DV 300 User's Manual

Foreword

Please read this manual in detail in order to use this product efficiently and to ensure the users' safety. If you have any problems and this user's guide can not provide feasible solutions, please contact our agent in your district or directly contact our company. Our professional engineers will take pleasure in serving you. Thank you for purchasing our products, and your reorder would be highly appreciated.

Contents

Chapter 1   Cautions for Safty

Inverter is an electrical and electronic device, in this manual DANGER and CAUTIONS is marked to call your attention to safety. When this inverter is in the process of transit, installation and running, please make sure it is in safe environments specified in this chapter.

Description of safety marks:

Danger and casualty may be caused if this product is wrongly used.

Danger, flesh wound, moderate bodily injury and damage to equipment may be caused if this product is wrongly used.

1.1 Cautions and matters needing attention

●Confirm the following upon receipt of this product:

1. Don't install the inverter which is damaged, or lacks accessories. Forced installation will cause danger of bodily injury.

●**Installation**

1. Please hold the bottom of the main body of the machine in transit.

If you only hold the panel, the main body may drop to hurt your feet.

2. Please install it on an inflammable board, such as metal, lest fire

should be caused.

3. If more than two inverters are installed in the same control booth,

a cooling fan should be installed. And please keep the temperature of

the air in the intake below 40℃, or fire and other accidents may be

caused because of overheating.

● **Wiring**

1. Make sure to cut off the power before wiring, or there will be

danger of electric shock and fire.

2. Wiring should be done by professionals majoring in electric

engineering, or there is danger of electric shock and fire.

3. Grounding end of inverter must be firmly grounded, or there will be danger of electric shock and fire.

4. Check whether the emergency stop terminal is effective after it is correctly connected, or there will be danger of bodily injury. (Users should take the responsibility of wiring.)

5. Don't touch the output terminals, never connect input terminal with outer shell; and never short-circuit output terminals, or there will be danger of electric shock and short circuit.

1. Make sure the voltage of the AC main loop power supply is the same with the rated voltage of the inverter, or there will be danger of bodily injury and fire.

2. Don't do high-voltage tests on this inverter, or damage to semiconductor components will be caused.

3. Connect braking resistor or braking unit according to the wiring diagram, or there will be danger of fire.

4. Fasten the terminals with screwdriver of specified moment, or there will be danger of fire.

5. Never connect the AC power to output terminal U, V and W. Imposed voltage on output terminals will cause internal damage to the inverter.

6. Don't connect phase-shifting capacitor and LC/RC noise filter to output loop, or it will damage the internal components of the inverter.

7. Don't connect electromagnetic switch and electromagnetic connector to output loop, or when the inverter is running with load, the surge current generated by electromagnetic switch and electromagnetic contactor will make the over-current protect the loop.

8. When wiring, don't dismantle the outer cover of the front panel, just take off the cover of the terminals, or wrong operation will damage the internal components.

● Trial running
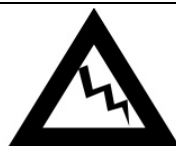
1. Make sure the outer cover of the terminals is correctly installed before turning the power on, or electric shock may happen.

2. If immediate restart after instantaneous power failure (Pr018) is

set effective, do not stand close to the machines lest they should restart suddenly and cause bodily injury.

3. **Please correctly connect emergency stop switch, or there is danger of bodily injury.**

⚠

1. **Don't touch braking resistor with hand because the discharge at the two ends of it will increase temperature, or electric shock or burn injury may happen.**

2. **Please check the allowable usage range of the motor and machine before running. If it is violated, there will be danger of bodily injury.**

3. **Please don't check signal during running, or the equipment may be damaged.**

4. **Please don't carelessly change the settings of this inverter at will, because it is properly set by the manufacturer, or the equipment may be damaged.**

● **Maintenance**

1. Don't touch the high-tension wire terminals. There is danger of electric shock.

2. Make sure the outer cover for terminals is correctly installed before switching the power on, and disconnect the power before dismantling the outer cover.

3. Maintenance and check can only be done before cutting the power of the main loop and confirming CHARGE light-emitting diode is went out. Electrolytic capacitor has residual voltage.

4. Maintenance and check should only be done by professional technician. There is danger of electric shock.

1. Please pay special attention to the CMOS integrated circuit which is installed on the keyboard, control circuit board and drive circuit board. Static electricity may damage the IC on circuit board.

2. When power is turned on, don't change and dismantle wires connected to the terminals. There is danger of electric shock.

3. Don't check signal when the inverter is running, or the equipment may be damaged.

● **Others**

1. **Users are strictly prohibited to refit this product by themselves, or there will be danger of bodily injury and electric shock.**

2. **Users should take the whole responsibility of losses caused by their wrong wiring, wrong use and unauthorized modification to this product.**

1.2 Working environments

   Don't install inverter in the following places:

place under
direct sunshine

where there is erosive
gas and liquid;

where there is oil

where there is salt

where there is rain and water;

where there is dust
and metal particle;

where there is
violent vibration;

where there is excessive
low temperature;

where there is excessive
high temperature;

where there is electromagnetic
wave and ultrahigh wave
(eg: electric welding machine);

where there is
radioactive matter;

where there is
flammable goods.

Chapter 2   Commodity Inspection

The products manufactured by our company have been strictly inspected before delivery. Please carefully check the products upon receipt of them, because there may be some unexpected damage to them during transportation.

2.1   Inspection items

Please check the following items upon receipt of the products:

items	check methods
Whether this product is the one you exactly ordered.	Confirm the nameplate on the side of the inverter.
Whether components are damaged.	Examine the appearance to check whether it is damaged in transport.
Whether the screws are loose.	A screwdriver is needed.
Quality Certificate, User's Manual and other accessories.	HL3000 User's Manual and other accessories.

2.2　Nameplate

Model: DV300-4015T

Input: three-phase power supply　　380V　50/60Hz

Output: AC three-phase V power supply　0~380V　1.5KW　4A

2.3　Description of model

DV 300-4 015 T

T means the general models
F means the models suited for
blowing engine and pumps
(constant torque).

the maximum compatible power of motor.
015=1.5kw
037=3.7kw
110=11kw

input voltage: 4=380V
2=220V

series number

initials of manufacturer
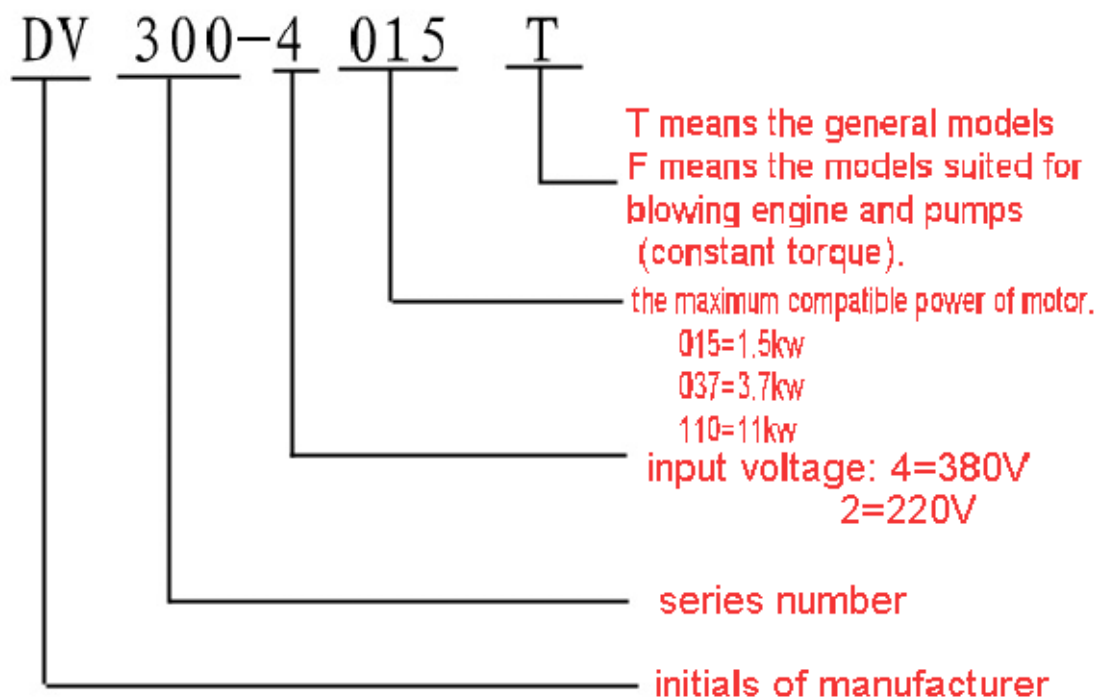
Chapter 3　Installation and Wiring

3.1　Ambient working environments

The working environments directly determine the functionality

and service life of your inverter. So, to assure the inverter operate smoothly, please provide the following environment:

Good ventilation in the room;

Temperature: -10C~+40C, naked state: -10C~+50C;

Avoid high temperature;

Don't install the inverter in places with rain drop and excessive humidity (<90%);

Don't install the inverter on flammable board, such as wooden board;

Don't install the inverter in sunlit place;

Avoid flammable, corrosive gas and liquid;

Do not install the inverter in an environment, which contains dust, floating fiber and mental particles;

Install the inverter on a firm base with no vibration;

Keep it away from electro-magnetic interference.

3.2 Installation direction and position

Internal cooling fans are installed in HL 3000 series products. In order to achieve good effect, the inverter should be installed in vertical direction, and there should be sufficient space in every direction between the inverter and other objects or baffle, such as wall. The specifications are shown in the following table:
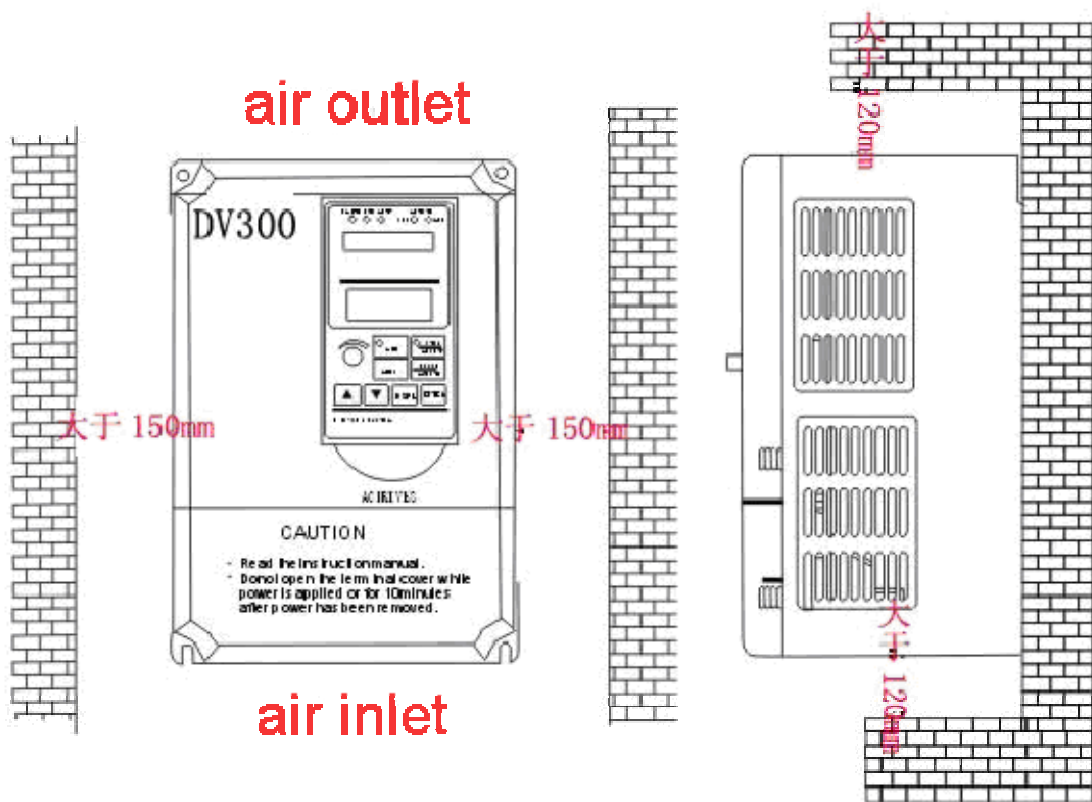
3.3 Wiring
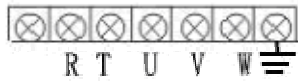
3.3.1 Arrangement of main loop terminals

single-phase 0.5~1.5kw main loop terminals;
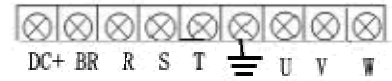
single-phase 0.75~3.7kw main loop terminals;
three-phase 0.75~5.5kw main loop terminals;

three-phase 7.5~15kw main loop terminals;

three-phase 11 kw plus main loop terminals.

3.3.2 Description of main loop terminals.

The functions of the main loop terminals are shown as follows, please correctly connect wires according to their functions.

Terminal No.	Function
R.S.T(R.T)	AC input terminal connecting to three-phase power supply or single-phase power supply.

U.V.W	Inverter's output terminal connecting to three-phase AC motor.
DC+. DC-	Connect to braking unit link terminal. DC+ and DC- are the positive and negative electrode of the bus-bar respectively.
DC+.BR	Braking resistor link terminal.
	Ground terminal.

3.3.3 Size of wires connecting to main loop

Model of inverter HL3000	cross section area of wire(mm2)	Model of inverter HL3000	cross section area of wire(mm2)
-2005	1.5	-4110	10
-2007	2.5	-4150	10
-2015	2.5	-4185	16
-2022	4.0	-4220	16
-2037	6.0	-4300	25
-4007	1.5	-4370	25
-4015	2.5	-4450	35
-4022	4	-4550	35
-4037	4	-4750	35
-4055	6	-4930	60
-4075	6	-41100	60

Attention: If the wire is longer than 30 meters, cross section area should be larger than the one listed in this table.

3.3.4 Methods to main loop wiring

If this inverter is set to run in forward direction, make sure to confirm the motor also rotates in forward direction. If the motor rotates in reverse direction, please interchange any two wires connecting to output terminal U, V, W, so as to adjust the motor run in forward direction.

●Connecting power to output terminals is forbidden.

Connecting power to output terminals will damage the internal components of the inverter.

● It is forbidden to short-circuit or connect output terminals to ground.

Don't directly touch the output terminals, and don't connect output wire to the outer shell of inverter. Wrong operation will result in electric shock or short circuit. Furthermore, don't short-circuit output wires.

● It is not allowed to use phase-shifting capacitor.

Don't connect phase-shifting leading electrolytic capacitor or LC/RC filter in output loop, or will cause damage to the inverter.

● Electromagnetic switch is not allowed to be connected between inverter and motor.

Never link electromagnetic switch and electromagnetic contactor in output loop. The surge current generated by

electromagnetic switch and electromagnetic contactor will make over-current protect the loop, and this may cause severe damage to the internal components.

● **Countermeasures to conduction interference**

To counter interference from output components, it is also acceptable to put all output wires into a metal pipe, besides to install noise filters. The distance between the output wire and signal wire should be more than 30 cm. The impact of conduction interference will be greatly reduced.

