degdrive

Universal inverter

DGI1000

0.4-75KW

SERVICE MANUAL

Foreword

We products are designed and produced according toEN61800-5-1: 2003, EN61800-3: 2004 standards under ISO9001:2008 quality management system.

1. DGI1000 series can fulfill all kinds of demand for general-purpose inverter by advanced control manner which make high torque，high precision and wide-range speed regulation drive be available. DGI1000 is organic combine of customer's general need and industrial requirement to provide practical PI adjuster, simple PLC, programmable input output terminal control, long-distance synchronous control, impulse frequency provision and other special inverter control with powerful function for customer and to provide highly-integrated incorporative solution of high value for reducing system cost and improving system reliability for device manufacturing and automatization engineering customers.

DGI1000's big torque low noise and low electromagnetic disturbance during operation can fulfill customer's environmental protection requirement by space voltage vector PWM control technique, speed sensorless vector control technology and electromagnetic compatibility unitary design.

2. DGI1100 series inverter specialized for drawing machine is a kind of inverter in cable industry for winding and rewinding control. Its internal real-time computing module can automatically identify the coil diameter of the receive volume, the wire diameter of drawing wire , according to the changes of winding and rewinding of the roll diameter, automatically adjust the output frequency of winding and rewinding of the inverter, to keep constant tension of winding and rewinding cable.

Drawing machine can divide into large drawing machine, medium drawing machine, slender drawing machine and micro drawing machine other four, composes of drawing and taking-up two parts. To improve the quality of cable and lower the cost, drawing machine is general from single frequency control to dual-frequency control, and now most of the dual-frequency control is generally used external PID control board, the shortcomings of this approach are: the control parameters of PID board is difficult to debug, the control performance depends on the level of debugging skill; Too many components and adjustable potentiometers on the PID board are more prone to damage, repair and maintenance costs are high.

DGI1100 series inverters specialized in drawing machine adopt a unique control method, independently form dual-frequency digital PID control system, automatically identify the diameter of reel roll, the mechanical transmission ratio,

cable diameter, automatically adjust the PID parameters, track the speed of the host, that is to pole zero of the tension balance when it powers on (middle point), is a real sense of the fool-type inverter special for drawing machine. As long as the correct general electrical wiring, you can work. Whether it is an empty plate, half plate, full plate, or the low speed, medium speed, high speed, which ensures a smooth start, smooth operation, constant tension when wire drawing machine at work, as well as achieving start, stop at any time. Complete replacement of external PID board to make the system more compact, cheaper, easier to maintain, while controlling effect is more stable.

In order to maintain constant tension of the close and put, the inverter special for drawing machine is to be in a relatively short period of time acceleration and deceleration. During the process of acceleration and deceleration, the inverter must provide larger start-up current, braking current and resulted in higher DC bus voltage, thus it needs external braking resistor.

Appendix 1 only makes instructions of controlling function of the inverter special for drawing machine, please use with DGI1000 manual simultaneously when operating.

Assembling wiring, parameter setting, troubleshooting and daily maintenance notices are available in this manual. To make sure that you can correctly assemble and operate DGI1000 series inverters to exert their excellent performance, please read this user manual detailed before you assemble the device and conserve the manual appropriately before the end-user get them.

Please contact our office or dealer in all places at any moment if you have any doubts or special demands when using these inverters, and you can also contact our after service center in our Headquarters directly. We will serve you with all our heart.

We reserve our right to notice you if we change contents of this manual.

CONTENTS

1 Safety information and use notice points

In order to ensure the safety of your personal and equipment, before using the inverter, please read this chapter of contents conscientiously.

1.1 Safety precautions

There are three kinds of safe relevant warnings in this service manual, they are as follows:

This symbol explains items that need to be paid attention to when being operated.

note

This symbol is briefed on some useful information.

This symbol briefs on: If does not operate on request, may cause death, severely injured or serious property loss.

Forbid user directly power off when the inverter is under running, accelerating or decelerating, must only ensure that the drive has been completely shut down or in standby situation can perform power off operation. Otherwise, the users themselves afford the damage of the inverter, equipment damage and personal accident.

(1) Forbid to connect U, V, W output end to AC power supply, otherwise cause the complete damage of the inverter.
(2) Don't make P- and P + short-circuited, otherwise cause the inverter to be damaged.
(3) The inverter is forbidden to install on the flammables, otherwise have danger of fire.
(4) Don't install it in the environment with explosive gas, otherwise have danger of causing explosion.
(5) After connecting main loop, should carry on insulating treatment to bare wiring end, otherwise have danger of getting an electric shock.
(6) If being connected to the power supply, don't operate the inverter with moist hands, otherwise have danger of getting an electric shock.
(7) The ground terminal of the inverter must be grounded well.
(8) Inverter being connected to power supply, please don't open cover and carry on wiring, can connect the wire or check only after closing power for10 minutes.
(9) Only qualified personnel may carry on wiring and forbid leaving over any conductive thing in machine, otherwise have danger of getting an electric shock or causing damage of the inverter.
(10) Inverter stored for over 2 years, should be stepped up gradually with voltage regulator first while having the electricity, otherwise have danger of getting electric shock and explosion.

(1) It is prohibited that connect AC 220V signal to control ends except TA, TB, TC, otherwise have danger of damaging property.
(2) If the inverter is damaged or without all parts, please don't install and operate it, otherwise have danger of fire or cause personnel to be injured.
(3) When installing, should choose a place where can endure the inverter, otherwise have danger of injuring personnel or damaging property while falling down.

1.2 Use range

(1) This inverter is only suitable for three phases AC asynchronous motor in general industrial field.
(2) While applying inverter to such equipments that relate much to the life, great property, safety devices etc., must handle cautiously, and consult with producer, please.
(3) This inverter belongs to the control device of general industrial motor, if used in dangerous equipment, must consider the security safeguard procedures when the inverter breaks down.

1.3 Use notice points

(1) DGI1000 series inverter is voltage-type inverter, so temperature, noise and vibration slightly increasing compared to power source running when using, belongs to normal phenomenon.
(2) If need to run for a long time with constant torque of low-speed, must select motor of frequency conversion for use. Use general asynchronous AC motor when running at a low speed, should control temperature of the motor or carry on heat dissipation measure forcedly, so as not to burn the generator.
(3) Such mechanical device needing lubricating as the gearbox and gear wheel, etc., after running at a low speed for a long time, may be damaged as lubrication result become poor, please take necessary measure in advance.
(4) When the motor running with frequency above specified, besides considering the vibration, noise increase of the motor, must also confirm speed range of the motor bearing and the mechanical device.
(5) For hoist and great inertia load, etc., the inverter would shut off frequently due to over-current or over-voltage failure, in order to guarantee normal work, should consider choosing proper brake package.
(6) Should switch on/off the inverter through terminal or other normal order channels. It is prohibited that switch on/off the inverter frequently by using strong electric switch such as magnetic control conductor, otherwise will cause the equipment to be damaged.
(7) If need to install such switch as the magnetic control conductor, etc. between

inverter output and the motor, please guarantee the inverter is switched on/off without output, otherwise may damage the inverter.

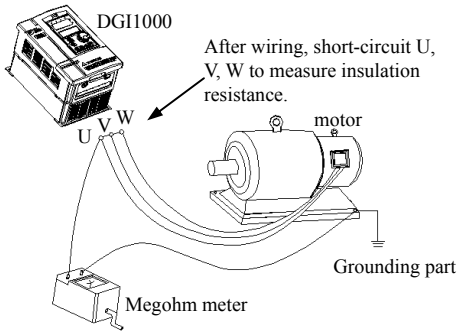
(8) The inverter may meet with mechanical resonance of the load within certain range of frequency output, can set up jumping frequency to evade.

(9) Before using, should confirm the voltage of the power is within the working voltage range allowed, otherwise should vary voltage or order special inverter.

(10) In the condition of altitude above 1000 meters, should use the inverter in lower volume, reduce output current by 10% of specified current after each 1500 meters height increasing.

(11) Should make insulation check to the motor before using it for the first time or after a long time placement. Please inspect with 500V voltage-type megohm meter according to method shown as graph 1-1 and insulation resistance should not be smaller than 5 MΩ, otherwise inverter may be damaged.

(12) To forbid assembling capacitor for improving power factor or lightningproof voltage-sensible resistance etc., otherwise will cause malfunction trip of the inverter or damage of the parts, shown as graph 1-2.



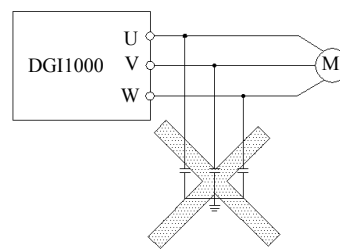


Fig.1-1 motor insulation measure **Fig.1-2 capacitor at output side forbidden**

1.4 Scrap notice points

When disposing scrap inverter and its parts, please note:

(1) The unit: please discard as industrial useless.

(2) Electrolytic capacitor: when burning the inverter electrolytic capacitor in it may explode.

(3) Plastic: when plastic, rubber parts etc. in the inverter are burning, they may bring bad, poisonous gas, so please be ready to safeguards.

2 Type and specification of the inverter

2.1 Incoming inverter inspect

(1) Check if there is damage during transportation and inverter itself has damage or fall-off parts.

(2) Check if parts presented in packing list are all ready.

(3) Please confirm rated data of the inverter is in line with your order requirement.

Our product is guaranteed by strict quality system during manufacturing, packing, transportation etc., please contact our company or local agent rapidly if some careless omission or mistake arise, we'll deal with it as soon as possible.

2.2 Type explanation

DGI1000- 4 T 0022 G / B

Inverter serial No.

code	Volt. grade
2	220V
4	380V
7	690V

Code	Input volt.
T	Three phase
S	Single phase

code	Inverter type
G	General
P	Special

code	Motor power (KW)
0004	0.4
0007	0.75
⋮	⋮
0750	75

code	Fitting part
B	built-in brake unit
E	remote-control keypad

Fig. 2-1 type description

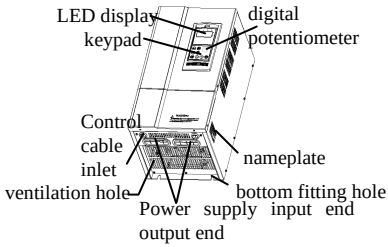
note If the inverter hasn't relevant content or can be defaulted, code after "/" will be ignored.

