DGI6000 Frequency Inverter

DEG Drive

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degdrive®

Contects

Contects

Security Information

1.1 Saft Marks and Definitions

The Security clauses written in this User Manual are very important to ensure the security using of Frequency Converter , and prevent the damage to the operator or persons and things around. Please know these marks completely and observe the requirement strictly .

Danger

Please must observe this mark, otherwise would bring about casualty accident

Warning

This mark means if operating by breaking the rule would cause minor wound or damage to the operator and things.

Attehtion

This mark means the instructions you should pay a attention

Reminding

This mark reminds you the information useful for you

Forbidding

Could not do it absolutely.

Forecd

What you must do .

1.2 Range of Appliance

Attehtion

The frequency converter is matched with Industrial 3-phase AC asynchronous motor .

Warning

- The Frequency Converter should not be used with the equipments , such as Nuclear-powered control equipments, Space navigation equipments, Traffic equipments, Security equipments, Weapons equipments, and so on, which may cause casualty accident because of the faults of the frequency converter . Please look into our company in advance for the special usage of frequency converter .
- Our frequency converters are made as the requirement of ISO System . But Customers also need take any security measures for the operating of Important equipments.

1.3 Appliance Conditions

Attehtion

- Install the product vertically in the place of well ventilated to get the best result of cooling . And if installed in level position, please add the ventilation installation .
- Around Temperaturer : within the range of -10 ~ 40C. Take away the upper cover if over 40C, and when be over 50C, customers should cool forced or use by derating. We do not suggest the application in high-temperaturer conditions, since it will shorten the life of Frequency Converter.
- Humidity should be lower than 90%, and no water coagulum.
- The vibration within the intallation place should be less than 0.5G. and do not allow any sudden shock happened to the frequency converter
- Installation site should far away from electromagnetic field , and should be no inflammable and explosive dangerous goods.

Warning

- Ensure the product is fixed on the fireproofing material , like Metal , in case of fire..
- Make sure no wire pieces, soldering tins or Zinc or iron sheets into product, in case that the frequency converter to be burn up because of short circuit

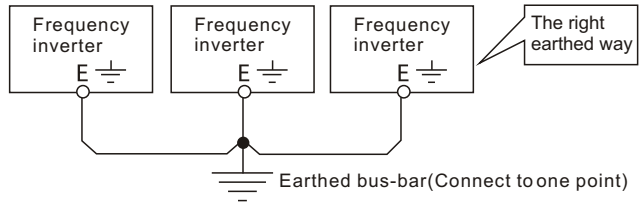
1.4 Security Items of Installation

Danger

- Strictly forbid to operate by damp hands.
- Strictly forbid to do any layout working or open the cover when the power is still open, and you should wait for 10 minutes after breaking the power if for layout or inspection working, otherwise would get an electric shock.

Warning

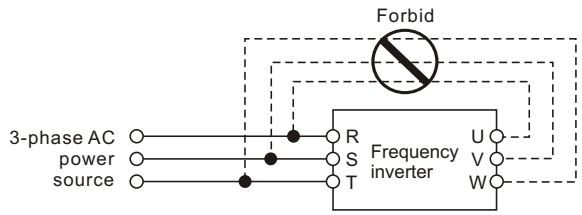
- Do not use the product with failure or lack components.
- Make sure the cables are connected securely with the main-circuit terminal, or else would cause damage to the poduct because of poor cantact .
- The earth terminals of frequency converter must be reliable ground connection .In case of the affect from anti-interference of earth resistantor, several frequency converters should be earthed by one point. See the drawing 1-1.



Drawing1-1

Forbidding

Strictly forbid to connect the AC power source with the output terminals U、V、W of frequency converter , otherwise would be damage to product. See drawing 1-2.



Drawing1-2

Forecd

Customers must install no-fuse or leakage circuit-breaker to protect the cicuit and avoid the broden the scope of accident because of fault of fault of product.

Attehtion

- It not fit to install the electromagnetism Contactor at the output circuit of frequency converter .The reason is that the open-or-close action of contactor when the motor is runnig, will produce operation over voltage and damage to frequency converter. But it is necessary for the following situation:

① When the frequency conversion used in energy saving control, and the system operates under rated speed frequently, in order to realize ecomonic operation, need to remove frequency converter.

② When for important process flow and could not stop for long time, in order to improve the system reliability, need to transfer among control system.

③ When one frequency converter controls multi-set of motors.

Users must note that when frequency converter output, the contactor could not act. !

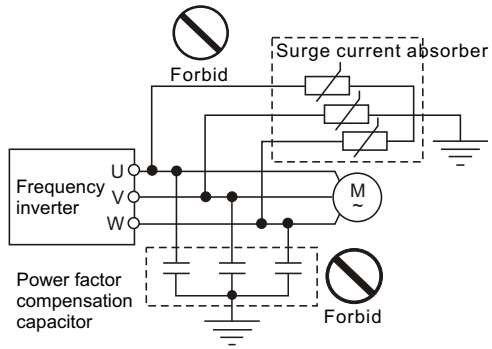
1.5 Security items for operating

Danger

- Strictly forbid to operate by damp hands.
- For the frequency converter be stored over 2 years, users should set-up to rated value by voltage regulator when be energized,otherwise would get an electric shock or explosion.
- Do not touch the inner of product or put anything into the product when power-on. Even more, could not open the cover when the product is in the process of electrifying , otherwise would get an electric shock or make the converter could not operate normally .
- Please operate the function of "Re-start after outage" carefully,or else will cause casualty accident.

Warning

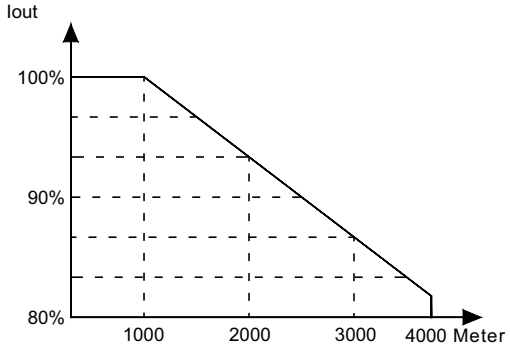
- When operating over 50Hz, must be sure the speed range of motor bearing and machine devices when operating.
- The machine devices, such as Reducer Casing or Gear Wheel which need be lubricated,should not run for long time under low-speed.
- Since the heat dissipation capacity would be poorer whencommon motor running in low-frequency, should be derating, and if be constant torque load, should must adopt forced heat dissipation or use the frequency -changer motor .
- If the product was not be used for long time, user should cut off the power source, in case of any damage to the converter or fire.
- Since the output voltage is PWM Pulse wave, please do not install capacitor or surge-current-absorber on the output end of frequency converter, Or else would result in Fault tripping or even any damage to power components of frequency converter. Please remove if these products have been installed. Please see the drawing 1-3.



Drawing 1-3

Attehtion

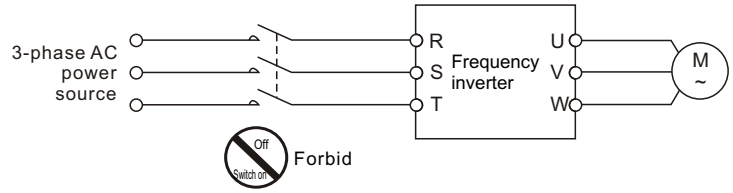
- If the Motor is put to use for first time or using again after long time stored, should make the insulation examine and ensure the insulating resistance is no less than 5M.
- If allowed to operate frequency converter over its operating voltage range, should deploy voltage set-up transformer or voltage reducing device.
- Application in the place more than 1000 meters above sea level, because of the thin air , the heat dissipation capacity of frequency converter would be poorer and should be used by derating. Generally, reduce 10% rated for per 1000 meters height. See the Drawing 1-4.



Drawing 1-4 Derating Curve drawing of Frequency converter

Forbidding

- Forbid to touch the radiator section or charging resistance by hand, or else would be burned.
- Strictly forbid to install the switch devices, like contactor, at the input side of frequency converter and stop or start frequently. Since the main circuit of frequency converter includes stronger charging current and would produce heat-accumulation effect, make the components be heat-fatigue, shorten the life of frequency converter. See the Drawing 1-5



Drawing 1-5

Forecd

- If any smoking, peculiar smell or noise happen, please cut off the power souce immediately, and examine it or get help from agent.

1.6 Attention for Scrapped items

Warning

- The chemical condenser of frequency converter may cause explosion when be burned. Please treat it well.
- The Operation keyboard and other plastic materials would produce toxic gas when be burned , please treat well .

Attehtion

- Dispose of the frequency converter as Industrial waster

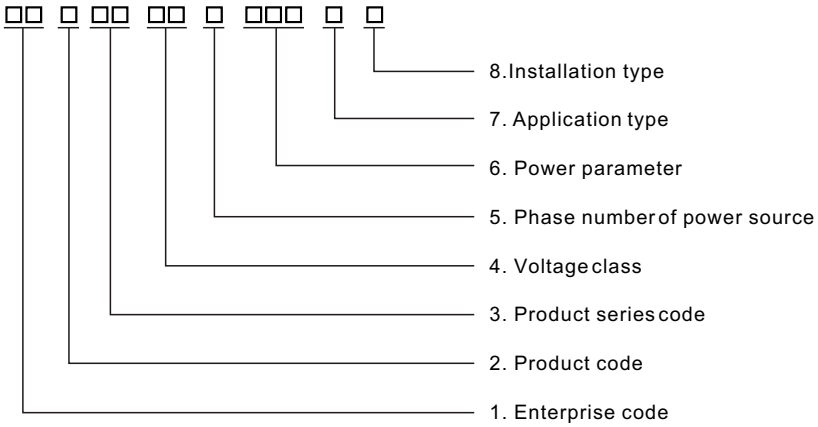
2.1 Openpackage Inspect

Please check-up the following items before openpackage.

- Whether the outer casing or components are damaged or fall off .
- Check the rated value on the nameplate at side of product, whether it is the same as your order.
- Whether all things listed in packing list are well-appointed.

If any questions, please contact with supplier.

2.2 Model explanation of Frequency Converter

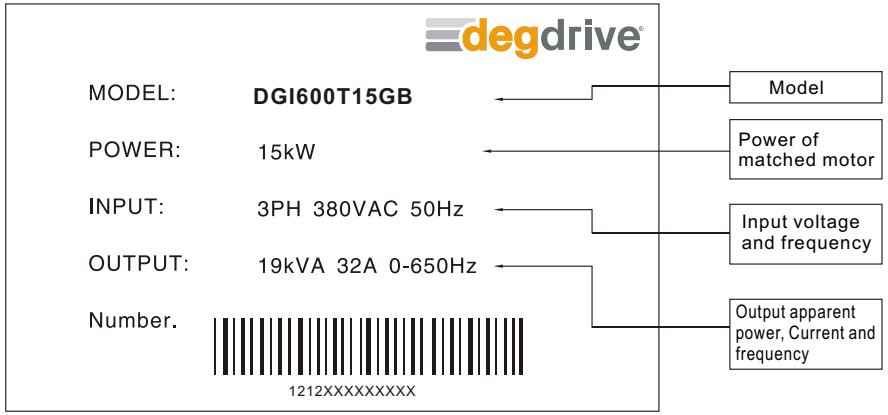


Explanation:

1、Enterprise Code:DGI is DEG drive
2、Product Code: R is Soft Starter, I is Frequency Converter
3、Product series code: 10 is 1000 series , 60 is 6000 series
4、Voltage class: 02 is 220V; 03 is 380V. 1
5、Phase number of power source: T means 3-phase; S means single-phase
6、Power parameter: D75 means 0.75KW, 075 means 75KW.
7、Application type: G means Constant Torque type ; P means fan or water-pump type
Z means shot-molding special type B means lifting special type
8、Installation type: A means cubicle type ; B means Hanged type ;
C means exposed unit ; D means spare parts

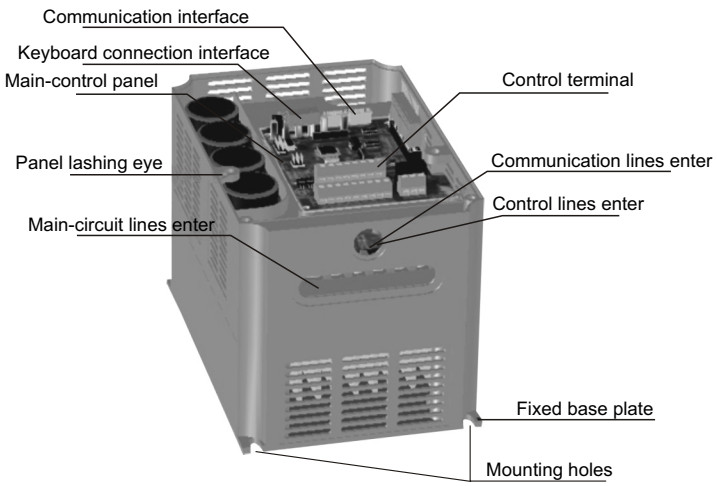
2.3 Nameplate explanation

At the riht side of frequency converter outer casing, there is the nameplate which writes the model and rated values of frequency converter . As the following:

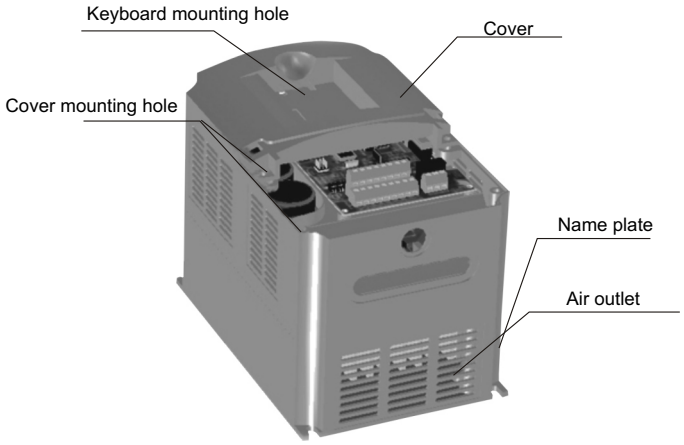


Drawing 2-2 Nameplate of Frequency Converter

2.4 Explanation of spare parts of frequency converter



Drawing 2-3(A)Name of Spare Parts



Drawing 2-3(B)Name of Spare Parts

3.1 Product Characteristic

DGI6000 series Frequency Converter is a kind of power converter which adopts the noninductive vector technique and change the running speed of AC asynchronous motor by controlled the output voltage and frequency. It can exactly detect the three-phase output AC signal and the change of phase angle just by current sensor, and correct the frequency automatically by the computing mode of noninductive vector, so that ensure the motor fixed speed when the load changing.

- Built-in parameter auto-tuning function, can automatically identify the characteristic of motor and set up related parameter, make the motor run continualy steadily even when the operating parameter of motor changes as times go by .
- Protection function in all fields: protection of under-voltage, over-voltage, over-current, prevention of motor stall, over-load and over-heat.
- Standard V/F mode,Noninductive vector mode,Output power(torque) contol mode.
- Control function special for industrial mechanic: 6 kinds of multifunction programmable digital input function (99 kinds of functions are optional); 3 kinds of multifunction programmable digital output function (94 kinds of function are optional); Timer and counter, Rotation speed trace function, flip-flop function, Automatic operating function, Built-in RS485 communication interface .One or more frequency converters can be dynamical controlled by one computer at the same time, besides that, one computer may simultaneously control nearly 99 sets of converters (Relay amplifier must be installed when the numbers of converters exceed 31 units); Built-in PID function .The range of output frequency is 0.00~650.00Hz.
- Adopts low inductance structure, reduce the peak voltage of circuit, strengthen the EMC function, improve the reliability of product greatly.

3.2 Frequency converter sereies model explanation

DGI6000 series

Classification	DGI6002	DGI6003	DGI6004
Voltage class	AC220V	AC380V	AC460V
Voltage range	AC220~240V	AC380~440V	AC460~480V

Product Instruction

Model of general frequency converter

Power (KW)	Norninal value	Current (A)	Norninal value	Current (A)	Norninal value	Current (A)
(kW)	DGI6002T	(A)	DGI6003T	(A)	DGI6004T	(A)
0.75	D75GB	4	D75GB	2.5	D75GB	2.5
1.5	1D5GB	7	1D5GB	3.7	1D5GB	3.7
2.2	2D2GB	10	2D2GB	5	2D2GB	5
4	3D7GB	16	3D7GB	9	3D7GB	8
5.5	5D5GB	20	5D5GB	13	5D5GB	11
7.5	7D5GB	30	7D5GB	16	7D5GB	15
11	011GB	42	011GB	25	011GB	22
15	015GB	55	015GB	32	015GB	27

1: The over-current coefficient: for G type is 1.5 times, for P type is 1.2 times, for B,Z type is 2 times

2: Built-in braking unit when power is under 15KW.

Product illustration

3.3 Outline dimensions

The installation size of G type wall hanging unit

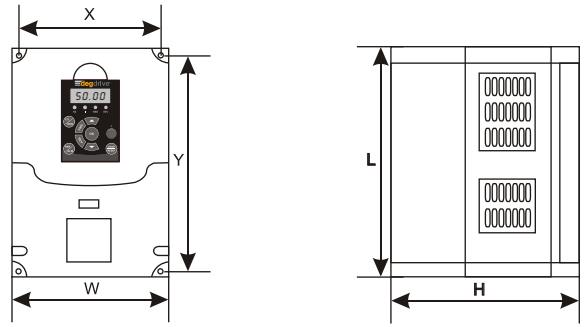


Chart 1

Power degree (kW)	L (mm)	W (mm)	H (mm)	X (mm)	Y (mm)	Mounting hole (φ)	Gross weight (kg)
0.75~2.2	170	155	165	112	157	6	1.7~2.4
3.7~7.5	220	150	180	135	207	6	2.4
11~15	300	220	210	201	287	6.5	5.5

3.4 Technical parameter and specifiations

Form 3-1Explanation form of technical parameter and specifications

Items		Despription
Input	Rated voltage, frequency	Single-phase：220VAC 50Hz/60Hz 3-phase： 380VAC 50Hz/60Hz 460VAC 50Hz/60Hz
	Allowed range of working voltage	Voltage Virtual value：380/220V 20% Allowed voltage： 20% fluctuation; Frequency fluctuation： 20%
Output	Rated voltage	220VAC/380VAC
	Frequency output range	0.1 ~ 650.00Hz
	Rated Capacity/current	Please refer to lectotype form
	Temperature protection	Fan starts to operate when above 45°C, And trip to OH when 80°C .
Control and operation	Over-load ability	G type:150 %/minute; P type：130 % /minute B/Z type : 200 %/30S; 250 % instantaneous protection
	Control mode	Noninductive vector control / VF control /Output power(torque) control
	Governing range	1:100
	Starting torque	When be 0.50Hz is 150% of rated torque
	Frequency precision	Keyboard set：output frequency`s 0.01 %； Maxmum output frequency`s 0.2 %
	Frequency resolution	Keyboard set: 0.01Hz, Analog set: 0.1Hz
	Low-frequency torque compensation	0 ~ 30%
	Standard function	Speed tracking, pause deceleration, PID control, Automatic speed compensation, Automatic voltage output adjustment (AVR), 16 steps speed operation, Power(torque) control, Frequency jump, Simple PLC automatic operation, Up-Down control, Wobble frequency operation, Two-circuit signal superposition control, Automatic reset, Timer, Flip-flop
	Basic frequency	0.5 ~ 650.00Hz
	Acceleration and deceleration time	0.1～6553.0S continuation adjustment
	DC Braking	DC Braking voltage: 0～30% adjustment, allow 0.5～650Hz brakign. DC Braking time: 0.0～25S

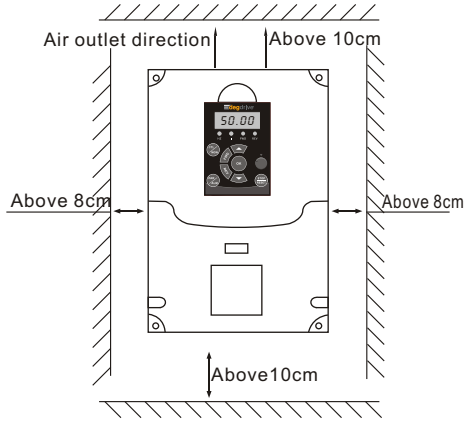
Items		Description
Control signal	Analog input	0～5V/10V，4～20mA，Set by Potentiometer
	Analog output	PWM signal output through be filtered ,and can set the PWM pulse output (10V)
	Digital input	6 groups of multifunction programmable digital input terminals , total 99 kinds of function are optional.
	Digital output	2 groups of programmable open-loop collector output, one group of programmable relay output . Total 94 kinds of function are optional.
Protection functiont	Standard function	Over-current,over-load, over-voltage, short-circuit protection , low-voltage protection ,over-heat protection Earthed fault protection. Motor over-heat .
Display function	LED display	Output power limited,Output frequency speed Conversion, DC bus-bar voltage, output voltage, temperature.
		Output current(value,%,% of motor current), Output power of power factor angle, Input power, Power coefficient, Chronograph time.
Communication	RS-485	Standard Built-in, one or more converters can be dynamic controlled by main computer at the same time.
Environment	Temperature around	-10～50℃(the maximum temperature rise of Radiator is 80°C), indirect sunlight.
	Altitude height	Lower than 1000 meters
	Humidity	20～90% RH，no water condensation
	Shaking	Below 0.5G
Structure	Protection grade	IP20
	Cooling way	Forced cooling
	Installation way	Wall hanging type.

4.1 Installation of frequency converter

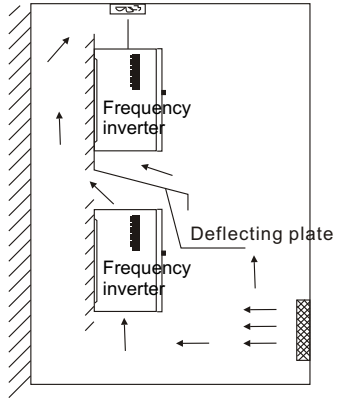
Forecd

Customers must install no-fuse or leakage Circuit breaker to protect the cicuit and avoid broaden the scope of accident because of fault of fault of product.

DGI6000 are wall hanging type, The drawing 4-1 shows the installation space and distance for singal converter . When install two converters up and down, shold select channelizing boarding. Showed by drawing 4-2 .



Drawing 4-1 Mounting space drawing



Drawing 4-2 Mounting drawing of multisets

Attehtion

- The higher ambient termperature is, the shorter frequency converter`s life is.
- If there has thermal device near frequency converter, please remove away. And if frequency converter is installed inside a case, should consider the verticality and space.

Warning

- Do not use the product with failure or lack components
- Make sure the cables are connected securely with the main-circuit terminals, or else would cause damage to the poduct because of poor cantact .
- The earth terminals of frequency converter must be reliable ground connection .In case of the affect from anti-interference of earth resistant, several frequency converters should be earthed by one point.

4.2 Dismounting and Installation for spare parts

4.2.1 Dismounting and installation for operation key-board

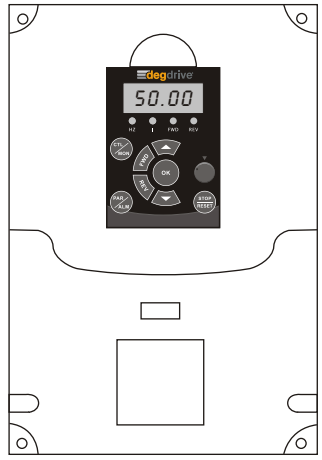


Diagram 4-3 Dismounting diagram of the operation key-board

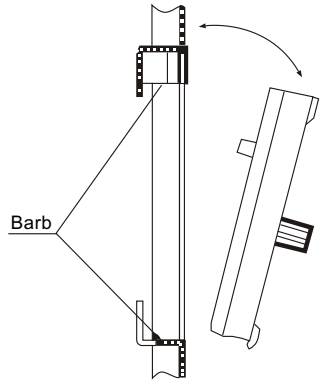


Diagram 4-4 Installation diagram of the operation key-board

1. Dismounting:
Put the middle finger or the forefinger into the finger insert hole on the operation key-board, press the topping leaf spring, and then pull out. The key-board can be dismounted. See the Diagram 4-3.
2.Installation
Put the bottom of the operation key-board on the installation claws, which is under the installation slot of the operation key-board. Press the topping leaf spring and push inside with the middle finger. Loosen the finger after a sound of “ka” , the key-board is installed. See the Diagram 4-4

4.2.2 Dismounting and installation of the Cover (Diagram 4-5)

Diagram 4-5 Dismounting and Installation Diagram of the cover

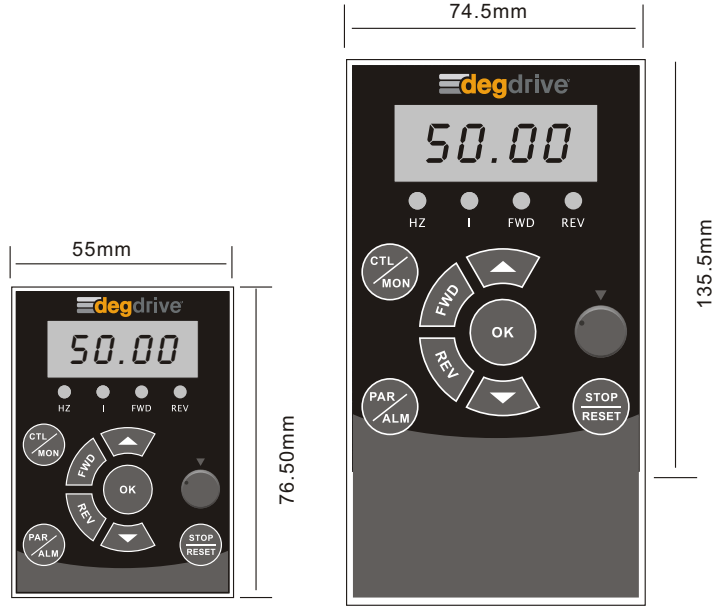
1、Dismounting：

Dismount the two screws under the cover, pull down the cover until drop off.

2、Installation：

Align the hooking on the cover and the installing month under the casing panel, then clip in. Push up the cover tightly, screw up the screws at last.

4.2.3 Installation dimenstions of operation key-board



Reminding

• Please visit our web-site at **www.degdrive.com** to get more information about the installation dimensions and technical specifications of the all series of DGI6000 frequency converter .

4.3 The wiring of frequency converter

4.3.1 Attentions


Danger

- Only 10 minutes after the power source be cut off completely, then allowed to open the cover of converter.
- Ensure the charging lamp at the under riht corner of main-circuit terminals has been went out. Only the voltage value between main-circuit terminals P+, P- is under 36VDC, then allowed to do the innter wiring.
- Only the special and trained persons would do the Inner wiring for frequency converter.


Forbidding

- Besides terminals RY2、RY3、RY1, Strictly forbid to connect other control terminals with 220V power source, otherwise would make the converter breakdown.
- Declare again , could not connect the AC power source to output terminals U,V, W .


Warning

- Check whether the rated input voltage is the same as power source voltage. Or else would damage to frequency converter.
- Install in proper order, install the main body first,and then do wiring ,in case of electric shock or damage to frequency converter.
- The product has been through pressure test, customer could not do test again.
- Customers must install no-fuse or leakage Circuit breaker to protect the cicuit and avoid the broden the scope of accident because of fault of fault of product.
- Must connect the earth terminal of frequency converter and ourter case of motor to the earthed line. The earthed line should be copper coil,section should larger than 4mm2 , and earthed resistance must less than 10Ω.