● **Countermeasures to radio interference**

All input wires, output wires and the inverter produce radio interference themselves. Radio interference can be reduced by installing noise filters at each side of input and output terminals and by screening them by iron vessels. The wires between inverter and motor should be as short as possible. All the measures are shown in the following diagram:

countermeasures to radio interference
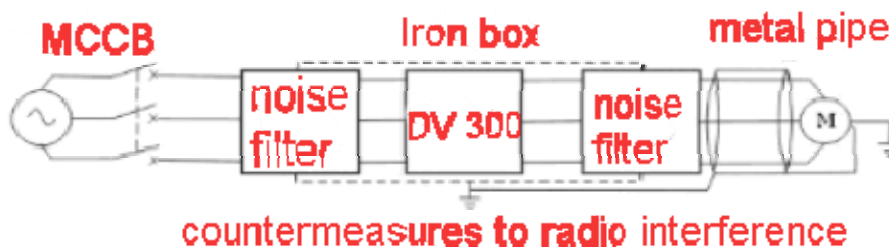
● **Length of the wire connecting inverter and motor**

The longer the wire between inverter and motor, the higher the

carrier wave frequency, and the more the current loses. The leakage current will impose impactive influence on inverter and other equipment. The relation between the carrier wave frequency and the length of the wire linking inverter and motor are shown in the following table:

The distance between inverter and motor	< 50m	<100m	>100M
Frequency of carrier wave	<12kHz	<8kHz	<5kHz

● **Connecting ground wires**

Make sure the ground terminal is grounded. As to 380V power, the resistivity of the ground wire should be less than 10Ω.

Don't share ground wires with welding machines and other motive power. The specifications of the ground wire should be up to the standard specified by the devices. The devices should be as close to the ground as possible. If two inverters are used together, don't make the two ground wires form a loop. The right methods and wrong ones are shown as follows:

correct methods | DV300 | DV300 | DV300
correct methods | DV300 | DV300 | DV300
wrong methods | DV300 | DV300 | DV300

methods to connecting ground wiresto connecting ground wires
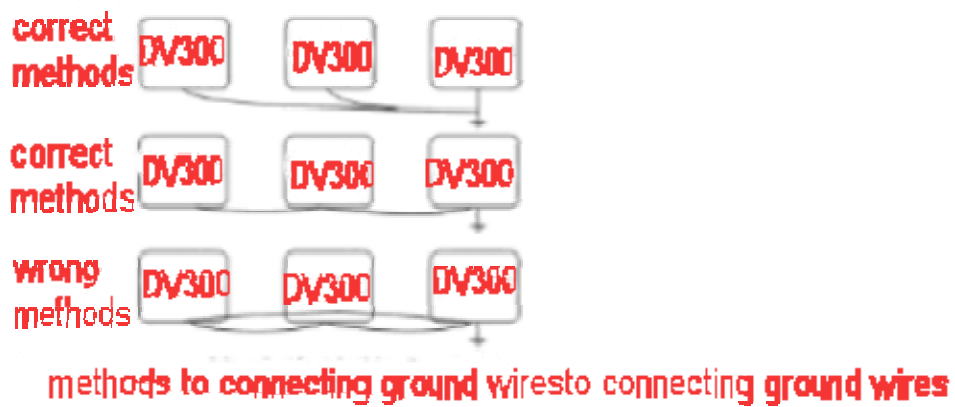
Attention: the neutral point of motor should not be grounded in method A.

3.3.5 Arrangement of terminals on control loop

connect to terminals of monitor — single-phase 0.5~1.5kw control loop terminals (plastic shell)

JA1	JA2	JA3	12V	COM	X1	X2	X3	X4	X5	X6	10V	FV	COM	FO

connect to terminals of monitor — single-phase 0.75~2.2kw control loop terminals (plastic shell) / three-phase 0.75kw~3.7kw control loop terminals

JA1	JA2	JA3	JB1	JB2	12V	COM	X1	X2	X3	X4	X5	X6	X7	X8	COM	10V	FV	COM	F1	FO	COM

connect to terminals of monitor — single-phase 2.2~3.7kw control loop terminals (iron shell) / three-phase 1.5kw~220kw control loop terminals

COM	X1	X2	X3	X4	X5	X6	X7	X8	COM	12V
JA1	JA2	JA3	JB1	JB2	CE	C1	10V	FV	COM	F1	FO

3.3.6 Description of terminals on control loop

Terminal No.	Name	Function description
X1	Multi-function input terminal 1	Factory setting: forward rotation
X2	Multi-function input terminal 2	Factory setting: reverse

		rotation
X3	Multi-function input terminal 3	Factory setting: stop
X4	Multi-function input terminal 4	Factory setting: jogging. If it is connected with COM, the inverter will run in jogging mode.
X5	Multi-function input terminal 5	Factory setting: multi-step speed 1. If it is connected to COM, the inverter will run the 2 nd step speed.
X6	Multi-function input terminal 6	Factory setting: muti-step speed 2. If it is connected to COM, the inverter will run the 3 rd step speed.
X7	Multi-function input terminal 7	Factory setting: input external fault signal
X8	Multi-function input terminal 8	Factory setting: reset
COM	Common terminal	common terminal of X1~X8, FV, FI, FO, +10V, +12V
JA1,JA2,JA3,JB1,JB2	Multi-function output terminal	Factory setting: output fault signal. JA1 and JA3 are normal open contacts of relay JA; JA2 and JA3 are normal open contacts; JB1 and JB2 are normal close contacts of relay JB.
C1,CE	Multi-function output terminal	open-circuit output of collector. Factory setting: output fault signal.
10V	+10 power supply	Works as the power supply of frequency settor (potentiometer 10K)
FV	Analog signal input terminal	Connect to potentiometer or 0~10V signal. It is used to set frequency, PID and PID feedback.
FI	Analog signal input terminal	It is used to Input external 4~20mA signal, and set frequency, PID and PID feedback.
FO	Analog signal input terminal	If a DC 10V voltage meter is connected between FO and COM, this terminal is used

		to indicate output frequency, output current and output voltage.
12V	+12V power supply	Internal power, the output power is less than 0.2A.

3.37 Standard wiring diagram

Wiring of inverter contains wiring in main loop and wiring in control loop. In order to reduce interference and attenuation of controlling signal, the wiring carrying controlling signal should be less than 50m, and should keep 30cm away from the power line.
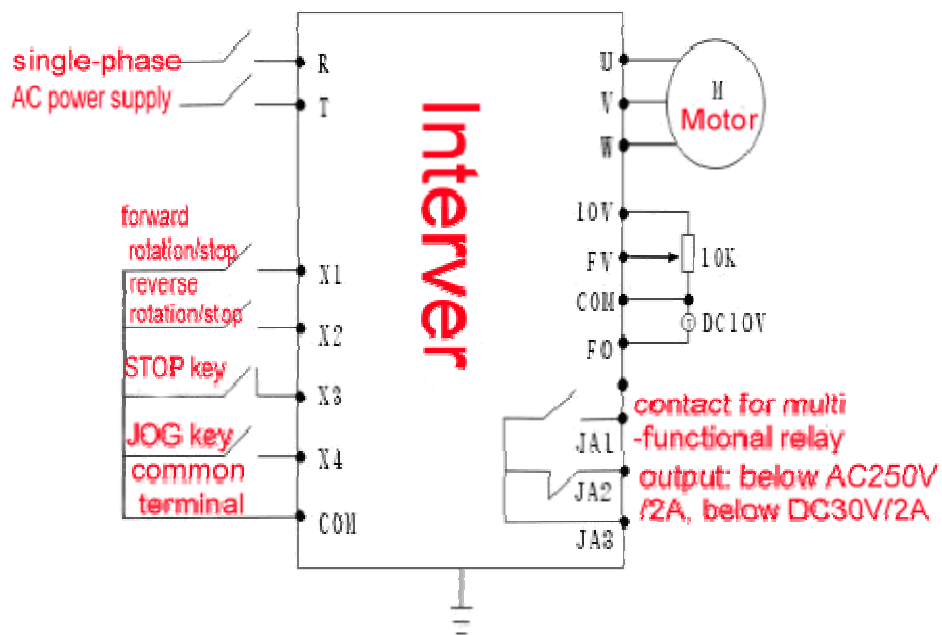
diagram 1: standard wiring diagramfor single-phase 0.5~1.5kw inverter (plastic shell)

braking resistor

DC+   BR

three-phase ___ R   U
AC power ___ S   V   (M) Motor
supply ___ T   W

Inverter

forward rotation/stop ___ X1   10V
reverse rotation/stop ___ X2   FV   10K
STOP key ___ X3   COM   DC10V
                    F0
JOG key ___ X4

multi-step speed option 1 ___ X5   JA1   contact for multi -functional relay
multi-step speed option 2 ___ X6   JA2   output: below AC250V /2A, below DC30V/2A
contact for external faults ___ X7   JA3   contact for multi -functional relay
                    JB1   output: below AC250V
contact for resetting signals ___ X8   JB2   /2A, below DC30V/2A

common terminal ___ COM   FI   4~20mA signal input
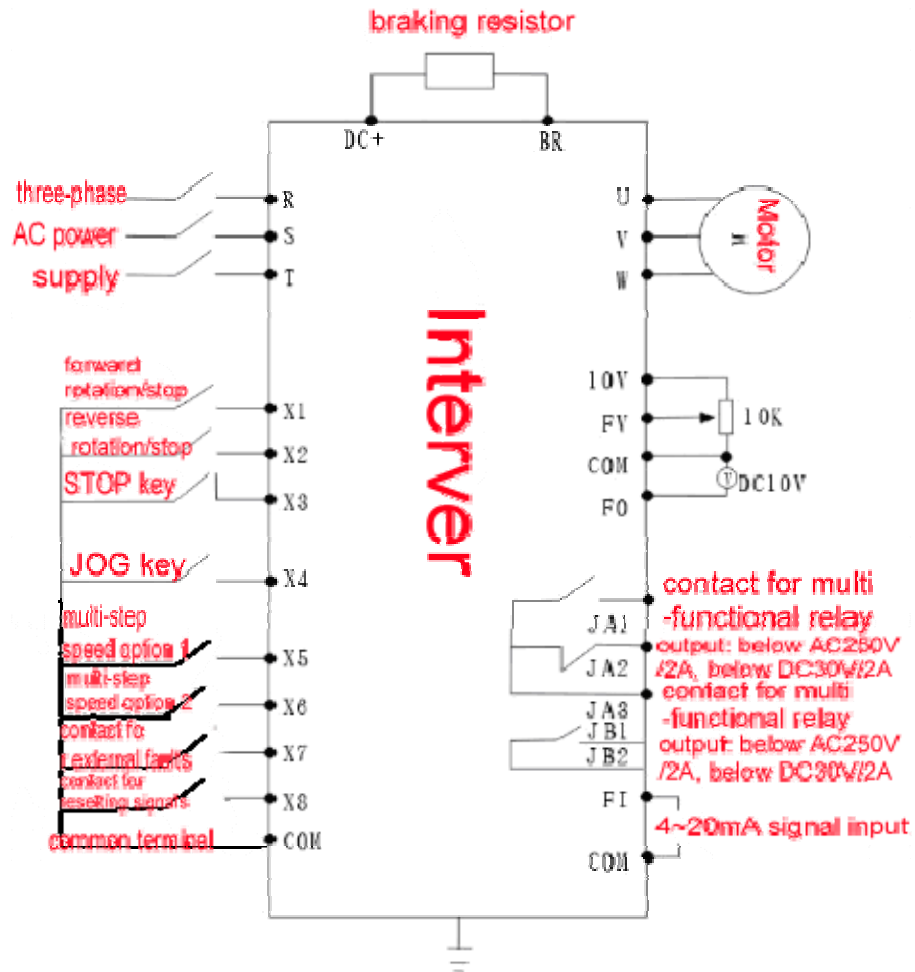   COM

diagram 2: standard wiring diagram for single-phase
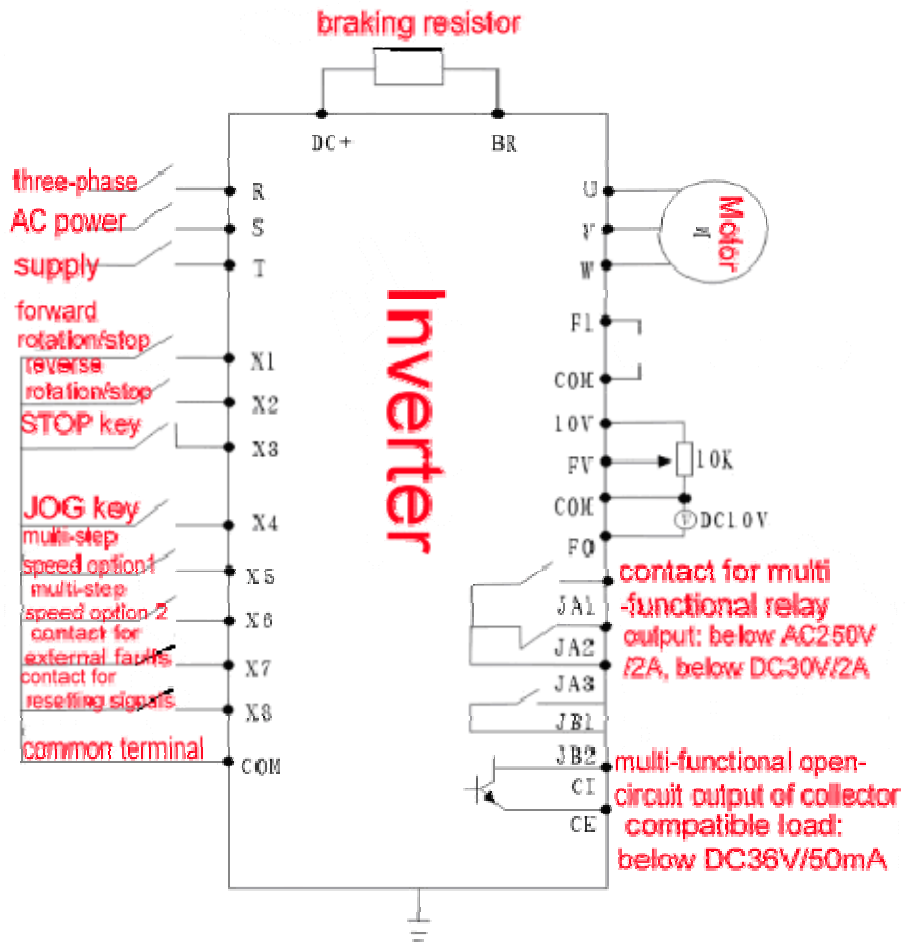0.75~2.2kw and three-phase 0.75~3.7kw inverter (plastic shell)

diagram 3: standard wiring diagram for single-phase 2.2~3.7kw and three-phase 1.5kw~200kw inverter (iron shell)

Chapter 4   Operation

4.1   Description of keys on control panel

Display area. Output frequency, output current, parameters and faults can be displayed.