2.3 Series type explanation

Table 2-1 series type explanation

Inverter type (G: general with constant torque: P: special for blower water pump)	Input voltage (V)	Rated power (KVA)	Rated output current (A)	Adapted motor (KW)
DGI1000/1300-2S0004	Single phase 220V ±15%	1.1	3	0.4
DGI1000/1300-2S0007		1.8	4.7	0.75
DGI1000/1300-2S0015		2.8	7.5	1.5
DGI1000/1300-2S0022		3.8	10	2.2
DGI1000-2S0037		5.6	17	3.7
DGI1000/1100/1300-4T0007G/0015P	Three phase 380V ±15%	1.5/2.4	2.3/3.7	0.75/1.5
DGI1000/1100/1300-4T0015G/0022P		2.4/3.3	3.7/5	1.5/2.2
DGI1000/1100/1300-4T0022G/0037P		3.3/5.6	5/8.5	2.2/3.7
DGI1000/1100/1300-4T0037G/0055P		5.6/8.6	8.5/13	3.7/5.5
DGI1000/1100/1300-4T0055G/0075P		8.6/11	13/17	5.5/7.5
DGI1000/1100/1300-4T0075G/0110P		11/17	17/25	7.5/11
DGI1000/1100/1300-4T0110G/0150P		17/21.7	25/33	11/15
DGI1000/1100/1300-4T0150G/0185P		21.7/25.7	33/39	15/18.5
DGI1000/1100/1300-4T0185G/0220P		25.7/29.6	39/45	18.5/22
DGI1000/1100/1300-4T0220G/0300P		29.6/39.5	45/60	22/30
DGI1000/1100/1300-4T0300G/0370P		39.5/49.4	60/75	30/37
DGI1000/1100/1300-4T0370G/0450P		49.4/60	75/91	37/45
DGI1000-4T0450G/0550P		60/73.7	91/112	45/55
DGI1000-4T0550G/0750P		73.7/99	112/150	55/75
DGI1000-7T0110G/0150P	Three phase 690V ±15%	17/21.7	15/18	11/15
DGI1000-7T0150G/0185P		21.7/25.7	18/22	15/18.5
DGI1000-7T0185G/0220P		25.7/29.6	22/28	18.5/22
DGI1000-7T0220G/0300P		29.6/39.5	28/35	22/30
DGI1000-7T0300G/0370P		39.5/49.4	35/45	30/37
DGI1000-7T0370G/0450P		49.4/60	45/52	37/45
DGI1000-7T0450G/0550P		60/73.7	52/63	45/55
DGI1000-7T0550G/0750P		73.7/99	63/86	55/75
DGI1000-7T0750G/0900P		99/116	86/98	75/90
DGI1000-7T0900G/1100P		116/138	98/121	90/110
DGI1000-7T1100G/1320P		138/167	121/150	110/132
DGI1000-7T1320G/1600P		167/200	150/175	132/160
DGI1000-7T1600G/2000P		200/250	175/215	160/200
DGI1000-7T2000G/2200P		250/280	215/235	200/220

2.4 Appearance and parts name explanation



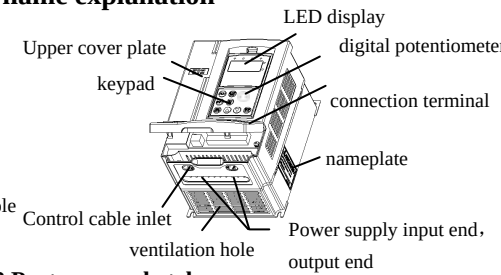


Fig. 2-2 Parts name sketch

2.5 Outer size and gross weight

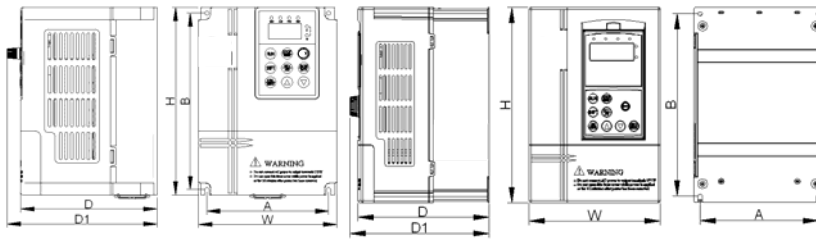


Fig.a **Fig.b**

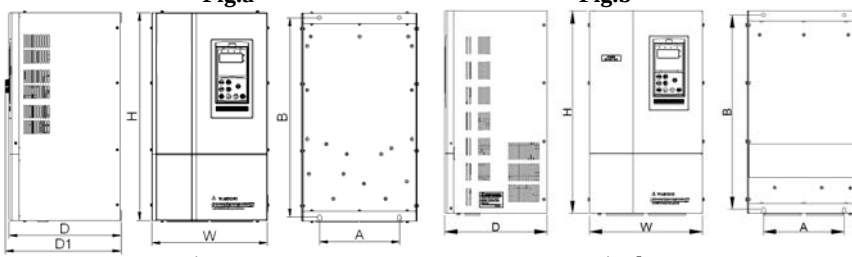


Fig.c **Fig.d**

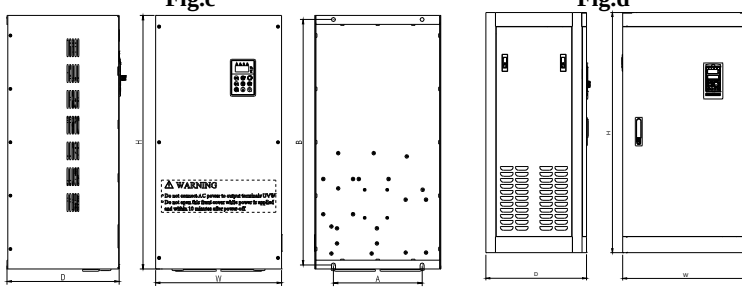


Fig.e **Fig.f**

Fig.2-3 Outer dimension

Table 2-2 DGI1000-2S0004~DGI1000-4T0750P mounting size

Inverter type (G: general; P: special)	A (mm)	B (mm)	W (mm)	H (mm)	D (mm)	D1 (mm)	Fixing aperture (mm)	G.W. (kg)	Fig.
DGI1000/1300-2S0004 DGI1000/1300-2S0007	110	160	125	170	123.2	135.5	4	2	Fig a
DGI1000/1300-2S0015 DGI1000/1300-2S0022									
DGI1000/EDS1100/1300-4T0007G/0015P									
DGI1000/EDS1100/1300-4T0015G/0022P									
DGI1000/1100/1300-4T0022G/0037P									
DGI1000-2S0037	140	215	155	230	155	164	5	3.8	Fig b
DGI1000/1100/1300-4T0037G/0055P									
DGI1000/1100/1300-4T0055G/0075P									
DGI1000/1100/1300-4T0075G/0110P	185	275	200	290	178	187	6	6.3	Fig b
DGI1000/1100/1300-4T0110G/0150P									
DGI1000/1100/1300-4T0150G/0185P	135	330	218	345	210	221	7	10	Fig c
DGI1000/1100/1300-4T0185G/0220P	180	410	260	430	252	261	9	17	Fig c
DGI1000/1100/1300-4T0220G/0300P									
DGI1000/1100/1300-4T0300G/0370P	200	485	280	505	252	261	9	23	Fig c
DGI1000/1100/1300-4T0370G/0450P									
DGI1000-4T0450G/0550P	200	515	300	535	252	261	9	33	Fig c
DGI1000-4T0550G/0750P	250	620	370	645	258	267	12	52	Fig c

Table 2-2 DGI1000-7T0110G~DGI1000-7T1320G mounting size

Inverter type	A (mm)	B (mm)	W (mm)	H (mm)	D (mm)	Fixing aperture (mm)	Fig.
DGI1000-7T0110G/0150P	200	552	284	570	252.7	9	Fig e
DGI1000-7T0150G/0185P							
DGI1000-7T0185G/0220P	280	620	420	650	300	9	Fig d
DGI1000-7T0220G/0300P							
DGI1000-7T0300G/0370P							
DGI1000-7T0370G/0450P							
DGI1000-7T0450G/0550P	320	720	500	750	300	12	Fig d
DGI1000-7T0550G/0750P							
DGI1000-7T0750G/0900P	400	790	590	820	372	12	Fig d
DGI1000-7T0900G/1100P							
DGI1000-7T1100G/1320P							
DGI1000-7T1320G/1600P							
DGI1000-7T1600G/2000P	-	-	630	1200	500	-	Fig f
DGI1000-7T2000G/2200P							

2.6 Outer size of keypad and its fixing box (unit: mm)

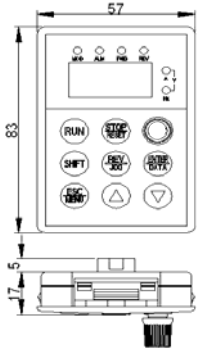


Fig.2-4 EN-KB5 outer size

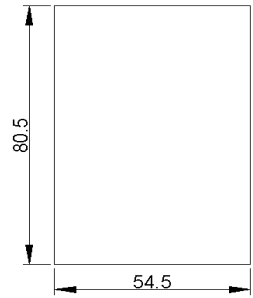


Fig.2-5 EN-KB5 hole size

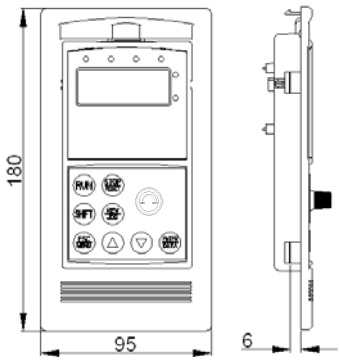


Fig.2-6 EN-KB6 outer size

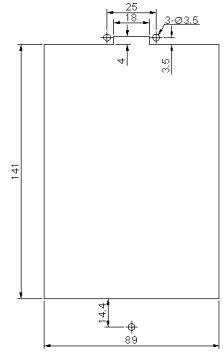


Fig.2-7 EN-KB6 hole size

2.7 Product technic index and spec

Item		Item description
Input	Rating volt., frequency	3 phase 690V grade, 3 phase 690V ,50Hz/60Hz; 3 phase 380V grade, 3 phase 380V ,50Hz/60Hz; 1 phase 220V grade, 1 phase 220V ,50Hz/60Hz
	Allowed work volt. range	3 phase 690 V grade: 586V~760V; 3 phase 380 V grade: 320V~460V; 1 phase 220V grade: 200V~260V
output	Voltage	690V grade: 0~690V; 380V grade: 0~380V; 220V grade: 0~220V
	Frequency	0Hz-400Hz

