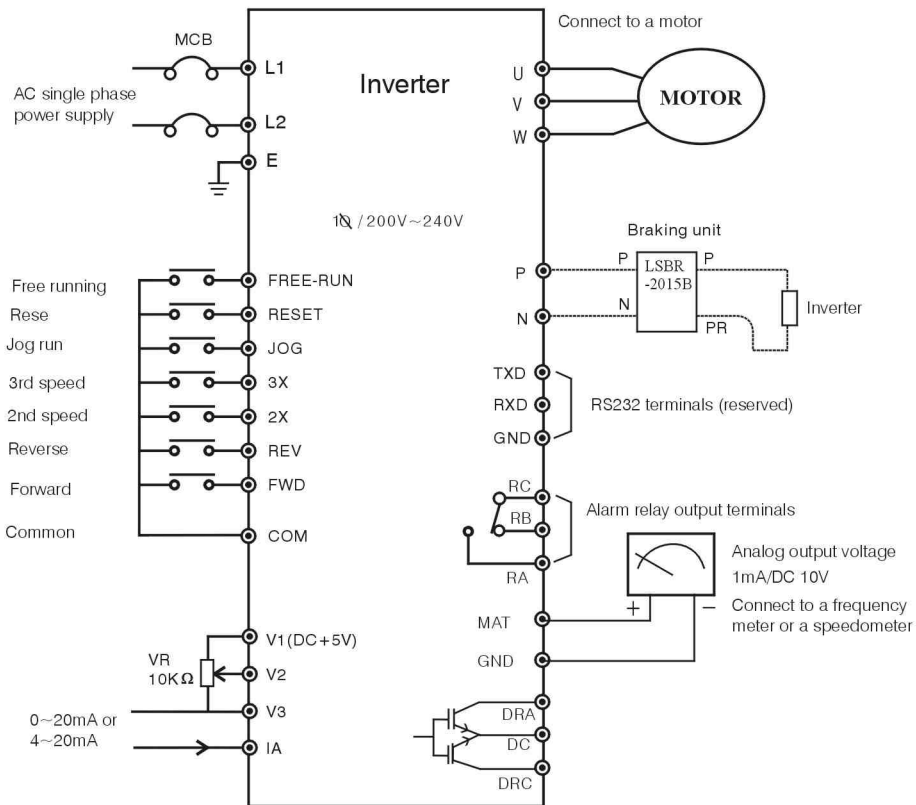


Remark 5. The maximum power supply in figure B is AC 250V/150 mA without the limitation of polarity.

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

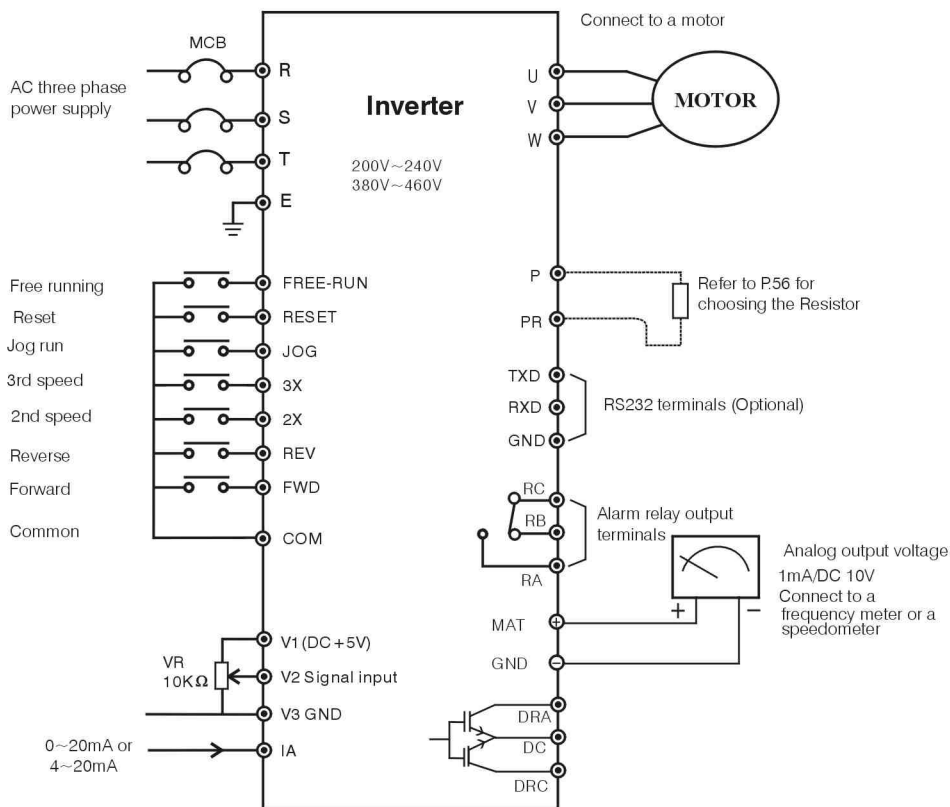
3-7 Wiring diagram of main circuit and control circuit