4.3.2 Explanation of Main-circuit terminals and wiring

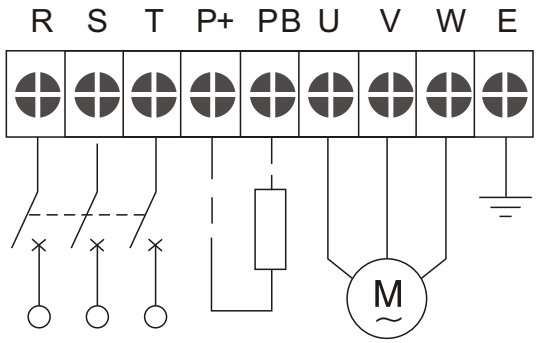
Form 4-2 Function Explanation of main-circuit terminals

Terminal code	Function explanation
R、S、T	AC power source input terminals, connect to 3-phase 380V AC power source (T)
L、N	AC power source input terminals, connect to 1-phase 220V AC power source (S)
U、V、W	Frequency Converter output terminals,connect to 3-phase AC motor
P1, P+	Connection terminals of DC Reactor,one end to P1,and another end to P+
P+、P-	Connection terminals of braking groups.The anode to P+,and cathode to P-
P+、PB	Connection terminals of outboard braking units. One end to P+, another end to PB.
E ⏚	Earthed terminal

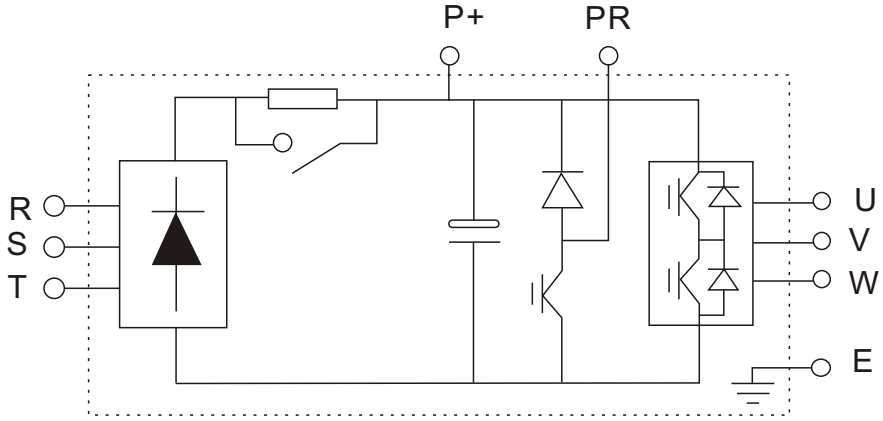

Reminding

*1 is DC Reactor;
*2 is outboard brake resistant ;
*3 is outboard braking groups

4.3.3 Main-circuit Terminals

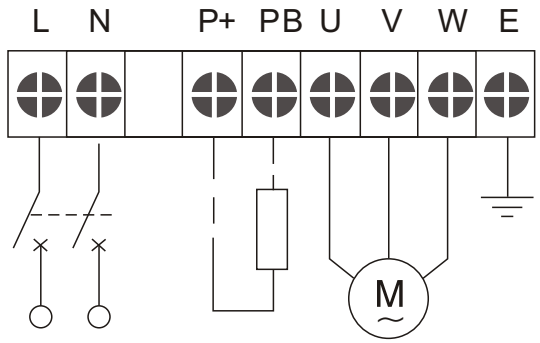


3-phase 380VAC AC-power sourcec

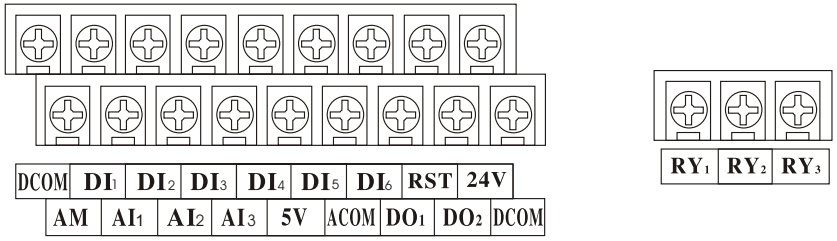


Drawing 4-6 Main-circuit terminals of D75GB~015GB units

4.3.4 Control-circuit terminals



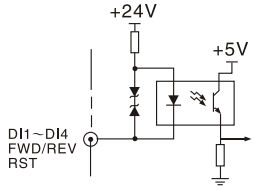
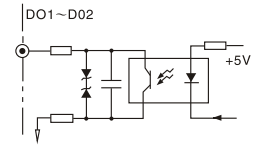
1-phase 220VAC AC-power sourcec

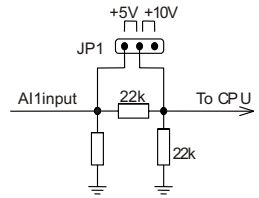
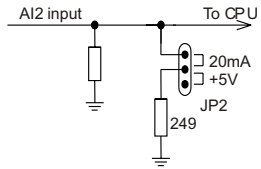
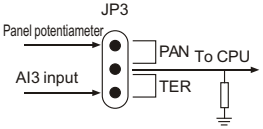
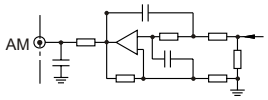


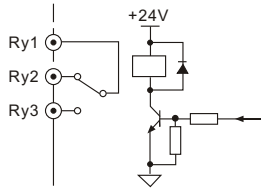
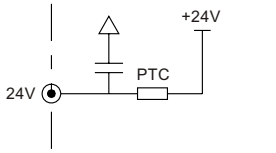
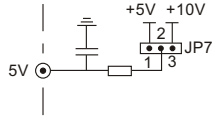
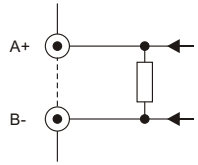
Drawing4-8 Control-circuit Terminals
(Matched units of D75GB～015GA)

4.3.5 Function explanation of Control-circuit Terminals

Form4-1 Function explanation of Control-circuit Terminals

Type	Terminal Code	Function Explanation	Specifications	Inner Circuit
Operation control terminal	DI5(FWD)	When DI5(FWD)~DCOM are short-circuit is forward running ,and when open-circuit is deceleration and stop (F003=73)	INPUT, 0～24V Level signal, low level signal is effect, 5mA	
	DI6(REV)	When DI6(REV)~DCOM are short-circuit is reverse running ,and when open-circuit is deceleration and stop (F004=74)		
	RST	When RST～DCOM is short-circuit, the frequency converter will reset and stop		
Multi -function digital input terminals	DI1	When DI(DI1、DI2、DI3、DI4)~DCOM are short-circuit is effect, and the function set by F041~F044	INPUT, 0～24V Level signal, low level signal is effect, 5mA	
	DI2			
	DI3			
	DI4			
Digital output terminals	DO1	Multi-function programmable collector is open-circuit and output 2 circuits. Programmable defines as multifunction switch output terminal	OUTPUT, Maxmum load current I≤50mA	
	DO2			

Type	Terminal Code	Function Explanation	Specifications	Inner Circuit
Analogy input And output terminal	AI1	Analogy signal input, reference place is ACOM (Ex-factory value is 0V~10V)	When JP1 choose 0V～+5V or 0V 10V DC voltage, JP1 desides the source of input terminal AI1	
	AI2	Analogy signal input, reference place is ACOM (Ex-factory value is 0~20mA)	When JP2 choose 0V~+5V DC voltage or 0V~ 10V DC current, JP2 desides the source of Input terminal AI2	
	AI3	Analogy signal input ,reference place is ACOM (Ex-factory value is potentiometer on the panel)	INPUT, 0～+5V DC Voltage or panel potentiometer, JP3 decides the source of input terminal AI3	
	AM	Multifunction programmable analogy voltage output, reference place is ACOM.	OUTPUT, 0～10V DC voltage.The output voltage of AM terminal is the PWM wave which is from CPU.The output voltage value varies directly as the width of PWM wave	

Type	Terminal Code	Function Explanation	Specifications	Inner Circuit
Relay output terminal	Ry1	The function of RY1、RY2、RY3 defined by their parameter separately, please refer Item F047 of this manual	Rated value of contact：250VAC-3A（COS ϕ=1）250VAC-1A（COS ϕ=0.4）30VDC-1A	
	Ry2			
	Ry3			
Power source interface	24V	24V is common source for circuits of digital input terminals	24VDC-100mA	
	DCOM	DCOM is earth terminal of digital signal input terminal		
	5V	Power source output, can be used as outer analogy supply source	5VDC	
	ACOM	The earth terminal of power source		
Communic-ation interface	A+	RS485 signal ＋end	Standard RS485 signal	
	B-	RS485 signal-end		

4.3.6 Interface distribution of control panel and jumper-wire set

Before using the frequency converter, should correctly set all jumper-wiring terminals on the control panel, and make sure every connection to interface fixed. The functions of jumper-wiring terminals are as the following ,and refer to the real unit.

1. JP1 decides the characteristic of terminal AI1

   If the outer analogy voltage is 0～10V input, please use input terminal AI1, and choos the JP1 to position +10V.

   If the outer analogy voltage is 0～5V input, please use input terminal AI1, and choos the JP1 to position +5V.

【Attention】The ex-factory value of AI1 is set as +10V

2. JP2 decides the characteristic of terminal AI2

   If the outer analogy voltage is 0～5V input, please use input terminal AI2, and choos the JP2 to position +5V.

   If the outer analogy current signal is 0～20mA input, please use input terminal AI2, and choos the JP2 to position 20mA.

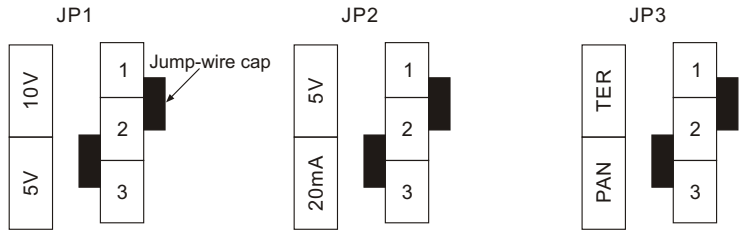
【Attention】The ex-factory value of AI2 is set as 20mA

3. JP3 decides the characteristic of terminal AI3

   If you use the keyboard potentiometer, please choose JP3 to PAN position

   If the outer analogy voltage is 0～5V input, could use input terminal AI3, and choos the JP3 to position TER. (TER is for short of “terminal”)

【Attention】The ex-factory position of AI3 is PAN (PAN is for short of “panel”)



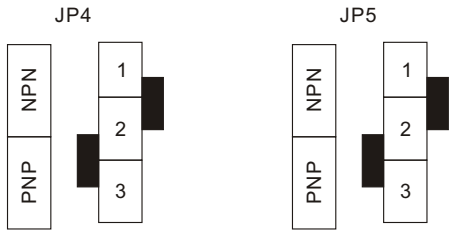
Jump-wire set of analogy input terminal

4. JP4 decides the characteristic of digital input terminal （DI1～DI4）and operation control command DI6（REV）、REV

When JP4 （1～2）is short-circuit, the characteristic is NPN: effect When digital input terminal and DCOM terminal are close.

When JP4 （2～3）is short-circuit, the characteristic is PNP: effect When digital input terminal and 24V terminal are close.

【Attention】The ex-factory definition of JP4 is NPN type, that is, DCOM is commom terminal of digital input



Jump-wire of digital input terminal characteristic

5. JP5 decides the characteristic of digital output DO1、DO2 terminal

When JP5（1～2）is short circuit, characteristic is NPN: DO1、DO2 terminal is effect to 24V.

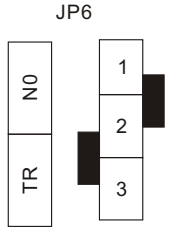
When JP5（2～3）is short circuit, characteristic is PNP: DO1、DO2 terminal is effect to DCOM.

【Attention】The ex-factory definition of JP5 is NPN type, that is , DO1、DO2 terminal is effect to 24V.

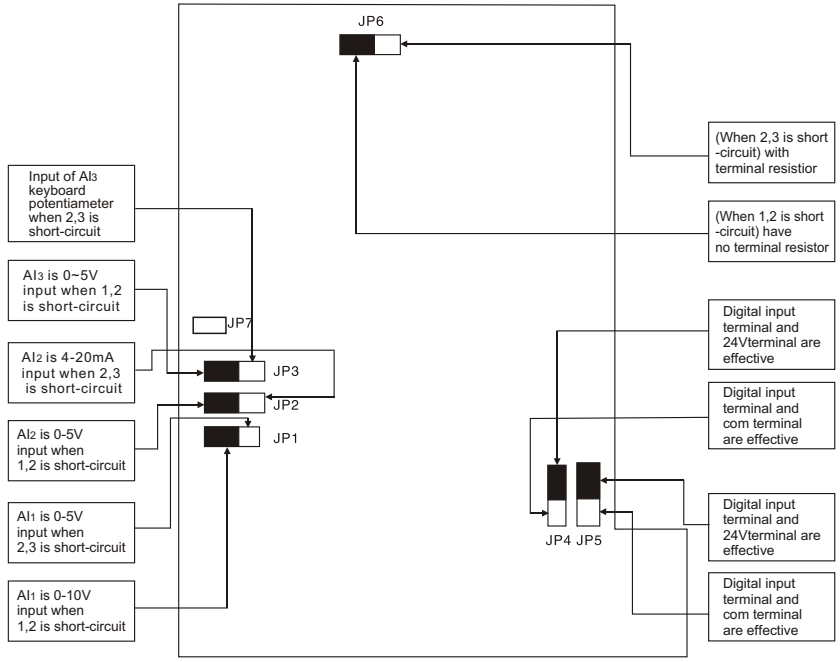
6. JP6 decides the characteristic of terminal resistor

When JP6（1～2）is short-circuit, with terminal resistor

When JP6（2～3）is short-circuit, not with terminal resistor



Jump-wire terminal resistor option

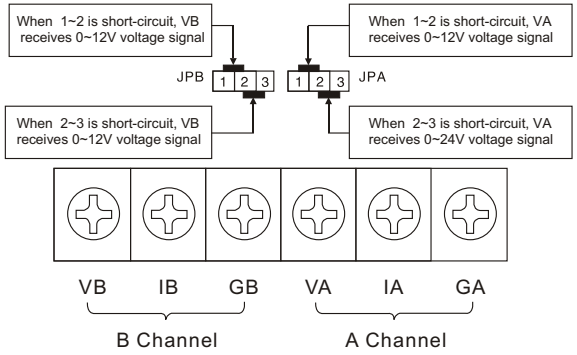


Drawing 4-14 Interface distribution of control panel and jumper-wire set

4.3.5 Hardware reset terminal (RST)

The hardware structure of RST input terminal is similar with DIn（n=1~4）. RST is used for frequency converter to reset.In any situation (JP4 is NPN type),when RST and DCOM is short-circuit, will force the frequency converter to reset .(If JP4 is PNP type, RST and 24V short circuiting is effect.)

4.3.6 The explanation of special purpose interface plate of Injection molding machine



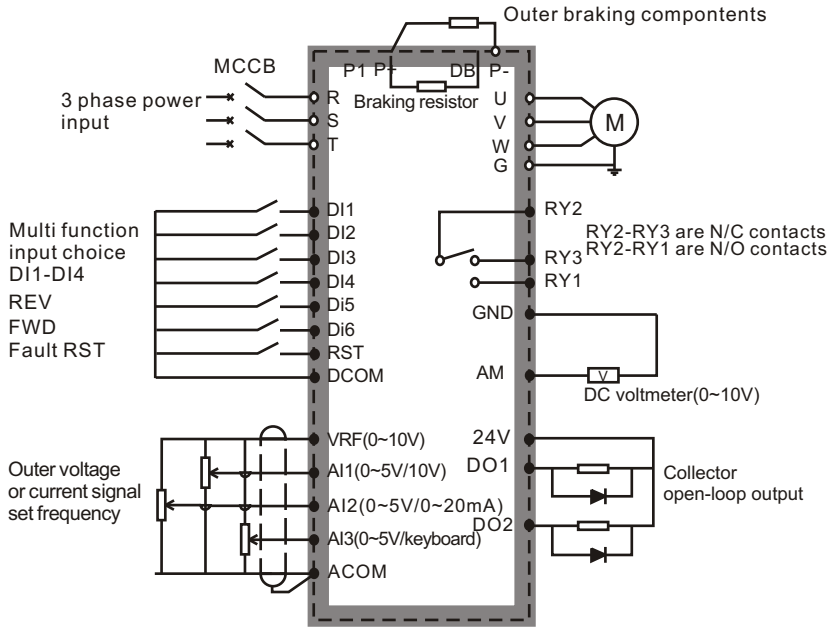
Drawing4-9 The platelet byway and jumper-wire of injection molding machine

Form 4-2 The function of injection molding machine platelet

Terminal function	I_A, I_B	0～1A Current signal input
	V_A, V_B	0～12V/0～24V Voltage signal input
	G_A	The reference place end of Voltage input V_A, and current input I_A
	G_B	The reference place end of Voltage input V_B, and current input I_B
Jumper wire set	JPA	V_A 0～12V/0～24V Optional 1-2 short-circuit with 0～12V 2-3 short-circuit with 0～24V
	JPB	V_B 0～12V/0～24V Optional 1-2 short-circuit with 0～12V 2-3 short-circuit with 0～24V

In any case, one channel could only receive one signal. For example, channel A could not receive current signal if it has received voltage signal. But this current signal could be received by channel B. Therefore, when channel A and B input two circuits signal, there are 4 kinds of combination ways : voltage & voltage, voltage & current, current & current, current & voltage .

4.4 The Basic wiring drawing of frequency converter

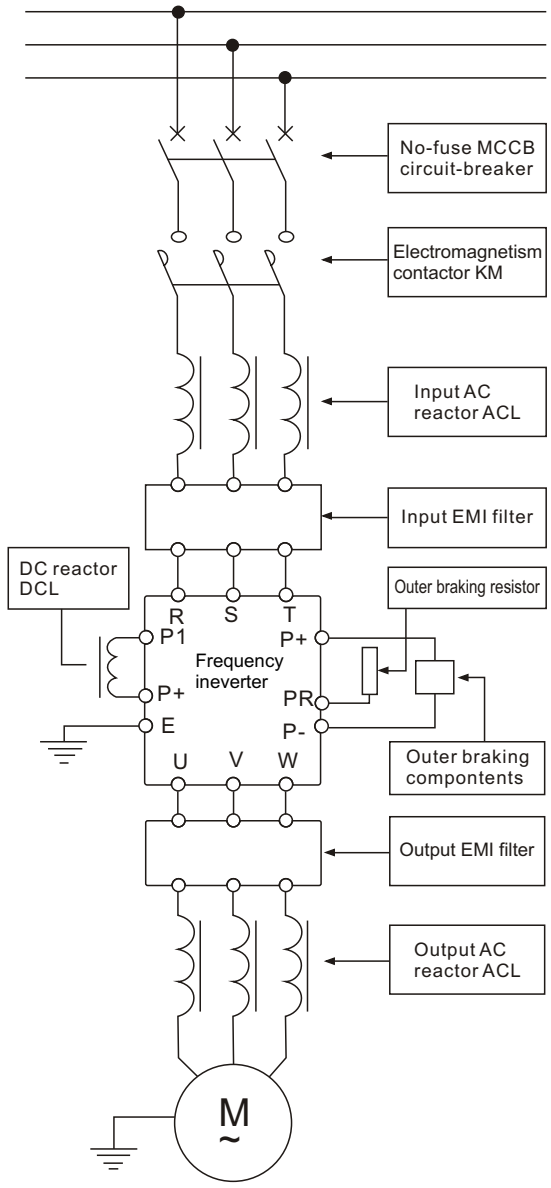


Drawing 4-10 Basic wiring drawing

Reminding

- If the load connected to the open-circuit output terminal of collectoris inductive load(likes relay coil), must connect fly-wheel diode in parallel to both ends of the load.
- The distance between the control-wire inside frequency converter or control cabinet and power cable should be 100mm at least, and on no account could these two lines be put into the same wire-trough. If the signal line must pass through power cable, should make the two lines quadrature(90° included angle). The control lines must be STP,and the shielding layer must connect with GND of terminal. The power cable had better be steel armoured shielded cable.
- The frequency coverter would have harmful effect to other electric equipments or meters in the same situation because of its stronger electromagnetic interference(EMI).In order ot reduce this EMI, could put the output cable of frequency converter into the earthed metal pipeline,or could use steel armoured shielded cable and connect the shielding layer to ground. Or,add a set of EMIFIL on the ouput cable .

4.5 The system wiring drawing of frequency converter



Drawing4-11 The connection between frequency converter and optional spare parts

Reminding

- Circuit breaker has function of over-current protection, and avoid the fault of following connected equipments extend. Please note the capacity when install the circuit breaker.
- Electromagnetic contactor is used to cut off the main power source when frequency converter in trouble,and prevent power-fail or restart after fault.
- Input AC Reactor could reduce influence caused by 3-phase unbalanced, raise the input power factor of frequency converter, and reduce the damage to rectifier circuit when the frequency converter connects with large-capacity motor. If the following situation happen,it is necessary to match the AC Reactor:

① The degree of unbalancedness of power source over 3%

② The capacity of power source is at least 500KVA,and more ten times than the capacity of frequency converter.

③The network voltage Suddenly changes because the power factor compensation capacitor switch on or off.

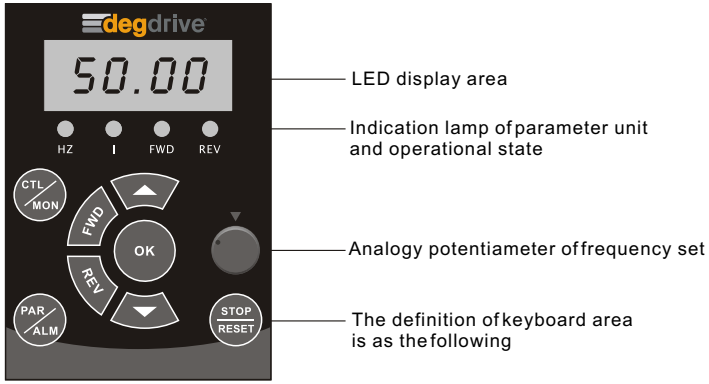
Advice to install the Reactor of 3%(Voltage dropping under the rated current)

- Input＆Output EMI filter is used to reduce electromagnetic or radio frequency interference (RFI) produced by electric network or frequency converter.
- Braking groups are used to consume the energy which is feedback from the load with large pontential or inertia to frequency converter, avoid the frequency converter tripping because of pump rising voltage overtop.Even it can stop motor quickly.
- Output AC Reactor could filter the higher harmonic component in the output current of frequency converter, and reduce the electromagnetic interference caused by higher harmonic. At one time, could improve the current waveform, reduce operating noise and termperature rise of motor,ensure the motor run steadily.Overmore,when the motor cable is longer, please install output reactor.

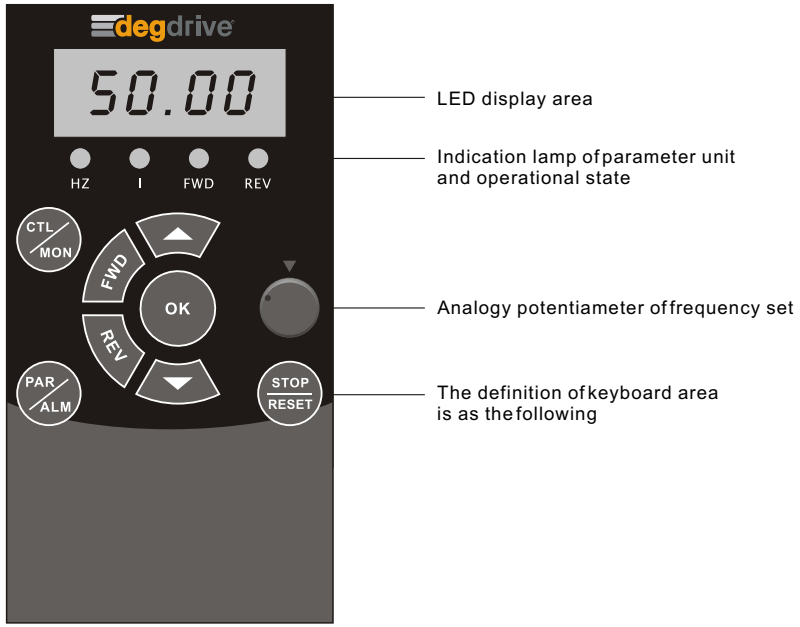
5.1 Operation Introduction

DGI6000 frequency converter supply kinds of operation and display methods for user.
Units below 5D5GB (includes 5D5GB) select DGI6000 KB001 keyboard.
Units above 7D5GB(includes 7D5GB) select DGI6000 KB002 keyboard.
See the pictures of 5-1、5-2、5-3

5.1.1 Introduction of Keyboard



Picture5-1 Plan of DGI6000 KB001 keyboard



Picture5-2 Plan of DGI6000 KB001 keyboard

5.1.2 The explanation of function keys

CTL/MON	Press this key, could change over between CTL MODE and MON MODE
PAR/ALM	Press this key, could change over between Parameter amending mode(PAR MODE) and Fault display mode(ALM MODE)

FWD	When be keyboard control mode(F039=0), The FWD key is effect
REV	When be keyboard control mode(F039=0), The REV key is effect
▲	Increasing key: Increasing of datas or parameter code
▼	Decreasing key: decreasing of datas or parameter code
STOP/RESET	Stop/Reset key: When be operating state, this key is for stopping operation; When be Fault display state （0- -）, be used to clear up fault, and reset; When Read/Write operation, press this key to move remending position
OK	Readout/write in key: for reading the parameter value or confirm the datas write-in effectly.

5.1.3 The function explanation of state indication lamp

- Hz： The lamp lighting when LED displays data of frequency
- I： The lamp lighting when LED displays data of current
- FWD： The lamp lighting when frequency converter is forward running.
- REV： The lamp lighting when frequency converter is reverse running.

5.1.4 The operational mode of keyboard

There are 4 kinds of operational mode:

①Control operating mode

- Press “ CTL/MON ” key, Could choose one operational mode between “Control operating mode” and “Monitor operating mode”.
- When “Hz” and “I” LED is not lighting, means “Control operating mode”. The user could control the running direction of frequency converter and adjust the operation frequency.
- When the jumper-wire JP3 of V3 is at the PAN position, and F040 frequency is set as 25, means adjust speed by keyboard potentiometer.

Function of pressing keys：

FWD For controlling forward running of frequency converter

REV For controlling reverse running of frequency converter

STOP/RESET For stopping frequency converter

When F040=3 or 8, change the operational frequency directly by pressing key.

When F040=8, the set frequency write in F000 directly.

OK Key，Read out information of F000.(Minimum value is set value of F016)

STOP/RESET Key，For moving the cursor.

▲ Key, to raise the operational frequency or change the information read out by F000

▼ Key，to reduce the operational frequency or change the information read out by F000

②Monitor operating mode

- Press " CTL/MON " key, Choose one mode between "control operating mode" and "onitor operating mode" By "onitor operating mode" user could monitor two kinds of data (such as,operational frequency " Hz" utput current "I" easily, and could control the forward running, reserve running and stopping of frequency converter.
- When lamp of "HZ" lighting,the frequency converter is "Monitor operating mode" and the LED display shows "Hz" information.(Or choose other information decided by F099. Introducted in Chapter 6.2).
- When lamp of "I" lighting,the frequency converter is "Monitor operating mode" and the LED display shows "I" information.(Or choose other information decided by F098. Introducted in Chapter 6.2).

Function of pressing keys :

FWD Key, For controlling forward running of frequency converter

REV Key, For controlling reverse running of frequency converter.

STOP/RESET Key, For stopping frequency converter

Key, Choose "Hz" or "I" information

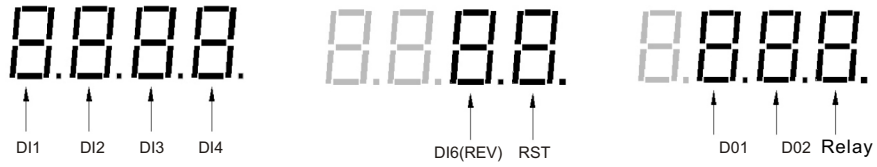
Key, Choose "Hz" or "I" information

5.1.5 Using of operation keyboard

① Change the parameter value of function code (change the parameter value of F002 from 10S to 5S)

Operation step	LED display	State indication
Mode before operating	0.00	HZ、I lamps go out
Press PAR/ALM key one time	F000	HZ、I lamps light
Press ▲ key to F002	F002	HZ、I lamps light
Press OK key one time (read out)	10.0	HZ、I lamps light
Press ▼ key to 5.0	5.0	HZ、I lamps light
Press OK key one time (write in)	5.0	HZ、I lamps light
Press CTL/MON key return to control operating mode	0.00	HZ、I lamps go out

② The correspondence between the displayed code of parameter F063、F064、F065 and the state of outer input output terminals is as the following:



0: means terminal input is inefficient.

1: means terminal input is availability.

5.2 Simple operating

5.2.1 Frquency converter reset and set the ex-factory value of parameter

- If the frequency converter is used for the first time, you could initialize the data to ex-factory value if you are not sure about the parameter value.
- First set F094 = 1, then change to ALM mode, shows "0. - -" . Press STOP key, and could recover the ex-factory value. Or, set F094 = 1, connect RST terminal to COM terminal, then frequency converter would reset and recover to ex-factory value.