Functional data setting key, used for shifting between display status, reading and modifying parameter

Stop/Reset key

run key

Programming key

Value shift key

Speedup/speeddown key

diagram 1

LED indicator

Display area. Output frequency, output current, parameters and faults can be displayed.

jog key

Programming key

Value shift key /Reverse key

Functional data setting key, used for shifting between display status reading and modifying parameter
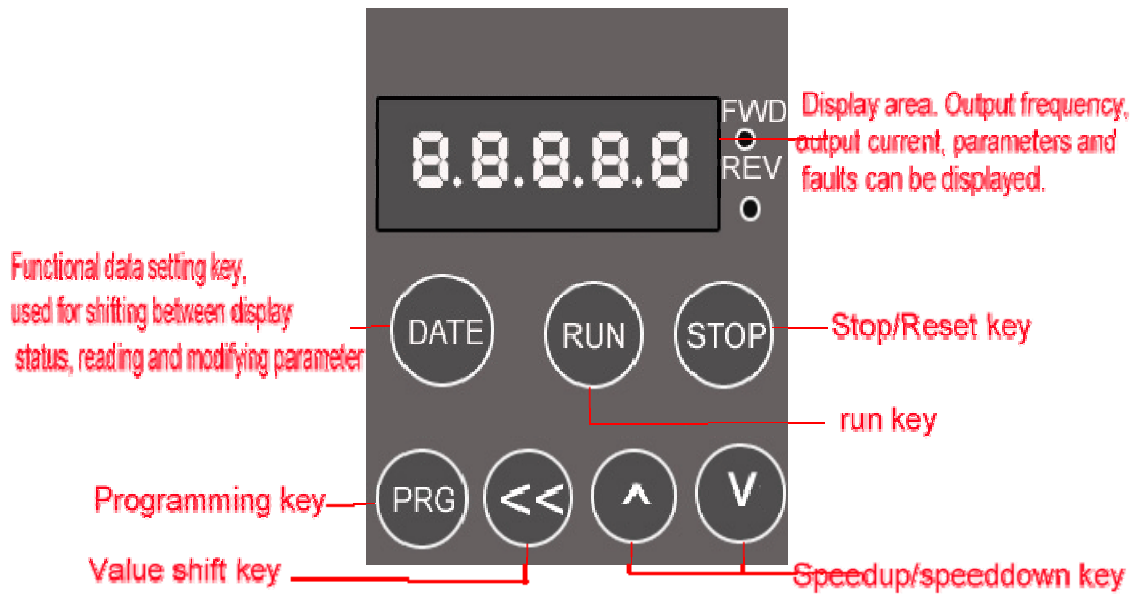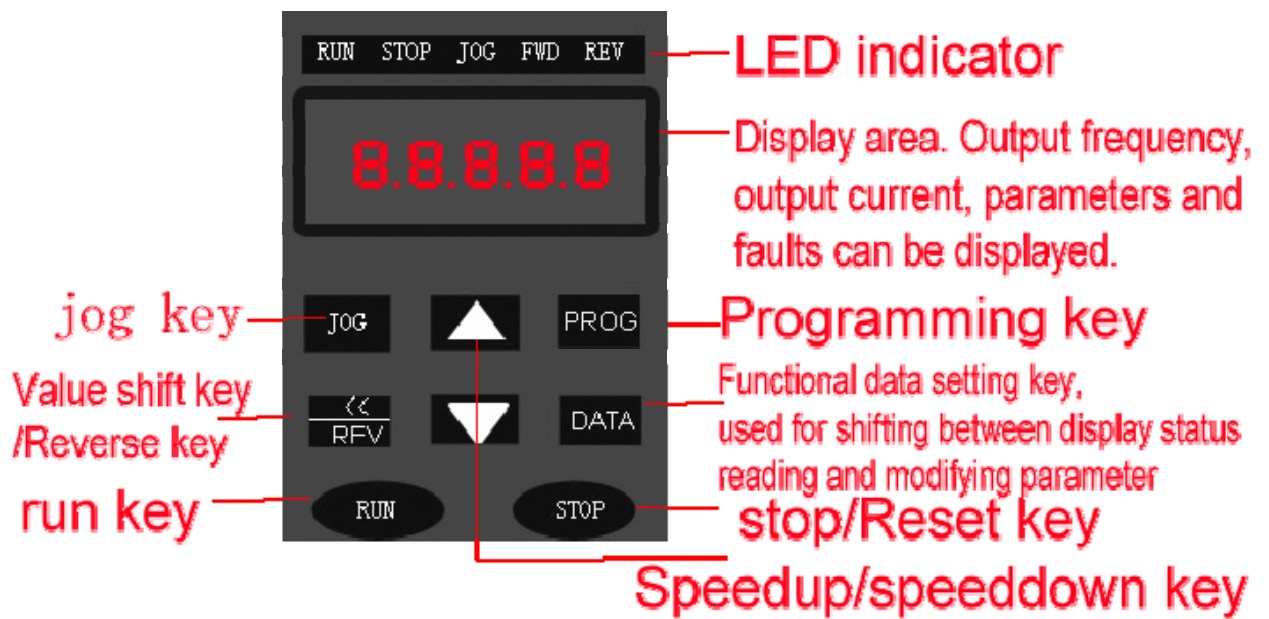
run key

stop/Reset key

Speedup/speeddown key

diagram 2

4.2 Functional description of keys

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JOG ：Jogging key. Press JOG key to start motor (if Pr043=1) and release JOG key to stop running.

PROG：Select normal working mode or programming mode (modification of parameters),press this key to enter programming mode.

DATA： In normal working mode, press this key to display data of inverter status, including frequency., output current, rotation speed, etc. Or press this key in programming mode to display parameters, press this key once again to store modified data.

RUN ：Start running. If Pr001=0 or Pr001=4, press this key once to start up motor.

STOP：Stop running. Press this key to reset after removing abnormalities if the inverter is interrupted by abnormalities.

```
<<
REV
```
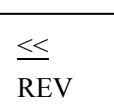
In the status of parameter setting, when modifying parameters, press this key to

choose   data needing modification; In the status of non-parameter setting, if this

key is   ed, the motor will start reverse rotation when Pr003=0 or Pr004=0.

4.3 Operation of viewing and displaying function

In the status of non-parameter setting, press DATA key to display all the information of inverter as follows:

Order	code	Physical indicator	Description
0	H	Target frequency	Display set frequency of inverter in waiting status.
	F	Operating frequency	Display actual output frequency of inverter in running status.
1	A	Output current	Display value of output current when the inverter is running.
2	U	Bus-bar voltage	Display voltage of internal DC bus-bar of inverter.
3	r	Synchronous rotating	Display output rotating speed when the inverter

		speed	is running.
	J	Counter value	It will be display only when counter is effective.
	L	PID feedback value	It will be display only when PID is effective.
4	y	PID given value	It will be display only when PID is effective.
5	C	Temperature of heat radiator	The temperature of radiator in inverter.

4.4   Trial running

4.1 .1 Check points before running

To check inverter and familiarize with operation, trial running should be carried out before being used for the first time. Please confirm before running:

whether the main loop wiring is correct; whether screws of terminal are tightened; whether wiring is proper; whether short circuit occurs due to damage of cables; whether the load status is correct and input voltage is compatible.

4.4.2   Checkpoints in running

If motor runs smoothly, if motor runs in right direction, if motor vibrates abnormally, if motor runs smoothly when accelerating or decelerating, if load current is within

range of rated value, if display of keypad is correct.

4.4.3 Trial running by panel

a.   Display shift operation

press "DATA" key

Input power display set frequency

press "DATA" key

Display output current

press "DATA" key

Display voltage of DC bus bar

press "DATA" key

Display synchronous rpm

Display present temperature of heat radiator

Display present set frequency

b. Display of freq. setting

▼▲ keys can be used to set frequency only when frequency is being displayed. Or frequency should be set by parameter Pr051.

Display Freq. Screen

press ▼▲ to set frequency

Freq.49.9Hz

press ▼ key

The value of Pr051 is modified as

49.9Hz at the same time.

Freq.: 0.0Hz

RUN STOP JOG FWD REV

H   0.0

JOG   ▲   PROG

<< REV   ▼   DATA

RUN   STOP

press ▼ key

Frequency: 0.2Hz

press ▼ key

Frequency: 50Hz

press ▼ key

Note: Frequency setting in this way can be done either in the status of stop or running

Set frequency

RUN STOP JOG FWD REV

H 50.0

JOG ▲ PROG

<<
REV ▼ DATA

RUN STOP

Enter program screen

RUN STOP JOG FWD REV

Pr 000

JOG ▲ PROG

<<
REV ▼ DATA

RUN STOP

press "PROG" key

The last digit flickers

select operation command

RUN STOP JOG FWD REV

Pr   001

JOG   ▲   PROG
<<
REV   ▼   DATA
RUN   STOP

press ▲ key

The 1 st-step frequency

RUN STOP JOG FWD REV

Pr   051

JOG   ▲   PROG
<<
REV   ▼   DATA
RUN   STOP

press ▲ key

Read current data

RUN STOP JOG FWD REV

= 50.0

JOG ▲ PROG

<<
REV ▼ DATA

RUN STOP

Press"DATA" key
The last digit flickers.

Shift flickering cursor to tens place

RUN STOP JOG FWD REV

= 50.0

JOG ▲ PROG

<<
REV ▼ DATA

RUN STOP

press" REV" key

Shift flickering cursor to digit to be changed

Change parameter to 40.0

press ▼ key

press ▼▲to modify data

input data

press" DATA" key

Display set frequency

press" PROG" key

d. Running operation

Display set freq.

Set Freq. as 5.0Hz

```
 RUN  STOP  JOG  FWD  REV

     H           5.0


   JOG      ▲      PROG

   <<
   REV      ▼      DATA

     RUN         STOP
```

press ▼ key

Runs at 5.0Hz

RUN STOP JOG FWD REV

F   5.0

JOG   ▲   PROG

<<
REV   ▼   DATA

RUN   STOP

After the indicate lamp is on and the motor runs normally.
Runs at 25.0Hz

RUN STOP JOG FWD REV

F   25.0

JOG   ▲   PROG

<<
REV   ▼   DATA

RUN   STOP

press ▲ key

Increase Freq. to 25.0Hz

Runs at 50.0Hz

press ▲ key

Increase Freq. to 50Hz

Motor stops running, 50Hz displayed

press "STOP "key

Frequency falls to 0Hz within the set time,
RUN lights off, motor stops running.

e. Reset operation in case of Abnormality

Under-voltage protection

Reset will fail if causes of trouble is not solved

Display set frequency

press STOP key

Chapter 5 Parameters Table

5.1 Description of table

⑴ In the NOTE column of parameters table, "√" means this function is changeable during operation; "×" means this function is not changeable during operation; "◎" means this function can not be changed by users at all.

⑵ In "setting range" and "factory settings" of the table, "△" means setting range and factory settings vary with different model and specification of inverter.

5.2 Functions and parameters table

Function code	parameter	Setting range	Factory setting	note
Pr000	frequency settings selection	0: Main freq. input is set via operator panel 1: set by panel potentiometer; 2: set by potentiometer on terminal FV or 0~10V; 3: set by 0~10mA signal on terminal FI 4. set by ▼▲ on operation panel. If potentiometer and 0~10V signal are detected from terminal FV, this parameter will shift to 5 automatically; 5. set by potentiometer on terminal FV or 0~10V; if operation on ▼▲ is detected, this parameter will shift to 5 automatically.	4	√
Pr001	running command selection	0. controlled by operator panel(start forward rotation, start reverse rotation, stop); 1. controlled by external terminals (start/stop, forward rotation/reverse	4	×

		stop); 2.controlled by external terminals(start/stop, forward rotation/reverse stop); 3. controlled by external terminals(start forward rotation, start reverse rotation, stop); 4. the above ways are automatically adopted.		
Pr002	stop mode selection	0. stop by decelerating brake; 1. free stop; 2. immediate DC brake.	0	√
Pr003	Reverse forbidden setting	0-reverse allowed 1-reverse forbidden	0	×
Pr004	forbid to start reverse rotation from keyboard	0. allow to start reverse rotation from keyboard 1. forbid to start reverse rotation from keyboard	1	×
Pr005	startup frequency	0.0~10.0Hz	3.0Hz	√
Pr006	delayed startup	0.0~60.0S	0.0S	×
Pr007	accelerating and decelerating curve	0. straight line; 1. S curve.	0	×
Pr008	automatic voltage stabilization	0. ineffective; 1. moderate sensitivity; 2. high sensitivity.	220V:1 308V:2	√
Pr009	slip frequency compensation	0.0~5.0Hz	0.0Hz	√
Pr010	carrier frequency setting	1~15KHz ($\triangle$)	$\triangle$	×
Pr011	frequency arrival setting	0.0~400.0Hz	0.0Hz	√
Pr012	analogy output selection	0.analogy frequency meter 1.analogy voltage meter 2.analogy current meter	0	√
Pr013	analogy output gain	50~200%	100	√
Pr014	Startup display item selection	0. frequency (H,L); 1. output current (A); 2. bus-bar voltage (U); 3. number of users;	0	√

		If the count function is operative, it displays the present value(J); if PID function is operative, it displays PID feedback value(L); or it displays mechanical speed (r) (=output frequency * Pr015). 4. PID given value (y); 5. the temperature of heat radiator inside the inverter.		
Pr015	proportional coefficient of mechanical speed	0.01~99.99	30.0	√
Pr016	data protection	0. modification allowed; 1. modification forbidden.	0	√
Pr017	remember frequency	0. the frequency set by ▲ and ▼ on operator panelwill not be remembered; 1. the frequency set by ▲ and ▼ on operator panelwill be remembered.	1	√
Pr018	immediate restart after instantaneous power failure	0. ineffective; 1. automatically follow rotating speed in case of power-on; 2. restart from startup frequency in case of power-on.	0	√
Pr019	times of restarting after malfunction	1~10 times	0(ineffective)	√
Pro020	waiting time of restarting after malfunction	0~10S	10S	√
Pro021	startup voltage of brake	220V Inverter: 350-400V, factory setting: 360V;	360V	√
		380V Inverter:650-700V, factory setting:660V.	660V	
Pr022	response point preventing overheat while decelerating	220V inverter: 350-450V, factory setting: 400V;	400V	√
		380V inverter: 650-750V, factory setting: 700V.	700V	
Pr023	response point preventing	110~150% of rated current of inverter	130	√

		over-current while accelerating			
Pr024	response point preventing over-current at constant speed	110~150% of rated current of inverter	130	√
Pr025	rated current of inverter		△	◎
Pr026	rated current of motor	50-110% of rated current of inverter	100	√
Pr027	rated voltage of motor	220V inverter: 50-250V, factory setting: 220V;	220V	×
		380V inverter: 100-450V, factory setting: 380V.	380V	
Pr028	rated frequency of motor	20.0-400.0Hz	50.0Hz	×
Pr029	intermediate voltage	lowest voltage-99% of rated voltage	18	×
Pr030	middle frequency	0.1~rated frequency of motor	12.5Hz	×
Pr031	lowest voltage	0~10% of rated voltage of motor	1	×
Pr032	torque elevation	1~30 (△)	△	√
Pr033	highest operation frequency	the lowest operation frequency~400Hz	50.0Hz	√
Pr034	the lowest operation frequency	0.0Hz~10.0Hz	0.0Hz	×
Pr035	analog input corresponding to highest frequency (maximum PID target value)	0~100%	98Hz	√
Pr036	analog input corresponding to the lowest frequency (minimum PID target value)	0-100%	2	√