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

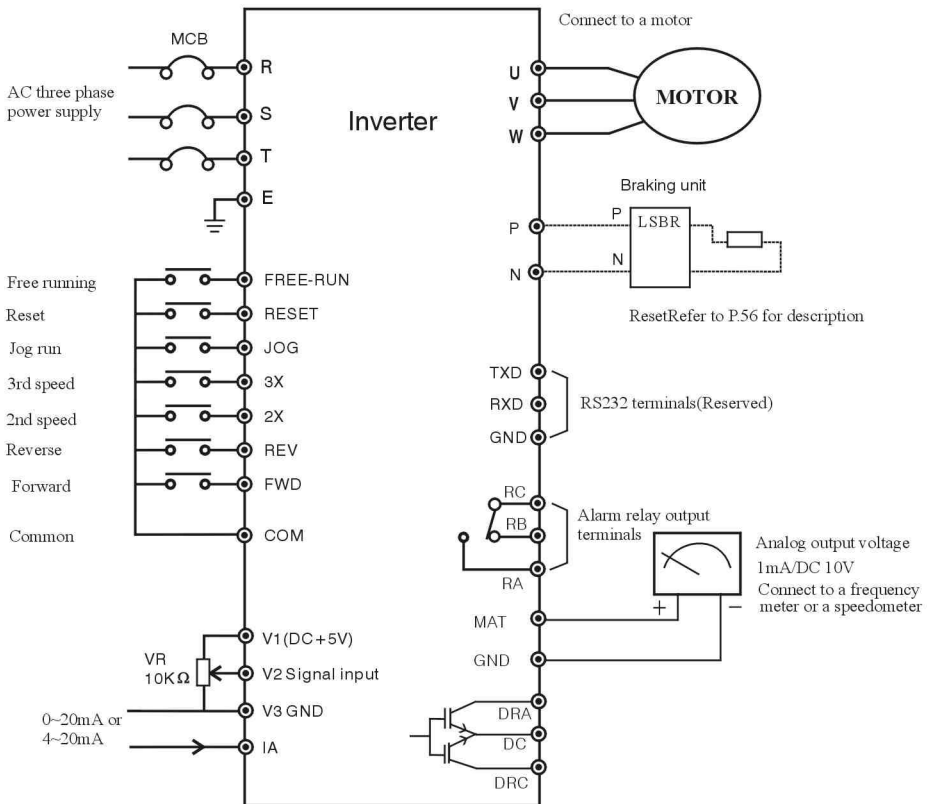


3-7-2 Wiring diagram of three phase main circuit and control circuit Suitable for the following models :