	Over loading capacity		G type: 150% of rating current for1 minute，200% of rating current for 0.5 second； P type: 120% of rating current for 1 minute；
Control performance	Control mode		Speed sensorless slip vector control, open loop V/F control
	Speed regulation range		1: 100
	Start-up torque		150% of rating torque at 1 Hz frequency
	Running speed stable state precision		≤±0.5% of rating synchronous speed
	Frequency precision		Digital setting: max. frequency×±0.01%；analog setting: max.frequency×±0.5%
	Frequency resolution	Analog setting	0.1% of max. frequency
		Digital setting	precision : <100Hz 0.01Hz; ≥100Hz: 0.1Hz
		Exterior impulse	0.5% of max. frequency
	Torque boost		Automatic torque boost, manual torque boost 0.1%~12.0%
	V/F curve (volt. frequency characteristic)		Set rating frequency randomly at range of 5~400Hz，can choose constant torque, degressive torque 1, degressive torque 2, degressive torque 3 and user-defined V/F in total 5 kinds of curve
	Accelerating decelerating curve		2 modes: straight line accelerating decelerating and S curve accelerating decelerating; 7 kinds of accelerating decelerating time (unit minute/second can be optioned), max. time 6000 minutes.
	brake	Power consumption brake	Interior or exterior brake resistance. 690 V grade haven't build-in brake unit .
		DC brake	Optional start-up and stop，action frequency 0~15Hz，action volt. 0~15%，action time 0~20.0 s
	Jog		Jog frequency range: 0.50Hz~50.00Hz; jog accelerating decelerating time 0.1~60.0s can be set
	Multisection speed running		Realized by interior PLC or control terminal
	Interior PID controller		Be convenient to make closed-loop system
	Automatic energy save running		Optimize V/F curve automatically based on the load to realize power save running
	Automatic volt. regulation (AVR)		Can keep constant output volt. When power source voltage varies.
	Automatic current limiting		Limit running current automatically to avoid frequent over-current which will cause trip
Running function	Running order specified channel		Key pad specified, control terminal specified, serial port specified.
	Running frequency specified channel		Digital provision, analog provision, impulse provision, serial port provision, combined provision，can be switched at any time by kinds of method.

	pulse output channel	Impulse square wave signal output of 0~20KHz，can realize output of physical parameter such as setting frequency, output frequency etc.
	Analog output channel	2 channel of analog signal output，thereinto AO1 channel can be 4~20mA or 0~10V and AO2 channel is 0~10V; through them the inverter can realize output of physical parameter such as setting frequency, output frequency etc.
keypad	LED display	Can display setting frequency, output frequency, output voltage, output current etc.
	Lock the button	Lock all or part of the buttons(analog potentiometer can't be locked)
Protection function		Over-current protection, over-voltage protection, lack-voltage protection, over-heat protection, over-load protection, etc.
Fitting parts		brake subassembly, remote-control keypad, connecting cable for remote-control keypad etc.
ambient	Use ambient	indoor，not bare to sunlight，no dust, no corrosive gas, no flammable gas, no oil fog, no vapor, no water drop or salt etc.
	altitude	Lower than 1000m ,if higher than 1000m ,need to reduce amount to use.
	Ambient temperature	-10ºC~+40ºC(under ambient temperature 40ºC ~50ºC, please reduce the volume or strengthen heat sink)
	Ambient humidity	Smaller than 95%RH, no condensation water
	vibration	Smaller than 5.9m/s²(0.6g)
	Storage temperature	-40ºC~+70ºC
configuration	Defending grade	IP20
	Cooling mode	By fan with automatic temperature control
Mounting mode		Wall hanging

note To exert excellent performance of this inverter, please choose correct type and check relevant content according to this chapter before wiring for use.

Must choose correct type, otherwise may cause abnormal running of the motor or damage of the inverter.

3 Installation and wiring

3.1 Installation ambient

3.1.1 Demand for installation ambient

(1) Installed in drafty indoor place，ambient temperature within -10ºC~40ºC，need external compulsory heat sink or reduce the volume if temperature exceeds 40ºC.

(2) Avoid installing in place with direct sunlight, much dust, floating fibre and metal powder.

(3) Forbid to install in place with corrosive, explosible gas.

(4) Humidity should be smaller than 95%RH， without condensation water.

(5) Installed in place of plane fixing vibration smaller than 5.9m/s²(0.6g).

(6) Keep away from electromagnetic disturbance source and other electronic apparatus sensible to electromagnetic disturbance.

3.1.2 Installation direction and space

(1) Normally the inverter should be mounted vertically, horizontal mounting will seriously affect heat dissipation and the inverter must be used in lower volume.

(2) Demand for minimum mounting space and distance，please see Fig.3-1.

(3) When install multiple inverters up and down, must apply leading divider between them, see fig. 3-2.

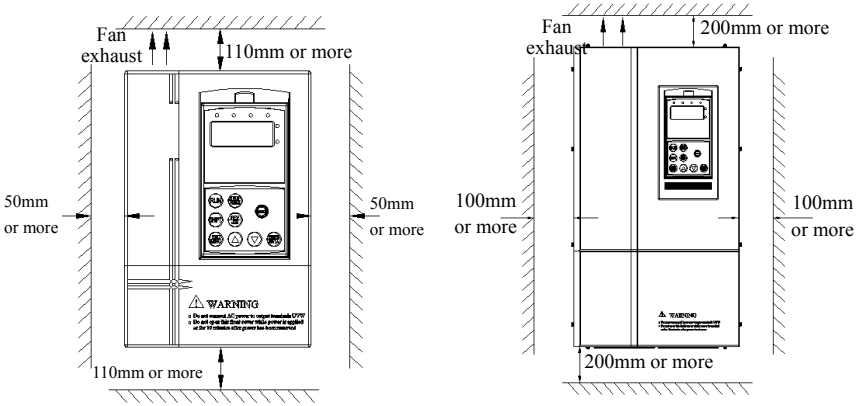


Fig. 3-1 mounting space

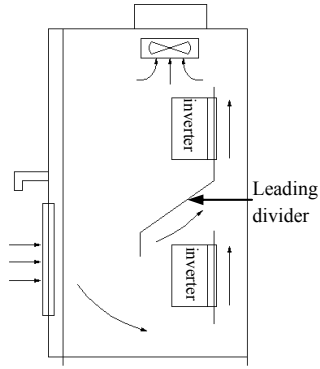


Fig. 3-2 mounting of multiple inverters

3.2 Parts disassembly and installation

3.2.1 Key board disassembly and installation

(1) Disassembly

Let the forefinger press finger inlet on the keypad，depress fixing flexible plate on the top lightly, draw it outward, then you can disassemble the keypad.

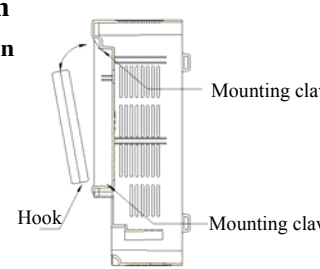


Fig.3-3 mounting sketch of keypad

(2) Assembly

First place the fixing hook at the bottom of keypad onto mounting claw on keypad mounting hole, let forefinger press fixing flexible plate on top of keypad and then push it inside, release it in proper location(after a crisp sound), see Fig. 3-3.

3.2.2 Plastic/metal cover disassembly and installation

3.2.2.1 Plastic cover disassembly and installation:

(1) Disassembly

Put the finger into handle hole on the bottom of cover, lift it in force, till buckle between cover and unit body off, draw the cover backward, then you can disassemble the cover.

(2) Assembly

1> tilt the cover for 5~10 degree；

2> put the mounting claw into relevant hole on the unit body and then press downward in force, see fig. 3-4.

3.2.2.2 Metal cover disassembly and installation

(1) Disassembly

First take off 2 screws at sides of the cover and move it a bit outward horizontally, then tilt it at 15 degree and draw it outward at direction shown in right figure, now you can take the cover off.

(2) Assembly

First put down the cover in parallel with unit body and make it just locked at 2 sides of the inverter, secondly force it ahead and make fixing part on its top inserted into fixing slot of unit body, at last screw the cover and finish assembly for the cover. As shown in Fig.3-5.

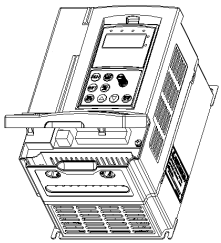


Fig. 3-4 disassembly and mounting sketch of plastic cover

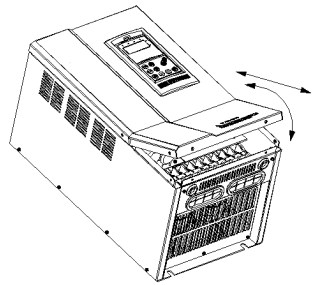


Fig.3-5 disassembly and assembly for metal cover

3.3 Wiring notice points

(1) Assure power cuf off completely for above 10 minutes before wiring，otherwise have danger of getting electric shock.

(2) Forbid connecting power wire to output U, V, W of the inverter.

(3) There is current leakage in the inverter and leak current of middle/high power inverter is bigger than 5mA，for safety reason，inverter and motor must be earthed safely，commonly use 3.5mm² above copper wire as ground wire and ground resistance smaller than 10Ω.

(4) Before shipment compression resistance test of the inverter is passed，so user should not conduct compression resistance test again.

(5) Should not assemble electromagnetic contactor and absorbing capacitance or other absorbing device, see fig. 3-5.

(6) To be convenient to over current protect of input side and power off maintenance inverter should be connected to power supply through relay.

(7) Connecting wire for relay input and output loop(X1~X8, OC1~OC4, FWD, REV), should use above 0.75mm² glued wire or shielding wire，one shielding layer end hung in the air, the other connected to grounding end PE or E, connecting wire shorter than 20m.

