Controlled by keyboard and analog signal.
Key board : Set speed by keyboard.
Analog signal : Refer to P.24~P.27 for descriptions

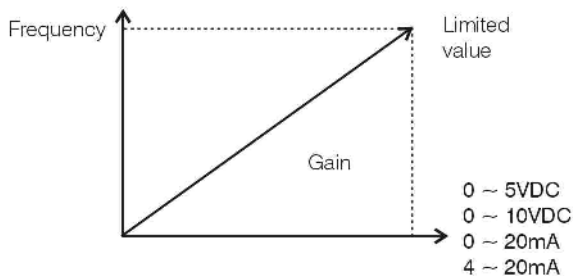
1. Potentiometer operation on control panel (Interior 0~5VDC)
2. Exterior potentiometer operation (Interior 0~5VDC or exterior 0~10VDC)
3. Exterior signal operation (Exterior 0~5VDC or exterior 0~10VDC)
4. 0~20mA current signal operation



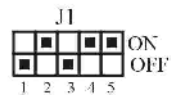
The mode selection function must apply the adjustment of DIP switch J1. The improper setting could result in the reduction of the inverter life.

Gain graph

Relative curved graph of analog signal instruction (0~5VDC, 0~10VDC, 0~20mA, 4~20mA) complying with output frequency.



DIP Switch



Remark: Refer to P.24~P.27 for descriptions.

9 PARAMETER SETTING METHOD

$\text{P}01=2$: (1) Set control terminals FWD, REV and COM for the control of run/stop operations. And adjust acceleration or deceleration by ▲, ▼ on keypad.

- (2) The monitor displaying -0- indicates that the revolution direction is not confirmed and the inverter can not start up. Close the FWD-COM or REV-COM terminals, and then adjust acceleration or deceleration by ▲, ▼. At this time, the monitor displays 0.0.

** Any connector on control terminal has its own function. Refer to the descriptions on every section (P.22 for example).*

$\text{P}01=3$: Controlled by control terminal and analog signal

- (1) The monitor displaying -0- indicates that the revolution direction is not confirmed and the inverter can not start up. Close the FWD-COM or REV-COM terminals, and then input analog signals for operation. At this time, the monitor displays 0.0.
- (2) 0~5VDC, 0~10VDC and 0~20mA analog signal input applied with the adjustment of DIP switch J1. Refer to P.24 for descriptions.

$\text{P}01=4$: Controlled by keypad and analog signal

- (1) keyboard: Progress speed setting from keyboard.
- (2) Refer to P.24~P.27 for analog signal setting.
- (2-1) Potentiometer operation on control panel (Interior 0~5VDC of inverter)
- (2-2) Exterior potentiometer operation (Interior 0~5VDC of inverter, exterior 0~5VDC or exterior 0~10VDC)
- (2-3) Exterior signal operation (Exterior 0~5VDC or exterior 0~10VDC)
- (2-4) 4~20mA current signal operation



CAUTION

*The function setting must apply the adjustment of DIP switch J1.
The improper setting could result in the reduction of the inverter life.*

$\text{P}01=5$: Controlled by control terminal and analog signal

- (1) Refer to item (2) of $\text{P}01=2$ and item (1) of $\text{P}01=3$ for control terminal operation.
- (2) Refer to item (2) of $\text{P}01=4$ for analog signal control.