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

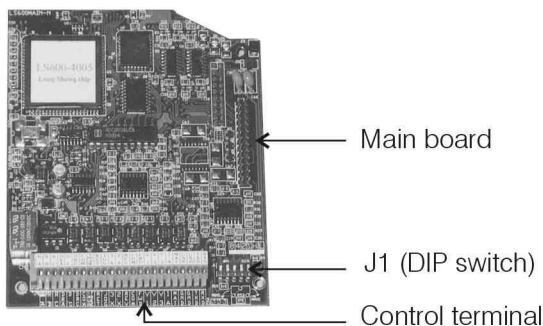


3-7-3 Wiring diagram of three phase main circuit and control circuit Suitable for the following models : LS600-2015, LS600-4015 or above

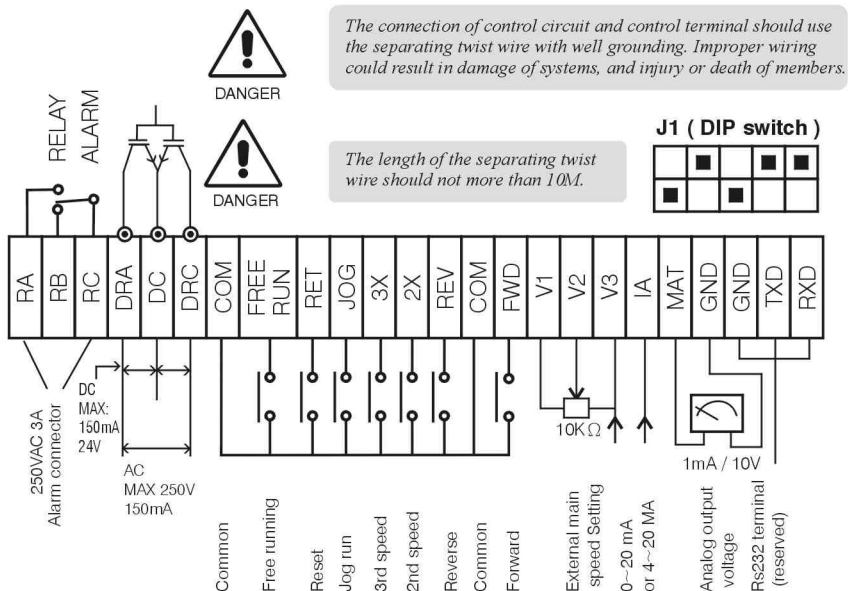


4 Description of control terminal and DIP switch J1

4-1 Position of control terminal and DIP switch J1

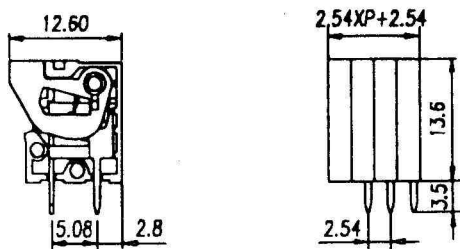


4-2 Description of control terminal wiring

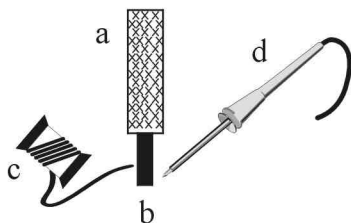


4-3 Specification and method of control terminal wiring

1. Internal construction of terminal

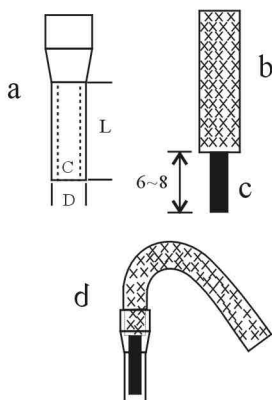


2. Peel 10mm ~ 12mm off the line, and weld it with tin



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

3. With needle terminal



- a. Needle terminal
 - L: 10mm length
 - D: 1.3mm external diameter
 - C: 1.0mm internal diameter
- b. Electrical signal wire
 - 150V/2A rating
 - 26-20 wire gauge
 - (0.128 mm² ~ 0.5 mm²)
- c. 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
	V2	Input terminal used for frequency Setting
	V3	Ground terminal used for frequency setting, connect with potentiometer pin #1
	TXD	RS232 output terminal
	RXD	RS232 input terminal
	GND	RS232 ground terminal
	FWD	Forward instruction terminal
	REV	Reverse instruction terminal
	FREE RUN	Free-run stop terminal
	JOG	Jogging operation terminal
	COM	Common ground terminal
	2X	2nd speed terminal
	3X	3rd speed terminal
	RESET	Reset signal terminal
	IA	Electric current signal terminal
	MAT	Analog signal output
	GND	Analog ground
Control circuit output terminal	RA	Alarm relay output terminal
	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.