(1) Before wiring, assure power supply is cut off completely for 10 minutes and all LED indicator light extinguished.
(2) Before internal wiring, confirm that DC volt. Between main loop end P+ and P- fall down to below DC36V.
(3) Wiring can only be done by professional person trained and qualified.
(4) Before electrification, check if voltage grade of the inverter is in line with that of power supply volt.，otherwise will cause personnel injured and device damaged.

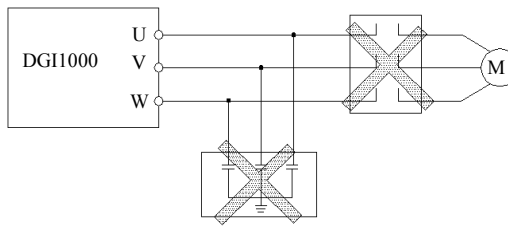


Fig.3-6 banned magnetic control conductor and absorbing capacitance between inverter and motor

3.4 Main loop terminal wiring

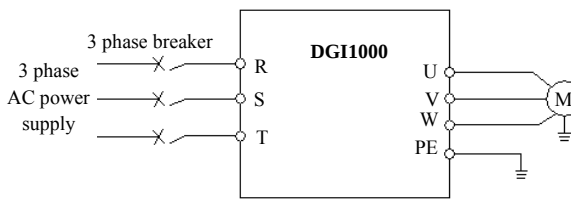


Fig.3-7 main loop simple wiring

3.4.1 Connection between inverter and fitting parts

(1) Must assemble disjunction device such as isolation switch etc. between power source and the inverter to assure personal safety when repairing the inverter and needing compulsory power off.
(2) Power supply loop must have breaker or fuse with over current protection function to avoid malfunction expanding caused by failure of after device.
(3) AC input reactor
If high-order harmonics between inverter and power supply is biggish which can't fulfil system requirement，or need to improve input side power factor, AC input reactor is needed.
(4) Magnetic control conductor only be applied to power supply control and don't apply magnetic control conductor to controlling on/off of the inverter.

(5) Input side EMI filter

Can use EMI filter to inhibit high-frequency conduction disturbance and emission disturbance from inverter power supply wire.

(6) Output side EMI filter

Can use EMI filter to inhibit emission disturbance noise and wire leakage current from output side.

(7) AC output reactor

Advise assembling AC output reactor to avoid motor insulation damage, too large over current and inverter frequent protection when connecting wire from inverter to motor exceeds 50m.But voltage drop of AC output reactor must be considered. Improve input output voltage of the inverter or let the motor in lower volume to avoid burning off the motor.

(8) Complete ground wire

Inverter and motor must be earthed and grounding resistor smaller than 10Ω.Grounding wire should be shorter enough and wire diameter be bigger enough(not smaller than following standard):7.5KW or below motor: 3.5mm² above copper wire;11～15KW motor: 8mm² above copper wire. 18.5～37KW motor 14mm² above copper wire; 45～55KW motor: 22mm² above copper wire.

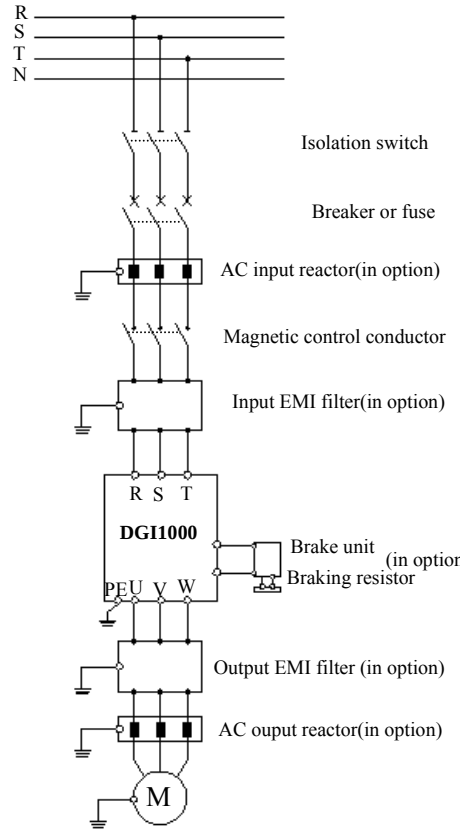
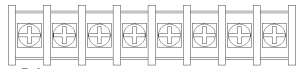
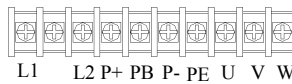


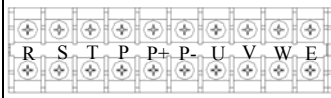
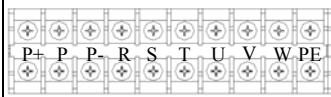
Fig.3-8 connection of inverter and fitting parts

3.4.2 Main loop terminal wiring

For main loop input output terminal, see table 3-1.

Table 3-1 main loop input output terminal description

Adapted type	Main loop terminal	End name	Function description
DGI1000-2S0004 ~ DGI1000-2S0022		L1 L2 P+ PB U, V, W PE	Zero wire Live wire DC volt. positive end Reserved end for external braking resistance 3 phase AC output end Grounding terminal
DGI1000-2S0037		L1 L2 P+ PB P- PE U, V, W	Zero wire Live wire DC volt. positive end Reserved end for external braking resistance DC volt. negative end Grounding terminal 3 phase AC output end
DGI1000-4T0007G ~ DGI1000-4T0022G		R, S, T P+ PB U, V, W PE	3 phase AC 380V input terminal DC volt. positive end Reserved end for external braking resistance 3 phase AC output end Grounding terminal
DGI1000-4T0037G ~ DGI1000-4T0110P		R, S, T P+ P- PB E U, V ,W	3 phase AC 380V input terminal DC volt. positive end DC volt. negative end Reserved end for external braking resistance Grounding terminal 3 phase AC output end
DGI1000-4T0110G/B~ DGI1000-4T0150G/B DGI1000-4T0150P/B~ DGI1000-4T0185P/B		R ,S, T P P+ P- PB U ,V ,W E	3 phase AC 380V input terminal DC volt. positive end P, P+ can connect DC reactor DC volt. negative end DC braking resistance can be connected between P and PB 3 phase AC output terminal Shield grounding terminal

DGI1000-4T0185G~ DGI1000-4T0550G DGI1000-4T0220P~ DGI1000-4T0750P		R, S, T P P+ P- U, V, W E	3 phase AC 380V input terminal DC volt. positive end Reserved terminal for exterior DC reactor DC volt. negative end 3 phase AC output terminal Shield grounding terminal
DGI1000-7T0185G~ DGI1000-7T1320G DGI1000-7T0220P~ DGI1000-7T1600P		P+ P P- R, S, T U, V, W PE	Reserved terminal for exterior DC reactor DC volt. positive end DC volt. negative end 3 phase AC 690V input terminal 3 phase AC output terminal Shield grounding terminal

note

(1) Can connect braking unit between P+ and P- externally if necessary.
(2) Can connect DC braking resistor between PB and P+ externally if necessary.
(3) DC reactor can be connected between P and P+ if necessary.
(4) P and P+ must be short-circuited before shipment, otherwise the inverter can't work.

3.5 Basic running wiring diagram

Adapted type: DGI1000-2S0004~2S0037 DGI1000-4T0007~4T0015G
DGI1000-4T0022G~DGI1000-4T0750P

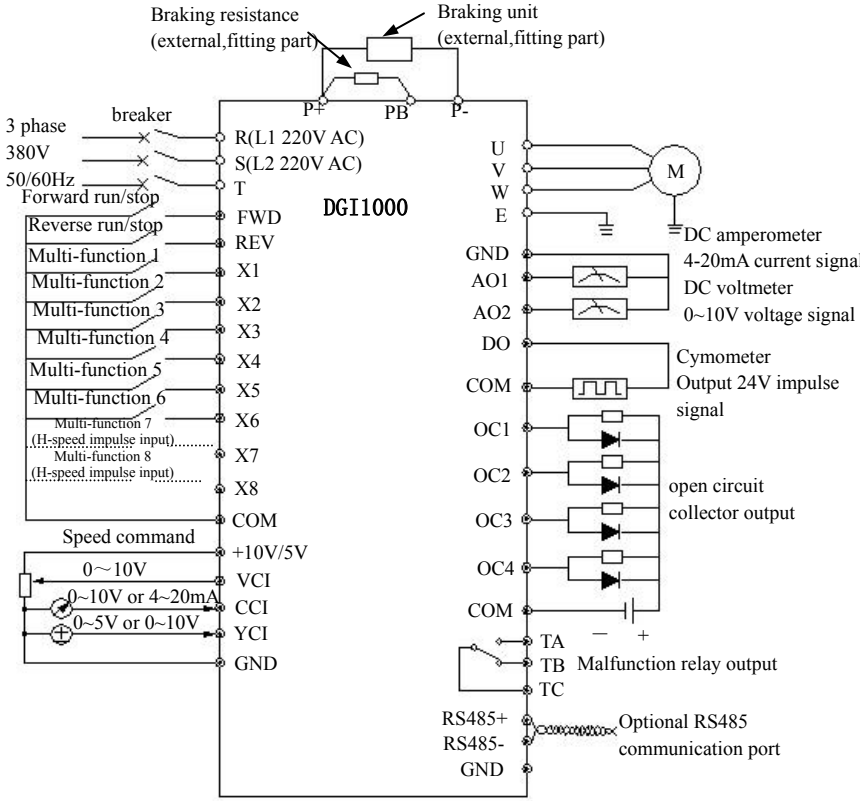


Fig. 3-9 basic wiring diagram

3.6 Control loop collocation and wiring

3.6.1 Location&function of terminal and slide switch:

For location of terminal and slide switch on the CPU board, please see Fig.3-10.

Function description of terminal provided for the user, please see Table 3-2，function and setup description of slide switch, please see Table 3-3，terminal CN1, CN3 and are for manufacturer's use. Should carry on terminal wiring correctly and set all slide switch on the CPU board before using the inverter，to use 1mm² above conducting wire as terminal connecting wire is recommended.