Reminding

- After initializing data, please refer to the parameter form on Chapte 6 for the ex-factory value.
- If parameter type is **R/W**, would recover to ex-factory value.

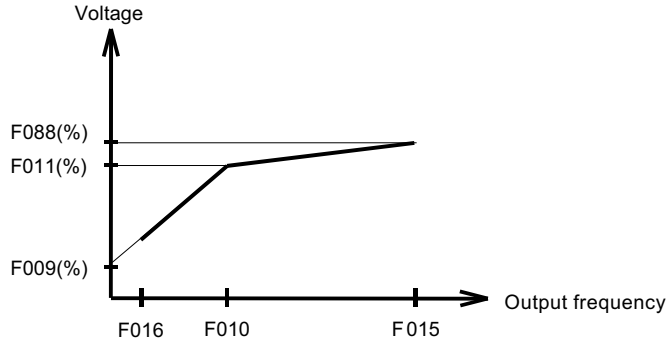
5.2.2 Set the parameter of motor

Before starting up frequency converter, must

1.Set parameter of V/F curve .(refer to the function description of F009、F010、F011、F015、F016 and F088 at the page____of this manul , or refer to the set form of fixed V/F curve at the page_____of this manual)

2.Set rated capacity of motor:

F078 = 100 % * (rated current of motor) / (rated current of frequency converter)



Reminding

· Execute the parameter auto-tuning function ,would set F009 automatically.

5.2.3 Parameter Auto-tuning

DGI6000 could automatically examine the characteristic of motor and set its relational parameter. Before executing the parameter auto-tuning function, need to set the following parameter:

F001: Acceleration time

F002: Deceleration time

F010: Rated frequency of motor (50.00Hz)

F011: Rate voltage of motor % (The voltage when motor running with rated frequency)

F015: Upper limit frequency , ≥F010

F068: Noninductive vector voltage compensation , set as "0.0"

F078: Rated capacity of motor(%) = (rated current of motor/rated current of frequency converter)

F088: Maximum output voltage (voltage when motor running with upper limit frequency)

Parameter auto-tuning

1.Set F094 = 155

2.Press PAR/ALM key to enter "0.- -" , then press STOP/RESET key, frequency converter executes parameter auto-tuning function.

5.2.4 The parameter set of auto-tuning

After executing parameter auto-tuning, the following parameter should be set automatically according to tuning result

F009: Torque hoisting set

F067: Operating mode optional

If auto-tuning be successful, set F067 as "3" ,choose noninductive vector mode.

If auto-tuning be fail, set F067 as "1" ,choose standard V/F mode.

F068: Noninductive vector voltage compensation coefficient.

If auto-tuning successful, F068 is for noninductive vector voltage compensation

F069: Noninductive vector frequency compensation coefficient.

If auto-tuning successful, F069 is for noninductive vector frequency compensation

5.2.5 Gain adjustment

When auto-tuning is wrong or need more exact compensation, users could remend F069 according to description of 5.2.5.1 and 5.2.5.2

Reminding

· Parameter F069= F1 . F2 is divided to two coefficients of F1,F2 by the base point

5.2.5.1 F1: Low-voltage phase compensation coefficient

Set F067 = 1 and F054 = 3 to make the motor run under 5% low-frequency(for example: F010=50Hz，5%=2.5Hz), read out the power angle of this frequency (POWER ANGLE φ), and account the value of F1 according to F1=50/tan（φ）

5.2.5.2 F2: High-speed load compensation coefficient

Set F067=3 to make the motor run under 50Hz high-speed, use tachometer to measure the speed change when no-load and full-load, then adjust F2 value to reduce the speed change caused by load change.

5.2.6 Monitor the operating state of frequency converter

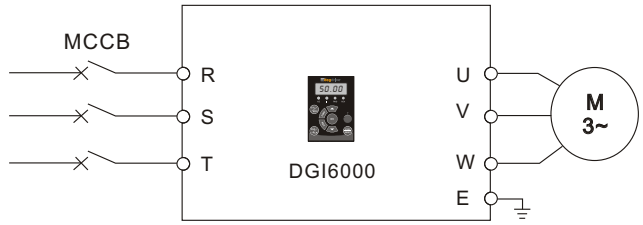
- Parameter F099 and F098 are for selecting the parameter needed be monitored.
- First inter MON MODE, when any lamp of Hz and I lamps lighting, frequency converter is in Monitor mode. Under this mode, could monitor either two parameter value.
- "▼" And "▲" keys are for choosing the parameter needed to display
- When both Hz and I lamps are out, frequency converter is in CTL MODE.

5.2.7 Wiring, and checking before electrifying

Wiring,and check power source normally,close the circuit breaker and electrify the frequency converter.The display will first show "2000" ,as following is frequency value "0.00" ,this moment frequency converter finishes initializing. If the keyboard could not display ,it means electrifying is fail, please open the circuit breaker and check the reason. Drawing 5-3 is simple operating wiring.

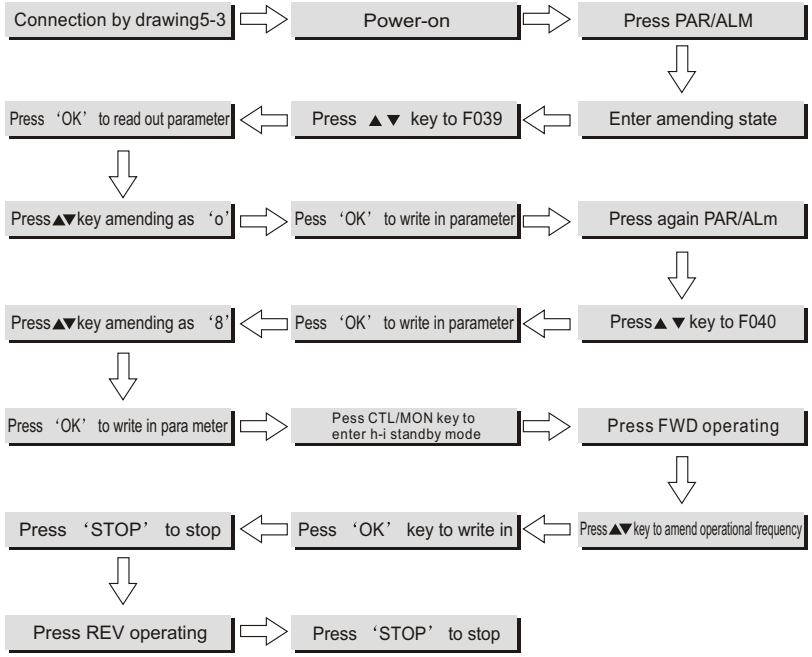
Warning

• Please cut off power source when checking, in case of electric shock



Drawing5-3 simple operating wiring

5.2.8 Operate on the keyboard to set frequency, FWD/REV running, start or stop



5.2.9 After simple operating, please check as following

- Whether the motor running direction is right;
- Whether the frequency converter trips when deceleration or acceleration running;
- Check whether speed and frequency value are right when motor runs;
- Whether any unormal vibration or noise happens to motor;

If the above situation happens, please adjust according to the Manual or get help .

Reminding

Kinds of often used control ways and paratmeter set

1.Use Keyboard panel to opearate stopping , F000 set frequency :

1)Parameter set：set F039 as 0.0 set F040 as 0.08

2)Start & stop： press “FWD” is forward running，press “REV” is reverse running，press “STOP” key to stop frequency converter.

3)Frequency set： Change value of F000 under the Control mode to change the frequency .

2.Use Keyboard panel to operate stopping, keyboard potentiometer set frequency :

1)Parameter set ：set F039 as 0.0 Set F040 as 25.08

2)Start & stop：Press “FWD” key is forward running，press “REV” key is reserve running，press “STOP” key to stop frequency converter.

3)Frequency set： Turn the potentiometer on keyboard to change frequency.

3.Use control terminals to operate stopping, connect external potentiometer speed adjustment.

1)Parameter set：set F039 as 2.0 set F040 as 1.08

2)Start & stop：When FWD ~ COM closing is forward running，when REV ~ COM closing is reserve running. When FWD ~ COM or REV ~ COM opening is stopping.

Frequency set：The frequency changes as voltage between AI1 and GND changes.

6.1 Simple list of function parameter

6-1 Parameter list of DGI6000 general type of frequency converter

Funcion code	Name	Set range	Minimum unit	Ex-factory set	Type
F000 Page51	Main speed frequency set	0.00Hz ~ 650.00Hz	0.00Hz	50.00Hz	R/W
F001 Page51	Acceleration time	0.1 ~ 6553.0S	0.1S	10.0S	R/W
F002 Page51	Deceleration time	0.1 ~ 6553.0S	0.1S	10.0S	R/W
F003 Page51	FWD（DI5）Input terminal function option	0 ~ 99	0	73	FR/W
F004 Page51	REV（DI6）Input terminal function option	0 ~ 99	0	74	FR/W
F005 Page52	Stopping DC braking original frequencty	0.50 ~ 650.00Hz	0.50Hz	5.00Hz	R/W
F006 Page52	Stopping DC braking voltgae	0 ~ 30 %	0	5%	R/W
F007 Page52	Action time of stopping DC brake	0.0 ~ 25.0S	0.0	1.0S	R/W
F008 Page52	Delay-time of stopping DC brake	0.0 ~ 1.0S	0.0	0.5S	R/W
F009 Page53	Torque hoisting set	0 ~ 30%	0	3%	FR/W
F010 Page53	Motor rated frequency	0.50 ~ 650.00 Hz	0.50 Hz	50.00 Hz	FR/W
F011 Page53	Motor rated voltage	30 ~ 100%	30 %	100 %	FR/W
F012 Page54	Maximum carrier-wave frequency/ turning point of carrier-wave Frequency	2.0 ~ 16.9 KHz	2.0 KHz	Type set	FR/W
F013 Page55	String interval of Modbus	3 ~ 250ms	3ms	3ms	FR/W
F014 Page55	Temperature examining form set	0.0 ~ 999.9	0.0	440.8	FR/W
F015 Page55	Upper limit frequency	0.50 ~ 650.00 Hz	0.50 Hz	50.00 Hz	FR/W

Funcion code	Name	Set range	Minimum unit	Ex-factory set	Type
F016 Page55	Lower limit frequency	0.00 ~ 650.00 Hz	0.00 Hz	0.00 Hz	FR/W
F017 Page55	Jumping frequency	0.00 ~ 650.00 Hz	0.00 Hz	0.00 Hz	R/W
F018 Page55	Range of jumping frequency	0.00 ~ 5.00 Hz	0.00 Hz	0.00 Hz	R/W
F019 Page56	Inching frequency	0.00 ~ 650.00 Hz	0.00 Hz	10.00 Hz	R/W
F020 Page56	Ac/deceleration time of inching frequency	0.1 ~ 25.0s	0.1s	10.0s	R/W
F021 Page56	Step 1 operating frequency	0.00 ~ 650.00 Hz	0.00 Hz	0.00 Hz	R/W
F022 Page56	Step 1 acceleration time	0.1 ~ 6553.0s	0.1s	10.0s	R/W
F023 Page56	Step 1 deceleration time	0.1 ~ 6553.0s	0.1s	10.0秒s	R/W
F024 Page56	Step 2 operating frequency	0.00 ~ 650.00 Hz	0.00 Hz	0.00 Hz	R/W
F025 Page56	Step 2 acceleration time	0.1 ~ 6553.0s	0.1s	10.0s	R/W
F026 Page56	Step 2 deceleration time	0.1 ~ 6553.0s	0.1s	10.0s	R/W
F027 Page56	Step 3 operating frequency	0.00 ~ 650.00 Hz	0.00 Hz	0.00 Hz	R/W
F028 Page57	Step 3 acceleration time	0.1 ~ 6553.0s	0.1s	10.0s	R/W
F029 Page57	Step 3 deceleration time	0.1 ~ 6553.0	0.1s	10.0s	R/W
F030 Page57	Stop way	0 ~ 1	0	0	R/W
F031 Page57	Forbidding REV	0 ~ 1	0	0	R/W
F032 Page57	Power factor/ filtering constant	50.00 ~ 99.99	50.00	85.20	FR/W
F033 Page57	Starting discharge braking circuit	0 ~ 2	0	0	R/W
F034 Page58	Restart after Low (over)voltage fault	0 ~ 1	0	0	R/W

Funcion code	Name	Set range	Minimum unit	Ex-factory set	Type
F035 Page58	over-current point of motor stall	10 ~ 200	10	200 %	R/W
F036 Page58	Intermit output time	0.1 ~ 5.0s	0.1s	0.5s	R/W
F037 Page58	Analogy output AM	0 ~ 17	0	0	R/W
F038 Page58	Analogy output AM gain	0 ~ 255	0	255	R/W
F039 Page59	Operating control way option	0.0 ~ 9.9	0.0	0.0	R/W
F040 Page72	Frequency set option	0.00 ~ 99.99	0.00	8.08	R/W
F041 Page61	Function option of Di1 input terminal	0 ~ 99	0	0	R/W
F042 Page61	Function option of Di2 input terminal	0 ~ 99	0	0	R/W
F043 Page61	Function option of Di3 input terminal	0 ~ 99	0	0	R/W
F044 Page61	Function option of Di4 input terminal	0 ~ 99	0	0	R/W
F045 Page61	Function option of open circuit collector output Do1	0 ~ 99	0	0	R/W
F046 Page61	Function option of open circuit collector output Do2	0 ~ 99	0	0	R/W
F047 Page61	Function option of relay output terminal	0 ~ 99	0	4	R/W
F048 Page61	Output current checking level	0 ~ 150%	0	100 %	R/W
F049 Page62	Frequency checking level	0.00 ~ 650.00 Hz	0.00 Hz	30.00 Hz	R/W
F050 Page62	Allowed range of frequency checking	0.00 ~ 25.0 Hz	0.00 Hz	5.0 Hz	R/W
F051 Page62	Action time of electronic thermal relay	0 ~ 120s	0	60s	R/W
F052 Page62	Poles of motor	2 ~ 12Poles	2Poles	4Poles	FR/W
F053 Page62	Proportion of gear wheel	0 ~ 250%	0	100 %	R/W

Funcion code	Name	Set range	Minimum unit	Ex-factory set	Type
F054 Page62	Monitor mode option	0～250	0	0	R/W
F055 Page63	Analogy convertr input signal option	0～250	0	0	R/W
F056 Page63	Analogy converter output information	0～1023	0		M
F057 Page63	Output frequency（Hz）	0.00～650.00 Hz	0.00 Hz	Hz	M
F058 Page63	Output speed （rpm）		0 rpm	rpm/ Krpm	M
F059 Page63	DC bus-bar voltage			Vdc	M
F060 Page63	Output voltage			Vrms	M
F061 Page64	Current and others state display				M
F062 Page64	Temperature of radiator	0～100℃		℃	M
F063 Page64	Digital input terminal state	0.0.0.0～1.1.1.1	0.0.0.0	0.0.0.0	M
F064 Page64	Control terminal state	0.0.～1.1	0.0.	0.0.	M
F065 Page64	Digital output terminal state	0.0.0～1.1.1	0.0.0	0.0.0	M
F066 Page64	Keep down				
F067 Page64	Operating mode option	0～4	0	1	FR/W
F068 Page64	Noninductive vector voltage compensation	0～30	0	10	FR/W
F069 Page66	Slippage compensation coefficient F1/F2	0.0～99.99	0.0	50.50 %	FR/W
F070 Page66	Analogy input gain	0.0～100	0.0	50 %	R/W
F071 Page67	Action time of TIMER	0.2～6553.0	0.2	5.0s	R/W
F072 Page67	Simple PLC auto-operating option	0～6	0	0	R/W

Funcion code	Name	Set range	Minimum unit	Ex-factory set	Type
F073 Page67	The first period time set of atuo-operating	0.1 ~ 6553.0s	0.1s	15.0s	R/W
F074 Page67	The second period time set of atuo-operating	0.1 ~ 6553.0s	0.1s	15.0s	R/W
F075 Page67	The third period time set of atuo-operating	0.1 ~ 6553.0s	0.1s	15.0s	R/W
F076 Page67	The fourth period time set of atuo-operating	0.1 ~ 6553.0s	0.1s	15.0s	R/W
F077 Page67	The fifth period time set of atuo-operating	0.1 ~ 6553.0s	0.1s	15.0s	R/W
F078 Page67	Rated capacity of motor	10 ~ 100 %	10	100 %	FR/W
F079 Page67	Restart way option	0 ~ 3	0	0	R/W
F080 Page67	Speed searching action level	10 ~ 200 %	10	150 %	R/W
F081 Page67	Deceleration when speed searching	0.1 ~ 25.0s	0.1s	2.0s	R/W
F082 Page67	Time of voltage recovering when speed searching	0.1 ~ 5.0s	0.1	0.5s	R/W
F083 Page69	IGBT protection time	2.0 ~ 25.0us	2.0us	3.0us	FR/W
F084 Page69	Input AC voltage	40 ~ 1000 V	40	380V	FR/W
F085 Page69	Rated current of frequency converter	0.5 ~ 3000.0 A	0.5	Type set	FR/W
F086 Page70	Gain adjustment of current displayed value	70 ~ 140	70	100	FR/W
F087 Page70	Gain adjustment of voltage displayed value	70 ~ 140	70	100	FR/W
F088 Page70	Maximum output voltage	30 ~ 100	30	100 %	FR/W
F089 Page70	Lowest value of Ai1 terminal input	0 ~ 1023	0	12	FR/W
F090 Page70	Maximum value of Ai1 terminal input	0 ~ 1023	0	1012	FR/W
F091 Page70	Lowest value of Ai2 terminal input	0 ~ 1023	0	12	FR/W

Funcion code	Name	Set range	Minimum unit	Ex-factory set	Type
F092 Page70	Maximum value of Ai2 terminal input	0～1023	0	780	FR/W
F093 Page71	Communication form/ Communication address	0.01～99.99	0.01	0.01	FR/W
F094 Page71	Data initialize	0～250	0	0	R/W
F095 Page71	Parameter write-protect	0～2	0	0	R/W
F096 Page71	Open special parameter set	0～1	0	0	R/W
F097 Page71	Software version			Type set	R
F098 Page72	Parameter needed monitor when I lamp lighting	0～99	0	61	R/W
F099 Page72	Parameter needed monitor when Hz lamp lighting	0～99	0	57	R/W

Reminding

- Parameter type R/W means this parameter is kept in EPROM and could be written and read .
- Parameter type FR/W means this parameter is special type controlled by factory, and is kept in EPROM and written and read. This parameter could not be changed only allowed by engineer.
- Parameter M means this parameter is for monitoring the state of frequency converter,and no any influence when be written.
- Parameter type R means this parameter is fixed constant.

6.2 Detailed explanation of parameter function

F000 Main speed frequency set	Set range：0.00 ～ 650.00Hz

F000 is the main operational frequency set inside the CPU. When F040 is set as “0”, this parameter is for frequency source.

Reminding

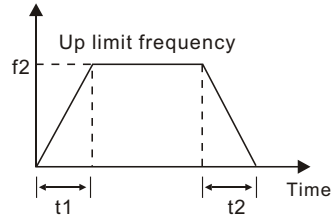
· When operational set is CTL mode,the information read out or written in always point to this parameter.

F001 Acceleration time	Set range：0～6553.0 S
F002 Deceleration time	Set range：0～6553.0 S

When F000 is assigned as operational frequency, the acceleration and deceleration time are assigned separately by F001 and F002.

Reminding

· Accerelation time is set as(The time of accerelation from 0Hz to upper limit frequency of F015), see t1 in the drawing 6-1.
· Deceleration time is set as(The time of output frequency from upper limit frequency of F015 to 0Hz. see t2 in the drawing 6-1).



6-1 Acceleration & deceleration time drawing

F003 FWD(DI5)Input terminal function option	Set range：0～99
F004 REV(DI6)Input terminal function option	Set range：0～99

F003 defines the function of digital input terminal DI5. Ex-factory is “73”, is defined as FWD function .
F004 defines the function of digital input terminal DI6. Ex-factory is “74”, is defined as REV function .

Reminding

• DI5,DI6 terminals is marked as FWD、REV .

F005 :Stopping DC braking original frequency	Set range：0.5～650.0Hz
F006 : Stopping DC braking voltage	Set range：0～30%
F007 : Action time of stopping DC brake	Set range：0.0～25.0 S
F008 : Delay time of stopping DC brake	Set range：0～1.0 S

Reminding

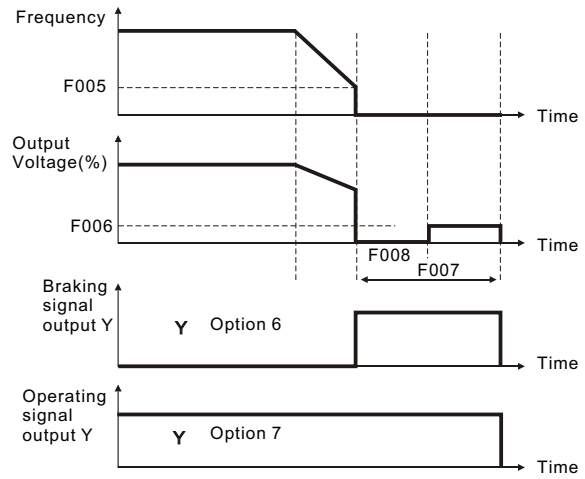
• This group of parameter is used to define the DC braking function when stopping. The DC braking function could supply zero-speed torque and be used to improve the accuracy of stopping,but not for deceleration braking under normal operating.
• If the DC braking voltage is over set, fault of over-current would happen to frequency converter easily when stopping.

F005： In process of stopping,if the output frequency is lower than stopping DC braking original frequency, the frequency converter would start up DC braking function. Inject direct current to motor and brake motor .

F006： When DC braking is started up, use the following formulat to define the percent of DC input voltage： **Output voltage = Rated voltage of motor F006**

F007： Means the continuous time of DC braking, and after this time,the DC braking voltage cancels rightly. When F007 is 0, the DC braking function is close when stopping.

F008： When deceleration braking,if output frequency is less than stopping DC braking original frequency, the output voltage would fall to the stopping DC braking voltage(F006).After the delay time of stopping DC braking (F008), would inject DC braking to motor.



The relation between frequency, output voltage and time when braking

F009 Torque hoisting set	Set range：0～30%

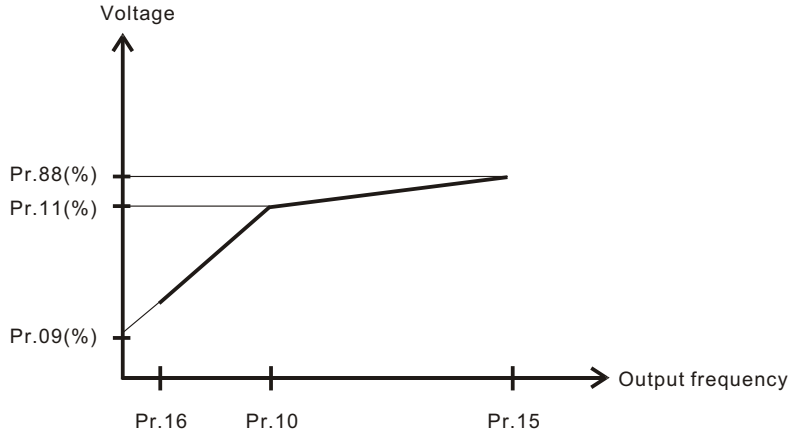
When output frequency is lower, this parameter decides the minimum output voltage to hoist torque.

Warning

Please use this parameter cautiously：
• After executing parameter auto-tuning,the torque hoisting would be set automatically.
• The effect of heat-radiation of motor which runs under low-frequency for long time would be poorer, and if torque hoisting set over high at this moment, may burn up motor .Please must use exterior forced radiation or derating application.
• For the application of energy-saving, should set the low limit frequency of F016, and check that the current should be Zero when frequency converter runs under 0Hz.

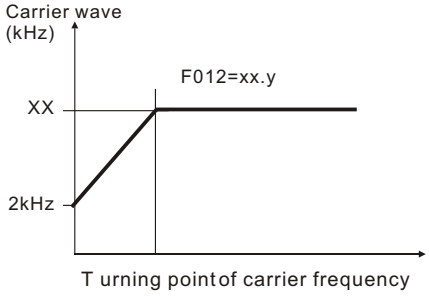
F010 Rated frequency of motor	Set range：0.50～650.00Hz
F011 Rated voltage of motor	Set range：30～100%

The two parameter define the rated frequency and voltage of motor.



F012 Max carrier frequency/ turning point of carrier frequency	Set range：2.0～16.9

F012=XX.Y,includes “XX” and “Y” two groups of parameter, XX defines the Max carrier frequency, Y defines the turning point of carrier frequency. The minimum carrier frequency is fixed as 2KHz. For example: F012=12.5, means the max carrier frequency is 12 KHz, and the turning point of carrier frequency is on operational frequency of 5.00Hz. The carrier frequency could be changed over automatically when running.



When operational frequency is more than the turning point of carrier frequency , carrier frequency would be the set value of max carrier frequency, otherwise the carrier frequency would adjust automatically between Max and Minimum carrier frequency according to the operational frequency.

Attehtion

- If carrier frequency be set over low, the output current form would be worse because the output current includes more high harmonic, and lead to noisy, more lossing and rising termperature to the motor. But the happened jamming and leakage current is little.
- Raise the set value of carrier frequency, could reduce noise of motor and improve the output current form. But the temperature of frequency converter will rise because of picked-up loss of power component switch. More leakage leads to strong jamming. If carrier frequency is over than ex-factory value, please make frequency converter derating used.

F013 Interval time of Modbus string	Setrange：3～250ms

When RS485 is defined as Modbus communication, this parameter defines the max interval time of communication string.

F014 Examining form of termperature set	Setrange：0.00～999.9

Users please do not remind this parameter without allowed , which may lead to fault of equipment.

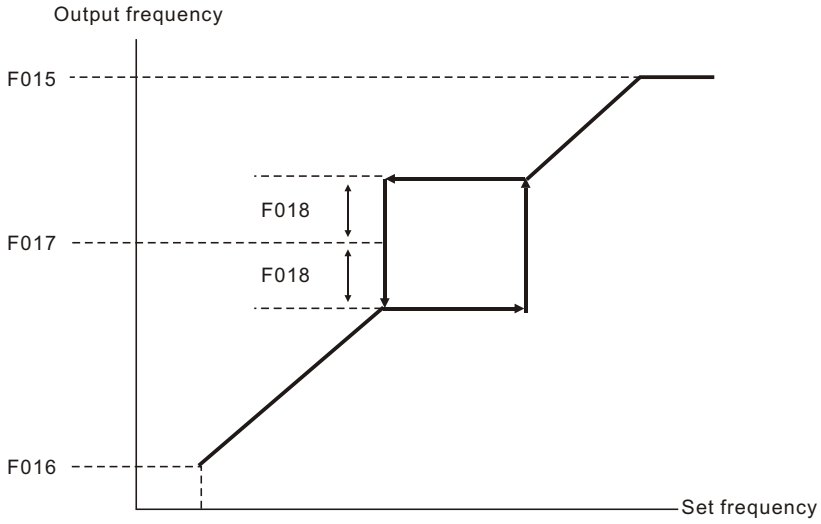
F015 Upper limit frequency	Set range：0.50～650.00Hz
F016 Lower limit frequency	Set range：0.00～650.00Hz

Upper limit frequency is Max output frequency within allowed range of frequency converter (refer to F010)

Lower limit frequency is Minimum output frequency within allowed range of frequency converter (refer to F010)

F017 Jumping frequency	Set range：0.00～650.00Hz
F018 Range of jumping frequency	Set range：0.00～5.00 Hz

Set F017 and F018 mainly to make frequency converter avoid from the resonance frequency point of loading.



F019 Inching frequency	Set range：0.00～650.00Hz
F020 Acceleration/deceleration time of inching frequency	Set range：0.1～25.0s

F019： This parameter decides the operational frequency when inching order asks for.
F020：This parameter decides acceleration/deceleration time when inching order asks for.

Reminding

• The inching frequency has the highest priority.
Inching frequency decides the operational frequency when inching order asks for. When inching order input, frequency converter would run under inching frequency according to the set inching acceleration/deceleration time.

F021 Step 1 operational frequency	Set range：0.00～650.00Hz

This parameter decides the operational frequency when the Step 1 speed is required.