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.

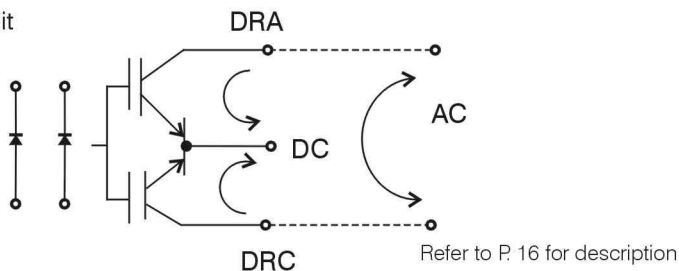
DRA, DC, DRC

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

(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



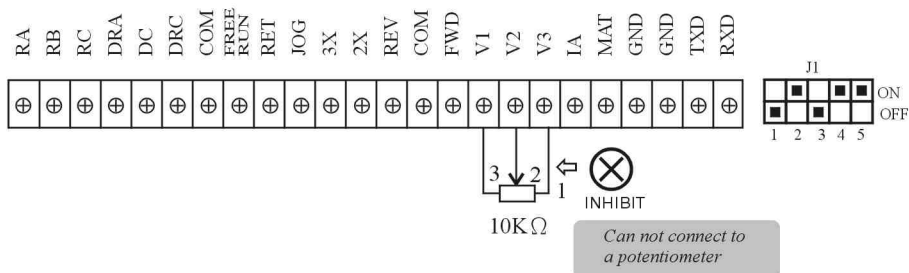
4-6 Description of DIP switch J1

J1	Signal	Description	Step
<div> <div>ON</div> <div>OFF</div> </div>	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
<div> <div>ON</div> <div>OFF</div> </div>	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
<div> <div>ON</div> <div>OFF</div> </div>	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
<div> <div>ON</div> <div>OFF</div> </div>	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
<div> <div>ON</div> <div>OFF</div> </div>	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
<div> <div>ON</div> <div>OFF</div> </div>	0~20mA Current signal	0~10mA current source. The analog signal control has changed to current signal control. Set C01=1, 3.	F
<div> <div>ON</div> <div>OFF</div> </div>	4~20mA Current signal	4~20mA current source. Set C01=4, 5.	G

4-7 Step description

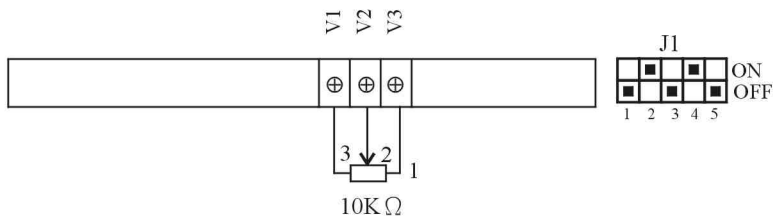
STEP A

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



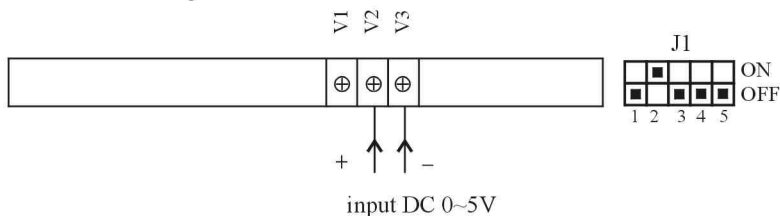
STEP B.