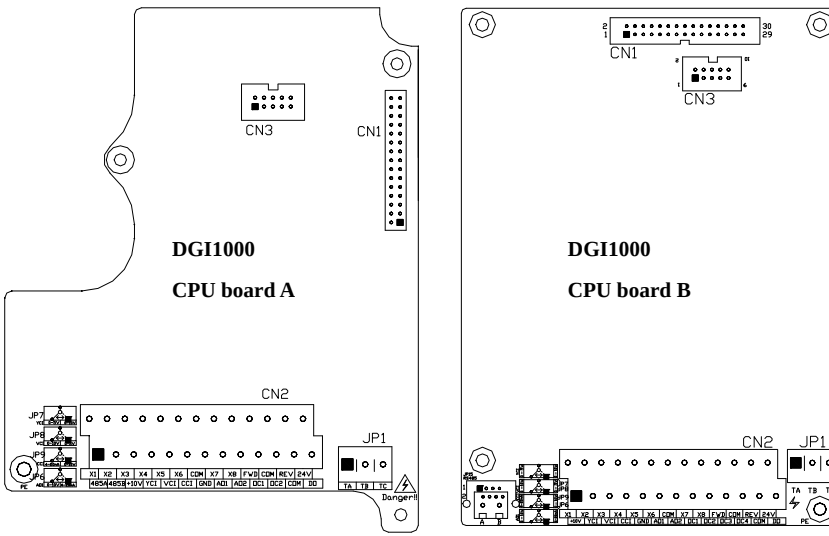


Fig. 3-10 slide switch on CPU board

Table 3-2 function description of terminal provided for user

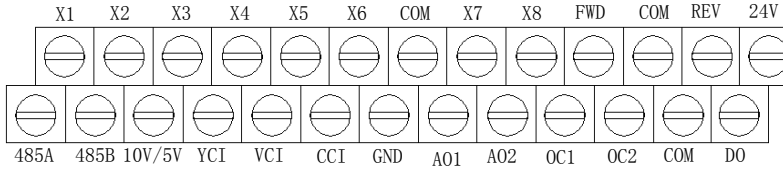
symbol	function	Description
RS485 JP15	RS485, JP15 communication port	connection port for remote-control keypad , upper machine control or cascade and synchronous control
JP1	Malfunction relay signal output	Always-open connect pin of the relay closed when malfunction in inverter occurs
CN2	External terminal input output control	Use this port when external terminal control inverter running

Table 3-3 function description of slide switch provided for user

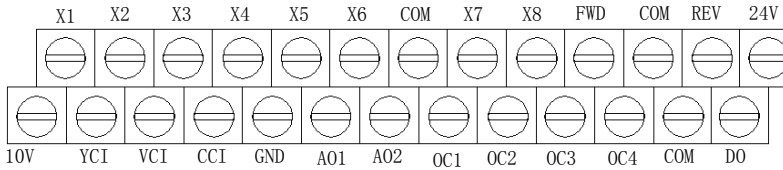
Symbol	Function	Setting	Factory default
JP7	YCI: 5V/10V voltage input mode selection	: 0~5V voltage signal; : 0~10V voltage signal	0~5V
JP8	VCI: 5V/10V voltage input mode selection	: 0~10V voltage signal; : voltage signal	0~10V
JP9	CCI: current/voltage input mode selection	: 0/4~20mA current signal; : 0~10V voltage signal	0/4~20mA
JP6	analog output terminal AO1 output current/voltage type selection	: 0~10V: AO1 terminal output voltage signal : 4~20mA: AO1 terminal output current signal	0~10V

3.6.2 Explanation for control CPU board

(1) control loop terminal CN2 arranged as follows for inverter below 1.5kw:

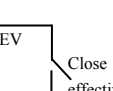


(2) control loop terminal CN2 arranged as follows for inverter above 2.2kw:



(3) CN2 terminal function description as Table 3-4.

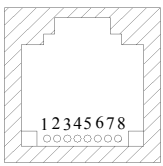
Table 3-4 CPU board CN2 terminal function table

item	symbol	name	Function description	Spec
Run command	FWD	Forward run command	Forward reverse run command, see F5.08 group double-wire and three-wire control function description	Optocoupler isolation input Input impedance: R=2K Ω Max. input frequency: 200Hz 
	REV	Reverse run command		
Multi-function input terminal	X1	Multi-function input 1	Used for multi-function input terminal, for detailed see Chapter 6 Section 6.6 terminal function parameter(F5 group)input end function description.	
	X2	Multi-function input 2		
	X3	Multi-function input 3		

	X4	Multi-function input 4	X7, X8 can be set as H-speed impulse input port, for detailed see Chapter 6 Section 6.6 terminal function parameter(F5 group)input end function description. (common end: COM)	Input impedance of X7, X8 input channel: R=2K Ω Max. output Freq.: 20KHz Input voltage range: 15~24V
	X5	Multi-function input 5		
	X6	Multi-function input 6		
	X7	Multi-function input 7		
	X8	Multi-function input 8		
Power supply	+24V	+24V power supply	Provide +24V power supply. (negative pole: COM)	Max. output current: 150mA
	+10V	+10V/+5V power supply	Provide +10V/+5V power supply. (negative pole: GND)	Max. output current: 50mA
	COM	Common end+24V power supply negative pole	Common end and reference ground of digital signal input	Internal isolating between COM and GND
	GND	+10V power supply negative pole	Reference ground of analog signal and +10V power supply	
Analog value input	CCI	Analog value input CCI	Accept analog voltage/current input，voltage, current optioned by slide switch JP9， factory default is current. (reference ground: GND)	Input voltage range: 0~10V (input impedance: 70KΩ) Input current range: 4~20mA (input impedance: 250Ω) Resolution: 1/1000
	YCI	Analog value input YCI	Accept analog voltage input, 0~5V or 0~10V optioned by slide switch JP7, factory default is 0~5V. Can control running direction of the motor directly. (reference ground: GND)	Input voltage range: 0~5V(input impedance 70KΩ), 0~10V(input impedance 36KΩ) Resolution: 1/1000
	VCI	Analog value input VCI	Accept analog voltage input，0~5V or 0~10V optioned by slide switch JP8，factory default is 0~10V. (reference ground: GND)	Input voltage range: 0~10V (input impedance: 70KΩ) resolution: 1/1000
Analog value output	AO1	Analog value output1	Provide analog voltage/current output，can express 6 kinds of parameter see F5.17 parameter description，output voltage/current optioned by slide switch JP6，factory default output voltage. (reference ground: GND)	Current output range: 4~20mA voltage output range: 0~10V
	AO2	Analog value output 2	Provide analog voltage output (reference ground: GND)	

Multifunction output end	OC1	Open circuit collector output terminal 1	Used for multi-function switch output terminal, for detailed see Chapter 6 Section 6.6 terminal function parameter (F5 group) output end function description. (common end: COM)	optocoupler isolation output Work voltage range: 15~30V Max. output current: 50mA Use method see Description of parameter F5.10~F5.13
	OC2	Open circuit collector output terminal 2		
	OC3	Open circuit collector output terminal 3		
	OC4	Open circuit collector output terminal 4		
	DO	H-speed impulse output terminal	Used for multi-function impulse signal output terminal, for detailed see Chapter 6 Section 6.6 terminal function parameter(F5 group) output end function description. (common end: COM)	Output impulse voltage: 24V Output frequency range: depending on parameter F5.24, max.20KHz

(4) Terminal RS485，arranged as follows(planform of RS485 terminal):



RS485 terninal arrangement								
No.	1	2	3	4	5	6	7	8
name	485+	*	485-	*	*	GND	*	+5V

"*" terminal is for the manufacturer, user can't use.

(5) RS485 terminal and JP15 function description as table 3-5

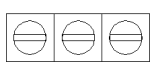
Table 3-5 CPU board RS485 terminal function table

item	symbol	name	Function description	spec
communication	RS485+	RS485 communication interface	485 difference signal positive end	For standard RS-485 communication interface please use twisted-pair or STP
	RS485-		485 difference signal negative end	
	JP15		485 connector	

note

You can choose crystal plug or connector for communication cable.

(6) Control terminal JP1，arranged as follows:



(7) JP1 terminal function description as Table 3-6.

Table 3-6 CPU board JP1 terminal function

Item	symbol	name	Function description	Spec
Relay output terminal	TA	Inverter malfunction output relay	Normal: TB-TC closed, TA-TC open Malfunction: TB-TC open, TA-TC closed	TB-TC: always-closed, TA-TC: always-open Contact capacity: AC250V/2A (COSΦ=1) AC250V/1A (COSΦ=0.4) DC30V/1A
	TB			
	TC			

3.6.3 Analog input output terminal wiring

(1) VCI terminal accepts analog voltage signal input，wiring as follow:

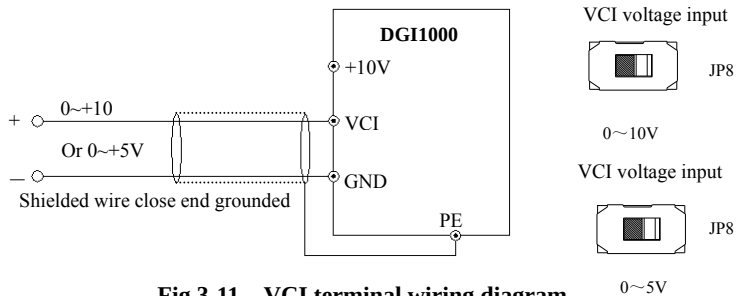


Fig.3-11 VCI terminal wiring diagram

(2) CCI terminal accepts analog signal input，slide switch decide to input voltage(0~10V) or input current(4~20mA)，wiring mode as follows:

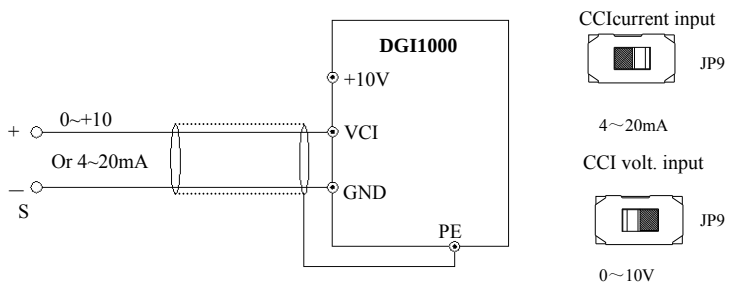


Fig.3-12 CCI terminal wiring diagram

(3) YCI terminal accepts analog voltage signal input，wiring mode as follows:

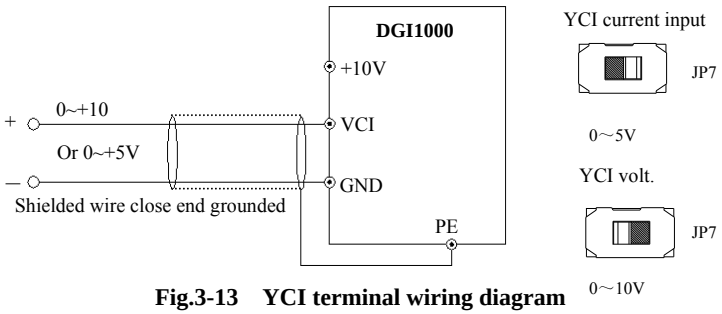
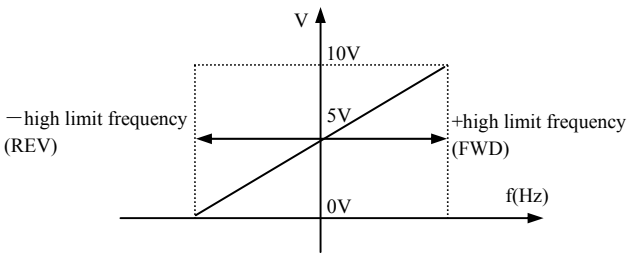


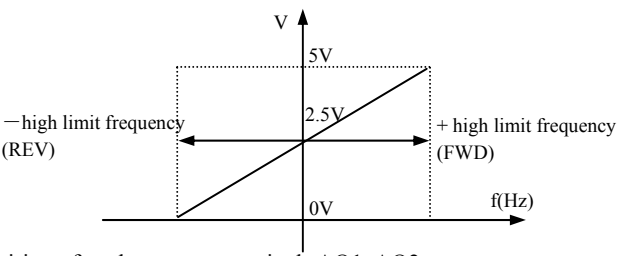
Fig.3-13 YCI terminal wiring diagram

Explanation: relation between YCI input voltage and set frequency is as following figure:

1> when YCI input voltage is 0~10V:



2> when YCI input voltage is 0~5V:



(4) wiring of analog output terminals AO1, AO2

Analog output terminals AO1, AO2 connected to analog meter and kinds of physical data can be indicated, thereinto AO1 can output current (4~20mA) or voltage (0~10V) decided by slide switch JP6. Terminal wiring mode as Fig.3-13.

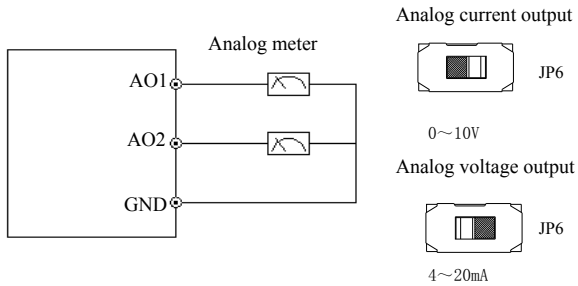


Fig.3-14 analog output terminal wiring

note

(1) When inputing anglog signal，can connect filter capacitor or common module inductance between VCI and GND or between CCI and GND or between YCI and GND.

(2) Analog input, output signal is easy to be disturbed，so must use shielded cable when wiring and well grounded, wiring length should be as short as possible.

3.6.4 Communication terminal wiring

DGI1000 inverter provides RS485 serial communication interface for the user.

Following wiring methods make single-main single-sub control system or single-main multi-sub control system possible. Using upper machine(PC or PLC controller)software can realize real time supervision to inverter in the industrial control system so that realize complicated run control such as long-distance control, high automatization etc; you can also take one inverter as mainframe and the others as submachine to form cascade or synchronous control network.

(1) When inverter RS485 interface connected to other devices with RS485 interface, you can connect wire as below figure.

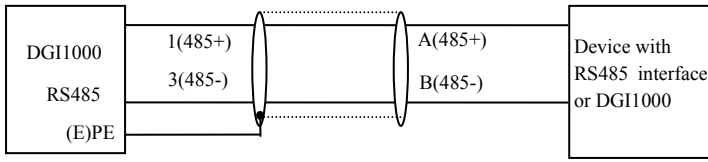


Fig.3-15 Communication terminal wiring

(2) To connect remote control keypad, you can connect plug of remote control keypad to RS485 directly. No need to set any parameter，inverter local keypad and remote control keypad can work at one time.

(3) Connection between inverter RS485 interface and upper machine(with RS232 interface):

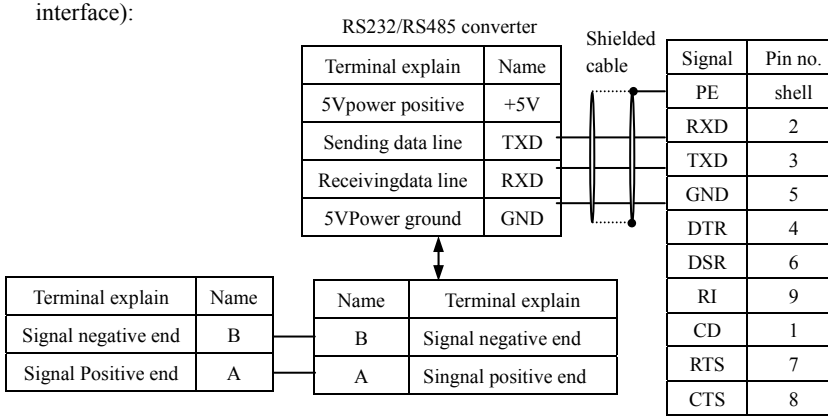


Fig. 3-16 RS485 communication wiring

(4) Multiple inverters can be connected together per RS485 and 31pcs inverter can be connected together at most. Communication system is more prone to disturbance as connected inverters increasing, following wiring is recommended:

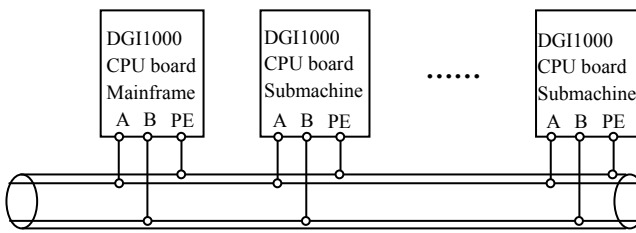


Fig. 3-17 recommended wiring for multiple inverters communication (all inverters and motors well earthed)

Normal communication still not available if using above wiring, can try to take following measure:

1> Provide separate power supply for PLC (or upper machine) or isolate its power supply.

2> Apply magnetic circle on the communication wire.

3> Reduce inverter carrier wave frequency properly.

note

(1) When form the network only by inverters, you must set local address parameter F2.15 of the mainframe DGI1000 to 0.

(2) For programming of RS485 interface，please refer to appendix communication protocol.

3.7 Installation guide for anti-jamming

Main circuit of the inverter is composed of high-power semiconductor switch gear，so some electromagnetic noise will arise during work，to reduce or stop disturbance to environment，show you assembling method of inverter disturbance suppressing from many aspects such as disturbance suppressing, spot wiring, system grounding, leak current, usage of power supply filter etc. in this section to be referred to during spot assembling.

3.7.1 Restraining to noise disturbance

Disturbance brought by the working inverter may affect nearby electronic device，effect degree relates to surrounding electromagnetic environment of the inverter and anti-disturbance capacity of this device.

(1) Type of disturbance noise

According to work principle of the inverter, there are mainly 3 kinds of noise disturbance source:

1> circuit conduction disturbance；

2> space emission disturbance；

3> electromagnetic induction disturbance；

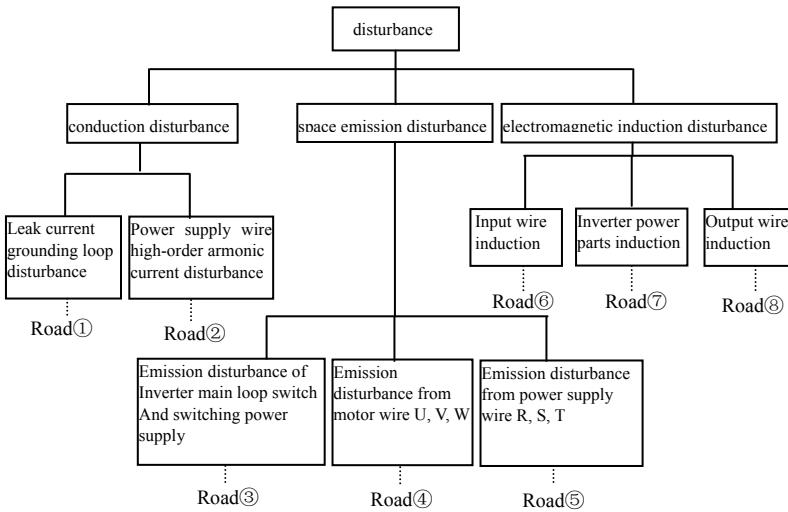


Fig.3-18 type of noise disturbance

(2) Noise spread road

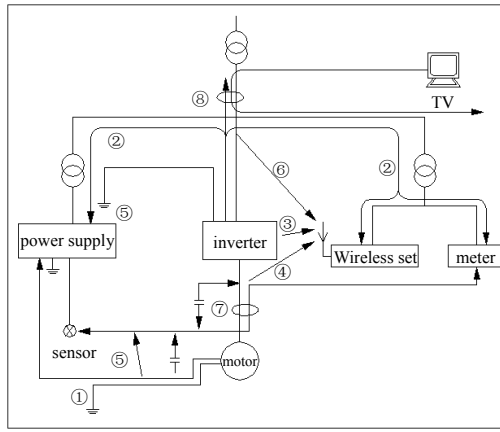


Fig.3-19 noise disturbance spread road sketch

(3) basic countermeasure for suppressing disturbance

Table 3-7 disturbance suppressing countermeasure table

Noise spread road	Countermeasure of weakening effect
①	When grounding wire of peripheral device and wiring of the inverter compose closed-loop, inverter grounding wire leakage current would make the device do wrong action. Can reduce wrong action if the device is not earthed here.
②	High-order harmonic from the inverter would make voltage and current transmit through power supply wire when peripheral device and the inverter electrified by same power supply, would disturb other devices in this same power supply system，can take following suppressing measure: assemble electromagnetic noise filter at inverter input end；isolate other devices by isolation transformer; connect power supply for peripheral device with remote power source; install ferrite filter magnetic circle for R, S, T three-phase conducting wire of the inverter to suppress conduction of high-frequency harmonic current.
③④⑤	● Keep device and signal wire prone to disturbance from the inverter. Should use shielded signal wire, shielding layer single end earthed and try best to keep away from the inverter and its input, output wire. If signal wire must intersect strong power cable, must keep them in real intersection and avoid parallel. ● Install high-frequency noise filter(ferrite common module choke, folksay magnetic circle) separately at input, output root，which can effectively suppress emission disturbance from dynamic wire. ● Should place motor cable shield of biggish thickness, for instance set it in tube with biggish thickness (above 2mm) or bury it in cement slot. Dynamic wire set into metal tube and use shielding wire to be grounded (use 4-core motor cable, one side is earthed through the inverter, the other side connected to motor shell).