F022 Step 1 accelereation time	Set range：0.1～6553.0s
F023 Step 1 deceleration time	Set range：0.1～6553.0s

This group parameter decides acceleration/deceleration time when frequency converter executes the step 1 order.

F024 Step 2 operational frequency	Set range ：0.00～650.00Hz

This parameter decides the operational frequency when the step 2 speed is required.

F025 Step 2 accelereation time	Set range：0.1～6553.0s
F026 Step 2 deceleration time	Set range：0.1～6553.0s

This group parameter decides acceleration/deceleration time when frequency converter executes the step 2 order.

F027 Step 3 operational frequency	Set range：0.00～650.00Hz

This parameter decides the operational frequency when the step 3 speed is required.

When applying PID function, please refer to the description of Chapter 8.

F028 Step 3 accelereation time	Set range：0.1～6553.0s
F029 Step 3 deceleration time	Set range：0.1～6553.0s

This group parameter decides acceleration/deceleration time when frequency converter executes the step 3 order.

F030 Stopping way	Set range： 0～1

0：When frequency converter receives stopping order, will reduce output frequency gradually according to the set deceleration form and time, stops up to 0Hz.
1：Frequency converter stops frequency output rightly when it receives stopping order. The loading stops freely according to mechanical inertia.

F031 Forbid reverse running	Set range：0～1

0： Frequency converter could both forward run and reverse run.
1： Frequency converter could only forward run , but not reserve run.

F032 Frequency factor/ filter constant	Set range：50.00～99.99

Parameter F032=aa.bb，be comparted by base point as two parameter. Normally do not need to amending this parameter.
aa：Power factor of motor set according to name plate of motor.
bb：Noninductive vector compensation filter constant.

F033 Starting discharging brake circuit	Set range：0～2

• When F033=0, discharging brake circuit could not act .
• When F033=1,the conditions of discharging brake circuit as the following:
a. Frequency converter must in running，and
b. Have no fault warning，and
c. Frequency converter is being deceleration，and
d. Frequency converter examine the voltage of DC bus-bar over 117%, will start up discharging braking module.
• When F033=2, the conditions of discharging brake action as the following:
a. Frequency converter must in running，and
b. Have no fault warning，and
c. Frequency converter examine the voltage of DC bus-bar over 117%, will start up discharging braking module.

F034 Reset after low(over)-voltage fault	Set range： 0～1

This parameter sets the reset function after low/over-voltage of frequency converter.
0：Frequency converter need to reset after recovering from low/over-voltage fault.
1：When input voltage is abnormity and causes fault trip,the frequency converter would stop output rightly , and will start up automatically after the latency time set by F036 when the voltage recovers to normal, then executes the speed trace ascertained by F079.

Reminding

- Should adopt speed trace function under this way(set F079 as 1,2,or 3), otherwise will lead to over-current/voltage protection.
- Please use the reset after outage function carefully, since this function may make frequency converter start up automatically when be discharged and be danger to persons and equipments.

F035 Stall over-current point	Set range： 10～200%

Frequency converter begins to execute auto-lowering speed to prevent motor stall, when the current overruns the percent of F035(frequency converter rate).

F036 Pause output time	Set range：0.1～5.0 S

When UP/OP warning happens or pause output be needed, F036 will define the least needed time of pause output, and after this time, frequency converter could be allowed to restart.

F037 Analogy output AM	Set range：0～17
F038 Analogy output AM gain	Set range：0～255

F037 choose the signal need output through AM terminal.
F038 is for adjusting size of AM signal.
Folloiwng form lists the types of signal could output through AM terminal

F037	Output signal of AM terminal	Output proportion
0	Output frequency	5V * F057/ (F015)
1	Keep down	
2	Voltage of DC bus-bar	5V * F059/ 1000
3	Output voltage	5V * F060 / (2 * F084)
4～6	Keep down	
7	PID output	AM=5V*（PID output）
8	PID+AI1 bias input	When DIn(54)ON，5V*(PID gain *(PID output +PID bias * AI1))，When DIn(54)OFF，5V*(PID output)
9	PID+AI2 bias input	When DIn（54）ON，5V*（PID gain *（PID output +PID bias *AI2））， when DIn（54）OFF，5V*（PID output）
10	PID+AI3 bias input	When DIn（54）ON， 5V*（PID gain *（PID output +PID bias *AI3））， when DIn（54）OFF，5V*（PID output）
11	PID+F028 bias input	When DIn（54）ON，5V*（PID gain *（PID output +PID bias * F028））， when DIn（54）OFF，5V*（PID output）
12	Could set output voltage	5V * (F038 / 255)
13～16	Keep down	
17	Radiator temperature	5V *(F062/100)

F039 Operating control ways option	Set range：0.0～9.9

- F039 is used to choose the types and ways that frequency converter receives operaiting or stopping command
- The most important step is choosing operating control ways before frequency converter beginning to start up.
- Operating control way option F039=a.b, contents two groups option of “a” and “b” to be one parameter. When DI1~DI4(like: DI1 is set as “89”) or DI1~DI4(like: DI1 is set as “90”) switch on, control order source option= “b”, orelse, control order source option= “a”.
  Please refer to addenda instruction.

F039=0	The control order of Forward/reverse running or stopping would be decided by keyboard controller.

• Press Forward key, frequency converter is forward running.
· Press REV key, frequency converter is reverse running.
· Press STOP key, frequency converter will stop operating.

F039=1	The control order of Forward/reverse running or stopping would be decided by the input state of FWD and REV terminal on the control terminals.

· FWD terminal decides operating or stopping of frequency converter.

· REV terminal decides running direction of frequency converter.

F039=2	The control order of Forward/reverse running or stopping would be decided by the input state of FWD and REV terminal on the control terminals.

· FWD terminal decides frequency converter forward running.

· REV terminal decides frequency converter reverse running.

F039=3	Similar as F039=1 mode, but first check FWD must be OFF state before starting up.
F039=4	Similar as F039=2 mode, but first check FWD and REV terminal must be OFF state before starting up.
F039=5	When choose commmunitation form of HPI6000, the operating and stopping order are controlled by RS485 communication

F040 Frequency set option	Set range：0.00～99.99

This parameter decides input source of operational frequency.

F040 = 0	Decided by numerical value of F000.
F040 = 1	Decided by input of AI1 JP1 decides（0～10V）or（0～5 V）
F040 = 2	Decided by input of AI2 JP2 decides（4～20mA）or（0～5 V）
F040 = 8	Directly decided by operation setter input.
F040 = 25	Keyboard potentiometer speed adjusting
F040 = 40	Decided by PID output

Reminding

• Refer to description of section 6.3 for detailed.

F041 DI1 terminal input function option	Set range：0～99
F042 DI2 terminal input function option	Set range：0～99
F043 DI3 terminal input function option	Set range：0～99
F044 DI4 terminal input function option	Set range：0～99

DI1、DI2、DI3、DI4、FWD and REV terminals are multifunction digital input terminals. The hardware and software function of above terminals are completely the same. When input terminal is open-circuit, they are in "OFF" state. And when input terminal and COM terminal are close(JP4 choose NPN), they will be "ON" state. Every input terminal could choose special function.

Reminding

• Refer to description of section 6.4 for detailed.

F045 Open-circuit collector output DO1 function option	Set range：0～99
F046 Open-circuit collector output DO2 function option	Set range：0～99
F047 Relay output terminal function option	Set range：0～99

Reminding

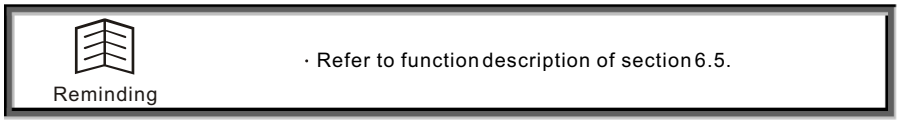
• Refer to description of section 6.5 for detailed.

F048 Output current detection level	Set range：0～150%

Define the detection level of current picker module group.

F049 Frequency detection level	Set range：0.00～650.00Hz
F050 Allowed range of frequency detection	Set range：0.00～25.0

This group of parameter applys in digital ouput function of SPE、SPA、SPZ、SPO



F051 Electronic thermal relay action time	Set range：0～120S

The frequency converter contents electronic thermal relay. This parameter defines over-load tripping time. If F051=0, the thermal relay does not act. If the rated capacitor of frequency converter more than motor`s, adjust parameter F078 to protect the motor exactly.

F052 Motor poles	Set range：2～12P
F053 Gear wheel proportion	Set range：0～100%

The set values of F052 and F053 are for computation of rpm(F058).
rpm=(120* output frequency(F057)/ motor poles(F052） * wheel proportion(F053)%

F054 Monitor mode option	Set range：0～250

Monitor mode(F054) uses to choose inner signal needed to monitor, and displayed in F061 parameter.
0：Output current Irms(Ampere)
1：Output current Irms(Rated percent of frequency converter)
2：Output current Irms(Rated percent of motor)
3：Power angle Φ(current phase delay angle)
4：Output power VA= $\sqrt{3}$ ×Vrms×Irms
5：Power factor PF=COS(Φ)
6：Watt（AC side）= $\sqrt{3}$×Vrms×Irms$_{\cos\Phi}$

7～9：keep down
10：Display the input power limit value set in advanced
11：Over-load accumulation level
32： Display time of timer when using timer function.

F055 Analogy plexer input signal option	Set range：0～250
F056 Analogy plexer output information	Set range：0～1023

F055	F056 Data contect after A/D transfer
0	Measured value of Vdc(DC bus-bar voltage)
1	Measured value of Iv
2	Measured value of Iw
3	Measured value of AI1
4	Measured value of AI2
5	Measured value of AI3
6	Measured value of temperature sensor
7	Keep down
8	When use RS485 communication interface to write in parameter, will display the waited-but-be not written stroke number of EPROM .
9～31	Keep down
32	When use COUNTER function, display counter value.

F055 chooses the signal channel needed be detected, then transfer this analogy signal to digital signal information by the 10-bit A/D converter of CPU ,and at last keep the transferred information into F056. The range of transferred information must within 0~1023.

F057 Output frequency(Hz)	Display range：0.00～650.00Hz
F058 Output rotate speed(rpm)	
F059 DC bus-bar voltage (Vdc)	
F060 Output voltage	

F061 Current and other state display	
F062 Temperature of radiator	Display range：0～100℃

F057～F062 are used to monitor the operating state of frequency converter.
F057： Display output frequency(Hz).Could read out the output frequency anytime.
F058： Display motor rotate speed(rpm).Output rotate speed could be computed by frequency F057, motor poles F052, Gear wheel proportion F053.

rpm=(120 * F057/ F052)* F053

When output rotate speed=10000rpm，The display form on operational panel is "xx.xx Krpm"
When output rotate speed=9999rpm，The display form on operational panel is "xxxx rpm"
F059： DC bus-bar voltage Vdc. Vdc is DC voltage Volt value measured from inner capacitor

Vdc = 1.414* Vac (input voltage)

F060： Output voltage Vrms. Vrms is root mean square value of frequency converter output voltage.
F061： Output current Irms or other information. Please refer to F054 parameter set.
F062：Temperature of Raditor
Display the centigrade degree of inner radiator. When temperature overruns 45℃,the fun operates continuely. And when be over 80℃,the frequency converter stops and display "OH" fault.

F063 Digital input terminal state	Set range：0.0.0.0～1.1.1.1
F064 control terminal state	Set range：0.0.～1.1
F065 Digital output terminal state	Set range：0.0.0～1.1.1

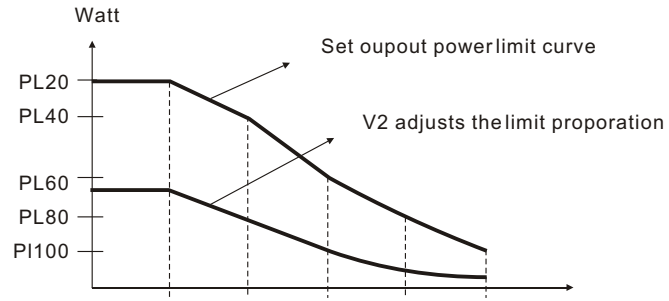
F063：Display DI1～DI4 digital input terminal state
F064: Display FWD and REV control terminal state
F065: Display DO1～DO2、RY1～RY3 Digital output terminal state
0： Means terminal input is unavailable
1： Means terminal input is available

F066 Keep down	
F067 Operating mode option	Set range：0~4

F067 could choose 3 kinds of operating mode
F067=0 and F067=2 **keep down**
F067=1 **Standard V/F mode**
Frequency converter output Sine PWM wave to motor, and sense AC output current, and compensate distortion produced by effect of dead time, reduce the torque buffeting of motor.
F067=3 **Noninductive vector mode**
Frequency converter operates under Noninductive vector control arithmetic system, supply extra torque compensation voltage. Could compensate slip because of load increasing.
F067=4 **Output power(torque) control mode**
The operation characteristic is similar with F067=1, when output power overruns the set upper limit, frequency converter would reduce automatically its output frequency.

Reminding

· Under this mode, F073～F077 defines output power limit curve which is controlled by AI2 or AI3.



Since auto-operating mode function is cancelled, must set F072 as "0".
PL20(F073)：is the output power limit value when output frequency is 20% of upper limit frequency(F015).
(output frequency=F015 * 20%)

PL40(F074): is the output power limit value when output frequency is 40% of upper limit frequency(F015).
(output frequency=F015 * 40%)
PL60(F075): is the output power limit value when output frequency is 60% of upper limit frequency(F015).
(output frequency=F015 * 60%)
PL80(F076): is the output power limit value when output frequency is 80% of upper limit frequency(F015).
(output frequency=F015 * 80%)
PL100(F077): is the output power limit value when output frequency is upper limit frequency(F015).
(output frequency=F015)
PL20~PL100 are all expressed as "W.n", the expression is : $PL = W \cdot 10^{n}$

For example: F015=60Hz, PL20(F073)=15.2, means the output power limit value is $Pl20 = 15 \cdot 10^{2}$=1500Watt when output frequency is 12Hz(60*20%)
Actual output power: compute according to $P(Watt) = \sqrt{3} \cdot Vout \cdot Iout \cdot \cos\phi$
The monitor of output current and power is descripted detailed in F054.

F068 Noninductive vector voltage compensation	Set range：0～30

F068 the compensation coefficient when frequency converter operates under Noninductive vector mode.

This parameter could be set by parameter auto-tuning function automatically, and normally no need to be remended. Please refer to parameter set of auto-tuning at 5.2.4.

F069 Slip compensation coefficient F1/F2	Set range：0.00～99.99

F069: Motor inner parameter of R1、R2、L1、L2 become to this parameter

F1： **Low-speed phase compensation coefficient**

Set F067=1 and F054=3, make the frequency converter operate under 5% lowe-speed (like F010=60Hz，5%=3Hz), read out power angle of this frequency, then compute F1 value according to F1=50/RY1n(ϕ).

F2： **High-speed load compensation coefficient**

Set F067=3，make frequency converter operate under 60Hz high-speed, use a tachometer to measure the speed change when no-load and full-load, and adjust the F2 value to reduce speed change caused as load change.

F070 Analogy input gain	Set range：0.0～100%
F071 Timer action time	Set range：0.2～6553.0 S

Reminding

· Please refer to function description of section 6.4.

F072 Simple PLC auto-operating option	Set range：0～6
F073 The first step time of auto-operating set	Set range：0.1～6553.0S
F074 The second step time of auto-operating set	Set range：0.1～6553.0S
F075 The third step time of auto-operating set	Set range：0.1～6553.0S
F076 The fourth step time of auto-operating set	Set range：0.1～6553.0S
F077 The fifth step time of auto-operating set	Set range：0.1～6553.0S

Reminding

· Please refer to instruction of F073～F077 when use torque control mode.
· Please refer to detailed introduction in setion 6.6

F078 Motor rated capacitor	Set range：10～100%

F078 defines the percent of motor current and rated current of frequency converter, please refer to description of F051.

F079 Resart may option	Set range：0～3
F080 Action level when speed searching	Set range：10～200%
F081 Deceleration time when speed searching	Set range：0.1～25.0S
F082 Voltage restoring time when speed searching	Set range：0.1～5.0 S

The frequency converter has the speed trace function. When restart after pause, could first sense the current rotate speed of motor, then output right starting frequency to reduce impulse current.

Parameter F079~F082 are used to define the speed trace characteristic of frequency con verter when restarting after pause.

1.Set digital input function terminal to start up speed trace program.

Set the input terminal function option mode Xn=8，when input terminal is "ON", frequency converter will make IGBT intermit to output. When input terminal recovers to be"OFF", frequency converter will still keep intermit stopping state for a period of time decided by F036, then begins to execute the speed trace .

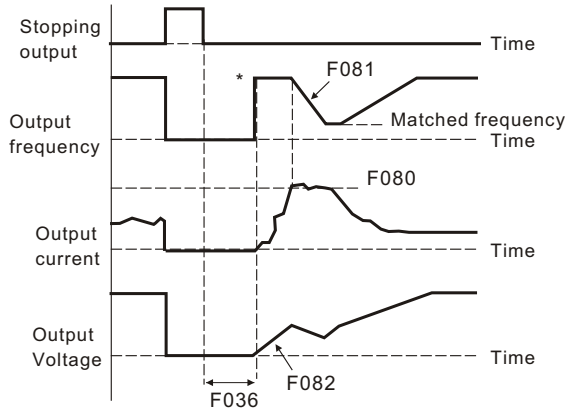
2.Restore normal voltage(F034=1) after the fault of instantaneous voltage over-lower or over-high.

When input voltage is unormal and lead to fault tripping, frequency converter will rightly stop output.And when input voltage restores, the frequency converter will still keep stopping output state within a period of time decided by F036. Then begins to execute the speed trace.

There are 4 parameter to decide the characteristic of speed trace as the following, F079 Restart way option.

0	Do not track, begins to operate from minimum speed.	1	Begins speed trace from operating frequency before stopping
2	Begins speed trace from upper limit frequency	3	Begins speed trace from set frequency

F081 Deceleration time when speed searching(refer to action sequential drawing)
F082 Voltage restoring time when speed searching



As above drawing, after the time decided by F036, the process of speed trace could fall into four steps:

Step 1： According to option of F079, first ouput frequency, this moment, the output voltage is 0 volt.

Step 2：Keep the operational frequency set just now.Then increase gradually the output voltage according to voltage acceleration time appointed by F082.In the process of voltage increasing, monitor whether the output current overruns the defined value defined by F080 at the same time .

Step 3： If output current overruns the set value of F080, then reduce the output frequency according to the deceleration time set by F081, up to the output current is less than set value of F080. This means the output frequency of frequency converter is equal as motor speed.

Step 4： From now on, the ouput frequency of frequency converter could be increased to the former set frequency.

F083 IGBT protection time	Set range：2.0～25.0us

F083 is used to prevent the two groups of IGBT of up and down breakover at the same time.

Reminding

• Only the factory could remend this parameter. If need when repairing , please contact with factory.

F084 Input AC voltage	Set range：40～1000V

F084 defines the standard input power source voltage of frequency converter.
According to this parameter, frequency converter computes all the related voltage
a)OP over-high voltage tripping level = **1.414 * F084* 130%**
b)UP over-low voltage tripping level = **1.414 * F084* 70%**
c)OP after over-high voltage tripping,
voltage restoring level= **1.414 * F084* 120%**
d)UP after over-low voltage tripping,
voltage restoring level = **1.414 * F084* 80%**
e)when contactor is put into use,
the voltage level = **1.414 * F084* 69%**
f)When contactor switching off,
the voltage level = **1.414 * F084* 65%**
g)Discharging starting voltage= **1.414 * F084*117%**
(refer to function description of F033)

Reminding

• Contactor is used to make the charging resistor shirt-circuit

F085 Rated current of frequency covnerter	Set range：0.5～3000.0A

F085 defines rated output current of frequency converter

F086 Gain adjustment of current shown value	Set range：70～140
F087 Gain adjustment of voltage shown value	Set range：70～140

F086 adjusts the shown value of output current.
F087 adjusts shown value of DC bus-bar voltage(Vdc)

F088 Max output voltage	Set range：30～100%

F088 defines the max voltage when frequency converter operates under upper limit frequency. Refer to F010、F011 and F015。

F089 AI1 terminal input minimum value	Set range：0～1023
F090 AI1 terminal input maxmum value	Set range：0～1023

F089 and F090 define the minimum and maxmum value of AI1.
【Adjustment way of the minimum value of AI1 input】 set F055=3， Connect the input terminal of AI1 to GND terminal: at the moment , the minimum value of AI1 input is information read by F056, and input this information to F089 parameter.（JP1 choose at +10V position）
【Adjustment way of the maxmum value of AI1 input】 set F055=3， Connect AI1 input terminal to the +10V terminal: at the moment, the maxmum of AI1 input is the information read by F056, and input this information to F090.（JP1 choose at +10V position）


Reminding

• This parameter has been adjusted , please do not adjust it again if not necessary.

F091 AI2 terminal input minimum value	Set range：0～1023
F092 AI2 terminal input maxmum value	Set range：0～1023

F091 and F092 define the minimum and maxmum value of AI2.
【Adjustment way of the minimum value of AI2 input】 set F055=4， Connect the input terminal of AI2 to GND terminal: at the moment , the minimum value of AI2 input is information read by F056, and input this information to F091 parameter.（JP2 choose at +5V position）
【Adjustment way of the maxmum value of AI2 input】 set F055=4， Connect AI2 input terminal to the +5V terminal: at the moment, the maxmum of AI2 input is the information read by F056, and input this information to F092.（JP2 choose at +5V position）


Reminding

• This parameter has been adjusted , please do not adjust it again if not necessary.

F093 Communication form/ communication address	Set ragne：0.01～99.99

When applying the computer communication control, this parameter is used to define the communication address code and communication rate of frequency converter . please refer to RS485 communication function of Chapter 7.

F094 Data initialize	Set range：0～250

1) The R/W type of parameter initialize to ex-factory value, the steps as following:
Step 1：write in F095=0，F094=1。
Step 2：After the execution software(press RESET key in ALM mode) or hardware of frequency converter reset action, the information of R/W type in EPROM memorizer would be to ex-factory value.
2) All parameter auto-initialize to ex-factory value, the steps as following(please operate carefully):
Step 1：write in F094=249。
Step 2：After the execution software(press RESET key in ALM mode) or hardware of frequency converter reset action, the information of R/W type in EPROM memorizer would be to ex-factory value.

F095 Parameter write-protect	Set range：0～2
F096 Open special parameter set	Set range：0～2

If set F095=1，all the parameter（except F000 and F095）are not allowed to be remended.
If set F095=0，The parameter of R/W type are allowed to be remended.
If set F095=0 and F096=1， All the parameter of R/W and FR/W type are could be remended.
If set F095=2，All the parameter are only written in RAM memorizer , and not stored into EPROM memorizer.

F097 software version	

This parameter shows the software version of frequency converter.

F098 The parameter needs monitor when "I" lamp lighting	Set range：0～99
F099 The parameter needs monitor when "Hz" lamp lighting	Set range：0～99

Under the monitor mode, set F098 and F099 could choose two groups of important parameter to monitor.

Set these two groups of parameter, could monitor other important parameter. Refer to set value of F057～F062.

F098： Assign the parameter that frequency converter need to monitor when【I】lamp lighting.

F099：Assign the parameter that frequency converter need to monitor when【Hz】lamp lighting.

Example：F099=57,parameter F057 stands for output frequency,therefore， will show output frequency on the seven steps display

6.3 The way of set operational frequency

F040 is the parameter of frequency set option, could be from operation setter,memorizer, analogy input, up/down counter, or the combination of above source.

Frequency set option F040=cc.dd，contents"cc" and “dd” two groups of option as one parameter, refer to DIn(88) and DIn(90)。When DIn(88) and DIn(90) starting, control command source option="dd"，otherwise, control command source option ="cc".

6-3 parameter form of HPI6000 series general frequency converter

F040	Frequency set option	Operation control way decision
0	Decided by number value of F000	Refer to instruction of F039
1	Decided by AI1 input	Refer to instruction of F039
2	Decided by AI2 input	Refer to instruction of F039
3	Input by operational setter (increasing key / decreasing key)	Refer to instruction of F039
4	Operational frequency and direction decided by size of AI1.	
5	Operational frequency and direction decided by size of AI2.	
6	Decide by built-in up/down counter	Refer to instruction of F039
7	Similar as F040=6，but when open the frequency converter, will input the value of F000 to up/down counter.	
8	Similar as F040=3, but when open the frequency converter, will input the value of F000 to the operation panel, and could write-in F000 automatically after remending frequency.	
9	Similar as F040=4, after operating, even the output frequency is lower than F016, could keep operating under low-speed.	

10	Similar as F040=5, after operating, even the output frequency is lower than F016, could keep operating under low-speed.
11	The same as F040=6。
12	Frequency set = AI1 * (1 ± (F070 * AI2))，after operating, even the output frequency is lower than F016, could keep operating under low-speed.
13	Frequency set = AI2 ± (F015 * (F070 * AI1))，after operating, even the output frequency is lower than F016, could keep operating under low-speed.
14～16	Keep down
17	Similar as F040=1，after starting to operate，even the output frequency is lower than F016, could keep operating under low-speed.
18	Similar as F040=2，after starting to operate，even the output frequency is lower than F016, could keep operating under low-speed.
19	Similar as F040=11，could write in F000 automaticaly after the value of up/down counter be remended.
20	Contrary to action of F040=18. +5V(or 20mA)---> low-speed； 0V---> high-speed
21	Frequency set =operation setter set * (1± (F070 * AI2))。
22	Frequency set =panel set ± (F015 * (F070 * AI1))，after operating, even the output frequency is lower than F016, could keep operating under low-speed.
23～24	Keep down
25	Similar as F040=2，frequency set is decided by input of AI3. (i.e：keyboard potentiometer)
26	Similar as F040=5，frequency set is decided by input of AI3 (i.e：keyboard potentiometer)
27	Similar as F040=5， frequency set is decided by input of AI3. after operating, even the output frequency is lower than F016, could keep operating under low-speed.
28	Frequency set = AI1 * (1 ± (F070 * AI3))，after operating, even the output frequency is lower than F016, could keep operating under low-speed.
29	Frequency set = AI3 ± (F015 * (F070 * AI1))，after operating, even the output frequency is lower than F016, could keep operating under low-speed.
30	Similar as F040=2，frequency set is decided by input of AI3. after starting to operate, even the output frequency is lower than F016, could keep operating under low-speed.
31	Contrary to action of F040=30, +5V(or +10V)---> low-speed， 0V---> high-speed
32	Contrary to action of F040=17, +5V(or +10V)---> low-speed， 0V---> high-speed
33	Frequency set = panel set * (1± (F070 * AI1))

34	Frequency set = panel set *(1± (F070 *AI3))
35	Frequency set = panel set ± (F015 *(F070 *AI2)), after operating, even the output frequency is lower than F016, could keep operating under low-speed.
36	Frequency set = panel set ± (F015 *(F070 *AI3)), after operating, even the output frequency is lower than F016, could keep operating under low-speed.
37	AI1 control forward running, AI2 control reverse running
38	AI2 control forward running, AI1 control reverse running
39	Similar as F040=0, frequency set is decided by number value of F000. after operating, even the output frequency is lower than F016, could keep operating under low-speed.
40	Frequency set is decided by PID output
41～45	Keep down
46	Frequency set is decided by RS485 communication interface（only suit for when HPI6000 communication form）
47	Keep down
48	Frequency set=PID gain*（PID output+PID bias* AI1）, refer to chapter 8
49	Frequency set=PID gain*（PID output+PID bias* AI2）, refer to chapter 8
50	Frequency set=PID gain*（PID output+PID bias* AI3）, refer to chapter 8
51	Frequency set=PID gain* PID output+PID bias* F028）, refer to chapter 8

Reminding

- JP1 chooses the configuration of analogy input AI1.could choose 0 ～ +5V or 0 ～+10V 。
- JP2 chooses the configuration of analogy input AI2. could choose 0 ～ +5V or 0 ～ 20mA。
- JP3 is used to choose that analogy input signal source is AI3 or keyboard potentiometer speed-adjustment.

F040 = 0	Output frequency is decided by information of F000.

Under this mode, frequency information is stored in F000.When starting to operate,is used to decide the output frequency of frequency converter. But the operation direction is controlled by F039.

Parameter F000 is the main-speed set frequency which is saved in memorizer. As soon as the frequency data is written into F000, would be saved forever, unless users write in new value.