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

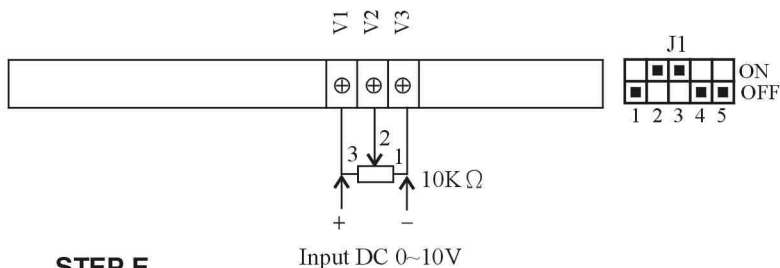


STEP C.

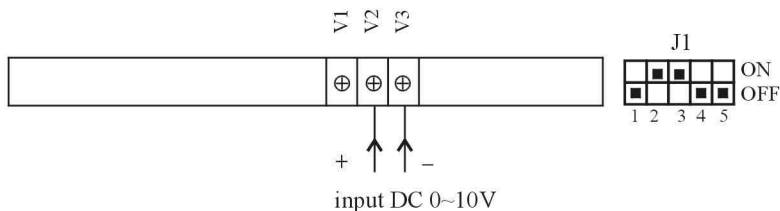
1. Connect to DC 0~5V exterior voltage source.
2. Set DIP switch-J1 pins #1, #3, #4, #5 off and pin #2 on.
3. Set C01=1 or 3.
4. Position diagram

**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

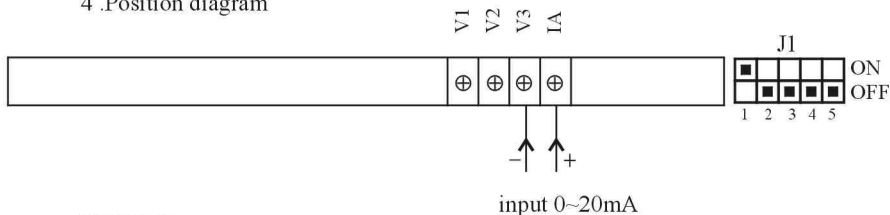
**STEP E.**

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

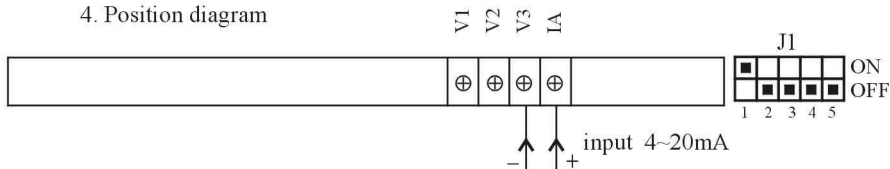


STEP F.

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

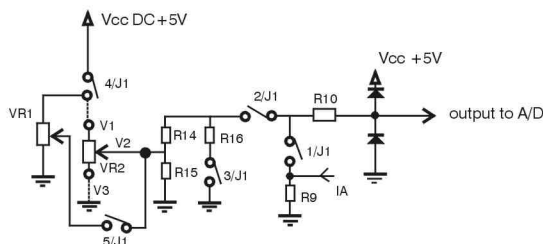
**STEP G.**

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



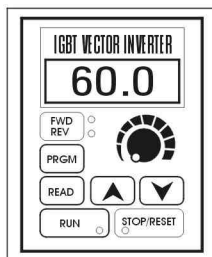
Observe the safety specifications mentioned in above sections before operation.

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

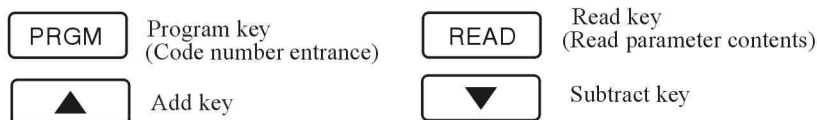
Do not turn on/off the inverter by throw in or cut off the power supply. Failure to observe the warning could result in the damage of inverter; the reduction of inverter life, a fire or the loss of effects.