Pr037	analog input gain	0-200%	100	√
Pr038	upper frequency limit	lower frequency limit—400.0Hz	50.0Hz	×
Pr039	lower frequency limit	0.0—upper frequency limit	1.0Hz	√
Pr040	braking time when stopping	0.0—25.0S	0.0s	√
Pr041	DC brake torque	0.0—30%(△)	△	√
Pr042	DC brake startup frequency	0.0—25.0Hz	3.0Hz	√
Pr043	keyboard jogging control	0. keyboard jogging control is forbidden; 1. keyboard jogging control is allowed.	1	√
Pr044	jogging frequency	The lowest operation frequency~ the highest operation frequency	5.0Hz	√
Pr045	jogging accelerating time	0.1—999.9S	△	√
Pr046	jogging decelerating time	0.0—999.9S	△	√
Pr047	bind multi-step speedup and speeddown time	0. only use the first speedup and speeddown time(except jogging) ; 1. bind multi-step speedup and speeddown time. The first-step speed uses the first speedup and speeddown time; the second-step speed uses the second speedup and speeddown time, the others is on the analogy of this.	0	√
Pr048	reserved			
Pr049	program running mode	0. ineffective ; 1. stop after single cycle; 2. run reciprocatingly; 3. keep running at the last frequency after single cycle.	0	×
Pr050	coefficient of program running time	1—100	1	√
Pr051	the 1 st step frequency	the lowest frequency—the highest frequency	50.0Hz	√
Pr052	the 1 st speedup time	0.1—999.9S	△	√
Pr053	the 1 st speeddown time	0.1—999.9S	△	√

Pr054	time of program running 1	0.1—999.9S	0.1s	√
Pr055	rotating direction of program running 1	0. forward rotation; 1. reverse rotation.	0	×
Pr056	the 2 nd step frequency	the lowest frequency---the highest frequency	5.0Hz	√
Pr057	the 2 nd speedup time	0.1—999.9S	△	√
Pr058	the 2 nd speeddown time	0.1—999.9S	△	√
Pr059	time of program running 2	0.1—999.9S	0.1s	√
Pr060	rotating direction of program running 2	0.forward rotation; 1.reverse rotation.	0	×
Pr061	the 3 rd step frequency	the lowest frequency---the highest frequency	10.0Hz	√
Pr062	the 3 rd speedup time	0.1—999.9S	△	√
Pr063	the 3 rd speeddown time	0.1—999.9S	△	√
Pr064	time of program running 3	0.1—999.9S	0.1S	√
Pr065	rotating direction of program running 3	0.forward rotation; 1.reverse rotation.	0	×
Pr066	the 4 th step frequency	the lowest frequency--- the highest frequency	15.0Hz	√
Pr067	the 4 th speedup time	0.1—999.9S	△	√
Pr068	the 4 th speeddown time	0.1—999.9S	△	√
Pr069	time of program running 4	0.0—999.9S	0.1s	√
Pr070	rotating direction of program running 4	0.forward rotation; 1.reverse rotation.	0	×
Pr071	the 5 th step frequency	the lowest frequency--- the highest frequency	20.0Hz	√
Pr072	the 5 th	0.0—999.9S	△	√

	speedup time			△	√
Pr073	the 5 th speeddown time	0.0—999.9S		△	√
Pr074	time of program running 5	0.1—999.9S		0.1s	√
Pr075	rotating direction of program running 5	0.forward rotation; 1.reverse rotation.		0	×
Pr076	the 6 th step frequency	the lowest frequency –the highest frequency		25.0 Hz	√
Pr077	the 6 th speedup time	0.1—999.9S		△	√
Pr078	the 6 th speeddown time	0.1—999.9S		△	√
Pr079	time of program running 6	0.1-999.9S		0.1s	√
Pr080	rotating direction of program running 6	0.forward rotation; 1.reverse rotation.		0	×
Pr081	the 7 th step frequency	the lowest frequency—the highest frequency		30.0 Hz	√
Pr082	the 7 th speedup time	0.1—999.9S		△	√
Pr083	the 7 th speeddown time	0.1—999.9S		△	√
Pr084	time of program running 7	0.1—999.9S		0.1s	√
Pr085	rotating direction of program running 7	0.forward rotation; 1.reverse rotation.		0	×
Pr086	the 8 th frequency	the lowest frequency—the highest frequency		35.0 Hz	√
Pr087	the 8 th speedup time	0.1—999.9S		△	√
Pr088	the 8 th speeddown time	0.1—999.9S		△	√
Pr089	time of program running 8	0.1—999.9S		0.1s	√
Pr090	rotating direction of program running 8	0.forward rotation; 1.reverse rotation.		0	×

Pr091	PID mode	0. PID function is ineffective; 1. the target value is set by ▼and ▲ on operation panel, feedback value is input from terminal FV; 2. the target value is set by ▼and ▲ on operation panel, feedback value is input from terminal FI; 3. the target value is set by the potentiometer on panel, feedback value is input from terminal FV; 4. the target value is set by the potentiometer on panel, feedback value is input from terminal FI; 5. the target value is set by terminal FV, feedback value is input from FI; 6. the target value is set by terminal FI, feedback value is input from FV.	0	×
Pr092	maximum target value	minimum target value—100.0	100.0	√
Pr093	feedback value corresponding to maximum target value	0—100% (Attention: |Pr095—Pr093| should be larger than 10%)	100	√
Pr094	minimum target value	0-- maximum target value	0.0	√
Pr095	feedback value corresponding to minimum target value	0—100% (Attention: |Pr095—Pr093| should be larger than 10%)	0	√
Pr096	proportion coefficient	0.01—10.00	1.00	√
Pr097	integral coefficient	0.01—10.00	0.30	√
Pr098	differential coefficient	0.01—10.00	0.30	√
Pr099	feedback sampling cycle	0.1—20.0S	1.0S	√

Pr100	present count value	0—9999	0	√
Pr101	count preset	1-9999	1	√
Pr102	count unit	1—9999	1	√
Pr103	count arrival action selection	0. stop counting and close output; 1. stop counting and continue outputting; 2. count again and close output; 3. count again and continue outputting.	0	√
Pr104	function selection of input terminal X1	0. Multi-step speed 1 1. Multi-step speed 2 2. Multi-step speed 3	16	√
Pr105		3. Freq rise	17	√
Pr106		4. Freq fall	6	√
Pr107		5. Jog in forward direction	5	√
Pr108		6. Normally close STOP key	0	√
Pr109		7. Free stop	1	√
Pr110		8. Count input	18	√
Pr111		9. Clear counter 10. Jog in reverse direction 11. Pause decelerating and accelerating 12. Normally open STOP key 13. Force to output reverse rotation 14. Reserved 15. Reserved 16. Forward rotation 17. Reverse rotation 18. External malfunction 19. External reset 20-31. reserved	19	√
Pr112	output function selection of JA1,JA2 and JA3	0. In running 1. Freq reaches the ceiling 2. Any freq arrival	3	√
Pr113	output function selection of JB1 and JB2	3. Malfunction 4. Under-voltage 5. Counting arrival	3	√
Pr114	output function selection of C1 and CE	8. In stopping others: Reserved or ineffective	3	√
Pr115~Pr124	reserved			
Pr125	malfunction record 1	Referred to fault codes for details in Chapter 6.		◎
Pr126	malfunction record 2			◎

Pr127	malfunction record 3			◎
Pr128	Total running time		0 day(s)	
Pr129~Pr131	reserved			
Pr132	Software version			◎
Pr133	restore the factory settings	0. ineffective; 1. restore all parameters to factory settings.	0	×

Chapter 6   Detailed Explanation of Function Parameters

Pr000: frequency settings selection

setting range:0-15   factory setting: 4

0. **Frequency is set by ▲ and ▼ on operator panel;**

1. **Frequency is set by potentiometer on panel;**

2. **Frequency is set by FV terminal potentiometer or 0-10V;**

3. **Frequency is set by FI terminal   4-20mA;**

4. **Frequency is set by ▲ and ▼ on operation panel, if potentiometer or 1-10V signal is detected from FV terminal, it will be automatically changed to 5.**

5. **Frequency is set by FV terminal potentiometer or 0-10V, when FV=0, and ▲ and ▼ are detected on panel, it will be automatically changed to 4.**

   Function Description: this function is used to select operation frequency settings (work as the first-phase frequency when

multi-phase speed or program is operative) or control source. The second-phase to eighth-phase frequency are set by parameter Pr056~Pr086. When frequency is controlled by ▲ and ▼ on panel (Pr000=0 or 4), frequency rise and frequency fall functions could be set by X1~X8 multi-function input terminals, which have the same operation effect with ▲ and ▼ key on panel.

Pr001: running command selection
  range:0-4   factory setting:4

0. controlled by the operator panel(start forward rotation, start reverse rotation, stop);

1. controlled by external terminals (forward rotation/stop, reverse rotation/stop);

2. controlled by external terminals (start/stop, forward rotation/reverse stop);

3. controlled by external terminals (start forward rotation, start reverse rotation, stop).

4. the above ways are automatically adopted.

Function Description: this function is used to select the ways to start and stop the inverter.

●When panel control is selected (Pr001=0), the external

terminal control is ineffective. The motor is controlled by forward rotation key-RUN, reverse rotation key-REV and stop key-STOP on the panel. Whether reverse rotation key-REV is effective is controlled by Pr003 and Pr004.

●When external terminals are selected (Pr001=1), forward rotation key, reverse rotation key and stop key- on the panel are ineffective. Forward rotation will start if connect control terminal X1 (factory setting: forward rotation) with COM; if disconnected, forward rotation will stop. Reverse rotation will start if connect control terminal X2 (factory setting: reverse rotation) with COM; if disconnected, reverse rotation will stop.

● When external terminals are selected (Pr001=2), forward rotation key, reverse rotation key and stop key on the panel are ineffective. Forward rotation will start if connect control terminal X1 (factory setting: forward rotation) with COM; if disconnected, forward rotation will stop. Reverse rotation will start if connect control terminal X2 (factory setting: reverse rotation) with COM; if disconnected, forward rotation will start.

●

●When external terminals are selected (Pr001=3), forward rotation key, reverse rotation key and stop key on the panel are

ineffective. Control terminal X3 (factory setting: normal close) and COM connect to normal close contact for Stop; X1 (factory setting: forward rotation) and COM connect to normal open contact for Forward Rotation; X2 (factory setting: reverse rotation) and COM connect to normal open contact for Reverse Rotation.

● When automatic adoptation is selected (Pr001=4), the above method are all effective. And the following diagram shows the wiring methods:

Pr001=1

Pr001=2
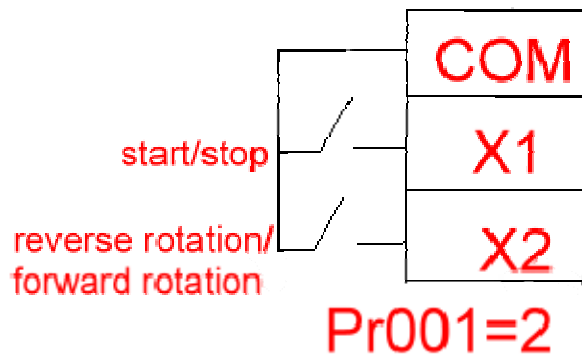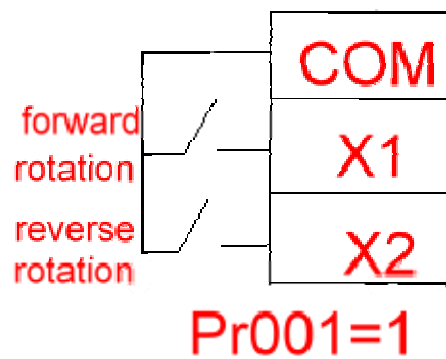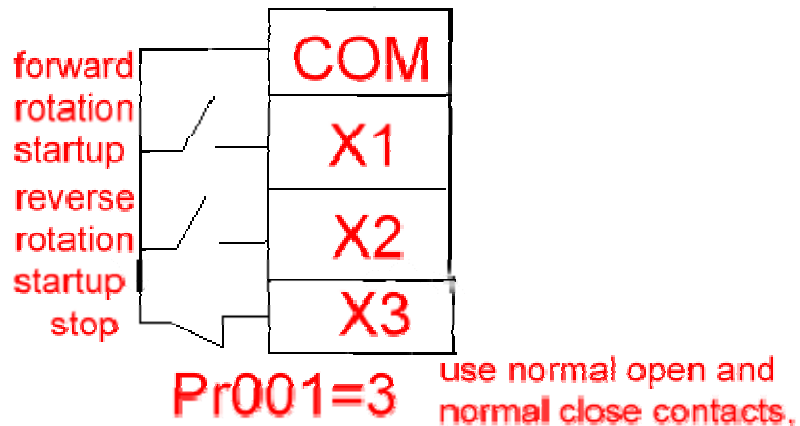
Pr002　select stop settings　setting range: 0-2　factory setting: 0

0. stop by decelerating brake;

1. free stop;

2. immediate DC brake.

Function description: this function is used to select the ways of stopping inverter.

● When decelerating brake is selected (Pr002=0), the motor will decelerate to the DC brake initiative frequency Pr042 after the inverter receive the command, and then brake and stop according to Pr041 DC brake torque and Pr040 DC brake time.

● When free stop is selected (Pr002=1), the inverter will cut output immediately on receipt of the command. The motor will be stop by inertia.

● **When immediate DC brake is selected (Pr002=2), on receipt of the command, the inverter will brake and stop immediately according to Pr041 DC brake torque and Pr040 DC brake time.**

● **External free stop can be realized When one of multifunction input terminals X1~X8 selected "free stop" (see input function selection for Pr041~Pr111), and this terminal is connected to COM.**

Pr003: Reverse forbidden setting

Setting range: 0-1   factory setting:0

0. **reverse rotation allow;**

1. **reverse rotation forbidden.**

Function description: this function is used to forbid motor to rotate reversely or not. This parameter should be set as 1 to prevent accidents, if the motor's reverse rotation will possibly cause bodily injury, losses to production and damage to equipment.

While connecting wires, users should check whether the motor is rotating in correct direction.

Pr004: forbid to start reverse rotation from keyboard

Setting range: 0-1　factory setting: 1

0. allow to start reverse rotation from keyboard

1. forbid to start reverse rotation from keyboard

Function description: this function is used to select whether the reverse rotation key-REV on operator panelis effective.

Pr005: startup frequency

Setting range: 0.0-10.0Hz　factory setting: 3.0Hz

Function description: this function is used to set startup frequency of the inverter, then it will accelerate to this target frequency.

ATTENTION: If this value is set too high, current protection action may be caused.