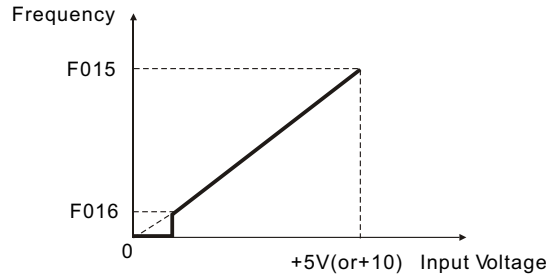
Reminding

- Under this mode,if change F000,will rightly change the output frequency when the frequency converter is operating.

F040 = 1	Output frequency is decided by voltage of AI1

Under this mode, the voltage signal of AI1 terminal will decide the output frequency when frequency converter is operating, but the operating direction is decided by F039.

When the input signal is the maxmum value, the output frequency is equal as the frequency set by F015.The relation between input voltage and output frequency is as the following drawing.



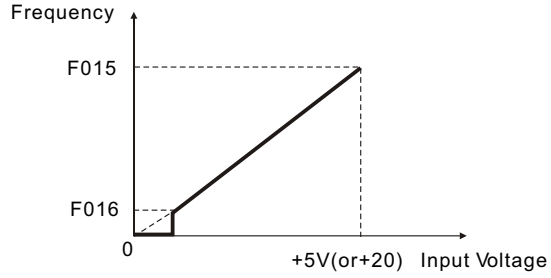
Reminding

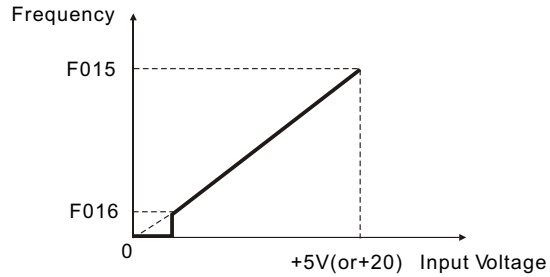
- Use JP1 to choose suitable input voltage range.if necessary, could use F089 and F090 to amend input range.

F040 = 2	Output voltage is decided by input of AI2.

Under this mode, the voltage(or current) signal of AI2 terminal decides the output frequency when frequency converter is operating.but the operating direction is controlled by F039.

When the input signal is the maxmum value, the output frequency is equal as the frequency set by F015.The relation between input voltage and output frequency is as the following drawing.





Reminding

• JP2 decides input voltage or current signal. If necessary, could use F091 and F092 to remend the input range.

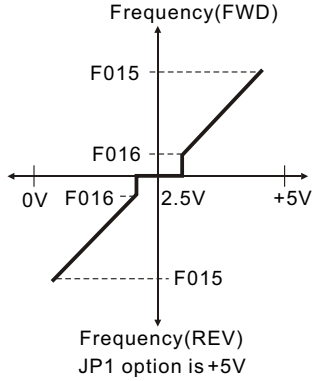
F040 = 3	Output frequency is decided directly by operational setter input.

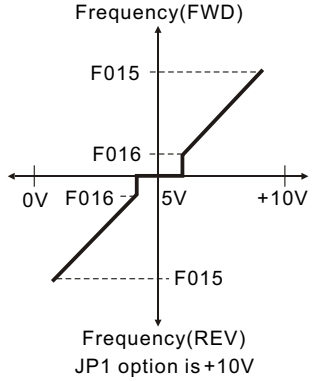
Output frequen cy is decided directly by the operational setter. If use sequence communic ation control, the output frequency would be decided by RS485 communication command input. But the operating direction is controlled by F039.

Reminding

• After staring to operate, even set frequency is lower than F016, will keep the frequency of F016 and operating under low-speed.

F040 = 4	Output frequency and operating direction are controlled by voltage of AI1.



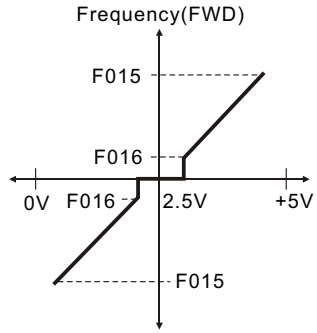


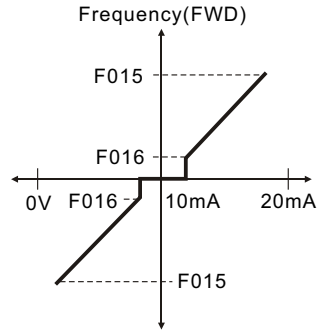
Under this mode, the voltage signal of AI1 terminal will decide the output frequency and operating direction when frequency converter is operating. When input signal is the maxm um value, frequency converter is forward running under the frequency set by F015. when input signal is "0", frequency converter is reverse running under the frequency set by F015. when input signal is near to center point, frequency converter will stop output. Please compare the function of F040=9

Reminding

• Use JP1 to choose suitable input voltage range. If necessary, could use F089 and F090 to remend the input range.

F040 = 5	Output frequency and operating direction are controlled by input of AI2.





Under this mode, the voltage signal of AI2 terminal will decide the output frequency and operating direction when frequency converter is operating. When input signal is the maxmum value, frequency converter is forward running under the frequency set by F015. when input signal is "0", frequency converter is reverse running under the frequency set by F015. when input signal is near to center point, frequency convert er will stop output. Please co mpare the function of F040=10

Reminding

• JP2 decides input voltage or current signal. if necessary, could use F091 and F092 to remend the input range.

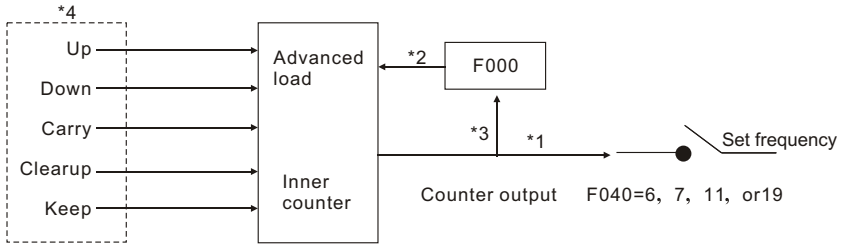
F040 = 6	Output frequency is decided by innter up/down counter

F040 = 7	Similar as F040=6, but will input the value of F000 in up/down counter when power-on .

Reminding

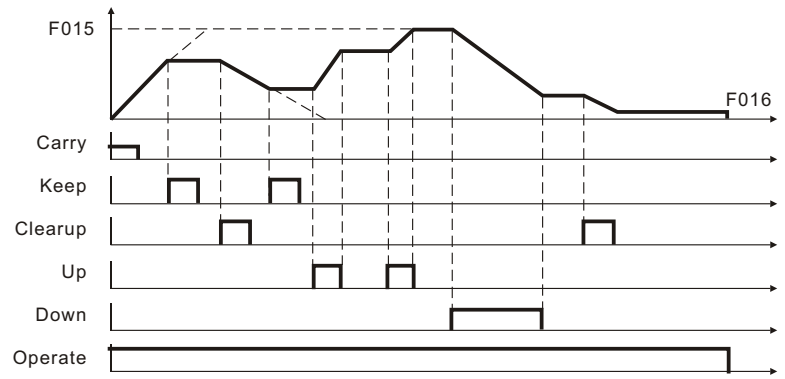
• After starting to operate, even set frequency is lower than F016, will keep the frequency of F016 and operating under low-speed.

The structure of inner up/down counter is as the following:



Reminding

1. When F040=6,7,11 or 19, the output of up/down counter decides operating frequency.
2. When F040=7 or19, when opening frequency converter, will input the value of F000 in up/down counter.
3. When F040=19, will write the frequency value after amending into F000;
4. Re the input signal, such as: up, down, upload, dearup and keeping , please refer to description of multifunction digital input terminal.
5. Could mostly use four input at the same time.



Application of up/down counter

F040 = 8	Similar as F040 = 3 , but when opening frequency converter, could read out the F000 value in advanced.

Similar as F040=3, The different points as follwing:

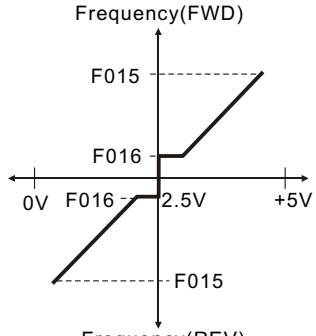
a. Could read out F000 value in advanced when power-on, and be treated as advanced set frequency.

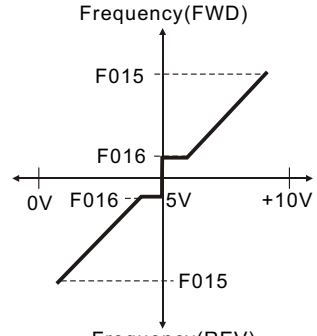
b. F000 When use the operational settor, and set frequency modifying, will write in automatically F000.

Reminding

• After starting to operate, even set frequency is lower than F016, will keep the frequency of F016 and operating under low-speed.

F040 = 9	Output frequency and operating direction are decided by AI1 voltage, and do not stop when output frequency is lower than F016.



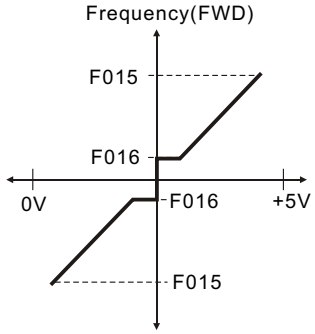


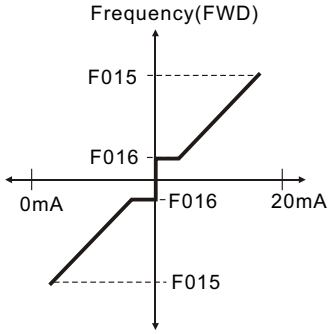
Under this mode, the voltage signal of AI1 terminal will decide the output frequency and operating direction when frequency converter is operating. When input signal is the maxmum value, frequency converter is forward running under the frequency set by F015. when input signal is "0", frequency converter is reverse running under the frequency set by F015. when input signal is near to center point, frequency converter will operate under the frequency set by F016, Please compare the function of F040=4.

Reminding

- Use JP1 to choose suitable input voltage ragne. If necessary, could use F089 and F090 to modify the input range.

F040 = 10	Output frequency and operating direction ard controlled by AI2 input; but do not stop when frequency is lower than F016.





Under this mode, the voltage signal of AI2 terminal will decide the output frequency and operating direction when frequency converter is operating. When input signal is the maxmum value, frequency converter is forward running under the frequency set by F015. when input signal is "0", frequency converter is reverse running under the frequency set by F015. when input signal is near to center point, frequency converter will operate under the frequency set by F016, Please compare the function of F040=5 .

Reminding

- JP2 decides input voltage or current signal. If necessary, could use F091 and F092 to modify the input range.

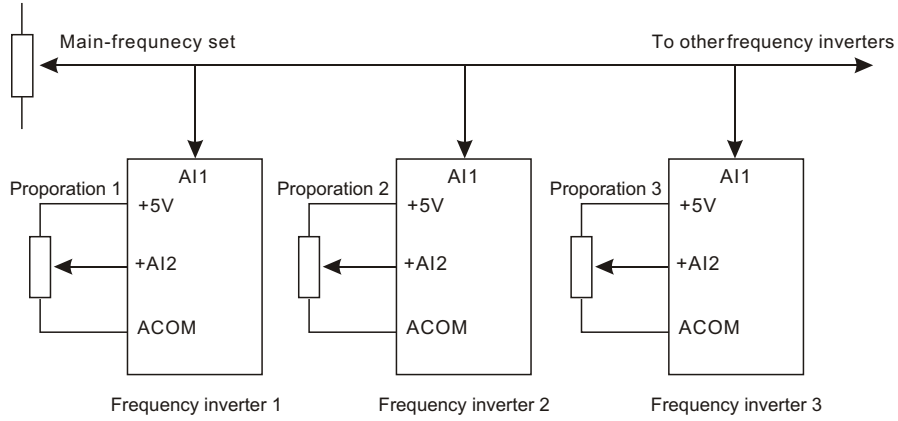
F040 = 11	The same as F040=6
F040 = 12	Set frequency = AI1 ＊(100% ± (F070*AI2)) (suit for proportion interlocking operating)

Under this mode， set frequency = AI1 * (100% ± (F070 * AI2)). Normally, AI1 analogy signal is treated as main set frequency, and AI2 analogy signal is treated as multiplication rate input.
When signal AI2 input is the maxmum value, changing rate is (100 % + F070);
When signal AI2 input is the minimum value, changing rate is (100 % - F070)。

Reminding

- When set frequency is less than F016, frequency converter will continuely operate according to F016 set.

The application as following， AI1 decides the basic speed of every frequency converter. and the percent of every unit is controlled by AI2.



F040 = 13	Set frequency= AI2 ± (F015 *(F070*AI1)) (suit for synchronization interlocking operating)

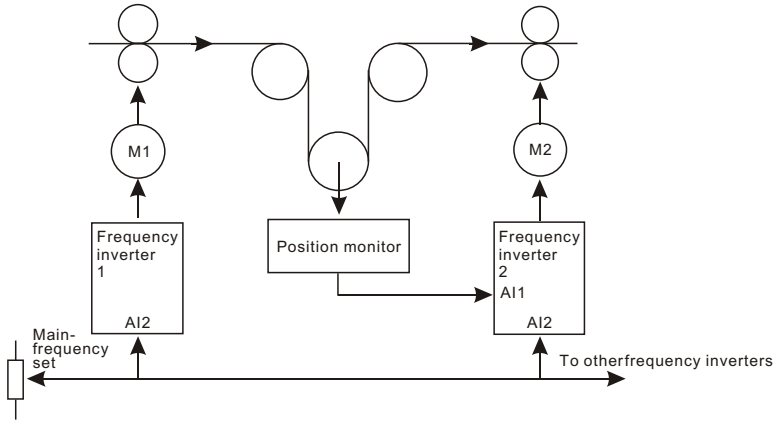
Under this mode, set frequency = AI2 ± (F015 *(F070 *AI1))。Normally, AI2 analogy signal is treated as main set frequency, and AI1 analogy signal is treated as addition or subtraction compensation input.
When signal AI1 input is the maxmum value, changing rate is +(F015 *F070);
When signal AI1 input is the minimum value, changing rate is -(F015 *F070)。

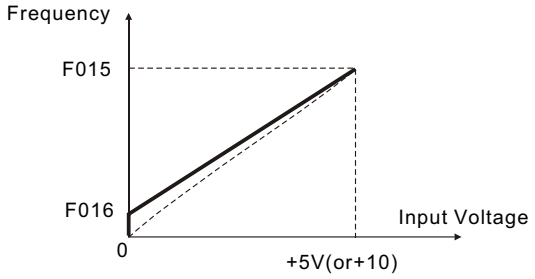
F040 = 14 ~ 16	Keep down
F040 = 17	Similar as F040 = 1, after operating，even output frequency is lower than F016, could keep operating under low-speed.

Reminding

• When set frequency is less than F016, frequency converter continue to operate according to F016 set

The typic application is as following, AI2 decides basic linear velocity. If there difference between speed of M2 and M1, the output of position detector will input directly AI1 terminal of frequency converter 2, then modify the speed of M2 to keep two units synchronization.

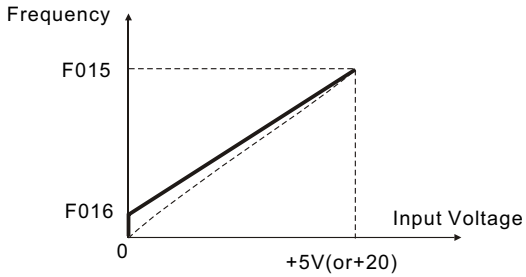




Reminding

• Use JP1 to choose proper input voltage range. If necessary, could use F089 and F090 to modify input range.

F040 = 18	Similar as F040 = 2, after operating，even output frequency is lower than F016, could keep operating under low-speed.



Reminding

• JP2 decides input voltage or current signal, if necessary, could use F091 and F092 to modify the input range.

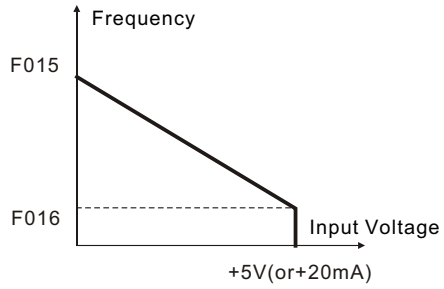
F040 = 19	Similar as F040 = 6, but could write in F000 automatically after remending the value of up/down counter.

Similar as F040=6，the different points as the following:

a. Could read out F000 value in advanced when power-on.

b. When set frequency changing, will write in F000 automatically.

F040 = 20	Similar as F040 = 18，but the definition of high and low speed are diffenent.



• Under this mode, the voltage or current signal of AI2 terminal will decide output frequency when frequency converter is operating. But the operating direction is controlled by F039.

• When input signal is the maxmum value, frequency converter is forward running under the frequency set by F016; Contrarily, when input signal is zero, frequency converter will operate under frequency set by F015

Reminding

- JP2 decides input voltage or current signal. If necessary, could use F091 and F092 to modify input range.
- Please refer to the instruction of F040=18, and note the difference from above drawing.

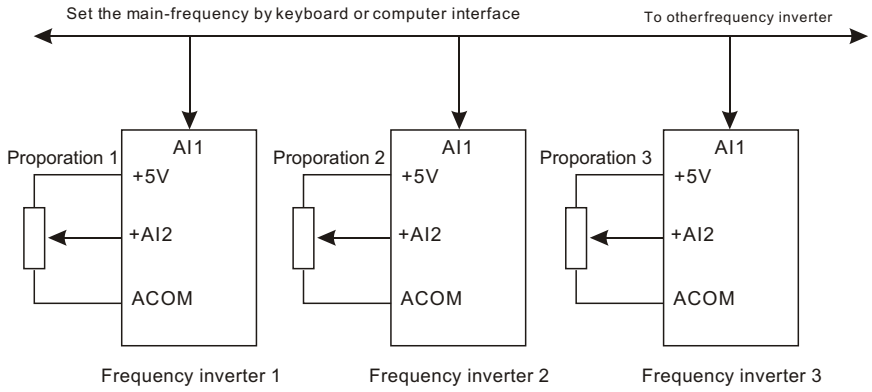
F040 = 21	Frequency set = set frequency of operational settor * (100% ± (F070*AI2))

- This mode is similar as F040 = 12, but AI1 input is set frequency of operational settor.
- Under this mode, set frequency = **set frequency of operational settor * (100 % ± (F070 * AI2))**, The set frequency of settor is as main set frequency, and analogy signal from AI2 is as multiplication rate input.
- When signal AI2 input is the maxmum value, changing rate is (100 % + F070).
- When signal AI2 input is the minimum value, changing rate is (100% - F070).

Reminding

- When set frequency is less than F016, frequency converter continues to operate according to F016 set.

This function is applicated in multi-unit proportion interlocking control of computer online. Refer to instruction of F040=12, and note compare the difference from the following drawing:



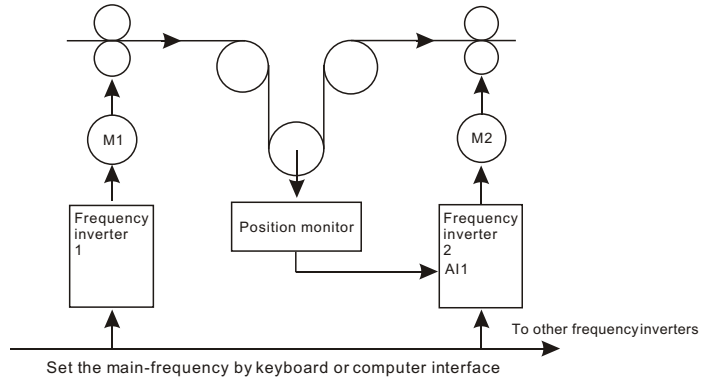
F040 = 22	Set frequency = set frequency of operational settor ± (F015 * (F070*AI1))

This mode is similar as F040 = 13, But AI2 input is set frequency of operational settor. Under this mode, **set frequency = set frequency of operational settor ± (F015 * (F070 * AI1))**, The set frequency of settor is as main set frequency; and the analog y signal fro m AI1 is treated as addition or subtraction compensation input.
When signal AI1 input is the maxmum value, changing rate is (F015 * F070)
When signal AI1 input is the minimum value, changing rate is -(F015 * F070)。

Reminding

- When set frequency is less than F016, frequency converter continues to operate according to F016 set.

This function is applicated in multi-unit synchroni zation interlocking control of computer online. Refer to instruction of F040=13, and note compare the difference from the following drawing:



F040 = 23 ~ 24	Keep down

F040 = 25	Output frequency is decided by AI3 input（keyboard potentiom eter adjust speed）

This mode is similar as F040 = 2, but the voltage signal of AI3 terminal will decide output frequency when frequency converter is operating. And the operating direction is controlled by F039. Refer to function of F040=2.

Reminding

• If necessary, could use F091 and F092 to modify the input range of AI3.

F040 = 26	Output frequency and operating direction are controlled by AI3 input

This mode is similar as F040 = 5， But the voltage signal of AI3 terminal will decide the output frequency and operating direction when frequency converter is operating. Refer to function description of F040=5.

Reminding

• If necessary, could use F091 and F092 to modify input range of AI3. Input voltage range is 0～+5V

F040 = 27	Output frequency and operating direction are controlled by AI3 input. But do not stop when frequency is lower than F016.

This mode is similar as F040 = 10, But the voltage signal of AI3 terminal will decide the output frequency and operating direction when frequency converter is operating, and do not stop when frequency is lower than F016. Refer to the function description of F040=10.

Reminding

• If necessary, could use F091 and F092 to modify input range of AI3. Input voltage range is 0～+5V

F040 = 28	Set frequency = AI1＊(100% ± (F070*AI3)) (suit for proportion interlocking operating)

This mode is similar as F040 = 12， But the signal of AI2 terminal changes to the signal of AI3 terminal. Refer to the function description of F040=12.

Reminding

• If necessary, could use F091 and F092 to modify input range of AI3. Input voltage range is 0～+5V

F040 = 29	Set frequency = AI3 ± (F015 * (F070*AI1) (suit for synchronization interlocking operating)

This mode is similar as F040 = 13， But the signal of AI2 terminal changes to the signal of AI3 terminal. Refer to the function description of F040=13

Reminding

• If necessary, could use F091 and F092 to modify input range of AI3. Input voltage range is 0～+5V

F040 = 30	Output frequency is decided by AI3 input， after operating, even output frequency is lower than F016, could keep operating under low-speed.

This mode is similar as F040 = 18， But the signal of AI2 terminal changes to the signal of AI3 terminal. Refer to the function description of F040=18.

Reminding

• If necessary, could use F091 and F092 to modify input range of AI3. Input voltage range is 0～+5V

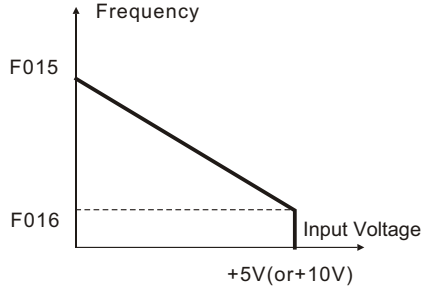
F040 = 31	Similar as F040 = 30， but is contrary to the definition of high and low-speed.

This mode is similar as F040 = 30， Under this mode, when the input signal of AI3 terminal is maxmum value, frequency converter is forward running under frequency set by F016. Contrarily, when input signal is zero, frequency converter is operating under frequency set by F015. Refer to the function description of F040=20.

Reminding

• If necessary, could use F091 and F092 to modify input range of AI3. Input voltage range is 0～+5V

F040 = 32	Similar as F040 = 17， but the definition of high-speed and low-speed .



This mode is similar as F040 = 20， but the signal of AI2 terminal changes to be the signal of AI1 terminal. Under this mode， the voltage signal of AI1 terminal will be used to decide the output frequency when frequency converter is operating. And the operating direction is controlled by F039. When input signal is Maxmum value, frequency converter is forward running under the frequency set by F016. Contrarily, when inupt signal is zero, frequency converter will operate under the frequency set by F015.


Reminding

• Use JP1 to choose proper input voltage range. If necessary, could use F089 and F090 to modify the input range.

F040 = 33	Set frequency = set frequency of operational settor * (100% ± (F070*AI1))

Similar as F040 = 21, multiplication rate input will be AI1.

F040 = 34	Set frequency = set frequency of operational settor * (100% ± (F070*AI3)

Similar as F040 = 21, multiplication rate input will be AI3.

F040 = 35	Set frequency = set frequency of operational settor ± (F015 *(F070*AI2))

Similar as F040 = 22, addition or subtraction compensation input will be AI2.

F040 = 36	Set frequency = set frequency of operational settor± (F015 *(F070*AI3))

Similar as F040 = 22, addition or subtraction compensation input will be AI3.

F040 = 37	AI1 forward running, AI2 reverse running

Controlled by AI1 when be forward running, the same as F040 = 17
Controlled by AI2 when be reverse running, the same as F040 = 18

F040 = 38	AI2 forward running, AI1 reverse running

Controlled by AI2 when be forward running, the same as F040 = 18
Controlled by AI1 when be reverse running, the same as F040 = 17

F040 = 39	Output frequency is controlled by the information of F000, after operating, even output frequency is lower than F016, could keep low-speed operating.

This mode is similar as F040= 0, But after operating, even output frequency is lower than F016, could keep operating under low-speed.


Reminding

• Under this mode, when frequency converter is operating, changing F000 will change the output frequency rightly.

F040 = 40	Output frequency is decided by PID output

Please refer to PID function of Chapter 8.

F040 = 41~45	Keep down
F040 = 46	Output frequency is decided by RS485 communication interface command. (refer to chapter 7.)

F040 = 47	Keep down
F040 = 48	Frequenc set=PID gain* (PID output +PID bias *AI1)
F040 = 49	Frequenc set =PID gain* (PID output +PID bias *AI2)
F040 = 50	Frequenc set =PID gain* (PID output +PID bias *AI3)
F040 = 51	Frequenc set =PID gain* (PID output +PID bias * F028)

Please refer to the PID function on Chapter 8.

6.4 Multifunction digital input terminal option

Terminal of DI1、DI2、DI3、DI4、FWD (DI5) 、REV (DI6) are multifunction digital input terminal.