⑥⑦⑧	To prevent parallel or bundled power and weak conducting wire；should keep away from inverter mounted device to the best and its wiring should keep away from power wire of the inverter such as R, S, T, U, V, W etc.. Should pay attention to relative mounting place between device with strong electric field or strong magnetic field and the inverter, should keep distance and vertical intersection.

3.7.2 Local wiring and earthing

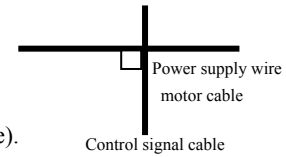


Fig.3-20 system wiring demand

(1) Avoid parallel cable from inverter to motor (U, V, W terminal education wire) and power supply wire (R, S, T terminal input wire). Should keep distance of 30cm above.

(2) Try your best to place motor table from U, V, W terminals in metal tube or metal wiring slot.

(3) Should use shielded cable as common control signal cable，shielding layer close-to–inverter side earthed after connected with PE terminal of inverter.

(4) Cable educed from inverter PE terminal must be connected directly to earth-plate and can't be connected to ground through grounding wire of other devices.

(5) Powerful cable(R, S, T, U, V, W)should not parallel control signal cable closely, say nothing of being bundled together, must keep distance of 20~60cm above (related to size of powerful current). Should cross each other vertically if intersection, as Fig.3-20.

(6) Powerful grounding wire must be connected to earth separately from weak grounding cable such as control signal and sensor cable etc.

(7) Forbid to connect other electricity consumption device to inverter power supply input end(R, S, T).

3.7.3 Relation of long-distance wiring and current leak and the countermeasure

High-order harmonic will form between-line leak current through distributing capacitor and to-earth leak current when long-distance wiring between inverter and motor commence. Can adopt following method to suppress:

(1) install ferrite magnetic circle or output reactor at inverter output side.

End voltage of the motor will be reduced markedly when installing reactor of 5% above rated voltage dropn and make long-distance wiring to U, V, W. Fully loaded motor have the danger of burning itself，should work in lower volume or step up its input output voltage.

(2) Reduce carrier wave frequency but motor noise would increase accordingly.

3.7.4 Installation demand for electromagnetic on-off electronic device

Relay，magnetic control conductor and electromagnetic iron and so on,

these electromagnetic on-off electronic device would bring lots of noise during work, so you should pay full attention to when installing them beside the inverter or in the same control chamber with the inverter and must install surge absorbing device as shown in Fig. 3-21.

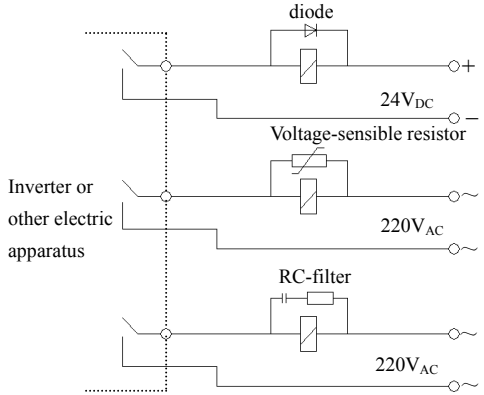


Fig.3-21 installation demand for electromagnetic on-off device

4 Run and operation explanation for inverter

4.1 Run of inverter

4.1.1 Running order channels

There are 3 kinds of order channel for controlling run action of the inverter such as run, stop, jog etc.:

0: keypad

Control by key RUN, STOP, REV/JOG on keypad(factory default).

1: Control terminal

Use control terminal FWD, REV, COM to make of double-line control， or use one terminal of X1～X8 and FWD or REV to make of three-line control.

2: Serial port

Control run and stop of the inverter through upper machine or other device which can communicate with the inverter.

Choose order channel by setting function code F0.02；and also can choose by multi-function input terminal(F5.00~F5.07 choose function 29, 30, 31).

Please make switching debugging in advance when switch the order channel to check if it can fulfil system requirement，otherwise have danger of damaging device and injuring personal.

4.1.2 Frequency-provision channel

DGI1000 common run mode there are 10 kinds of provision channel:

0: keypad analog potentiometer provision；
1: direct digital frequency provision；
2: terminal UP/DOWN provision(store after power-off or stop)；
3: serial port provision；
4: analog value VCI provision；
5: analog value CCI provision；
6: analog value YCI provision；
7: terminal pulse(PULSE) provision；
8: combination set;
9: terminal UP/DOWN provision(not store after power-off or stop)

4.1.3 Work state

Work state of DGI1000 is classified as waiting state and running state:
waiting state: If there is no running command after the inverter electrified or after stop command during running state, the inverter enters into waiting state.
running state: the inverter enters into running state after receiving run command.

4.1.4 Run mode

DGI1000 inverter have 6 kinds of run mode，following is in turn according to their priority: jog run→closed-loop run→PLC run→multisection speed run→swing frequency run→common run. Shown as Fig.4-1.

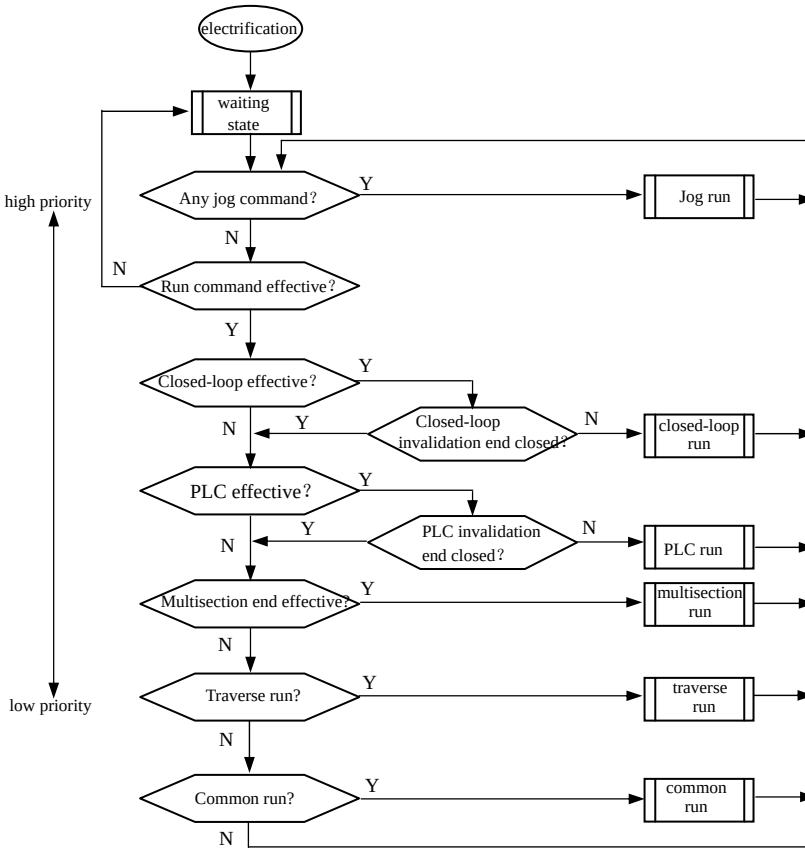


Fig.4-1 logic flow chart of DGI1000 inverter run state

0: jog run

Upon receiving jog run command (for instance, press the REV/JOG key on keypad) during waiting state, the inverter run at jog frequency (see function code F2.06~F2.08).

1: closed-loop run

The inverter will come into closed-loop run mode when closed –loop run control effective parameter is set(F3.00=1). Namely carry on PID adjustment to specified value and feedback value(proportion integral differential calculation，see F3 group function code) and PID adjustor output is inverter output frequency. Can make closed-loop run mode ineffective and switch to lower level run mode by multi-function terminal (function 20).

2: PLC run

The inverter will enter into PLC run mode and run according to run mode preset(see F4 group function code description) through setting PLC function effective parameter(F4.00 last bit≠0). Can make PLC run mode ineffective and switch to lower level run mode by multi-function terminal (function 21).

3: multi-section speed run

By nonzero combination of multi-function terminal(1, 2, 3, 4 function)， choose multisection frequency 1~7(F2.30~F2.36) to run at multisection speed.

4: swing frequency run

The inverter will enter into swing frequency run mode when swing frequency function effective parameter(F6.00=1)is set. Set relevant swing frequency run special parameter according to textile swing frequency craft to realize swing frequency run.

5: common run

Common open loop run mode of general inverter.

In above 6 kinds of run mode except “jog run” the inverter can run according to kinds of frequency setting method. In “PID run”“PLC run”“multisection run” “common run” mode the inverter can also carry on pendular frequency adjustment.

4.2 Operation and use of key board

4.2.1 Keypad layout

Keypad is main unit for receiving command, displaying parameter. Outer dimension of EN-KB6 is as Fig.4-2:

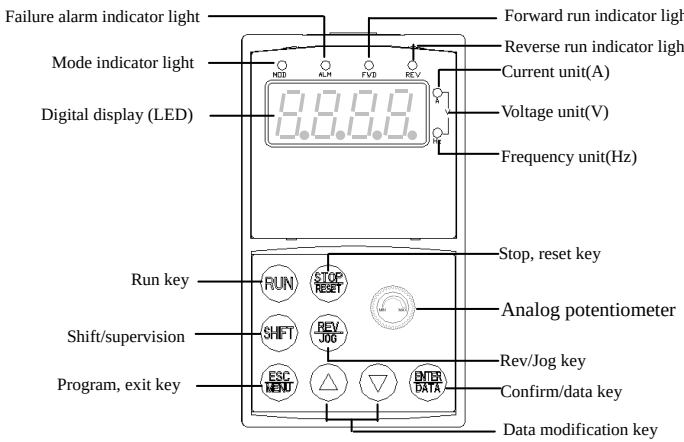


Fig.4-2 keypad layout sketch

4.2.2 Keypad function description

There are 8 key-presses and one adjusting button for analog potentiometer on inverter Keypad and function definition of each key is as shown in table 4-1.