Pr006: delayed startup

setting range:0.0-60.0s　　factory setting: 0.0s

Function description: After being started, the inverter will first output according to the startup frequency; then after this specified time, it will accelerate to the target frequency. This function aims to improve startup characteristic, so as to ensure the motor can fully start in the specified time.
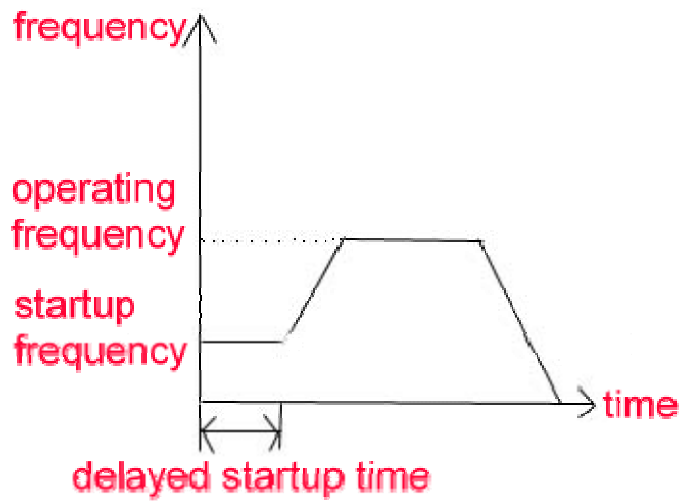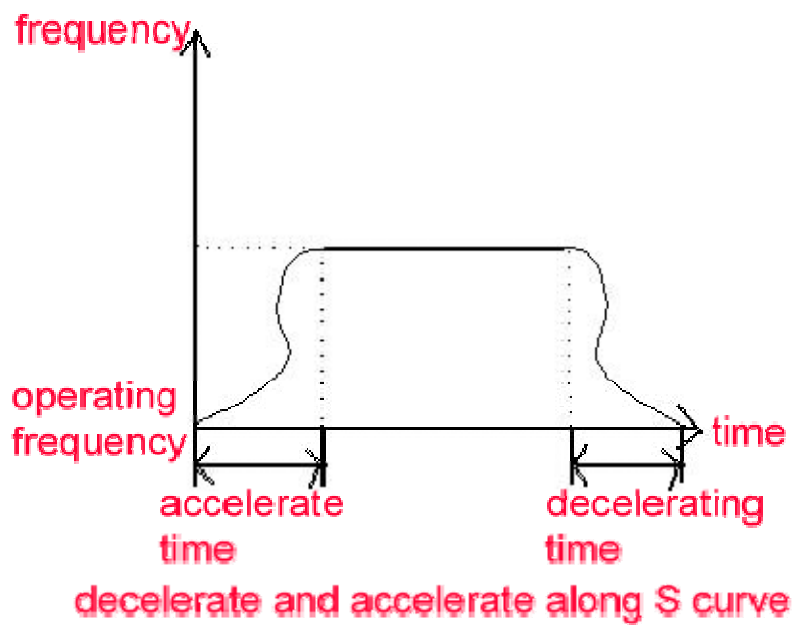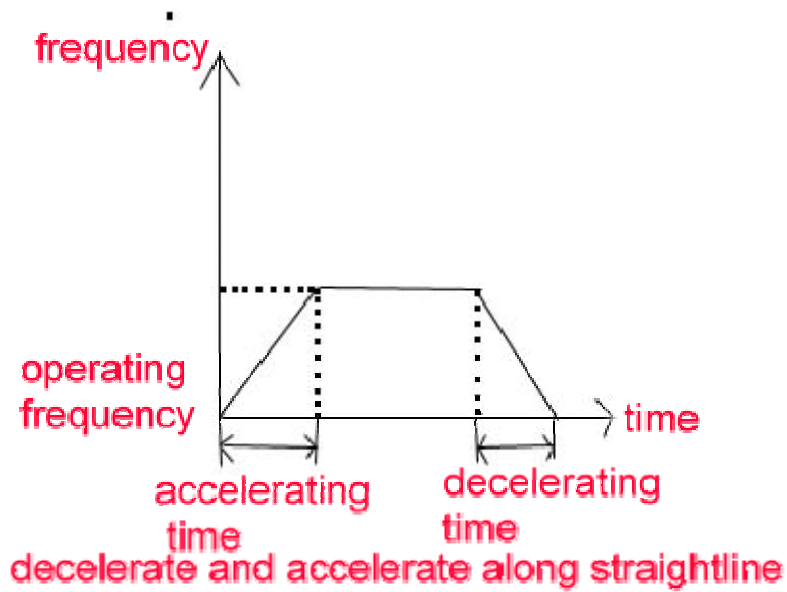
Pr007: accelerating and decelerating curve

Setting range: 0-1　　factory setting: 0

　0.　straight line;

　1.　S curve.

Function description: while accelerating or decelerating along S curve, there is buffering acceleration and deceleration without impact.

frequency

operating
frequency

time

accelerating
time

decelerating
time

decelerate and accelerate along straightline

frequency

operating
frequency

time

accelerate
time

decelerating
time

decelerate and accelerate along S curve

Pr008: automatic voltage stabilization

setting range: 0-2   factory setting: 1(220),2 (380V)

0. ineffective;

1. moderate sensitivity;

2. high sensitivity.

Function description: this function is used to set voltage stabilization.

When Pr008=1 or Pr008=2, if input voltage is higher than or equal to the set value of output voltage, this function ensures that the output voltage is stable. If input voltage is lower than the set value of output voltage, the input voltage equals to the output voltage.

Pr009: slip frequency compensation

setting range: 0.0-5.0Hz   factory setting: 0.0Hz

Function description: This function is used to set a rated compensation frequency to make the motor run at a constant speed. If the load is increased, the motor will slow down. This parameter aims at adjusting the output frequency in order to accelerate the motor to the synchronous rotary speed. This function will be ineffective if this parameter is set 0.0.

Pr010: carrier frequency setting

Setting range:1.0-15KHz

factory setting: subject to different product model

The higher the carrier wave frequency is, the more ideal the form of current wave will be, and the less noise the motor produces. When the frequency is low, the smaller the torque, the more electro-magnetic interference; the more electricity the main component wears, the more heat the inverter produces, which increases current loss and decrease efficiency. If the carrier wave frequency is low, the effect will be contrary to the above.

Their relations are shown in the following diagram:

carrierfrequency	electromagnetic noise	Interfering and leakage current	heat
1.0KHz | 10. 0KHz	High | LOW	LOW | High	LOW | High

Pr011: frequency arrival setting

Setting range: 0.0-400.0Hz   factory setting: 0.0Hz

Function description: this function is used to set the arrival points of operation frequency. If the inverter outputs a frequency that is higher than or equal to this parameter, it will output signal from terminal JA1, JA2, JA3, JB, JB2 or from terminal CE, C1. (Pr112, Pr113 or Pr114 =2: any frequency is the arrival point.)

Pr012: analogy output selection

setting range: 0-2   factory setting: 0

0. analogy frequency meter (0-the maximal frequency corresponds to 0-10);

1. analogy current meter (0-2 times rated current of inverter corresponds to 0-10);

2. analogy voltage meter (0- rated voltage of motor corresponds to 0-10v).

Function description: this function is used to connect a DC voltage meter or other equipment between terminal F0 and COM so as to supervise the output frequency, output voltage or output current of inverter. The highest output frequency of terminal F0 is 10V.

Pr013: analogy output gain

setting range; 50-200% factory setting:100

Function description: this function is used to adjust the bias between the output value and actual value of analogy signal.

Pr014: Startup display item selection

Setting range: 0-5   factory setting: 0

0.frequency (H,L);

1.output current (A);

3.bus-bar voltage (U);

4.number of users;

If the count function is operative, it displays the present value(J); if PID function is operative, it displays PID feedback value(L); or it displays mechanical speed (r) (=output frequency * Pr015).

5.PID given value (y);

6. the temperature of heat radiator inside the inverter.

Function description: this function is used to set the display when the inverter starts.

Pr015: proportional coefficient of mechanical speed

Setting range: 0.1-99.99   factory setting: 30.0

Function description: this function is used to set the ratio between the value of speed and operation frequency, as to make them in conformity.

value of speed= output frequency* proportional coefficient of speed.

For example: When the output frequency is 50Hz, if the rotating speed of the motor is 1500 rounds/minute, we can figure out that: setting value = 1500 rounds/50 Hz= 30.

Pr016: data protection   setting range: 0-1   factory setting: 0

0.modification allowed;

1.modification forbidden.

Function description: when Pr016=1, all parameters (except operation frequency) can not be modified, and the data will not be saved.

Pr017: remember frequency

Setting range: 0-1   factory setting: 1

0. the frequency set by ▲ and ▼ on operator panelwill not be remembered;

1. the frequency set by ▲ and ▼ on operator panelwill be

remembered.

Function description: this function is used to set whether the operation frequency will be remembered if meet a sudden power failure, so as to make it available next time.

Pr018: immediate restart after instantaneous power failure

Setting range: 0-2   factory setting: 0

0. **ineffective;**

1. **automatically follow rotating speed in case of power-on;**

2. **restart from startup frequency in case of power-on.**

Function description: this function is used to set whether the motor runs immediately in case of power-on after a sudden power failure.

● **if Pr018=0, the motor will not start in case of power-on after a sudden power failure, and will alarm for under-voltage.**

● **if Pr018=1, the motor will continue rotating in the status before power failure in case of power-on. This is suitable for heavy inertia load.**

● **if Pr018=2, the motor will restart from startup frequency and accelerate. This is suitable for general load.**

● **if this function is operative, please place a warning mark "DANGER" in front of the machine to avoid any accidents.**

Pr019: times of restarting after malfunction

Setting range: 0-10   factory setting: 0 (ineffective)

Function description: the inverter will try to resume running after malfunction (eg: over current, over voltage). The maximum is 10 times to resume running.

Pr020: waiting time of restarting after malfunction

Setting range: 0.0-60.0 seconds   factory setting: 10.0s

Function description: if malfunction happens, restart the motor after this time set by this parameter.

Pr021: startup voltage of brake

220V Inverter: 350-400V, factory setting: 360V;

380V Inverter:650-700V, factory setting:660V.

function description: when the motor is the status of regenerating brake, the voltage on the DC bus-bar inside the inverter will rise. This parameter is used to set the startup voltage of build-in brake unit of inverter.

Pr022: response point preventing overheat when decelerating

220V inverter: 350-450V, factory setting: 400V;

380V inverter: 650-750V, factory setting: 700V.

function description: when the inverter is in the process of decelerating, the motor will generate a rising voltage transmitted to the inside of inverter. The voltage on DC bus-bar will increase. When the voltage exceeds this value, the inverter will stop decelerating; it will continue to accelerate again when the voltage decreases below this value.

Pr023: response point preventing over-current when accelerating

Setting range: 110-150%　　factory setting: 130

Function description: while the inverter is in process of accelerating, if the output current exceeds this value, it will stop accelerating. It will accelerate again, if the current decreases below this value.

Pr024: response point preventing over-current at constant speed

Setting range: 110-150%　　　factory setting; 130

During operation, malfunctions may occur because of mechanical characteristics, mechanical collision or overload. If the operation exceeds this value, the inverter will decrease the output frequency, and will increase it to the operation frequency if the current restore to normality.

Pr025: rated current of inverter

Function description: this parameter is used to indicate the rated output current.

Pr026: rated current of motor

Setting range: 50-110%   factory setting:100

Function description: this function is used to protect the motor against over-current. The factory setting is the rated current of inverter. If the power of the mated motor is lower than that of the inverter, this parameter should be set according to the ratio between the actual rated current of motor and the rated current of inverter. If more than one motor is controlled by the same inverter, they are not under protection. So it is necessary to install over-temperature relay for them.

Pr027: rated voltage of motor

220V inverter: 50-250V, factory setting: 220V;

380V inverter: 100-450V, factory setting: 380V.

function description: this parameter is used to set rated voltage of motor.

Pr028: rated frequency of motor

Setting range: 20.0-400.0Hz   factory setting: 50.0Hz

function description: this parameter is used to set rated frequency of motor.

Pr029: middle voltage

Setting range: lowest voltage-99% of rated voltage

Factory setting:18

---

function description: this parameter is used to set middle voltage value of any V/F curve.

Pr030: middle frequency

Setting range: 0.1-rated frequency of motor.   Factory setting:12.5Hz

---

function description: this parameter is used to set middle frequency value of any V/F curve.

Pr031: lowest voltage

Setting range: 0-10% of rated voltage of motor   factory setting: 1

---

function description: this parameter is used to set the lowest voltage value of any V/F curve.

Pr032: torque elevation   setting range: 1-30

Factory setting: subject to different product model

Function description: this parameter is used to improve the torque

characteristic of motor operating at low frequency. At this time, the output torque can be elevated by adjusting the output voltage of inverter. If it is set too large, trip malfunction may happen to the inverter. 0 is ineffective to this parameter, the inverter will run at the value set by V/F curve, or the settings of V/F curve will be ineffective.

Pr033: highest operating frequency

Setting range: the lowest operation frequency-400Hz

Factory setting: 50Hz

Function description: this parameter is used to set the allowable highest operation frequency of inverter. The minimum value of all analogy input frequency (0-10V, 4-20mA) responds to this frequency range. The jogging frequency is all controlled by this frequency, as well as the first-phase to the eighth-phase.