F003: for choosing the function of FWD terminal
F004: for choosing the function of REV terminal
F041: for choosing the function of DI1 terminal
F042: for choosing the function of DI2 terminal
F043: for choosing the function of DI3 terminal
F044: for choosing the function of DI4 terminal


Reminding

• On the control terminal, FWD is DI5, REV is DI6
• DIn (n=1~6, is DI1 DI2 DI3 DI4 DI5 DI6)

6-4 Parameter form of HPI6000 series General frequency converter

F003、F004、F041～F044	Function code	Function explanation
0	NULL	No any action
1	EMS	emergency stopping
2	SPD3	Operating under step3 frequency setin advanced
3	SPD2	Operating under step2 frequency setin advanced
4	SPD1	Operating under step1 frequency setin advanced
5	JOG	Operating under inchingfrequency set inadvanced
6	OH	Motor over-heat protection function (Normal open type ofdetector)
7	TMIA	Timer(counter) input (delay-time close type)
8	ON__BB	Pause output andspeed trace (closeaction type)
9	FJR	Forward inching operating
10	RJR	Reserve inching operating
11	TMIB	Timer(counter) input (delay-time close type)
12～14	Keep down	
15	U/D CLEAR	Carry F016 into up/down counter
16	U/D LOAD	Carry F015 into up/down counter
17	U/D HOLD	Keep up/down counter
18	OFF__BB	Pasue output and speed trace (open-circuit action type)
19	UP	up/down counter increasing
20	DOWN	up/down counter decreasing
21	ALARM CLEAR	Fault reset
22	SET1(FF1)	Set flip-flop(1)
23	CLR1(FF1)	Clear away flip-flop (1)
24	SET2(FF2)	Set flip-flop(2)
25	CLR2(FF2)	Clear away flip-flop (2)
26	SET(FF1&FF2)	Set flip-flop(1) and (2) at the same time
27	CLR(FF1&FF2)	Clear away flip-flop(1)and(2)atthesametime

28	CLK Input	Input pulse oftimer (counter)
29	Keep down	
30	/OH	Motor over-heat protection function (Normal close type of detector)
31	Normal/Auto SW	Transfer switch between normal operating and auto-operating
32～35	Keep down	
36	TMIC	Timer(counter) input (switching type and loop type)
37～47	Keep down	
48	Speed Hold	Keep former speed operating
49	Keep down	
50	PID Enable	PID start-up
51	PID Hold	PID integrating keeping
52	PID Clear	PID integrating cleanup
53	PID Preset	Set PID input value in advanced
54	PID Bias	PID bias starting up
55	PID Boost	PID gain starting up
56～68	Keep down	
69	DC-BRAKE1	DC braking voltage controlled by AI1
70	DC-BRAKE2	DC braking voltage controlled by AI2
71	DC-BRAKE3	DC braking voltage controlled by AI3
72	SENSOR_LESS SELECTION	option between vector and non-vector
73	FWD FUNCTION	Forward operating
74	REV FUNCTION	Reverse operating
75	POWER_CONTROL SELECT	Source option of manual output power limit
76	FORWARD INHIBIT	Forbid forward operating
77	REVERSE INHIBIT	Forbid reverse operating
78	PANEL SET UP	Increase panel set frequency
79	PANEL SET DOWN	Decrease panel set frequency
80	SPEED SW1	16 steps of speed option

81	SPEED SW2	16speed levels for choosing
82	SPEED SW3	
83	SPEED SW4	
84	JOG ACC/DEC TIME	Accelereation/deceleration time option
85	SPD1 ACC/DEC TIME	
86	SPD2 ACC/DEC TIME	
87	SPD3 ACC/DEC TIME	
88	SPEED COMMAND SW	Speed order change over
89	CONTROL COMMANDSW	Control order change over
90	SPEED & CONTROLSW	Source of speedand control orderchange over
91	/TMIA	Timer(counter) input (delay-time switch-off type)(inverter input)
92	/TMIB	Timer(counter) input (delay-time close type)(inverter input)
93	/TMIC	Timer(counter) input (switching and loop type)(inverter input)
94	TMIAX	The same as X=7，delay time=F071*AI2
95	TMIBX	The same as X=11，delay time =F071*AI2
96	TMICX	The same as X=36，delay time =F071*AI2
97	/TMIAX	The same as X=91，delay time =F071*AI2
98	/TMIBX	The same as X=92，delay time =F071*AI2
99	/TMICX	The same as X=93，delay time =F071*AI2

DIn=0	No any function

Do not act whatever the state of input terminal

DIn=1	EMS: Emergency stopping function

Choose this function ,If input terminal ON when the frequency converter is operating,the converter will output DC voltage into motor to instead of AC voltage and stop the motor quickly. (Refer to the function description of F005～F008).

DIn=2	Step 3 operational frequency

DIn=3	Step 2 operational frequency
DIn=4	Step 1 operational frequency
DIn=5	Inching

F000 can set the main operational frequency, and other four parameter could set other normal operational frequency in advanced.
F000: Main-speed frequency, acceleration /deceleration time is set by F001 and F002.
F019：Inching frequency, acceleration /deceleration time is set by F02
F021：Step 1 operational frequency. acceleration /deceleration time is set by F022 and F023.
F024：Step 2 operational frequency. acceleration /deceleration time is set by F025 and F026.
F027：Step 3 operational frequency. acceleration /deceleration time is set by F028 and F029.
When the terminal decides the operational speed , the preference order is as the following:
Inching ＞Step 1 speed ＞Step 2 speed ＞Step 3 speed＞16 steps of speed ＞ Normal operational speed.
Normal operational speed: Means the frequency set option decided by F040.

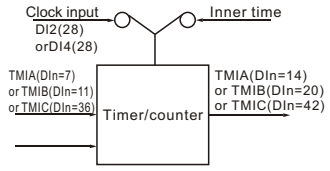
Reminding

- The above functions are effect when having operating order, but would also be effect without operational signal when be in ching operating of Xn=9 or Xn=10.
- Multi-periods of speed according to Pape___of this manual

DIn=6	OH Motor over-heat protection function（refer to DIn=30）

When input terminal is open-circuit, means be normal to operate.
When input terminal is close ,frequency converter will stop input and display OH fault information.

DIn=7	TMIA delay-time switching-off type of timer(/counter)input

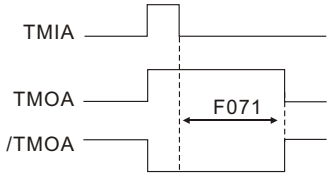


When the timer is being used, The signal of 0.1S rated time is choosed as timer(/counter) function input. And when time is being used, the input terminal of DI2 or DI4 which is assigned as Mode 28 would be pulse input terminal of timer(/counter) function. If need to remend by hand, please refer to function of Xn=94～99 .

Reminding

• The frequency converter contents timer(/counter) function. When digital input terminal DI2 and DI4, this function must be used as counter, otherwise be used as timer.

When any one of digital input terminal DIn is assigned with TMIA function, could choose DO1 or DO2 or RY1、RY3 to be output function of TMOA, and add with the timer(/counter) module to make up to a delay-time switch-off relay, and the delay-time is decided by F071.



When input TMIA switching on, output TMOA will switch on rightly. But when TMIA switching off, the TMOA must switch off after a period of time defined by F071.

Reminding

• The max input pulse of timer/counter is 1000Hz.
• The frequency converter has only one time/counter module.

DIn=8	ON__BB Pause output and speed trace(close action type), please refer to function of DIn=18

When the selected input terminal is "ON", all IGBT will stop output rightly; And when be "OFF", the frequency converter will execute the function of speed trace after a period of time (decided by F036).

DIn=9	FJR Forward inching operating

When the selected input terminal is "ON", the frequency converter would be forced to forward operate under inching frequency.(execute without extra operating order)

DIn=10	RJR Reverse inching operating

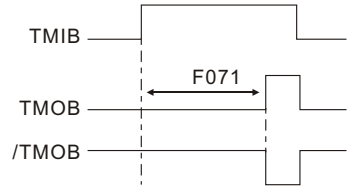
When the selected input terminal is "ON", the frequency converter would be forced to reverse operate under inching frequency.(execute without extra operating order)

DIn=11	TMIB Delay-time close type of timer(/counter) input

Please first refer to function description of DIn=7 timer(/counter) module

When any one of digital input terminal DIn is assigned with TMIB function, could choose DO1 or DO2 or RY3、RY1 to be output function of TMOB, and add with the timer(/counter) module to make up a delay-time switch-off relay, and the delay-time is decided by F071.

When input TMIB is "OFF", the TMOB would recover to state of "OFF" rightly, But when input TMIB is "ON", the output TMOB would must be "on" after a period of time defined by F071.
The max input pulse of timer/counter is 1000Hz.
HPI6000 frequency converter has only one timer/counter module.



DIn=12 ~ 14	Keep donw.
DIn=15	CLEAR : carries the F016 to up/down counter
DIn=16	LOAD : carries the F015 to up/down counter
DIn=17	HOLD : Keep up/down counter

Reminding

• If use the output of up/down counter for frequency set, the F040 must choose one number from 6,7,11 or 19.
• Please refer to function description of F040 about the difference among these four types.

If the function option of input terminal is DIn=15(CLEAR): and when this terminal is "ON", will carry the frequency of F016 into up/down counter, at this moment, the change of output frequency must be according to the feedback of F002.
If the function option of input terminal is DIn=16(LOAD): and when this terminal is "ON", will carry the frequency of F015 into up/down counter, at this moment, the change of output frequency must be according to the feedback of F001.
If the function option of input terminal is DIn=16(HOLD): and when this terminal is "ON", will carry the frequency of F015 into up/down counter, and will keep the former operating speed.

DIn=18	OFF__BB Pause output and speed trace(open-circuit action type)

When the selected terminal is "OFF", all IGBT will stop ouput rightly; And when the terminal recovers to "ON", the frequency converter will execute the speed trace function after a period of time decides by F036.

DIn=19	UP: up/down counter increasing

When the selected input terminal is “ON”, up/down counter increases according to the acceleration time of F001.

DIn=20	DOWN: up/down counter decreasing

When the selected input terminal is “ON”, up/down counter decreases according to the deceleration time of F002.

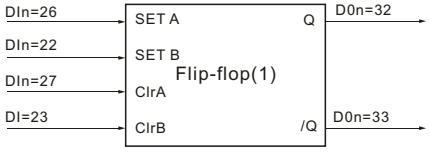
DIn=21	Fault reset

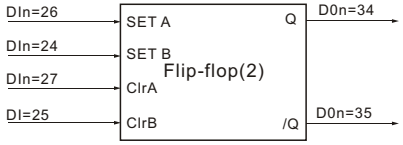
Only the frequency converter in trouble, the terminal with above function could be used as reset terminal. When the frequency converter is normal, this terminal has no any function.

Reminding

- Standard RST terminal could reset frequency converter in any situation.

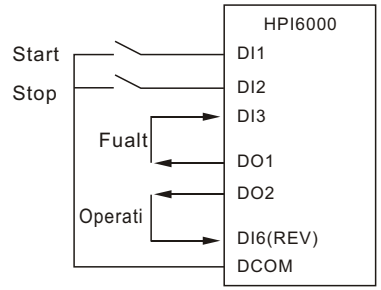
DIn=22	Set Flip-Flop（1）
DIn=23	Clear away Flip-Flop（1）
DIn=24	Set Flip-Flop（2）
DIn=25	Clear away Flip-Flop（2）
DIn=26	Set Flip-Flop（1）and（2）at the same time
DIn=27	Clear away Flip-Flop（1）and（2）at the same time



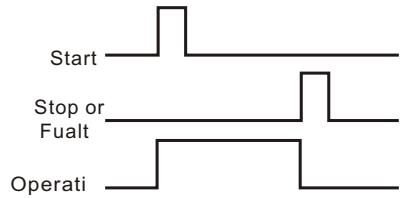


The above drawing is two groups of built-in flip-flop with normal function. Every flip-flop could be set or cleared away by two input terminals, and be monitored by two output terminals of DO1 or DO2 or RY1、RY2、RY3

Basic example of application: make the built-in flip-flop (1) and DI1，DI2，DO1 up to self -lock circuit.



F041=22,F042=23,F043=23,F045=4,
F046=32



DIn=28	Input pulse of timer (counter).

Reminding

- When input terminal DI2 or DI4 set as this mode, timer(counter) module would be function of counting automatically
- Refer to the description of Xn=7.

When DI1 choose（28）, keep down.
When DI2 choose（28）, applys in normal timer/counter, refer to DIn=7、DIn=11、DIn=36 set.
When DI2 choose（28）,No function.
When DI2 choose（28）, applys in normal timer/counter, refer to DIn=7、DIn=11、DIn=36 set.

Reminding

- The counter pluses one when pulse inpute instantly turns from OFF into ON.
- IMax limit of input pulse is 1000Hz

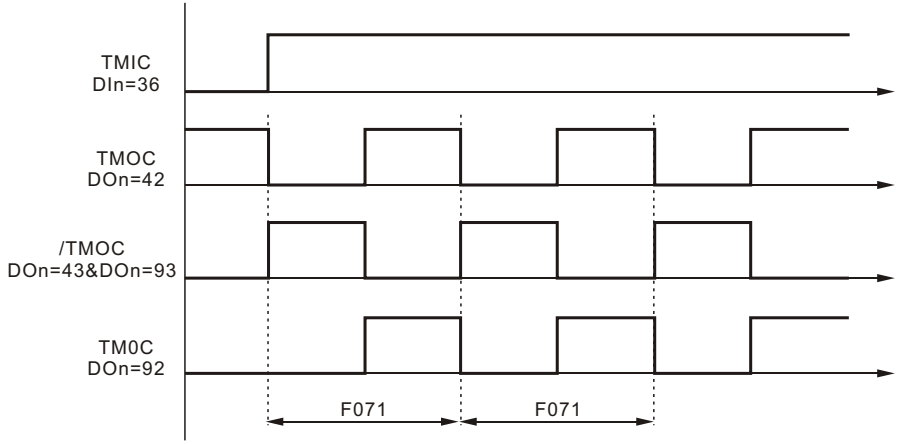
DIn=29	No function
DIn=30	/OH Motor over-heat protection function （ Refer to function description of parameter DIn=6.

When input terminal is close, means normal and could operate.
When input terminal is open-circuit, frequency convertor will stop ouput and disply OH fault information.

DIn=31	Transfer switch between normal operating and auto operating (refer to the function description of 6.6)

Generally, if just need normal operating mode, make F072=0 . If need auto-operating function, F072 could choose different auto-operating modes.
If need to change over between normal operating mode and auto-operating mode regularly, could set F072 as the needed auto-operating mode, then change over by handle by the appointed input terminal, so that no need to change F072 parameter regularly.
When the oppointed input terminal choose this mode, if input is "OFF" state, will execute auto-operating mode. If input is "ON" state, will return to normal operating mode, which is the same as the state when F072=0. If input recovers to be "OFF" state again, the frequency converter will also recover to auto-operating mode.

DIn=32 ~ 35	Keep down
DIn=36	Switching loop type timer(counter) input



When input TMIC is “OFF”, TMOC output always keeps “ON”. If TMOC output DO1 or DO2=92, output always keeps "OFF". When input TMIC is “ON”, TMIC output will do “ON/OFF” transfer rightly according to the time set by F071, time of ON/OFF is half and half. Refer to inst-ruction of DIn=94.

DIn=37 ~ 47	Keep down
DIn=48	Keep former operating speed

If the function option of input terminal is DIn=48, when this input terminal is “ON”, frequency converter stops acceleration or deceleration rightly and keep former operating speed. When input terminal is "OFF", the frequency converter keeps on acceleration or deceleration.

DIn=49	Keep down
DIn=50	PID starting
DIn=51	PID integrating keeping
DIn=52	PID integrating clear up
DIn=53	PID output value set in advanced
DIn=54	PID bias starting
DIn=55	PID gain starting

PID Function , refer to function of Chapter 8.

DIn=56～68	keep down
DIn=69	DC braking voltage is controlled by AI1
DIn=70	DC braking voltage is controlled by AI2
DIn=71	DC braking voltage is controlled by AI3

If the function option of input terminal is DIn=69，70 or 71, when this input terminal is “ON”, the frequency converter will output DC braking voltage to motor. The voltage value is controlled by AI1、AI2 or AI3

Reminding

• DC braking voltage=F006 * Vn（i：AI1、AI2、AI3）

DIn=72	Vector or non-vector transfer option

If input terminal function is DIn=72:

If F067=1, when input terminal is close, the operating mode of frequency converter will change over from normal mode to noninductive vector mode.
If F067=3, when input terminal is close, the operating mode of frequency converter will change over from noninductive vector mode to normal mode

DIn=73	Forward running

When choose this function, this terminal is set as FWD function . Refer to description of F003.

DIn=74	Reverse running

When choose this function, this terminal is set as REV function . Refer to description of F004

DIn=75	Source option of Manual output power limit (Refer to function description of F067)

This function is effect only when F067=4 output power limit mode.
If input terminal function is DIn=75, when input terminal is "ON", the power limit curve is controlled by AI2.
If input terminal function is other value, or this terminal is "OFF", the power limit curve is controlled by AI3.

DIn=76	Forbid forward running

When the selected input terminal is "ON", frequency converter forbids forward running.

DIn=77	Forbid reverse running

When the selected input terminal is "OFF", frequency converter forbids reverse running.

DIn=78	Increase panel set frequency
DIn=79	Decrease panel set frequency

When control panel set frequency is speed command source(F040=8),
If input terminal function is DI=78, and when this terminal is "ON", will increase panel set frequency. If input terminal function is DI=79, and when this terminal is "ON", will decrease panel set frequency.

DIn=80 ~ 83	16 Steps speed option

When all terminals of DIn= 2～5 are "OFF"(have no function of inching, SPD1, SPD2, SPD3)
If terminals of DIn=80～83 are "ON", and the set frequency is as the following:
Set frequency=DIn（83）* F027+DIn（82）* F024+DIn（81）* F021+DIn（F080）* F019

DIn=84 ~ 87	Acceleration/deceleration time option

When all terminals of DIn=2～5 are "OFF"(have no function of inching, SPD1, SPD2, SPD3)
When DIn=84 terminal is "ON", the acceleration time =F020, deceleration time =F020
When DIn=85 terminal is "ON", the acceleration time =F022, deceleration time =F023
When DIn=86 terminal is "ON", the acceleration time =F025, deceleration time =F026
When DIn=87 terminal is "ON", the acceleration time =F028, deceleration time =F029

DIn=88～90	Choose control command and speed command

Please refer to instruction of F039 and F040.
F039=a.b，has two groups option a and b
F040=cc.dd，has two groups option cc and dd
If terminal DIn=88 is "ON", speed source=dd
If terminal DIn=88 is "OFF", speed source=cc
If terminal DIn=89 is "ON", speed source=b
If terminal DIn=89 is "OFF", speed source=a
If terminal DIn=90 is "ON", speed source=b
If terminal DIn=90 is "OFF", speed source=a


Reminding

• If any Din=90, could not set Din=88 or 99 again.

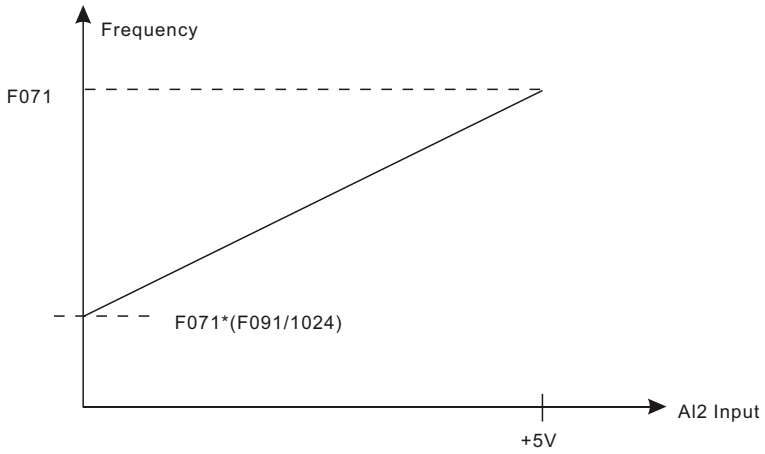
DIn=91	/TMIA delay-time switching-off timer(counter) reverse input
DIn=92	/TMIB delay-time close type timer(counter) reverse input
DIn=93	/TMIC Switching loop type timer(counter) reverse input

Reminding

• Please refer to function description of DIn=7 DIn=11 DIn=36

DIn=94~95	adjustable timer time

DIn（94）=TMIAX
DIn（95）=TMIBX
DIn（96）=TMICX
DIn（97）=/TMIAX
DIn（98）=/TMIBX
DIn（99）=/TMICX
Similar as TMIA～TMIC， but time of timer is adjusted by AI2。



6.5 Digital output function option

Parameter F045 choose function output by D01
Parameter F046 choose function output by D02
Parameter F047 choose function output by RY1、RY2、RY3

Every output could choose the function listed in the following form

F045、F046、F047	Function Code	Function instruction
0	OFF	Output is always OFF
1	STOP	Frequency converter is stopping
2	SPE	Output frequency is equal
3	SPNE	Output frequency is not equal
4	ALM	Be in trouble
5	NALM	No trouble
6	BRAKING	Frequency converter is in braking
7	RUNNING	Frequency converter is operating
8	SPO	Output frequency overrun
9	SPNO	Output frequency not over
10	SPA	Output frequency is arrival
11	SPNA	Output frequency is not arrival
12	DIR	Derection of running
13	Irms LEVELO	Irms＞F048
14	TMOA	Delay-time switching-off type timer output
15	SPZ	Output frequency is zero-speed
16	SPNZ	Output frequency is not zero-speed
17	SRY1LLING	Stall preventing deceleration
18～19	Keep down	
20	TMOB	Delay-time close type timer output
21	STEP1	Auto-operating under step 1
22	STEP2	Auto-operating under step 2
23	STEP3	Auto-operating under step 3
24	STEP4	Auto-operating under step 4
25	STEP5	Auto-operating under step 5
26	STEP6	Auto-operating under step 6

27	STEP7	Auto-operating under step 7
28	STEP8	Auto-operating under step 8
29	STEP9	Auto-operating under step 9
30	STEP10	Auto-operating under step 10
31	Keep down	
32	Q1（FF1）	Flip-flop（1）output
33	/Q1（FF1）	Flip-flop（1）reverse output
34	Q2（FF2）	Flip-flop（2）output
35	/Q2（FF2）	Flip-flop（2）reverse output
36～37	Keep down	Keep down
38	Output ON	ON Output is always ON
39	Keep down	
40	/TMOA	Delay-time switching-off timerreverse ouput
41	/TMOB	Delay-time close timeer reverse output
42	TMOC	Switching loop type timer
43	/TMOC	Switching loop type timer reverse output
44	×32CLK（only DO1）	Output pulse frequency=32×F057（Hz）
45	×16CLK（only DO1）	Output pulse frequency=16×F057（Hz）
46	×8CLK（only DO1）	Output pulse frequency=8×F057（Hz）
47	×4CLK（only DO1）	Output pulse frequency=4×F057（Hz）
48	×2CLK（only DO1）	Output pulse frequency=2×F057（Hz）
49	×1CLK（only DO1）	Output pulse frequency=1×F057（Hz）
50～53	Keep down	
54	Irms LEVEL1	Irms＞AI1
55	Irms LEVEL2	Irms＞AI2
56	Irms LEVEL3	Irms＞AI3
57	Power-Limit	Output power is limit
58～69	Keep down	

70	RUN &(AI1＞F074)	In operating and AI1＞F074 comparision output
71	RUN &(AI1＜F074)	In operating and AI1＜F074 comparision output
72	RUN &(AI2＞F075)	In operating and AI2＞F075 comparision output
73	RUN &(AI2＜F075)	In operating and AI2＜F075 comparision output
74	RUN &(AI3＞F076)	In operating and AI3＞F076 comparision output
75	RUN &(AI3＜F076)	In operating and AI3＜F076 comparision output
76～77	Keep down	
78	OL-WARNING	Over-load accumulation＞50%
79	/OL-WARNING	Over-load accumulation＜50%
80	AI1＞F074	AI1＞F074 comparision output
81	AI1＜F074	AI1＜F074 comparision output
82	AI2＞F075	AI2＞F075 comparision output
83	AI2＜F075	AI2＜F075 comparision output
84	AI3＞F076	AI3＞F076 comparision output
85	AI3＜F076	AI3＜F076 comparision output
86	ACC	In acceleration
87	DEC	In deceleration
88	DISCHARGE	In discharging
89	Keep down	
90	FWD	In forward running
91	REV	In reverse running
92	TMOC	Similar with Yn（42）but act after TMIC is ON
93	/TMOC	The same as Yn（43）

Reminding

• When in action of power-on and reset, all output are in “OFF” state

F045～F047=0	OFF（Output is always OFF）

When output terminal function choose this mode, this terminal is always in "OFF" state. Please refer to description of F045~F047=38

F045 ~ F047=1	STOP Frequency converter is stopping (Please refer to content of F045~F047=7)

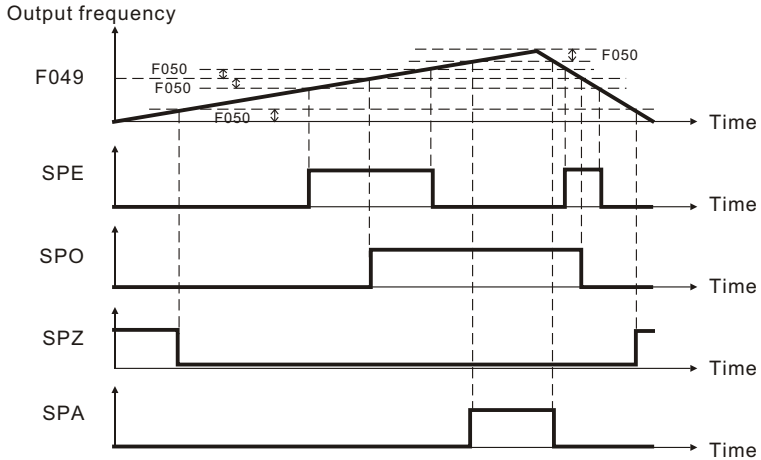
If output terminal function choose this mode, the frequency converter is in stopping state, and this terminal would be "ON". As soon as frequency converter begins to operate, the output would be "OFF" state.

Reminding

• Frequency converter is braking, and is still in operating state.

F045 ~ F047=2	SPE Output frequency is equal
F045 ~ F047=3	SPNE Output frequency is not equal

First, assign anyone frequency to exsit in the object frequency compared with F049, then assign the allowed error frequency to exist in F050. As the following drawing: If output terminal function chooses SPE, and when the error between output frequency of frequency converter and F049 is less than the range of F050, it is regarded as frequency equal. This moment, the output terminal would be "ON" state. But if the function chooses SPNE, the action is completely contrary to SPE.



F045 ~ F047=4	ALARM In trouble

When frequency converter is normal, output terminal is in "OFF" state, and if frequency converter is in trouble, the output terminal would be "ON" state rightly.

F045 ~ F047=5	NOT ALARM not in trouble

When frequency converter is normal, output terminal is in "ON" state, and if frequency converter is in trouble, the output terminal would be in "OFF" state rightly.

F045 ~ F047=6	BRAKING Frequency converter is braking

If output terminal chooses this function mode, and when frequency converter is braking, this output terminal is "ON", orelse is in "OFF" state.

Reminding

• The DC braking mentioned in this function means add the DC current to the coil of motor, and does not mean outer resistor discharge braking.
• When in the process of DC braking, the frequency converter is operating.

F045 ~ F047=7	RUNNING frequency converter is operating (refer to F045~F047=1)

If output terminal choose this mode, when frequency converter is operating, this output terminal will be "ON", and when frequency converter stops operating, the output terminal would be "OFF".

F045 ~ F047=8	SPO output frequency overruns
F045 ~ F047=9	SPNO output frequency does not overrun

Please refer to the time sequencial drawing of F045~F047=2.
First, assign anyone frequency to exsit in the object frequency compared with F049, refer to the drawing: If output terminal function chooses SPO, and when the output frequency overruns the frequency set by F049, it is regarded as frequency overruns. This moment, the output terminal would be "ON" state. But if the function chooses SPNEO, the action is completely contrary to SPEO.

F045 ~ F047=10	SPA output frequency arrival
F045 ~ F047=11	SPNA output frequency not arrival

Please refer to the time sequencial drawing of F045~F047=2
First, assign the allowed error frequency stored in F050, if output terminal function chooses SPA, and when the error between the output frequency of frequency converter and set frequency is less than the range of F050, it is regarded as frequency arrival, at the moment, output terminal would be in "ON" state.

If choose SPNA function, the action is completely contrary to SPA.

F045 ~ F047=12	DIRECTION operating direction

If output terminal choose this function, and when frequency converter output is forward direction, the output terminal is "ON" state. and when output is reverse direction, output terminal would be "OFF" state.


Reminding

• When frequency converter is stopping, output terminal is in "ON" state.

F045 ~ F047=13	Irms LEVEL0

When the output current "root mean square value" of frequency converter (Irms) ＞F048, this output terminal would be "ON".

F045 ~ F047=14	TMOA delay-time switching-off timer output
F045 ~ F047=15	SPZ output frequency is zero-speed
F045 ~ F047=16	SPNZ output frequency is not zero-speed

• Please refer to the time sequencial drawing of F045～F047=2

• First , must define the error range of zero-speed , and store it into F050.

• If output terminal function choose SPZ, and when output frequency is less than F050, is regarded as frequency in zero-speed; at this moment, output terminal would be "ON" state.

• If choose SPNZ function, the action is contrary completely to SPZ.

F045 ~ F047=17	STALLING Install preventing deceleration.

• When the frequency converter is operating, if output current overruns the limit(150%) of hardware, frequency converter will reduce the output frequency automatically and prevent motor stall, so that could reduce output current.

• If output terminal choose this function, when the frequency converter is executing deceleration action for preventing motor stall, output terminal would be "ON".