- 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

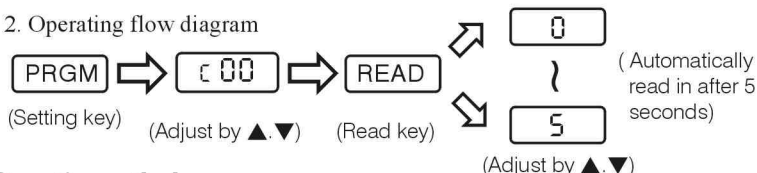
6 Parameter setting method

6-1 Parameter setting steps and descriptions

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



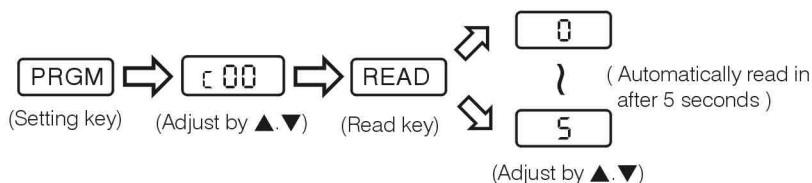
2. Operating flow diagram



Operating method:

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

C 00 Monitor display content selection

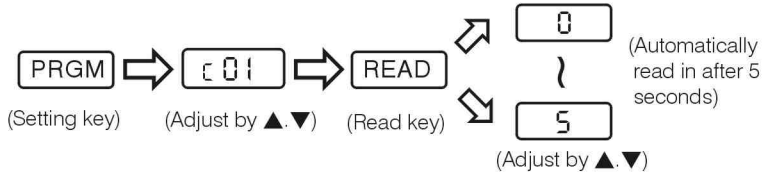


- C 00=0** : Frequency (Hz) display, maximum for 240Hz. The display resolution is 0.5Hz for normal revolution and 0.1Hz for accelerating/decelerating time more than 20 seconds.
- C 00=1** : 2-pole motor revolution speed rpm(1:10) display, maximum for 999
- C 00=2** : 4-pole motor revolution speed rpm(1:10) display, maximum for 999
- C 00=3** : 6-pole motor revolution speed rpm(1:10) display, maximum for 999
- C 00=4** : **C 30** unlock, **C 30** is for carrier wave setting.
- C 00=5** : The monitor display will immediately flash once per Second when the frequency decreases to zero (on the status of stop) after pressing the **STOP/RESET** key. And the frequency will immediately increase from 0Hz to the setting value after pressing the **RUM** 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.

c01 Control mode selection



c01 = 0 : Speed mode operation controlled by keyboard.
Acceleration or deceleration adjust by ▲, ▼

c01 = 1 : Controlled by keyboard and analogy signal.
Key board : Set speed by keyboard.
Analog signal : Refer to P.24~P.27 for descriptions

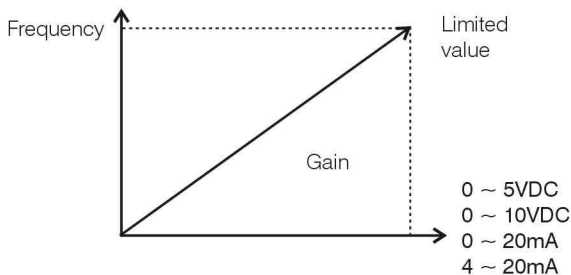
1. Potentiometer operation on control panel (Interior 0~5VDC)
2. Exterior potentiometer operation (Interior 0~5VDC or exterior 0~10VDC)
3. Exterior signal operation (Exterior 0~5VDC or exterior 0~10VDC)
4. 0~20mA current signal operation



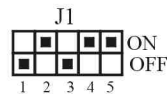
The mode selection function must apply the adjustment of DIP switch J1. The improper setting could result in the reduction of the inverter life.

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

COI=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).*

COI=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.

COI=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.*

COI=5 : Controlled by control terminal and analog signal

(1) Refer to item (2) of **COI=2** and item (1) of **COI=3** for control terminal operation.

(2) Refer to item (2) of **COI=4** for analog signal control.