Pr034: the lowest operation frequency

Setting range: 0.0-10Hz　　factory setting: 0.0Hz

Function description: this parameter is used to set the lowest allowable operation frequency of inverter. The minimum value of all signal (0-10V, 4-20mA) set by analog input frequency corresponds to this frequency range. The jogging frequency is controlled by this frequency, as well as the first-phase to the eighth-phase frequency.
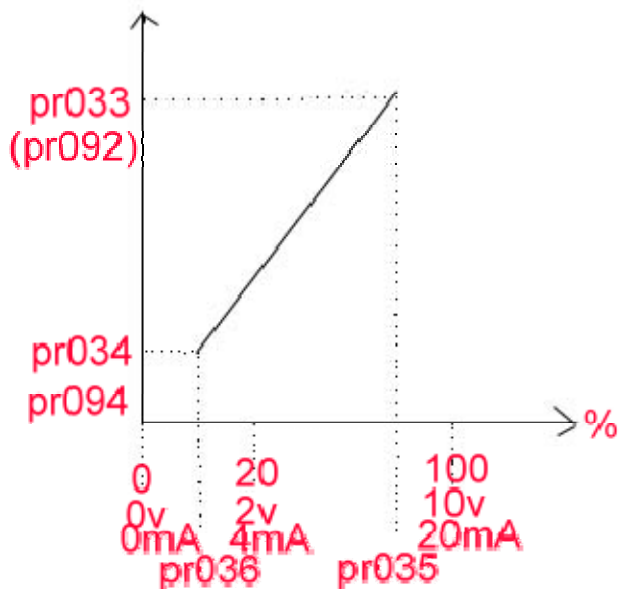
Pr035: analog input corresponding to highest frequency (maximum PID target value)

**Setting range: 0-100%   factory setting: 98**

Pr036: analog input corresponding to the lowest frequency (minimum PID target value)

Setting range: 0-100%   factory setting: 2

Function description: Pr035 and Pr036 are used to set analog relation corresponding to the highest and lowest frequency (PID maximum and minimum target value). See the following diagram:

forward characteristics(pr035>pr036)

pr033
(pr092)

pr034
(pr094)

%

0
0V
0mA

20
2v
4mA

100
10v
20mA
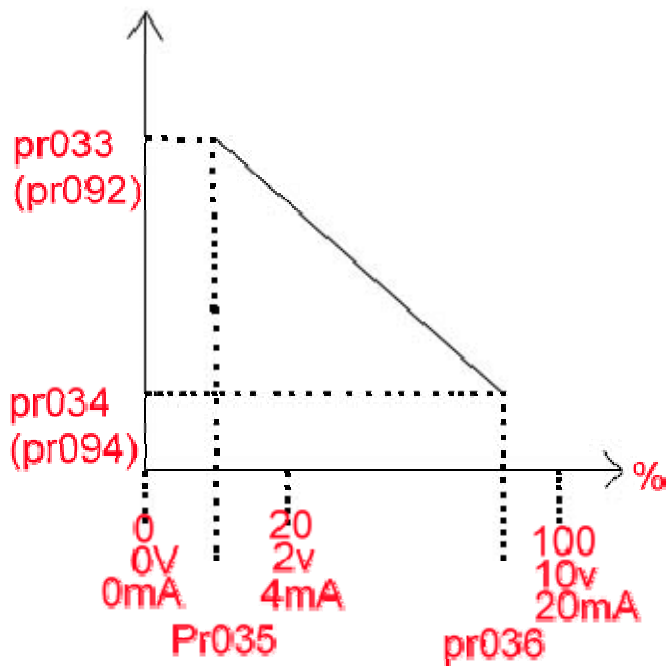
Pr035

pr036

reverse characteristics(Pr035<pr036)

If Pr035>Pr036, the higher the analog input is, the higher the rotating speed (PID target value) is.

If Pro035<Pr036, the higher the analog input is, the lower the rotating (PID target value) is.

Pr037: analog input gain

Setting range: 0-200%　　　factory setting: 100

Function description: If the input frequency (PID target value) is analog signal, this parameter should be the quotient of norminal dividing input value (norminal value/input value).

If the input signal is lower or higher than 10V/20mA, a frequency corresponding to 10V/20mA can be reached by adjusting
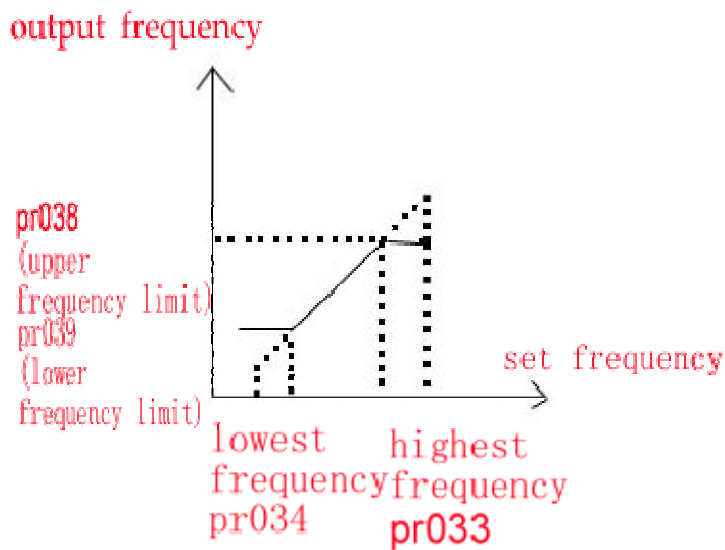
this parameter.

Pr038: upper frequency limit

Setting range: lower frequency limit—400.0Hz factory setting:50.0Hz

Pr039: lower frequency limit

Setting range: 0.0—upper frequency limit   factory setting: 1.0Hz

Function description: Pr038 and Pr038 are used to set the permissible highest and lowest frequency. Even though the operation frequency is lower than the lower frequency limit or higher than the upper frequency limit, the inverter can only operate between the specified range.

Pr040: braking time when stopping

Setting range: 0.0—25.0s   factory setting: 0.0s

Function description: this parameter is used to set the time lasting from starting braking to complete stop, when Pr002=0 or Pr002=2.

Pr041: DC brake torque   Setting range: 0.0—30%

 factory setting: subject to different product model

Function description: this parameter is used to set brake torque to ensure that the motor stops completely within the specified braking time. If it is set too high, the inverter is prone to over-current protection. When setting, it is advisable to gradually adjust this parameter starting with the small number.

Pr042: DC brake startup frequency

Setting range: 0.0—25.0Hz   factory setting: 3.0Hz

Function description: this function is used to brake and stop the motor according to the torque set by Pr041 and the time set by Pr040 after the motor decelerated to the frequency specified by this parameter.
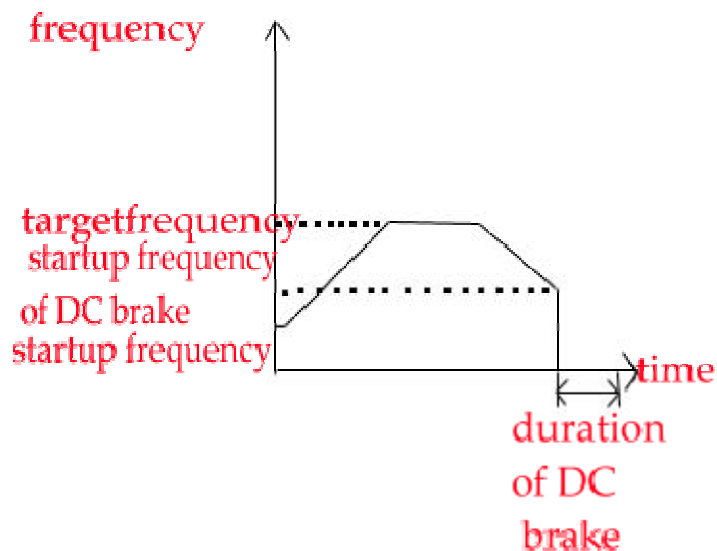
Jogging function

The inverter will execute jogging output if user presses the JOG key on the control panel, or connect X4(jogging function is set by the manufacturer) with terminal COM. If JOG is pressed, the inverter will operate according to the jogging speedup/speeddown time and

jogging frequency. If it is needed to use JOG key on the panel, Pr043 should be changed to 1.

Pr043: keyboard jogging control

Setting range: 0—1   factory setting: 1

0. jogging control keyboard from forbidden;

1. jogging control from keyboard lowed.

Function description: this parameter is used to set whether to execute jogging operation if the JOG key on the panel is pressed.

Pr044: jogging frequency

Setting range: 0.0—400.0Hz   factory setting: 5.0Hz

Function description: this parameter is used to the output frequency of inverter upon receipt of jogging instruction. This parameter is restricted by the highest operation frequency (Pr033) and the lowest operation frequency (Pr034).

Pr045: jogging accelerating time

Setting range: 0.1—999.9s

factory setting: subject to different product models

Function description: this parameter is used to set duration of

inverter accelerating 0Hz to the maximum operation frequency, after the inverter receives jogging instruction.

Pr046: jogging decelerating time

Setting range: 0.0—999.9s

Factory setting: subject to different product model

Function description: this parameter is used to set the duration of inverter decelerating from the maximum operation frequency to 0 Hz, after the inverter receives jogging instruction.
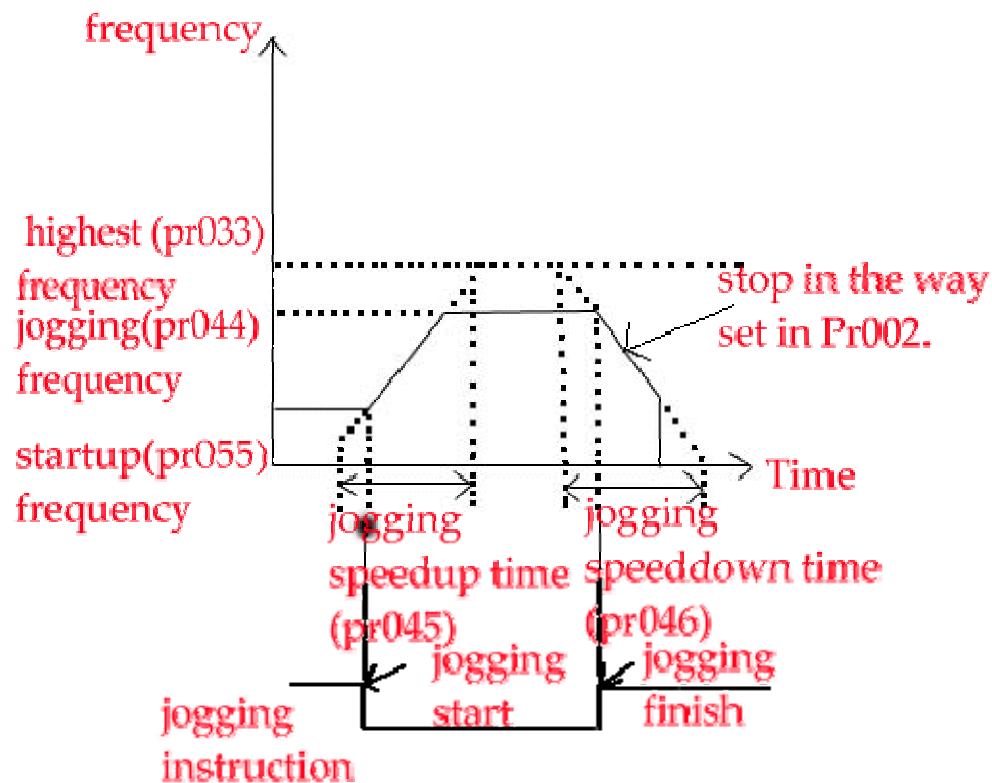
Multi-step operation, program running

If necessary, users can set frequency selection function by connecting or cutting the connection between the selected terminal and terminal COM. (namely: Multi-step speed 1; Multi-step speed 2; Multi-step speed 3, see Pr104~Pr111. If Multi-step speed is in effective, operating frequency is selected by multipurpose terminals X1~X8.)

For example, X5 is originally set as "multi-step speed 1", and X6 is originally set as "multi-step speed 2" by the manufacturer, at last X4 is set as "multi-step speed 3". Therefore, the multi-step speed has the following relation:

Multi-purpose terminals	X5	X6	X4	Multi-step speed selection
Parameter	Pr108=0	Pr109=1	Pr107=2	
Function of multipurpose terminal	Multi-step speed 1	Multi-step speed 1	Multi-step speed 1	
Status of terminals and COM	disconnection	disconnection	disconnection	1st step speed
	connection	disconnection	disconnection	2nd step speed
	disconnection	connection	disconnection	3rd step speed
	connection	connection	disconnection	4th step speed
	disconnection	disconnection	connection	5th step speed
	connection	disconnection	connection	6th step speed

	disconnection	connection	connection	7th step speed
	connection	connection	connection	8th step speed

Program running means that the inverter runs automatically in sequence according to the specified frequency, time and rotation direction set in the first-step to eighth-step. If the running time of a certain step is 0, this step will not take part in program running, which determinates the number of steps in running.

When multi-step speed and program are in the process of running, if Pr001 is set as 0 or 4, Pr051 will work as the operating frequency of the first-step, or the input from FV or from FI will be the operating frequency of the first step.

The frequencies of the second step to the eighth step are always decided by parameter Pr056, Pr061…….Pr086.

When multi-step speed and program are in the process of running, if Pr047 is set as 0, the first step frequency to the eighth step frequency always uses the first speedup and speeddown time; or they will use the corresponding speedup and speeddown time.

When multi-step speed is in running, the rotating direction of the motor is determined by startup mode and external control terminals. When program is running, the rotating direction of the motor is controlled by corresponding operation direction (Pr055,

Pr060…….Pr090).

Pr047: bind multi-step speedup and speeddown time

Setting range: 0—1   factory setting: 0

0. only use the first speedup and speeddown time;

1. bind multi-step speedup and speeddown time.

Function description: when Pr047=1, the first-step speed uses the first speedup and speeddown time; the second-step speed uses the second speedup and speeddown time, the others are on the analogy of this.

Pr048: reserved

Pr049: program running mode

Setting range:0—3   factory setting: 0

0. ineffective;

1. stop after single cycle;

2. run reciprocatingly;

3. keep running at the last frequency after single cycle.

Function description:

    If select stop after single cycle (Pr049=1), stop running after finishing a cycle according to the specified steps.

If select reciprocatingly run (Pr049=2), run reciprocatingly according to the specified steps.

If select to run at the last frequency after single cycle (Pr049=3), continue running after finish a cycle according to the specified steps.

Pr050: coefficient of program running time

Setting range:1—100   factory setting: 1

This function is used to set coefficient of program running time. The actual running time is: this coefficient times the running time of each step.

For example: if coefficient of program running time is 100, and the time of program running 1 is 1.0s, we can figure out that: the actual running time is 100s.

Pr051: the 1 st step frequency

Setting range: the lowest frequency—the highest frequency

Factory setting: 50.0Hz

Function description: this parameter is used to set operation frequency of inverter. It works as the 1 st frequency when multi-step speed and program are running.

It is also used as PID target value in PID mode (Pr091=1 or 2). At this time, the setting range is from Pr094 minimum target value to

Pr092 maximum target value.

This parameter can be directly modified by pressing ▼ and ▲ on the operation panel. It will be automatically remembered (Pr017=1) when cutting the power supply.

Pr052: the 1 st speedup time

Setting range: 0.1—999.9s factory setting: subject to different

product model

Function description: this parameter is used to set the duration needed to increase the output frequency of inverter from 0Hz to the highest frequency.

Pr053: the 1 st speeddown time

Setting range: 0.1—999.9s factory setting: subject to different

product model

Function description: this parameter is used to set the duration needed to decrease the output frequency of inverter from the highest frequency to 0Hz.

Pr054: time of program running 1

Setting range: 0.1—999.9s factory setting: 0.1s

Function description: this parameter is used to set the time value of

the first step of program running. If it is set as 0.0s, it will not take part in running.

Pr055: rotating direction of program running 1

Setting range: 0-1   factory setting: 0

0. forward rotation;

1. reverse rotation.

Function description: this parameter is used to set the rotating direction of motor during the 1 st step.

The following is the parameter of 2 nd to 8 th step, which have the similar functions.