F045 ~ F047=18	Keep down
F045 ~ F047=19	Keep down
F045 ~ F047=20	TMOB delay-time close timer output


Reminding

• Please refer to the function description of section of 6.4

F045 ~ F047=21	STEP1 auto-operating under step 1
F045 ~ F047=22	STEP2 auto-operating under step 2
F045 ~ F047=23	STEP3 auto-operating under step 3
F045 ~ F047=24	STEP4 auto-operating under step 4
F045 ~ F047=25	STEP5 auto-operating under step 5
F045 ~ F047=26	STEP6 auto-operating under step 6
F045 ~ F047=27	STEP7 auto-operating under step 7
F045 ~ F047=28	STEP8 auto-operating under step 8
F045 ~ F047=29	STEP9 auto-operating under step 9
F045 ~ F047=30	STEP10 auto-operating under step 10


Reminding

• Refer to section 6.6.3

• For only five steps under the mode of repeated automatic running, stages from 6 to 10 are invalid.。

F045 ~ F047=31	Keep down
F045 ~ F047=32	Q1 flip-flop（1）output
F045 ~ F047=33	/Q1 flip-flop（1）anti-phase output
F045 ~ F047=34	Q2 flip-flop（2）output
F045 ~ F047=35	/Q2 flip-flop（2）anti-phase output


Reminding

• Refer to the function description of Din=22

F045 ~ F047=33	Keep down
F045 ~ F047=34	Keep down
F045 ~ F047=35	ON（output is always ON）

When output terminal function chooses this mode, this terminal is always in "ON" state. This function could be self-detection and while could be used as normal digital output contact by the computer. Please refer to the description of F045～F047=0.

F045 ~ F047=39	Keep down
F045 ~ F047=40	/TMOA delay-time switching-off timer anti-phase output
F045 ~ F047=41	/TMOB close timer anti-phase output
F045 ~ F047=42	TMOC Switching loop type timer
F045 ~ F047=43	/TMOC Switching loop type timer anti-phase output

Reminding

• Refer to the function description of Din=7 and Din=36 at section 6.4

F045 ~ F047=44	×32CLK output pulse frequency =32×F057（Hz）
F045 ~ F047=45	×16CLK output pulse frequency =16×F057（Hz）
F045 ~ F047=46	×8CLK output pulse frequency =8×F057（Hz）
F045 ~ F047=47	×4CLK output pulse frequency =4×F057（Hz）
F045 ~ F047=48	×2CLK output pulse frequency =2×F057（Hz）
F045 ~ F047=49	×1CLK output pulse frequency =1×F057（Hz）

Output terminal function mode 44～49 are set output pulse frequency. When using this mode, the user must execute frequency converter reset, and start up DInCLK function. In the same way, when changing the DInCLK function , also must execute reset action.

Reminding

• This function is only effect for DO1 terminal, and the max output frequency is 3KHz

F045 ~ F047=51	Keep down
F045 ~ F047=52	Keep down
F045 ~ F047=53	Keep down

F045 ~ F047=54	Irms LEVEL1

When the output current "root mean square value" of frequency converter(Irms%) > 150% * AI1, this output terminal will be "ON".

F045 ~ F047=55	Irms LEVEL2

When the output current "root mean square value" of frequency converter(I rms%) > 150% * AI2, this output terminal will be "ON".

F045 ~ F047=56	Irms LEVEL3

When the output current "root mean square v alue" of freq uency c onverter(Irms%) > 150% * AI3, this output terminal will be "ON".

F045 ~ F047=57	is output power limiting

Frequency converter operates under the output power(torque) control mode, when the output power overruns the upper limit of set frequency, the frequency converter will reduce its output power automatically, and this output terminal will be "ON".

F045 ~ F047=58~69	Keep down
F045 ~ F047=70	Comparing output with AI1＞F074 during operating
F045 ~ F047=71	Comparing output with AI1＜F074 during operating

When the frequency converter is operating, and AI1 analogy input signal＞F074, Don（70） will be “ON”, and Don(71) will be "OFF".(F074 value must be defined within 0.0～1023.0, the point leaves out of account). Set F055=3, and F056 could monitor the size of AI1 analogy input signal.

F045 ~ F047=73	Comparing output with AI2＞F075 during operating
F045 ~ F047=73	Comparing output with AI2＜F075 during operating

When the frequency converter is operating, and AI2 analogy input signal＞F075, Yn（72） will be “ON”, and Yn(73) will be "OFF".(F075 value must be defined within 0.0~1023.0, the point leaves out of account). Set F055=4, and F056 could monitor the size of AI2 analogy input signal.

F045 ~ F047=74	Comparing output with AI3＞F076 during operating
F045 ~ F047=75	Comparing output with AI3＜F076 during operating

When the frequency converter is operating, and AI3 analogy input signal＞F076, Don（74） will be "ON", and Yn（75） will be "OFF".(F076 value must be defined within 0.0～1023.0, the point leaves out of account). Set F055=5, and F056 could monitor the size of AI3 analogy input signal.

F045 ~ F047=76	Keep down
F045 ~ F047=77	Keep down
F045 ~ F047=78	OL- WARNING over-load accumulation warning
F045 ~ F047=79	/OL- WARNING over-load accumulation warning

When F054 =11， F061 could monitor the accumulation value of overload(OL). (refer to description of F054)
When output terminal choose mode 78, if over-load accumulation value(OL)> 50%, this output terminal will be "ON".
When output terminal choose mode 79, if over-load accumulation value(OL) < 50%, this output terminal will be "ON".

F045 ~ F047=80	AI1＞F074 comparing output
F045 ~ F047=81	AI1＜F074 comparing output

When AI1 analogy input signal＞F074, Don（80）will be "ON", and Don （81）will be "OFF". (F074 value must be defined within 0.0～1023.0, the point leaves out of account). Set F055=3, and F056 could monitor the size of AI1 analogy input signal.

F045 ~ F047=82	AI2＞F075 comparing output
F045 ~ F047=83	AI2＜F075 comparing output

When AI2 analogy input signal＞F075, Don（82）will be "ON", and Don（83）will be "OFF". (F075 value must be defined within 0.0～1023.0, the point leaves out of account). Set F055=4, and F056 could monitor the size of AI2 analogy input signal.

F045 ~ F047=84	AI3＞F076 comparing output
F045 ~ F047=85	AI3＜F076 comparing output

When AI3 analogy input signal＞F076, Don（84）will be "ON", and Don（85）will be "OFF". (F076 value must be defined within 0.0～1023.0, the point leaves out of account). Set F055=5, and F056 could monitor the size of AI3 analogy input signal.

F045 ~ F047=86	In acceleration

If output terminal chooses this function, and when frequency converter is acceleration, output terminal would be "ON" state.

F045 ~ F047=87	In deceleration

If output terminal chooses this function, and when frequency converter is deceleration, output terminal would be "ON" state.

F045 ~ F047=88	In discharging

If output terminal chooses this function, and when the voltage of the capacitor inside frequency converter is over high, output terminal would be "ON" state.

F045 ~ F047=89	Keep down
F045 ~ F047=90	In forward running

If output terminal chooses this function, and when frequency converter output is forward running direction, output terminal will be "ON" state.

F045 ~ F047=91	In reverse running

If output terminal chooses this function, and when frequency converter output is reverse running direction, output terminal will be "ON" state.

F045 ~ F047=92	TMOC switching loop type timer(starting up control)

If output terminal chooses this function, and when DIn =36 and DIn ON, the function is the same as Don = 42. But when DIn is OFF, the output is always in "OFF" state.(refer to description of DIn=36).

F045 ~ F047=93	/TMOC switching loop type timer anti-phase output

The function is the same as Don = 43.

6.6 Simple PLC auto-operating option

6.6.1 The related parameter and function of simple PLC operating option

Parameter	Function
F072	Choose the simple PLC auto-operating option
F073	Auto-operating the first (sixth) step time set
F074	Auto-operating the second (seventh) step time set
F075	Auto-operating the third (eighth) step time set
F076	Auto-operating the fourth (ninth) step time set
F077	Auto-operating the fifth (tenth) step time set

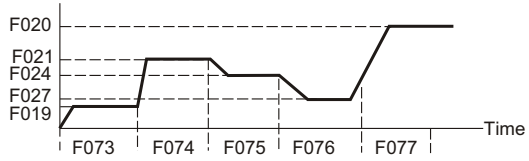
6.6.2 Simple PLC auto-operating option is controlled by F072, the auto-operating function could be chosen as the following:

F072	Function description
0	Normal operating, stop the auto-operating function
1	After stagewise auto-operating, keep constant-speed operating
2	After stagewise auto-operating, Stop, then repeat continually
3	After stagewise auto-operating, Stop, reverse, then repeat continually
4	After stagewise auto-operating, then repeat continually
5	After stagewise auto-operating, reverse, then repeat continually
6	Similar as mode 4; but every time will repeat from the second step.

Could use digital input terminal to transfer normal operating/simple PLC auto-operating, refer to description of DIn=31.

F072=1	After stagewise auto-operating, keep constant-speed operating

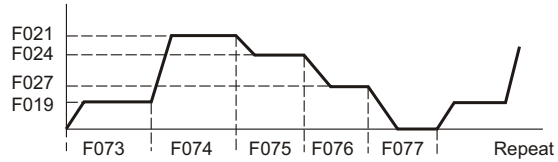
Step1: Frequency converter operates under inching frequency, operating time is controlled by F073.
Step2: Frequency converter operates under the step 1 operating frequency, operating time is controlled by F074.
Step3: Frequency converter operates under the step 2 operating frequency, operating time is controlled by F075.
Step4: Frequency converter operates under the step 3 operating frequency, operating time is controlled by F076.
Step5: Frequency converter operates continually under the main set frequency（F040 choose）



The application example of F072=1

F072=2	After stagewise auto-operating, Stop, then repeat continually

Step1: Frequency converter operates under inching frequency, operating time is controlled by F073.
Step2: Frequency converter operates under the step 1 operating frequency, operating time is controlled by F074.
Step3: Frequency converter operates under the step 2 operating frequency, operating time is controlled by F075.
Step4: Frequency converter operates under the step 3 operating frequency, operating time is controlled by F076.
Step5: Frequency converter stops operating, stopping time is controlled by F077
After the step5, begins to repeat again from step1



The application example of F072=2

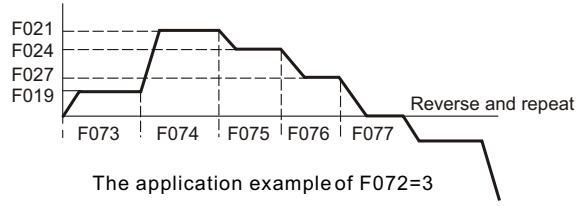
F072=3	After stagewise auto-operating, Stop, reverse, then repeat continually

Step1: Frequency converter operates under inching frequency, operating time is controlled by F073.
Step2: Frequency converter operates under the step 1 operating frequency, operating time is controlled by F074.
Step3: Frequency converter operates under the step 2 operating frequency, operating time is controlled by F075.
Step4: Frequency converter operates under the step 3 operating frequency, operating time is controlled by F076.
Step5: Frequency converter stops operating, stopping time is controlled by F077

After the step 5, reverse

Step6: Frequency converter operates under inching frequency, operating time is controlled by F073.
Step7: Frequency converter operates under the step 1 operating frequency, operating time is controlled by F074.
Step8: Frequency converter operates under the step 2 operating frequency, operating time is controlled by F075.
Step9: Frequency converter operates under the step 3 operating frequency, operating time is controlled by F076.
Step10: Frequency converter stops operating, stopping time is controlled by F077

After the step 10, reverse; and begins to repeat again from the step 1.



The application example of F072=3

F072=4	After stagewise auto-operating, then repeat continually.

Similar as mode F072=2。Just step 5 is difference.

Step1: Frequency converter operates under inching frequency, operating time is controlled by F073.
Step2: Frequency converter operates under the step 1 operating frequency, operating time is controlled by F074.
Step3: Frequency converter operates under the step 2 operating frequency, operating time is controlled by F075.
Step4: Frequency converter operates under the step 3 operating frequency, operating time is controlled by F076.
Step5: Frequency converter operates under main set frequency (F040 choose), operating time is controlled by F077
After the step 5, begins to repeat again from the step 1.

F072=5	After stagewise auto-operating, reverse, then repeat continually

Similar as mode F072=32。Just step 5 and 10 are difference.
Step1: Frequency converter operates under inching frequency, operating time is controlled by F073.
Step2: Frequency converter operates under the step 1 operating frequency, operating time is controlled by F074.
Step3: Frequency converter operates under the step 2 operating frequency, operating time is controlled by F075.
Step4: Frequency converter operates under the step 3 operating frequency, operating time is controlled by F076.
Step5: Frequency converter operates under main set frequency (F040 choose), operating time is controlled by F077

After the step 5, reverse.

Step6: Frequency converter operates under inching frequency, operating time is controlled by F073.
Step7: Frequency converter operates under the step 1 operating frequency, operating time is controlled by F074.
Step8: Frequency converter operates under the step 2 operating frequency, operating time is controlled by F075.
Step9: Frequency converter operates under the step 3 operating frequency, operating time is controlled by F076.
Step10: Frequency converter operates under main set frequency (F040 choose), operating time is controlled by F077

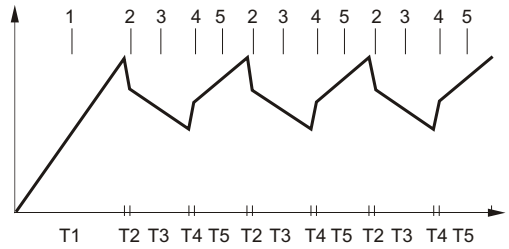
After the step 10, reverse; then repeat from the step 1.

F072=6	Similar as mode 4; but every time will repeat from the second step.

At the beginning, from step 1 to step 5 are the same as F072=4

But every time will repeat from the step 2.

At the beginning: step1 → step 2 → ····· step 5 → step 2 → step 5 ·····

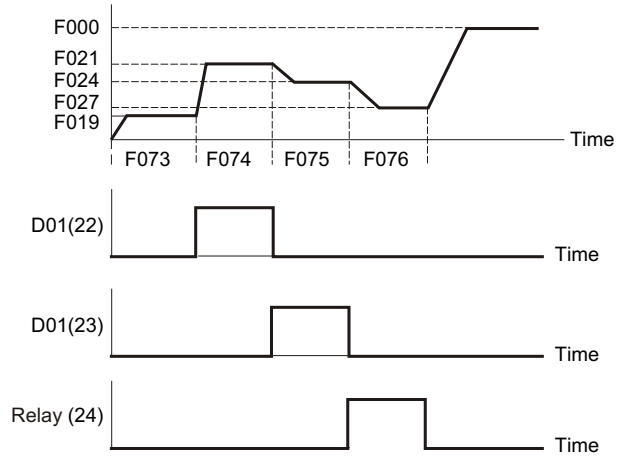


Application drawing of F072=6

6.6.3 Output signal when auto-operating under the special step.

- During the auto-operating, could choose the special digital output terminal(Don) function. When auto operating under the special step, could output signal to cooperate the action of ancillary equipments.
- Application: when frequency is in auto-operating, if hope that there all having output signal when operating under step 2.3.4 , the set method as the following:

Make F045=22, choose that DO1 will act when be step 2.
Make F046=23, choose that DO2 will act when be step 3.
Make F047=24, choose that RY1、RY1 will act when be step 4.
The action sequencial drawing of output terminal is the following:



7.1 RS485 communication interface parameter

When controlled by computer communication, F093 defines the communication address, former and rate of frequency converter.

7.1.1 DGI6000 series communication interface parameter set

F093=PB.ID (P: communication form，B：communication rate，
ID：communication address)

1.The set range of communication address：ID=01～99

2.The explanation of communication form set is as the following:

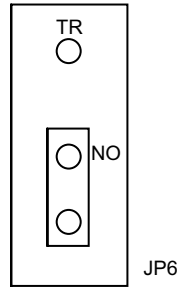
Communication form	Explanation
P=0	DGI6000 communication form，parameter No. is two-digit "nn"
P=1	DGI6000 communication form，parameter No. is three-digit"nnn"
P=2	Modbus，no parity, 8 bit binary
P=3	DGI6000 MoDbus, no parity , 8bit binary

3.The explanation of communication rate set is as the following:

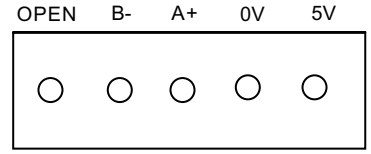
Communication rate	Explanation
B=0	4800bps，2stopbits
B=1	9600bps，2stopbits
B=2	19200bps，2stopbits
B=3	Keep down
B=4	4800bps，1stopbits
B=5	9600bps，1stopbits
B=6	19200bps，1stopbits
B=7	Keep down

7.2 The interface specification of RS485 hardware.

DGI6000 series Noninductive frequency converter is buit-in RS485 communication interface, CON6 output. The pin definition is as the following:



JP6



- RS485 interface allows the signal terminal of multi-pieces frequency converter connected in parallel directly.(do not connect CON6 PIN3（+5V）in parallel)
- when communicate with computer, could transfer to be standard 9pin Dsub(male) computer terminal. The definition after transfer is as the following：

Dsub(mail)9pin position	Definition	con6
PIN1～3	N.C.	
PIN4	A	A+
PIN5	B	B-
PIN6	0V	0V
PIN7～9	N.C.	

7. 3 DGI6000 communication form

7. 3 .1 The command for frequency converter

The signal communicate between RS485 interface and frequency converter by ASCII string, at the end should add up CR code(0x0D).

The communication interface of computer must be defined as：7Bit data，Even Parity。

7. 3 .1.1 Operating control command:(frequency converter has no apply information)

Command form：【C，uu，cc，fffff】

C：The original character of operating control command.

uu:communication address，assign that the uu channel receiving this string.uu(ID) could be appointed as the 00～99 channel.

If uu=00， All frequency converters must receive command.

cc：decimalist operating control command code（00～15）, made up by four binary-system signal.

cc=8 * Bit-3（inching）+4*Bit-2（reverse running）+2*Bit-1（forward running）+Bit-0（reset）

fffff：speed set value

Control code CC	Function
cc=00	Stop
cc=01	Reset
cc=02	Forward running
cc=06	Reverse running
cc=10	Inching forward running
cc=14	Inching reverse running

7. 3 .1.2 Parameter writing command：(frequency converter has no reply information)

Command form：【W，uu，nn， ddddd】or【W，uu，nnn，ddddd】

W：The original character of parameter writing command.

uu：Communication address，assign that the uu channel receiving this string.uu（ID）could be appointed as the 00～99 channel.

If uu=00， All frequency converters must receive command.

nn(n)：If communication form P=0， parameter No. is two-digit “nn”， parameter No. is 00~99.
If communication form P=1，parameter No. is three-digit “nnn”， parameter number is 000～099.

ddddd：the parameter value that wants to write in， is 00000～65535.

7. 3 .1.3 Parameter reading out command：

(frequency converter will reply about parameter value and operating state)

Command form：【R，uu，nn】or【R，uu，nnn】

R：The original character of parameter reading out command.

uu：Communication address，assign that the uu channel receiving this string.uu（ID）could be appointed as the 00～99 channel.

If uu=00， All frequency converters must receive command.

nn(n)：If communication form P=0， parameter No. is two-digit"nn"，parameter No. is 00～99.

If communication form P=1，parameter No. is three-digit "nnn"， parameter No. is 000～099.

7. 3 .2 The reply information of frequency converter to computer

As soon as frequency converter receiving the parameter reading out command, will reply rightly about this parameter and operating information of the time.

Reply information form【P，uu，nn，tt，ddddd，s，aaaa】or
【P，uu，nnn，tt，ddddd，s，aaaa】

P : The original character of parameter reply information.

uu : Point out this string is the reply information of the uu.
Parameter F093 of every frequency converte decides the communication address itself.

Nn(n): if communication form P=0，parameter No.is two-digit “nn”，parameter No.is 00～99。
if communication form P=1，parameter No.is three-digit “nnn”， parameter No.is 000～099。

tt: The information type of reply parameter

Information type tt	Information type	Information range	Keyboard controller display form
0	Can read-wirte and store	00000～65535	point two-digit
1	Can read-wirte and store	00000～65535	point one-digit
2	Can read-wirte and store	00000～65535	Integer
3	Can read-wirte and store	00000～00255	point two-digit
4	Can read-wirte and store	00000～00255	point one-digit
5	Can read-wirte and store	00000～00255	Integer
6	Can read-wirte and store	00000～00001	Interge
7	Can read-wirte but can not store	00000～65535	Interge
8	Only read	00000～65535	point two-digit，-if number value greater than 32767, need to remend to (65536～ddddd)
9	Only read	00000～65535	point two-digit
10	Only read	00000～65535	point one-digit
11	Only read	00000～65535	Interge
12	Only read	00000～00255	point two-digit

13	Only read	00000 ~ 00255	point one-digit
14	Only read	00000 ~ 00255	Interge
15	Only read	00000 ~ 00001	Interge
16	Only read	00000 ~ 00015	Interge，Binary
17	Only read	00000 ~ 00007	Interge，Binary
18	Only read	00000 ~ 00003	Interge，Binary
19	Only read	00000 ~ 01023	Interge
20	Only read	00000 ~ FFFF	Interge，Hex
22	Only read	00000 ~ FFFF	Interge，Hex

ddddd：Parameter value of reply（00000～65535）。

S ：reply about the output state of frequency converter

S=1：frequency converter is reverse running output

S=2：frequency converter is forward running output

S=3：frequency converter stops

S= other value，undefinition

aaaa：reply about the cureent four times of fault record of frequency converter（0000～9999）

Four numbers stand for the code record of current four times of fault：

a of thousand-digit：The code stands for the present fault state.

a of hundred-digit：The code stands for the first time fault state.

a of ten-digit：The code stands for the second time fault state.

a of unit-digit：The code stands for the third time fault state.

Reminding

• The meaning of fault code is in Chapter 9.

7．3．3Modbus communication form

DGI6000 series built-in standard Modbus communication form, and DGI6000 Modbus communication form，by through Modbus communication interface and human，PC，PLC will be connected directly.

8.1 PID parameter

The adjustment function of PID： The PID controller built-in frequency converter will detect the physical quantity (feedback quantity) by through the sensor of control object, then make this physical quantity compare with system specified rate. If there is bias, it will make the bias as zero by through PID adjustment function. This is normal process control way for keep the feedback quantity and specified rate as the same .

Reminding

• When using PID function, could not use other function related to F073～F077.

F073 PID input option

Made up by two groups of interge and point Y .Interge will choose the source of PID set value, point Y will choose the source of PID feedback value. The optional source of PID set value and PID feedback value as the following:

Set value	Instruction
0	Fixed value， F027 set(0.00 ~ 100.00%)
1	Analogy input AI1 is source，0 ~ +5V?0 ~ 0DI7FFF
2	Analogy input AI2 is source，0 ~ +5V?0 ~ 0DI7FFF
3	Analogy input AI3 is source，0 ~ +5V?0 ~ 0DI7FFF
4	Analogy input AI1 is source，+5V ~ 0?0 ~ 0DI7FFF
5	Analogy input AI2 is source，+5V ~ 0?0 ~ 0DI7FFF
6	Analogy input AI3 is source，+5V ~ 0?0 ~ 0DI7FFF
10	DI2(28) pulse input， computation way：0 DI 7FFF*(per 13.2ms total pulse number/F071)

F028 PID bias set(0.1～100.0%)

F029 PID gain set(0.0～500.0%)

F074 PID output value set in advanced(0.1～100.0%)

F075 PID`s Pgain

F076 PID`s Igain

F077 PID`s Dgain

8.2 PID digital input function option

DIn	Function	Instruction
50	PID function starting	When input terminal DIn(50)is ON，start up PID function When input terminal DIn(50)is OFF，stop PID function
51	PID integrating keeping	When input terminal DIn(51)is OFF， integrating normal treatment . When input terminal DIn(51)is ON，integrating keeping
52	PID integrating clearup	When input terminal DIn(52)is ON， clear up PID integrating value. When input terminal DIn(53)is ON，set PID integrating value
53	PID output value set in advanced	in advanced as the set value of F074. When input terminal DIn(54)is ON，bias quantity = bias input starting (refer to 8.3)
54	PID bias starting	When input terminal DIn(54)is OFF，bias quantity =0 When input terminal DIn(55)is ON， PID special gain = F029 set value (0.0～500.0%)
55	PID gain starting	When input terminal DIn(55)is OFF，PID special gain =100.0% When input terminal DIn(55)is ON，PID output will keep former output value, is similar as DIn(51)function.

8.3 PID speed source option

F040	Frequency set option
40	Frequency set =PID output (F040=40)
48	When input terminal DIn(54)is ON，frequency set= PID gain* (PID output +PID bias * AI1) When input terminal DIn(54)is OFF，frequency set =PID output
49	When input terminal DIn(54)is ON，frequency set = PID gain *(PID output +PID bias * AI2) When input terminal DIn(54)is OFF，frequency set =PID output
50	When input terminal DIn(54)is ON，frequency set = PID gain *(PID output +PID bias * AI3) When input terminal DIn(54)is OFF，frequency set =PID output
51	When input terminal DIn(54)is ON，frequency set = PID gain *(PID output +PID bias * F028) When input terminal DIn(54)is OFF，frequency set =PID output

8.4 Analogy output function

F037	AM terminal output signal	AM output
7	PID output	AM=5V*(PID output)
8	PID+AI1 bias input	When DIn(54)ON，5V*(PID gain *(PID output +PID bias *AI1))，When DIn(54)OFF，5V*(PID output)
9	PID+AI2 bias input	When DIn(54) ON，5V*(PID gain *(PID output +PID bias *AI2))，When DIn(54)OFF，5V*(PID output)
10	PID+AI3 bias input	When DIn(54）ON，5V*(PID gain *(PID output +PID bias *AI3))，When DI(54)OFF，5V*(PID output)
11	PID+F028 bias input	When DIn(54）ON，5V*(PID gain *(PID output +PID bias * F028))，When DIn(54)OFF，5V*(PID output)

8.5 PID simple application example

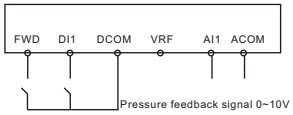
8.5.1 If feedback channel choose AI1(0～10V)，the range ability of remote pressure meter is 0～1Mpa.

8.5.2 Wiring diagram

1)Switch_on FWD& COM to start frequency inverter.

2)Switch_on DI1&COM to activate PID

Set_F040 to 40: output frequency is according to PID output



8.5.3 The set parameter as following：

1) F039 is according to actual requirement, normally be set as outer terminal control, that is F039=2;

2) F040=40 output frequency is decided by PID output;

3) F041=50 PID starting up，that is， DI1 function option is PID stating function；

4) F073=0.1 PID input option,

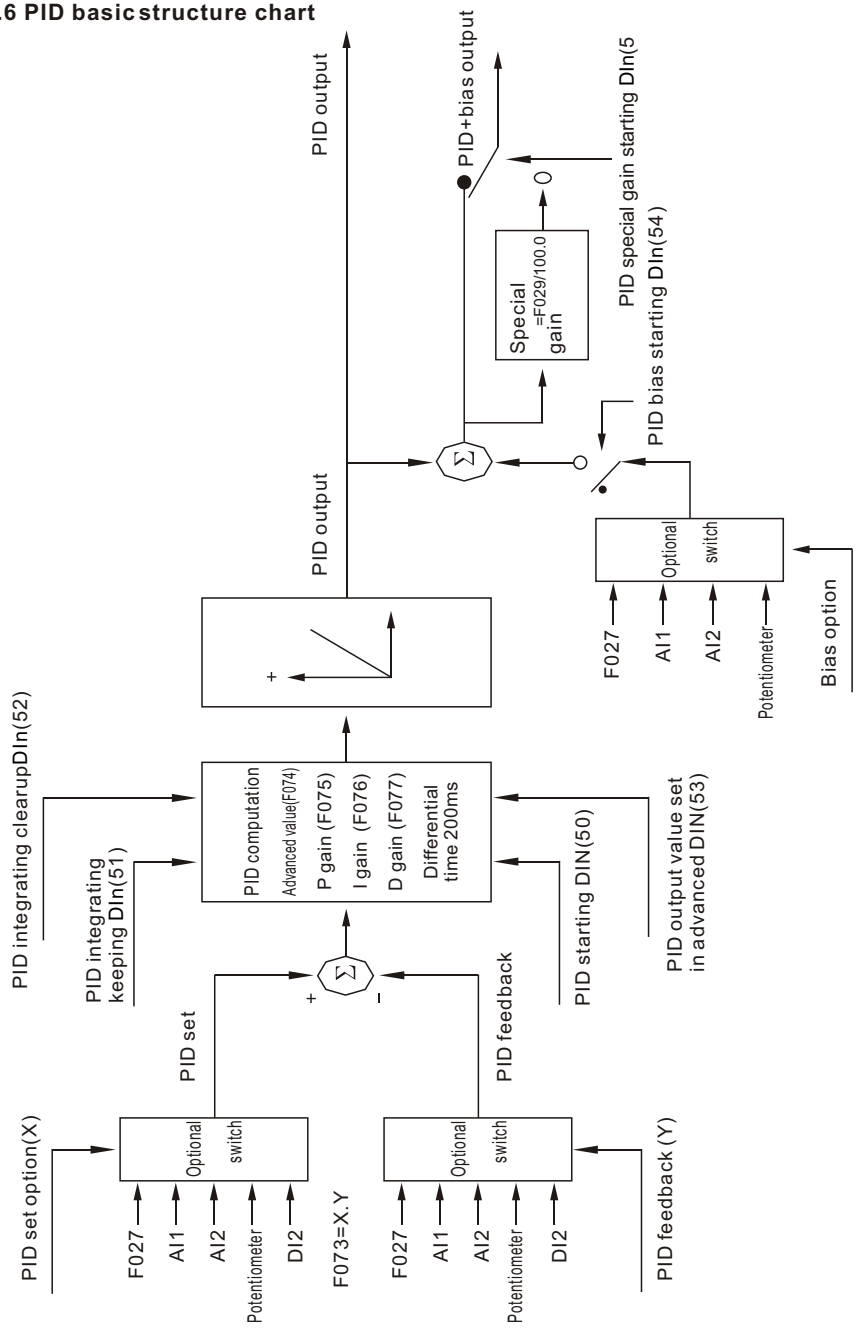
0 means the PID set value source，decided by F027

1 means PID feedback value source，analogy input AI1 is source;

5) F027=50% set value source PID(system required voltage is 0.5Mpa)。

8.5.4 Test running：close operational signal, that is, DI6(REV)~DCOM are close, frequency converter is operating under PID state.