Pr056: the 2 nd step frequency

Setting range: the lowest frequency---the highest frequency

Factory setting: 5.0Hz

Pr057: the 2 nd speedup time

Setting range: 0.1—999.9s

Factory setting: subject to different product model

Pr058: the 2 nd speeddown time

Setting range: 0.1—999.9s

Factory setting: subject to different product model

Pro059: time of program running 2

Setting range: 0.1—999.9s

   Factory setting: 0.1s

   Pr060: rotating direction of program running 2

Setting range: 0—1

Factory setting:0

   Pr061: the 3 rd step frequency

Setting range: the lowest frequency---the highest frequency

Factory setting: 10.0Hz

   Pr062: the 3 rd speedup time

Setting range: 0.1—999.9s

Factory setting: subject to different product model

   Pr063: the 3 rd speeddown time

Setting range: 0.1—9999.9s

Factory setting: subject to different product model

Pr064: time of program running 3

Setting range: 0.1—999.9s

Factory setting: 0.1s

Pr065: rotating direction of program running 3

Setting range: 0—1

Factory setting: 0

Pr066: the 4 th step frequency

Setting range: the lowest frequency--- the highest frequency

Factory setting: 15.0Hz

Pr067: the 4 th speedup time

Setting range: 0.1—999.9s

Factory setting: subject to different product model

Pr068: the 4 th speeddown time

Setting range: 0.1—999.9s

Factory setting: subject to different product model

Pr069: time of program running 4

Setting range: 0.0—999.9s

Factory setting: 0.1s

Pr070: rotating direction of program running 4

Setting range: 0—1

Factory setting: 0

Pr071: the 5 th step frequency

Setting range: the lowest frequency--- the highest frequency

Factory setting: 20.0Hz

Pr072: the 5 th speedup time

Setting range: 0.0—999.9s

Factory setting: subject to different product model

Pr073: the 5 th speeddown time

Setting range: 0.0—999.9s

Factory setting: subject to different product model

Pr074: time of program running 5

Setting range: 0.1—999.9s

Factory setting: 0.1s

Pr075: rotating direction of program running 5

Setting range: 0—1

Factory setting: 0

Pr076: the 6 th step frequency

Setting range: the lowest frequency –the highest frequency

Factory setting: 25.0Hz

Pr077: the 6 th speedup time

Setting range: 0.1—999.9s

Factory setting: subject to different product model

Pr078: the 6 th speeddown time

Setting range: 0.1—999.9s

Factory setting: subject to different product model

Pr079: time of program running 6

Setting range: 0.1-999.9s

Factory setting: 0.1s

Pr080: rotating direction of program running 6

Setting range: 0—1

Factory setting: 0

Pr081: the 7 th step frequency

Setting range: the lowest frequency—the highest frequency

Factory setting: 30.0Hz

Pr082: the 7 th speedup time

Setting range: 0.1—999.9s

Factory setting: subject to different product model

Pr083: the 7 th speeddown time

Setting range: 0.1—999.9s

Factory setting: subject to different product model

Pr084: time of program running 7

Setting range: 0.1—999.9s

Factory setting: 0.1s

Pr085: rotating direction of program running 7

Setting range: 0—1

Factory setting: 0

Pr086: the 8 th frequency

Setting range: the lowest frequency—the highest frequency

Factory setting: 35.0Hz

Pr087: the 8 th speedup time

Setting range: 0.1—999.9s

Factory setting: subject to different product model

Pr088: the 8 th speeddown time

Setting range: 0.1—999.9s

Factory setting: subject to different product model

Pr089: time of program running 8

Setting range: 0.1—999.9s

Factory setting: 0.1s

Pro090: rotating direction of program running 8

Setting range: 0—1

Factory setting: 0

PID functions

"PID control" compares output feedback value with the set

value by detecting the output feedback value of the control targets, and then controls and adjusts the deviation to 0.

PID controller consists of three parts, namely: proportion P; integral I and differential D. Closed-circuit control mostly suits for process control with less variation in physical value, such as current, voltage and temperature.

Some adjusting methods to PID control:

Set the PID function effective (Pr091), observe the system output via feedback signal, adjust the parameter of PID controller according to the waveform of output.

The following rules are usually adopted in adjustment:

When output does not oscillate, increase the proportion coefficient (Pr096);

When output does not oscillate, decrease integral coefficient (Pr097);

When output does not oscillate, increase differential coefficient (Pr098).

In practice, users can adjust the PID parameters according the following steps:

To restrain output deviation: decrease differential coefficient and increase integral coefficient;

To restrain output oscillation: decrease differential coefficient and decrease proportion coefficient.

Pr091: PID mode

Setting range: 0—6　　　factory setting: 0

0. PID function is ineffective;

1. the target value is set by ▼and ▲ on operation panel, feedback value is input from terminal FV;

2. the target value is set by ▼and ▲ on operation panel, feedback value is input from terminal FI;

3. the target value is set by the potentiometer on panel, feedback value is input from terminal FV;

4. the target value is set by the potentiometer on panel, feedback value is input from terminal FI;

5. the target value is set by terminal FV, feedback value is input from FI;

6. the target value is set by terminal FI, feedback value is input from FV.

Function description: this parameter is used to set the source of target value and feedback value while PID is selected. The PID target value shares Pr051 with "the 1 st step frequency", the operating method is the same, and they are all controlled

by Pr017.

Pr092: maximum target value

Setting range: minimum target value—100.0

Factory setting: 100.0

Function description: this parameter is used to set maximum target value when PID is running.

Pr093:feedback value corresponding to maximum target value

Setting range: 0—100%

Factory setting: 100

Function description: this parameter is used to set feedback of sensor corresponding to the maximum target value

Pr094: minimum target value

Setting range: 0-- maximum target value

Factory setting: 0.0

Function description: this parameter is used to set minimum target value when PID is running.
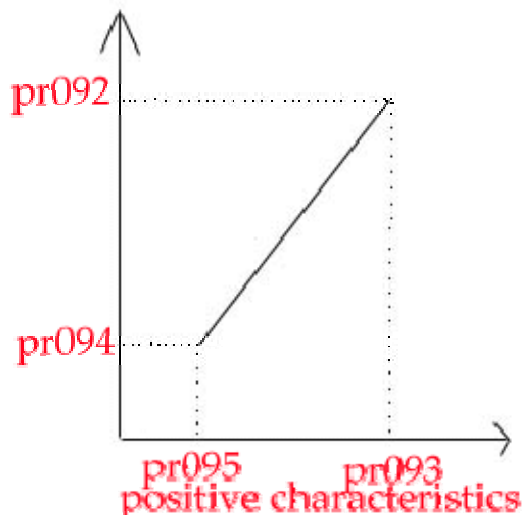
Pr095:feedback value corresponding to minimum target value

Setting range: 0—100%

Factory setting: 0

Function description: this parameter is used to set feedback of sensor corresponding to the minimum target value

ATTENTION: the difference between Pr093 and Pr095 should be larger than 10, or the factory setting: 100 and 0 will be used in running.
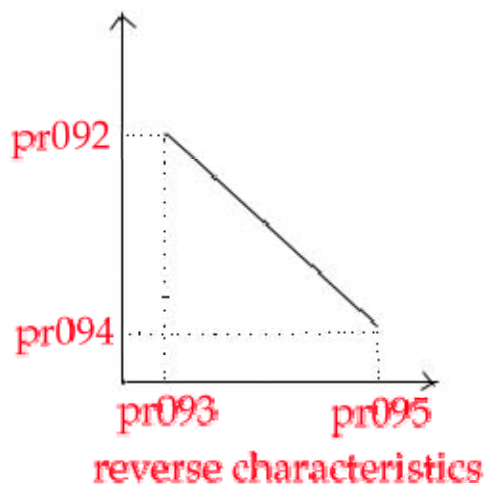
reverse characteristics

The output freq of inverter rises, the controlled physical object increases, the output signal from sensor increases, so input positive characteristics;

The output freq of inverter rises, the controlled physical object increases, the output signal from sensor decreases, so input reverse characteristics;

The output freq of inverter rises, the controlled physical object decreases, the output signal from sensor decreases, so input reverse characteristics;

The output freq of inverter rises, the controlled physical object decreases, the output signal from sensor increases, so input forward characteristics.

Pr096: proportion coefficient

Setting range: 0.01—10.00

Factory setting: 1.00

Function description: if this parameter is set large, response will be rapid, and if it is set too large, it is easy to cause oscillation. If this parameter is set small, response will be slow.

Pr097: integral coefficient

Factory setting: 0.01—10.00

Factory setting: 0.30

Function description: if this parameter is set large, response will be slow, the ability of external controlling will be weaker. if this parameter is set small, response will be rapid, but it is easy to cause oscillation.

Pr098: differential coefficient

Setting range: 0.01—10.00

Factory setting: 0.30

Function description: if differential coefficient is set large, response will be rapid, and if it is set too large, it is easy to cause oscillation. If this parameter is set small, response will be slow.

Pr099: feedback sampling cycle

Setting range: 0.1—20.0S

Factory setting : 1.0S

Function description: this parameter is used to set time interval for PID controller's next response.

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Counter

Inverter can count external events through multi-purpose terminals X1~X8; if it preset, it also can respond to count value arrival and other events. The counter can be cleared by external signal. (The settings of X1~X8 are from Pr104-Pr111)

Pr100: present count value

Setting range: 0—9999   factory setting: 0

Function description: This parameter is used to set present counting value, the external counting impulse signal can increase it upwards.

Pr101: count preset   setting range: 1-9999

Factory setting: 1

Function description: this parameter is used to set the preset value of counter. If count value equals to the preset value, the system will respond according to the parameter of Pr103 (count arrival action selection).

Pr102: count unit   setting range: 1—9999   factory setting: 1

Function description: this parameter is used to set unit value of each impulse. If it is set as 100, the present count will increase 1, when the external terminals received 100 signal impulses.

Pr103: count arrival action selection

Setting range: 0—3   factory setting: 0

0. stop counting and close output;

1. stop counting and continue outputting;

2. count again and close output;

3. count again and continue outputting.

Function description: this parameter is used to set action selection when the present count reaches the count preset value.

Pr104: function selection of input terminal X1

Setting range: 0—20

Factory setting: 16

Pr105: function selection of input terminal X1

Setting range: 0—20

Factory setting:17

Pr106: function selection of input terminal X1

Setting range: 0—20

Factory setting:6

Pr107: function selection of input terminal X1

Setting range: 0—20

Factory setting:5

Pr108: function selection of input terminal X1

Setting range: 0—20

Factory setting: 0

Pr109: function selection of input terminal X1

Setting range: 0—20

Factory setting:1

Pr110: function selection of input terminal X1

Setting range: 0—20

Factory setting:18

Pr111: function selection of input terminal X1

Setting range: 0—20

Factory setting: 19

Function description: the inverter has 8 multi-function input terminals named from X1~X8. Their function is set by Pr104~Pr111.

The function parameters of Pr104~Pr111 are shown in the table:

Parameter value	description									
			1	2	3	4	5	6	7	8
0	**Multi-step speed 1**	0		√		√		√		√
1	**Multi-step speed 2**	1			√	√			√	√
2	**Multi-step speed 3**	2					√	√	√	√
3	Freq rise									
4	Freq fall									
5	Jog in forward direction									
6	Normally close STOP key									
7	Free stop									
8	Count input									
9	Clear counter									
10	Jog in reverse direction									
11	Pause decelerating and accelerating									
12	Normally open STOP key									
13	Force to output reverse rotation									
14	Reserved									
15	Reserved									
16	Forward rotation									
17	Reverse rotation									
18	External malfunction									
19	External reset									
20-31	reserved									

Notice: the " √ " in the table means that the terminal corresponding

to this parameter connects with COM.

For example:

The 4 th step speed: the terminals of Multi-step speed 1 and Multi-step speed 2 are connected to COM at the same time.

Pr112: output function selection of JA1,JA2 and JA3

Setting range: 0—15   factory setting: 3

Pr113: output function selection of JB1 and JB2

Setting range: 0—15   factory setting: 3

Pr114: output function selection of C1 and CE

Setting range: 0—15   factory setting: 3

Function description: JA1 and JA3 are the normal open contacts of relay JA, JA2 and JA3 are normal close contacts. JB1 and JB2 are the normal open contacts of relay JB. If output below AC 250V/2A is allowed, C1 and CE are the open-circuit output of collector. Load bellow DC 36V/50mA is allowed. Its output function can be set by Pr112~Pr114.

The function parameters of Pr112~Pr114 are shown in the table:

Parameter value	Function

0	In running
1	Freq reaches the ceiling
2	Any freq arrival
3	Malfunction
4	Under-voltage
5	Counting arrival
8	In stopping
others	Reserved or ineffective
Pr115~Pr124: reserved	

Pr125: fault record 1

Pr126: fault record 2

Pr127: fault record 3

Function description:

Pr125~ Pr127 are used to record the latest three faults of the inverter,

the codes of the faults are in the following table:

Fault codes:

Parameter value	Code of fault	fault
0	OC-1	Over heating at speedup
1	OC-2	Over-current at speeddown
2	OC-3	Over-current at constant speed
3	OU-1	Over-voltage at speedup
4	OU-2	Over-voltage at speeddown
5	OU-3	Over-voltage at constant speed
6	LU	Under-voltage
7	OL	Overload
8	OH	Over heating
9	DL	output Short circuit
10	CPU	System abnormality

11	CODE	Check error of program code
12	EF	External malfunction
13	EEP	Memory error
14	DER	Parameter error
15		No malfunction

Pr128: total ruuning time   unit: day(s)

Function description: this function is used to read the running time of inverter.

Pr129~Pr132: reserved

Pr133: restore the factory settings

Setting range: 0—1   factory setting: 0

Function description: If this parameter is set as 1, all the parameters will be restored to the factory settings. If other numbers are set, this parameter will be ineffective.

Chapter 7   Malfunction Analysis and Troubleshooting

Converter has very wide applications; while some problems could unavoidably happen to the device because of different working environments and conditions. In this chapter, some frequent faults and problems as well as corresponding solutions are listed below.

HL3000 series inverters are designed with the protection of over-current, over-voltage, overload, under-voltage and other protective functions. Once any malfunction occurs, the inverter will immediately alarm and trip, stopping the output, the LED monitor will also display the corresponding fault code, then the motor stops the free running. When the problems are removed, press the STOP key to release the fault alarms.