8.6 PID basic structure chart



9.1 Fault code and countermeasure

Form 9-1 Normal fault code and countermeasure

ERROR display	Fault code	Fault explanation	Countermeasure
- -	0	Normal，no fault	
CA	1	over-current in acceleration	①Extend acceleration time
			②Reduce load inertia
			③Reduce torque hoist
			④Examine input power source
			⑤Choose the starting way as speed trace starting
CD	2	over-current in acceleration	①Deceleration time too short
			②Load inertia over great
			③Frequency conveter`s power samller
OC	3	over-current in operating	①Examine input power source
			②Reduce load breaking
			③Change a greater power unit
OH	4	Frequency converter over-heat	①Examine load current
			②Reduce carrier frequency
OP	5	Power source voltage over-high	①Examine input power source
			②Check the set value of F084 input AC power-source voltage
			③Extend deceleration time
UP	6	Power source voltage over-low	①Check input power source
			②Check the set value of F084 input AC power-source voltage
OL	7	Over-load	Examine load current
CB	8	over-current in DC braking	Amend parameter F005～F008
CS	9	software detecting over-current	Examine current sensor
		Memorizer self-detection fault	Change the main CPU panel

9.2 Abnormity and Countermeasure

Form 9-2 Abnormity and Countermeasure

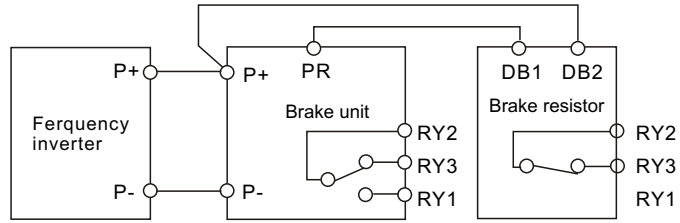
Abnormity	Conceivable reasons	Countermeasure
No any display after power-on	① network over-low voltgae or failure-phase ;	① Check the network voltage;
	② DC auxiliary power fault ;	② Looking for service ;
	③ Charging resistor damaged;	③ Looking for service;
Power source trip	①Input side of frequency converter short-circuti;	① Examine wiring or looking for service;
	② Capacitor of circuit breaker too small;	② Enlarge the capacitor of circuit breaker;
Motor not running	① Wrong wiring;	① Check wiring;
	② Operating way is set wrong;	② Reset the operating way;
	③ Over-load or motor blockage running;	③ Reduce load or adjust motor state;
Motor reverse running	① Wiring phase of motor wrong;	① Adjust any two phase output wiring of U,V,W;
Motor could not accelerate or decelerate	①Acceleration/deceleration time set illsuited ;	① Reset acceleration/ deceleration time;
	②Stall over-current point is set over-low;	② Enlarge the set value of stall over-current point;
	③Carrier frequency set illsuited or appears surge ;	③ Reduce carrier frequency;
	④over-heavy load;	④ Reduce load or change greater power of frequency converter;
rotate speed wave when motor is steady-state running	① Load wave over greatly;	① Reduce load wave;
	② Motor over-load protection coefficient is set too small;	② Enlarge motor over-load protection coefficient;
	③ Frequency set potentiometer is poor contact;	③ Change the potentiometer or looking for service;

Attention

· When be Error warning state, must check the system carefully and parameter according to the Manual. Press"STOP/RESET" to reset

10.1 Braking groupware

The braking groupware include braking unit and braking resistor.



Drawing 10-1 Connection drawing of braking groupware

Reminding

- The braking groupware are used to consume the feedback energy that the load of greater potential energy and inertia to frequency converter , in case of frequency converter tripping casued by over-high voltage.
- It is application for situation of greater inertia load, frequent braking or speediness stopping.

When the braking torque is 100%, : the specifications use in common of braking resistor and power as the following:

Model of frequency converter	Matched motor (kW)	Specifications of braking resistor	Remark
D75GB	0.75	80W,200Ω	Built-in braking unit
1D5GB	1.5	150W,100Ω	Built-in braking unit
2D2GB	2.2	250W,60Ω	Built-in braking unit
3D7GB	3.7	300W,40Ω	Built-in braking unit
5D5GB	0.4	50W,1000Ω	Built-in braking unit
7D5GB	0.75	80W,750Ω	Built-in braking unit
011GB	1.5	150W,400Ω	Built-in braking unit
015GB	2.2	250W,250Ω	Built-in braking unit
018GB	3.7	300W,150Ω	External braking unit
022GB	5.5	500W,200Ω	External braking unit
030GB	7.5	1000W,100Ω	External braking unit
037GB	11	1500W,40Ω	External braking unit
045GB	15	1500W,40Ω	External braking unit
055GB	18.5	1500W,40Ω	External braking unit
075GB	22	3000W,20Ω	External braking unit
095GB	30	3000W,20Ω	External braking unit
110GA	37	3000W,20Ω	External braking unit
132GA	45	5000W,10Ω	External braking unit
160GA	55	5000W,10Ω	External braking unit
187GA	75	9600W,13.6Ω	External braking unit
200GA	90	9600W,20Ω	External braking unit
220GA	110	9600W,20Ω	External braking unit
250GA	132	9600W,20Ω	External braking unit
280GA	160	9600W,20Ω	External braking unit

Select spare parts


Reminding

- The units under 015GB is built-in braking unit, and if the inner braking unit could not supply enough torque, should match external braking resistor and connect with braking components.
- Regarding the units above 015GB, if braking torque is poor, could connect several braking units in parallel. But please pay attention that the braking units connected in parallel must be set as the same braking electric level parameter to get the expected braking torque.

10.2 DC Reactor

When network capacitor is more larger than frequency converter`s, or the capacitor of power source is more than 1000KVA, or need high requirement for improving the power factor of power source, users could install the DC Reactor into the DC center bus-bar. This DC Reactor could be used with AC Reactor at the same time, and could reduce input high harmonic effectly.

Voltage	Matched motor(kW)	Current A	Inductance u H
380V	11～15	40	1500
	18.5～30	75	600
	37～55	150	300
	75～90	220	200
	110	280	140

11.1 Attentions of inspection and maintenance

It is necessary to do the daily and regular inspection and maintenance to the frequency converter, because that frequency converter operates for a long time and influenced by ambient temperature, humidity, dust or vibration, or the reason of compontents aging and abrasion, all will make the frequency converter be in latency trouble.

Warning

- Only special technical operator could do the inspection, maintenance, in case of accident.
- At least 10 minutes after cutting off the power source, could do the inspection and maintenance,in case of electric shock accident.
- Make sure indication lamp of control keyboard go out. Open the panel, then make sure that the charging lamp on the right side of main-circuit terminal go out.
- Must use insulated tools when inspecting, and please do not operate by the dank hands, in case of accident.
- Keep the equipment neat and clean.
- Do not use the product in the situation of dank or oily. The dust or other things will break down the isolation and lead to unexpected accident. Must be carefull!

11.2 Daily inspected items

Form 11-1 Daily inspected items

Inspected object	Inspected items	Inspection period	Inspection method	Eligibility standard	Used instrument
Operating enviroment	• Ambient temperature • Humidity, dust, corrodibility and oil mist	Daily	• Thermometer examine • Smell examine • Vision examine	• Ambient Temperatureis -10～40℃ no frost • Humidity 20-90%, no peculiar smell	• Thermometer • Hygrometer
Frequency converter	• Vibration • Heat • Noise	Daily	• Touch cover • Auditory examine	• Vibrate stable • Normal temperature • No abnormal noise	
Motor	• Vibration • Heat • Noise	Daily	• Touch cover • Auditory examine	• Vibrate stable • Normal temperature • No abnormal noise	
Electric parameter	• Input voltage • Output voltage • Output current	Daily	• Ammeter examine	• Every electric parameter within range rated value	• Moving-iron voltmeter • Rectifier voltmeter • Clip-on ammeter

11.3 Regular inspection items

Warning

- During inspection, could not dismount or shake compontents, even could not take away connectors, otherwise will lead to damage to frequency converter.
- Please do not leave the inspection tools (likes screwdriver) into the product after inspection, or else will damage to frequency converter.

Form 11-2 Regular inspected items

Inspected object	Inspected items	Inspection period	Inspection method	Eligibility standard	Used instrument
Main circuit	The whole	• Whether connection and terminal Loosened	Regular	• Vision examine	• The connection No loosened and terminal is firm.
		• Whether compontents be burned			• No compontents be burned
	Main power module	• Whether damaged	Regular	• Vision examine	• No damaged
	Filter capacitor	• whether leak	Regular	• Vision examine	• No leak
		• whether swelled up			• No swelled up
	Contactor	• Whether the voice of switching on is abnormal	Regular	• Vision examine	• Voice is normal
		• Dust clearup		• Vision examine	• Clean and neat
	Resistor	• whether has cleft	Regular	• Vision examine	• No cleft
		• whether colour is abnormal			• Normal colour
	Fan	• whether noise and vibration is abnormal	Regular	• Vision examine	• Normal voice, vibrate steady
		• Dust clearup		• Vision examine	• Clean and neat
	PCB panel	• Dust clearup	Regular	• Vision examine	• Clean and neat
Control circuit	FPC line base	• whether loosened	Regular		• Firm and no loosened
	The whole	• whether has abnormal smell or colour	Regular	• Vision examine	• Normal smell, no colour changing
		• whether has cleft		• Smell examine	• No cleft
	LED	• whether display normal	Regular	• Vision examine	• Display normal and clear
Keyboard	Connection line	• whether scratched	Regular	• Vision examine	• No scratched
		• whether firm			• Firm and no loosened

11.4 The storing of frequency converter

Please pay the following attentions for the storing of frequency converter

Attention

- Do not store the product at the place of high-temperature, dank and dusty, and make sure well airiness.
- The frequency converter not used for long time will cause the filter characteristic of electroanalysis capacitor poorer, must make sure one power-on within 2 years, and time of power-on is not less than 5 hours. Must use voltage regulator to raise the input voltage to the rated value, and check whether the function is normal, circuit is short-circuit. If above problems happen to, please remove earlily or look fro service.

11.5 The guarantee to frequency converter

If the following situation happen to the frequency converter, we will supply maintenance service:

1.The maintenance range just includes the frequency converter itself;

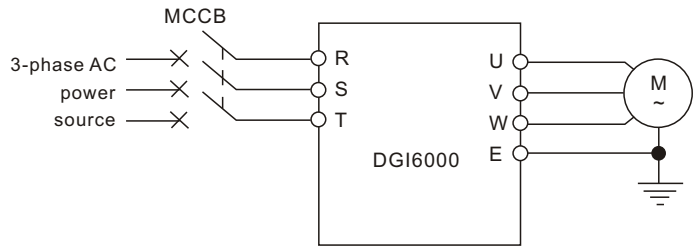
2.Regarding the fault or damage happens under normal using, the factory will supply maintenance service within 18 months from the ex-factory date, and will be charged if the time is over maintenance period;

3.It will also be charged for the following situation even within 18 months:

① The fault or damage caused by wrong operation or amending without authorization;
② The damage because of fire, flood, voltage abnormal or other natural calamities;
③ The damage because of transport or dropping after purchase;
④ Do not operate according to the User Manual;
⑤ The fault or damage by man-made or the reason of other equipments ;
⑥ Do not write the model, manufacture No, purchase date or name of distributor of the product according to the requirement of maintenance card. Or the words in the maintenance were changed.

The following application examples are is for reference.

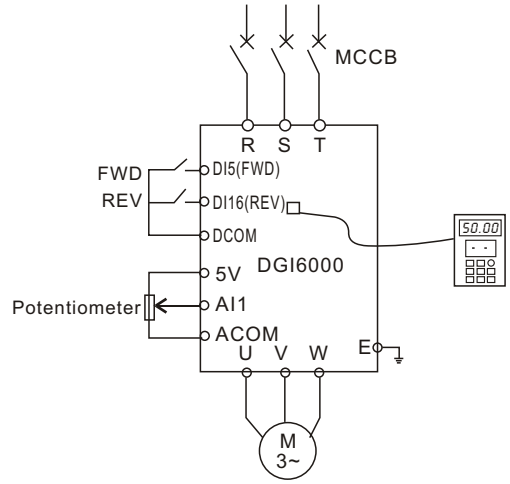
12.1 Example1: Keyboard controls the frequency converter starting and stopping, keyboard potentiometer set the frequency.



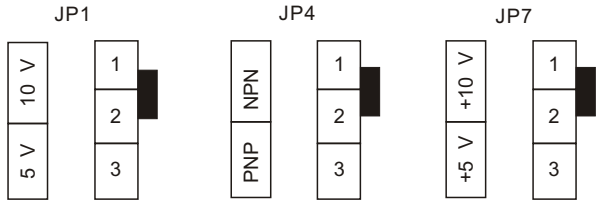
Drawing 12-1 The connection drawing of example1

- F039 control way option: set as "0" --keyboard operation;
- F040 frequency set option: set as "25" --keyboard potentiometer set;
- Use the FWD 、STOP RESET keys for starting up to operate and decelerating to stop;
- Turn the keyboard potentiometer to adjust speed.

12.2 Example 2: Outer terminals control frequency converter starting and stopping, outer potentiometer sets the frequency.



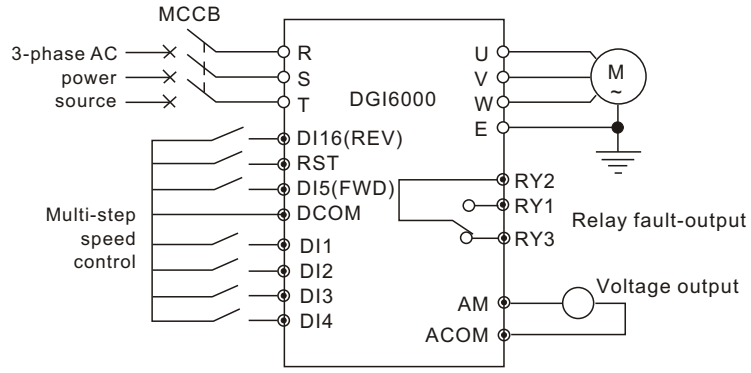
Drawing 12-2 Connection drawing of example 2



"1" of JP1 and "2" are short-circuit, means that W1 chooses 0~10V
"1" of JP4 and "2" are short-circuit, means that the common terminal of digital input terminal FWD, REV is COM
"1" of Jp7 and "2" are short-circuit, means that programmable power VER chooses +10V, and supply +10V power

- F039 control way option: set as 2--Outer terminals control;
- F040 frequency set way: set as 1--Outer voltage signal AI1(0 ~ 10V)
- FWD ~ DCOM close, motor is forward running; REV ~ DCOM close, motor is reverse running;
- FWD ~ DCOM or REV ~ DCOM switch off, frequency converter stops;
- Adjust the AI1 potentiometer for speed adjustment.
- Please note the set of jump-wire terminal, the ex-factory value could meet the requirement.

12.3 Example 3: Outer terminals control frequency converter starting and stopping, multi-step speed operating way.



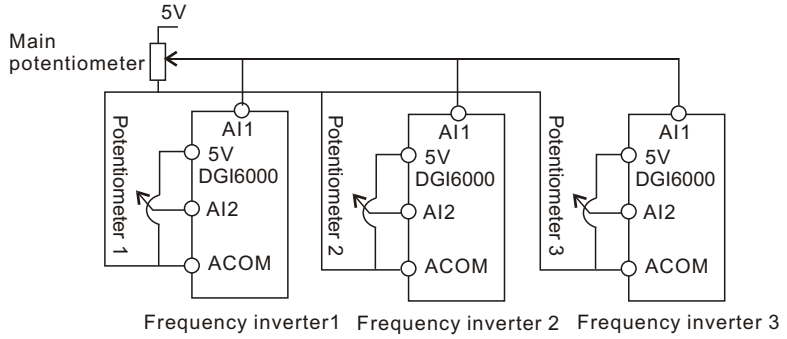
Drawing 12-3 The connection drawing of example

- F041=80，F042=81，F043=82，F044=83--(DI1~DI4 function option)--set as " multi-step speed control ";
- F019，F021，F024，F027---- multi-step speed frequency set, total 16 steps of frequency;
- FWD ~ COM close， motor is forward running; REV~COM close，motor is reverse running; FWD、REV ~ COM switch off，frequency converter stops;
- Any one or severls of DI1 ~ DI4 and COM close（ total 15 kinds of combination），the frequency converter will operate according to the multi-step speed frequency set by DI1 ~ DI4.

The function form of DI1~DI3 making up to 8-step speed:

Frequency	Step speed	X3(F024)	X2(F021)	X1(F019)
F000	1	0	0	0
F019	2	0	0	1
F021	3	0	1	0
F024	4	1	0	0
F019+F021	5	0	1	1
F019+F024	6	1	0	1
F024+F021	7	1	1	0
F019+F021+F024	8	1	1	1

12.4 Example 4: The proportion interlocking operating control of Multi-pieces frequency converter



Drawing12-5 Example5 wiring drawing

For example：ask the three motors to run according to the proportion of 1：0.5：0.2. When AI2 input is minimum value, output frequency =100%—F070*F015，the number “1” is corresponding to frequency 50Hz，and need having fine-tuning function.

Frequency 1 set as the following:

- F039 control way option：set as 2--as outer terminal control;
- F040 frequency set option：set as 12--proportional inlocking input;
- F070 proportional interlocking set：set as 0--choose the proportional input of AI2 input as "zero"，i.e, AI1 input is "1"，（note: F015=50Hz "1" value is corresponding to frequency 50HZ）;

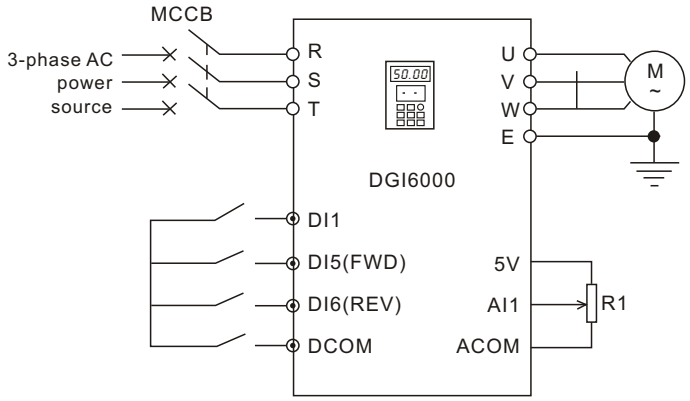
Frequency 2 set as the following:

- F039 control way option：set as 2--as outer terminal control;
- F040 frequency set option：set as 12--proportional inlocking input;
- F070 proportional interlocking set：set as 50--choose the proportional input of AI2 input as 50%，i.e, AI1 input is 50%（note F015=50Hz “0.5” value is corresponding to frequency 25Hz）;

Frequency 3 set as the following:

- F039 control way option：set as 2--as outer terminal control;
- F040 frequency set option：set as 12--proportional inlocking input;
- F070 proportional interlocking set：set as 80--choose the proportional input of AI2 input as 80%，i.e, AI1 input is 20%（note F015=50HZ “0.2” value is corresponding to frequency 10Hz）;
- Potentiometer 1，Potentiometer 2，Potentiometer 3，Could do the exact fine-tuning to every frequency converter.

12.5 Example 5 The special using of F039



F039 Operational control way option	F039 = 0.2
F041 DI1 terminal input function option	F041=89

F039 =a.b F039 in above example is set as 0.2

· F039=0.2 the integer part is the content of a: in above parameter, a=0 means operating control command is decided by keyboard. Press"FWD"key to control frequency converter forward running, press"REV"key, frequency converter is reverse running, press"STOP" key, frequency converter stops operating.

· F039=0.2 the point part is the content of b: in above parameter , b=2 means the operating control command is decided by FWD terminal to control frequency converter operating or stopping; and by REV terminal to control frequency converter reverse running.

· **Well then, when the F039 execute "a" function and "b" function?**

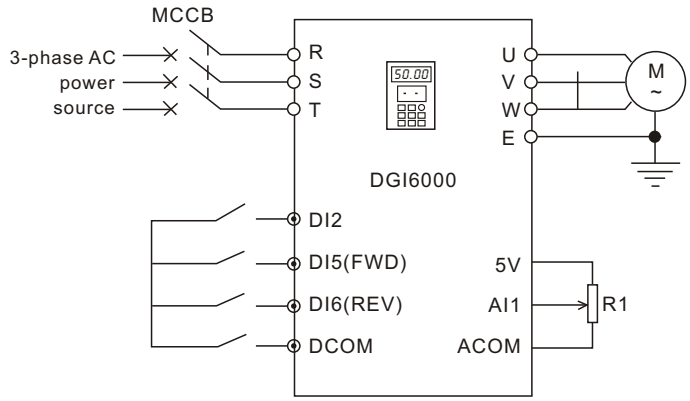
· F041=89 means DI1 terminal function chooses "89" function,

· When DI1 ~ DCOM are switching off, F039 operating control command=a

· When DI1 ~ DCOM are close, F039 operating control command =b

· In above example: when DI1 ~ COM are switching off, press FWD or REV key on the keyboard to realize forward or reverse running, press STOP key to stop; when DI1 ~ COM are close, use FWD ~ COM or REV ~ COM close or switching off to decide frequency converter operating or stopping.

12.6 Example 6 The special using of F040



F040 Frequency set option	F040 = 8.25
F042 terminal input function option	F041=88

F040 =cc.dd the F040 in above example is set as 8.25

· F040=8.25, The integer part is the content of cc: in above parameter, cc=8 means the frequency set option function is "8", that is, the frequency is set by F000 value when power-on.

· F040=8.25, The point part is the content of dd: in above parameter, dd=25 means the frequency set option function is "25", that is, the frequency is set by keyboard potentiometer after operating.

· **Well then, when the F040 execute "cc" function and "dd" funcgtion?**

F042=88 means DI2 terminal function chooses "88"function,

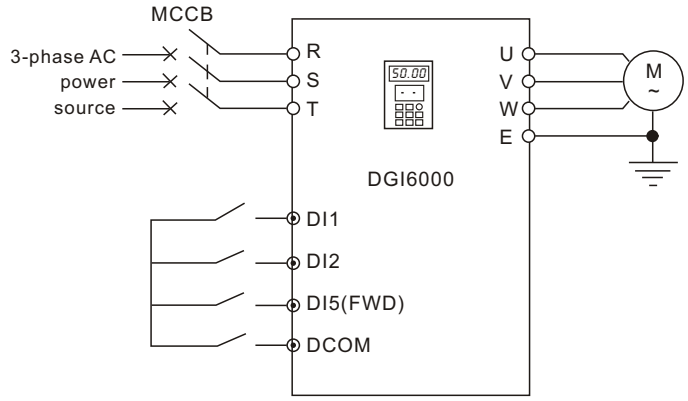
· When DI2 ~ DCOM are switching off, F040 operating control command=cc

· When DI2 ~ DCOM are close, F040 operating control command =dd

In above example: when DI2~COM are switching off, frequency set is decided by F000 parameter; when DI2~COM are close, frequency is decided by keyboard potentiometer.

If F040 is set as 8.25, when if such DI2、DI5、DI6、DCOM multifunction digital input terminal function is not set as "option control command and speed command" function, then frequency is decided by integer part 8, and at this moment the function of point part could realize.

12.6 Example 6 Use UP/DOWN terminal to decide operational Frequency



Parameter set：F040=6 F41=19 F42=20
Parameter explanation：when F040=6，the operational frequency is decided by the built-in up/down counter.
When DI1 and DCOM are close，the operational frequency increasing；
When DI2 and DCOM are close，the operational frequency decreasing；

Other digital input terminal could also realize above function!

Form of Fixed V/F curve set

By through the following form,could choose the fixed V/F curve, and choose 15 matching V/F curve parameter：

curve	F088	F015	F010	F011	F016	F009	Instruction
0	100%	50Hz	2.5Hz	7.50%	1.3Hz	4%	Normal using
1	100%	50Hz	3Hz	7.80%	1.5Hz	4%	Normal using
2	100%	50Hz	3Hz	7.80%	1.5Hz	4%	Normal using
3	100%	50Hz	3Hz	7.80%	1.5Hz	4%	60Hz to 72Hz constant voltage outut(Normal using)
4	100%	50Hz	25Hz	20%	1.3Hz	3.70%	The third power descending V/F curve
5	100%	50Hz	25Hz	28.90%	1.3Hz	4%	square descending V/F curve
6	100%	50Hz	30Hz	28.90%	1.5Hz	3.70%	The third power descending V/F curve
7	100%	50Hz	30Hz	28.90%	1.5Hz	4%	square descending V/F curve
8	100%	50Hz	2.5Hz	8%	1.3Hz	4.20%	High starting torque load
9	100%	50Hz	2.5Hz	8.50%	1.3Hz	4.20%	High starting torque load
10	100%	60HZ	3Hz	8%	1.5Hz	4.18%	High starting torque load
11	100%	60HZ	3Hz	8.50%	1.5Hz	4.20%	High starting torque load
12	100%	60HZ	3Hz	7.80%	1.5Hz	4%	60Hz to 90Hz constant voltage outut (Normal using)
13	100%	60HZ	3Hz	7.80%	1.5Hz	4%	60Hz to 120Hz constant voltage outut (Normal using)
14	100%	60HZ	3Hz	7.80%	1.5Hz	4%	60Hz to 180Hz constant voltage outut (Normal using)
15	Self-defined curve V/F						

Application example

Direct Current Reactor

If be capacity of power system is far greater than frequency converters', or the factor of improving this power consumption, we should retrofit a Direct Current Reactor in the bus of the twis changeable.
When this reactor be used with AC reactor, it will have noticeable effect to reduce the biggerthe higher harmonic.

Matching specification recommended

Voltage	Motor shaft power(KW)	Current(A)	Induction(uH)
380V	11~15	40	1500
	18.5~30	70	600

Application example

Matching specification recommended

Ferquency convertor models	Motor shaft power(KW)	Brake resistors specication	Remark
DGI6002SD75GB	0.75	150W,60Ω	Built in dynamic braking unit
DGI6002S1D5GB	1.5	150W.50Ω	Built in dynamic braking unit
DGI6002S2D2GB	2.2	250W,60Ω	Built in dynamic braking unit
DGI6003TD75GB	0.75	150W,60Ω	Built in dynamic braking unit
DGI6003T1D5GB	1.5	150W,60Ω	Built in dynamic braking unit
DGI6003T2D2GB	2.2	250W,250Ω	Built in dynamic braking unit
DGI6003T3D7GB	3.7	300W,150 Ω	Built in dynamic braking unit
DGI6003T5D5GB	5.5	500W,200Ω	Built in dynamic braking unit
DGI6003T7D5GB	7.5	1000W,100Ω	Built in dynamic braking unit
DGI6003TO11GB	11	1500W,40Ω	Built in dynamic braking unit
DGI6003T015GB	15	1500W,40Ω	Built in dynamic braking unit
DGI6003T018GB	18.5	1500W,40Ω	Built in dynamic braking unit
DGI6003TO22GB	22	3000W,20Ω	Built in dynamic braking unit