The common problems, types and solutions are listed separately in the table below:

Alarms and Solutions

No.	Malfunction code	Types of malfunction	Possible causes of malfunction	Solutions
0	OC-1	Over-current at speedup	1)Torque elevation too fast	1)Set a lower torque elevation value

1	OC-2	Over-current at speeddown	2)Time of speedup too short 3)Capacities of Converter too small 4)Short circuit on output side 5)Sudden load change of motor	2)Reset the speedup time 3)Replace with a lager-capacity Converter 4)Examine the insulation soundness of wiring 5)Examine whether the motor is locked
2	OU-3	Over-current at constant speed		
3	OU-1	Over-voltage at speedup	1)Abnormal voltageof power supply 2)Speeddown time too short 3)Improper braking units used 4)inertia moment of load too large	1)Examine input voltage 2)Reset speeddown time 3)select proper braking units 4) Reduce load inertia moment
4	OU-2	Over-voltage at speeddown		
5	OC-3	Over-voltage at constant speed		
6	LU	Under-voltage	1) Abnormal input voltage 2) Internal faults of Converter	1) check power supply 2) contact the manufacturer
7	OL	Overload	1) Load too large 2) Motor rotation blocked 3)Improper setting of thermal protection parameters	1) Reduce the load 2)Eliminate the lock 3)Reset the thermal protection parameters
8	OH	Over heating	1) surrounding temperature is too high; 2). Cooling fan breaks.	1). Cool the surrounding environment 2) change the cooling fan
9	DL	Short circuit of output	1) short circuit of grounding 2) internal malfunction of inverter	1) Remove the short circuit 2) contact the manufacturer
10	CPU	System abnormality	1) interfered by external factors 2) internal malfunction of inverter	1) eliminate interfere nce 2) contact the manufacturer

11	CODE	Check error of program code	1) internal malfunction of inverter	1) contact the manufacturer
12	EF	External malfunction	1) short circuit between COM and external terminals	1) Remove the short circuit 2) contact the manufacturer
13	EEP	Memory error	1) internal malfunction of inverter	1) contact the manufacturer
14	DER	Parameter error	1) internal malfunction of inverter	1) contact the manufacturer

Chapter 8　Peripheral Equipment

8.1　Connection diagram of Peripheral equipment and other compatible device
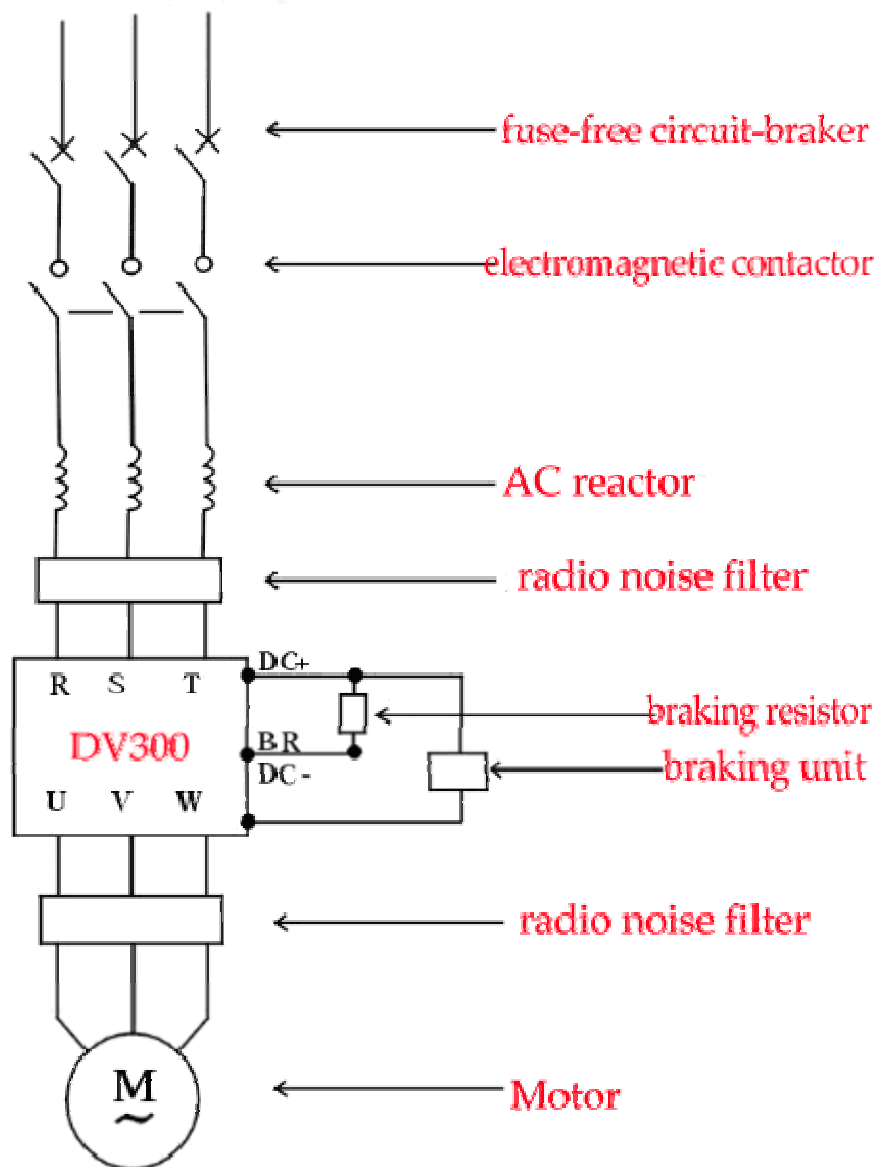
8.2   function description of peripheral equipment

● **Fuse-free circuit-braker MCCB: used to promptly cut the current of inverter, and prevent power malfunction if malfunction happens to inverter and the wiring.**

●**AC reactor MC: used to cut the main power supply and to prevent the inverter from restarting after the malfunction.**

●AC reactor ACL: used to improve the factor of input power, to decrease upper harmonic, and to restrain surge voltage.

●radio noise filter NF: used to reduce radio interference generated by inverter. (If the distance between the inverter and the motor is less than 20 meters, it is recommended to connect radio noise filter to the power side; if the distance is more than 20 meters, it can be connected to the output side.)

● Braking unit UB:

If brake torque could not meet requirements, braking unit UB is selected for the occasions of heavy inertia load, frequent brake or immediate stop.

Notice: ACL, NF and UB are only for choice.

8.2.1 Alternating current reactor

●AC reactor is used to restrain upper harmonic of input current of inverter. It is able to greatly improve power factor of inverter. AC reactor is recommended in the following circumstances:

● The ratio of power capacity to inverter capacity is larger than 10:0.

● A thyristor load or a power factor compensation device with switch is connected to the same power supply.

● There is a big imbalance of voltage in three-phase power supply.

(≥3%)

The following is specifications of general AC reactor.

Voltage(V)	Power(kw)	Current(A)	Inductance value(mH)	Power(kw)	Current(A)	Inductance value(mH)
380V	1.5	4	4.8	22	46	0.42
	2.2	5.8	3.2	30	60	0.32
	3.7	9	2.0	37	75	0.26
	5.5	13	1.5	45	90	0.21
	7.5	18	1.2	55	128	0.18
	11	24	0.8	75	165	0.13
	15	30	0.6	90	195	0.11
	18.5	40	0.5	110	220	0.09

8.2.2 Resistivity of regenerating braking resistor and power

Voltage (V)	Power of motor (kw)	Resistivity	Power of resistor (kw)	Power of motor (kw)	Resistivity	Power of resistor (kw)
380V	1.5	400	0.25	22	30	4
	2.2	250	0.25	30	20	6
	3.7	150	0.40	37	16	9
	5.5	100	0.50	45	13.6	9
	7.5	75	0.80	55	10	12
	11	50	1	75	13.6/2	18
	15	40	1.5	90	20/3	18
	18.5	30	4	110	20/3	18

8.2.2 Electricity-leakage protector

There exists direct-to-ground capacitor in inverter, in motor and in the input and output wires, especially the machines of large capacity. HL 3000 series inverters are of low noise with high carrier wave. Sometimes it may cause circuit protecting by mistake.

If the above problem occurs, it is necessary to install earth

leakage protective device besides decreasing carrier frequency and shorting wires. While installing, please pay attention to the following tips:

Earth leakage protective device should be installed on the input side of inverter next to fuse-free circuit-braker MCCB.

The action current of the earth leakage protective device should be larger than 10 times of leakage current (the total of leakage current of circuit, radio noise filter and motor) where inverter is not used and this circuit is connected to power current.

Chapter 9   Maintenance

DANGER
1. Don't touch the wiring terminals because there is high voltage on them, or there is danger of electric shock.
2. Make sure to cut off power before installing and dismantling terminal cover, or there is danger of electric shock.
3. Maintenance can only be done after cutting off the power of main

loop and confirming the indicator light went out. The residual voltage on Electrolytic capacitors is dangerous.

Maintenance and check should only be done by professional technician, or there is danger of electric shock.

CAUTIONS

1. Please pay special attention to the CMOS Integrated Circuit installed on the keyboard, control circuit board and drive circuit board. Static electricity may damage the IC on the circuit board.

2. When power is turned on, don't change and dismantle wire connected to the terminals. There is danger of electric shock.

3. Don't check signal when the inverter is running, or the equipment may be damaged.

9.1 Maintenance

Inverter is a typical product of electric technology and electronic technology. It possesses the dual characteristics of both industrial equipment and micro-electronics devices. Various malfunctions may arise due to the surrounding environment, such as temperature, humidity, smoke and dust; aging of the internal parts may also cause malfunctions. So, in order to keep this product in good operation status, daily and regular maintenance is necessary in storage and use. (at least once every 6 months).

9.1.1 Operating maintenance

Please check the following items when starting this inverter:

● **whether the motor produce abnormal noise and vibration;**

● **whether the motor and inverter produce abnormal heat;**

●**whether the surrounding temperature is too high;**

●**whether the value displayed on the load current meter is as usual;**

●**whether the cooling fan in the inverter works smoothly.**

9.1.2 Regular maintenance

Make sure to cut off the power before maintaining. Maintenance can only be done when there is no display on the monitor and 5 minutes later after the indicator light on main circuit went out, lest the residual electricity should injury the operator.

The checking items are listed in table 9—1:

Table 9—1: regular checking items:

Checking item	content	Solutions
1)terminals on main loop; 2)screws in control loop terminal	Whether the screws are loose	Fasten them with screwdriver
Heat radiator	Whether it is covered by dust	Eliminate with condensed air with pressure of 4~6kg/sq cm
PCB printed circuit	Whether it is covered by dust	Eliminate with condensed air with pressure of 4~6kg/sq cm
Cooling fan	Whether rotates smoothly; whether produces noise and vibration	Install a new fan
Power elements	Whether it is covered by dust	Eliminate with condensed air

		with pressure of 4~6kg/sq cm
Electrolytic capacitors	Whether there is change in color, smell, leakage ,and whether it bubbles	Install a new Electrolytic capacitors

In the process of maintenance, do not carelessly dismantle or shake the components, or pull out any plugins. The inverter may run abnormally or enter malfunction display, even cause damage to the main switch IGBT module due to wrong operation.

9.1.3 Components needing regular change

Some internal electronic components in inverter should be changed regularly in order to prolong the life of inverter and make it run reliably. The longevity of them is determined by the working environment and conditions. If the inverter is continuously used, the follow data is for your reference:

component	Standard longevity
Cooling fan	2~3 years
Electrolytic capacitor	4~5 years
printed circuit	5~8 years
fuse	10 years

9.2 Storage

If the inverter is to be stored temporarily or for a long, the following tips should be followed.

9.2.1 This product should be stored in a well-ventilated place with no dampness, no dust and no metal particle.

9.2.2 A charge test is needed if this product has been stored for more than a year, so as to restore the characteristics of the Electrolytic capacitor on main loop. During charging, the voltage should be adjusted slowly to the rated voltage. The charging time should be more than 2 hours.

9.2.3 The above mentioned test should be done at least once a year.

Chapter 10   Quality Guaranty

The quality of this product is guaranteed as follows:

1. Free repair refers only to the body of inverter, the time limitation starts from the delivery date of the manufacturer.

2. The duration of free repair lasts 12 months after purchase.

3. The following responsibilities fall on the manufacturer's side:

① free change in 3 months after purchase

② free repair in 12 months after purchase

4. If malfunctions are cause by the following accidents, the repair will be charged even if they occur in the duration of free repair:

● malfunctions caused by wrong operation or unauthorized refit or repair.

● malfunctions caused by wrong operation failed to follow the Standard Technical Specifications

● damage caused by dropping or improper transit after purchase

● malfunction or aging of components caused by installing and using inverter in unsuitable environments listed in chapter 1

● damage caused by wrong wiring

● malfunction caused by natural disaster and its concomitant accidents, such as earthquake, flood, hurricane, lightning, abnormal voltage.

5. As to malfunctioned products, the manufacturer has the right to entrust other enterprises with repairing service. The user will be charged according to actual cost. If an agreement is signed, the agreement will take priority.

6. After-sales service is also provided by our sale departments, manufacturing departments and agencies in China.

Appendix A   Standard Technical Specifications

Item		Content
input	Rated voltage	380V/220V+/- 15%
	Rated frequncy	50/60Hz
output	Output voltage	Three-phase power 0~input voltage
	Output frequency	0.1~400.0Hz
Control functions	Modulating mode	SVPWM control
	Carrier frequency	1~15KHz
	Precision of output frequency	+/-0.1% of maximum output frequency
	Frequency resolution	0.1Hz
	Torque elevation	0~30%
	rotary speed adjustment	0.0~5.0Hz
	time of speedup and speeddown	0.1~999.9S
	V/F curve	any value can be set
	Multi-step speed running	8 speeds can be preset
Operation function	Operation control mode	Panel control, external terminals control.
	Ways of frequency set	▲,▼ on panel; analog voltage or potentiometer, analog current, external control terminal rise/fall
	Input signal	Forward/reverse rotation instruction, jogging instruction, multi-step speed instruction, operation instruction, malfunction signal input, reset instruction, counting signal input
	output alarming signal	Relay output(AC250V/2A), open-circuit output of collector(DC36/50mA)
Other functions		Program running, PID function, immediate restart after an instantaneous power failure, upper frequency limit and bottom, parameter lock, automatic voltage stabilization, decelerate to stop or free stop, DC brake, analogy output.
Protective functions		Over-current, over-voltage, under-voltage, overheating, over-load, output short-circuit, external malfunction, etc
Working environment	location	Below altitude of 1000 meters, with no direct sunshine.
	ambient temperature	-10C~40C
	Humidity	Below 90%, with no dew
	ambient air	no erosive and flammable gas

Appendix B   Products   Description

model	Input power	The largest compatible power of motor (KW)	Rated output current (A)
DV3000-2005T	Single-phase220V 50Hz	0.5	3
DV3000-2007T	Single-phase220V 50Hz	0.75	4
DV3000-2015T	Single-phase220V 50Hz	1.5	7
DV3000-2022T	Single-phase220V 50Hz	2.2	10
DV3000-2037T	Single-phase220V 50Hz	3.7	18
DV3000-4007T	Three-phase 380V 50Hz	0.75	2.5
DV3000-4015T	Three-phase 380V 50Hz	1.5	4
DV3000-4022T	Three-phase 380V 50Hz	2.2	5.8
DV3000-4037T	Three-phase 380V 50Hz	3.7	9.5
DV3000-4055T	Three-phase 380V 50Hz	5.5	13
DV3000-4075T	Three-phase 380V 50Hz	7.5	18
DV3000-4110T	Three-phase 380V 50Hz	11	25
DV3000-4150T	Three-phase 380V 50Hz	15	30
DV3000-4185T	Three-phase 380V 50Hz	18.5	39
DV3000-4220T	Three-phase 380V 50Hz	22	46
DV3000-4300T	Three-phase 380V 50Hz	30	60
DV3000-4370T	Three-phase 380V 50Hz	37	75
DV3000-4450T	Three-phase 380V 50Hz	45	90
DV3000-4550T	Three-phase 380V 50Hz	55	110
DV3000-4750T	Three-phase 380V 50Hz	75	150
DV3000-4930T	Three-phase 380V 50Hz	93	175
DV3000-41100T	Three-phase 380V 50Hz	110	215