Table 4-1 keypad function table

key	name	Function description
ESC MENU	Program/Exit key	Enter into or exit programming state
SHIFT	Shift/Supervision key	Can choose modification digit of set data under editor state; can switch display status supervision parameter under other state.
ENTER DATA	Function/Data key	Enter into the next menu or data confirmation
REV JOG	Rev/Jog key	Under keypad mode, to press this key can set reverse run or Jog run according to the 2nd bit of parameter F0.03
RUN	Run key	Enter into forward run under keypad mode
STOP RESET	Stop/reset key	In common run status the inverter will be stopped according to set mode after pressing this key if run command channel is set as keypad stop effective mode. The inverter will be reset and resume normal stop status after pressing this key when the inverter is in malfunction status.

	Analog potentiometer	Be used to set frequency; when F0.00=0 value set by analog potentiometer is frequency provision
	Increasing button	To increase data or function code (to press it continuously can improve increasing speed)
	Decreasing button	To decrease data or function code (to press it continuously can improve decreasing speed)

4.2.3 LED and indicator light

4 status indicator light: they are MOD(mode), ALM(alarm), FWD(forward run), REV(reverse run)from left to right on the LED, their respective indicating meaning is as shown in table 4-2.

Table 4-2 status indicator light description

<table>
<tr><th colspan="3">item</th><th colspan="2">Function description</th></tr>
<tr><td rowspan="8">Display function</td><td colspan="2">Digital display</td><td colspan="2">Display current run status parameter and set parameter</td></tr>
<tr><td rowspan="7">Status indicator light</td><td>A, Hz, V</td><td colspan="2">unit for relevant current digital displayed physical parameter(for current is A, for voltage is V, for frequency is Hz)</td></tr>
<tr><td>MOD</td><td colspan="2">This indicator light is lit in nonsupervision status and extinguished if no key pressed for a minute, then come back to supervision status</td></tr>
<tr><td>ALM</td><td colspan="2">Alarm indicator light, indicate that the inverter is in over current or over voltage suppressing status or failure alarm status currently</td></tr>
<tr><td>FWD</td><td>Forward run indicator light，indicate that the inverter output forward phase order and the connected motor rotate in forward direction</td><td rowspan="2">The inverter work in DC brake status if FWD, REV indicator light is lit at the same time</td></tr>
<tr><td>REV</td><td>reverse run indicator light, indicate that the inverter output reverse phase order and the connected motor rotate in reverse direction</td></tr>
</table>

4.2.4 Key board display status

DGI1000 keypad display status is classified as waiting status parameter display, function code parameter editing status display, malfunction alarm status display, run status parameter display in total 4 kinds of status. LED indicator light will all be lit after the inverter electrified, and digital display LED will display character "-EN-", then enter into set frequency display. As shown in Fig.4-3 a.

(1) waiting parameter display status

The inverter is in waiting status and waiting status supervision parameter is displayed on keyboard, normally parameter F3.28 decide which status supervision parameter to be displayed. As shown in Fig.4-3 b，the unit is indicated by rightward unit indicator light.

To press 

key，it can display different waiting status supervision parameter circularly(display 15 kinds of supervision parameter of C group acquiescently，whether the last 7 kinds of supervision parameter are displayed is difined by function code F2.11，F2.12, for detail please see C group status

supervision parameter in function parameter schedule graph of chapter 5).

(2) run parameter display status

The inverter enters into run status when receiving effective run command and normally parameter F3.28 decide which status supervision parameter to be displayed on the keypad. As shown in Fig.4-3 c，unit is displayed by rightward unit indicator light.

To press SHIFT key，can display run status supervision parameter circularly (defined by function code F2.11 and F2.12). During displaying, can press ENTER DATA to switch to initial supervision parameter decided by F3.28, otherwise will display the last displayed parameter all along.

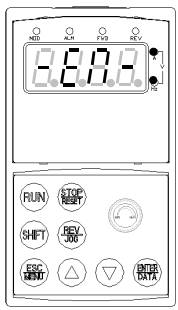


Fig.a electrification，display-EN-

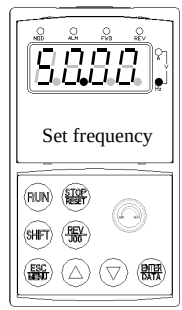


Fig.b waiting status，display waiting status parameter

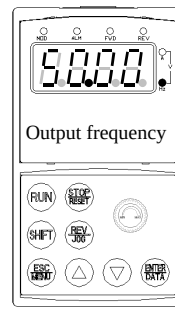


Fig.c run status, display run status parameter

Fig.4-3 inverter electrification, waiting, run status display

(3) Failure alarm display status

The inverter enters into failure alarm display status upon detecting failure signal and display failure code sparklingly(as shown in Fig.4-4); To press SHIFT key can look over relative parameter after stopping running；Can press ESC MENU key to enter into program status to see about Fd group parameter if want to search failure information.

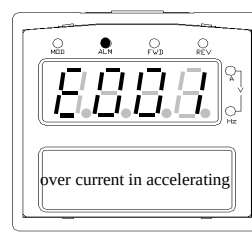


Fig.4-4 failure alarm

Can carry on failure restoration by STOP RESET key, control terminal or communication command on the keypad after troubleshooting. Keep displaying failure code if failure exist continuously.

For some serious failure，such as inverse module protect，over current, over voltage etc., must not carry on failure reset forcibly to make the inverter run again without failure elimination confirmed. Otherwise have danger of damaging the inverter！

(4) function code editing status

Under waiting, run or failure alarm status，press ESC/MENU key，can enter into editing status(If user password is set，can enter into editing status after inputting the password，see also FF.00 description and Fig.4-10)，and editing status is displayed according to three classes menu mode，as shown in Fig. 4-5. To press ENTER/DATA key can enter into one class by one class. Under function parameter display status，to press ENTER/DATA key to carry on parameter storage operation；To press ESC/MENU key can only come back to upper class menu without stroring modified parameter.

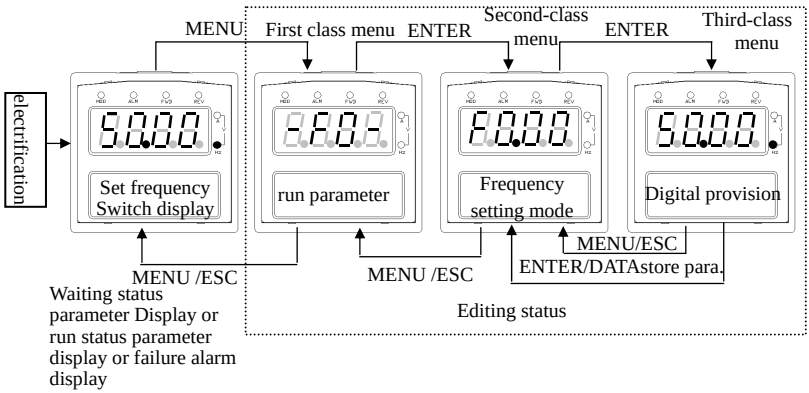


Fig.4-5 keypad display status switching

(5) Special display function

You can change set frequency under supervision state directly when keypad potentiometer is effective (F0.00=0) or keypad digital setting is effective (F0.00=1). Here the inverter displays set frequency if it's stop or displays output frequency if it's running. After set frequency stops changing for 1 second the inverter will go back to normal display status.

4.2.5 Method for operating keypad

Can carry on various operation to the inverter through keypad，for example:

(1) Status parameter display switching:

After pressing key SHIFT，display C group status supervision parameter; after displaying one supervision parameter code for 1 second, will display this parameter value automatically.

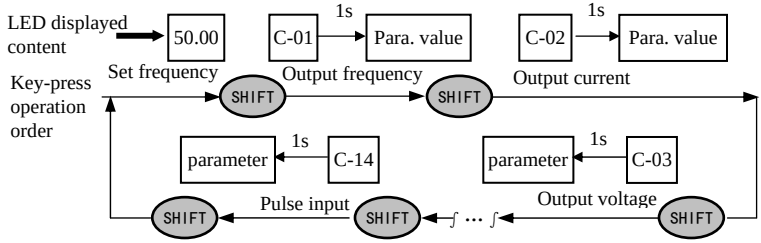


Fig. 4-6 waiting status parameter display operating example

Description:

1> All status parameters C-00～C-14 can be displayed when the inverter leaves factory. You can make a change by modifying function code F2.11, F2.12 if you want to, for detail please refer to F2.11, F2.12function code description.

2> Can press ENTER DATA key to switch into constant supervision C-01 display status directly when the user see about status supervision parameter.

(2) Function code parameter setting

Take function code F2.06 modified from 5.00Hz to 6.00Hz as example. Boldface in Fig.4-7 shows flickering digit.

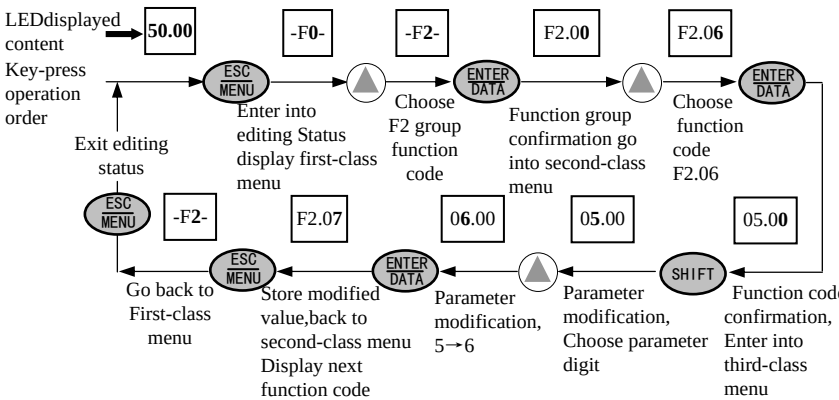


Fig.4-7 example for parameter setting and modification

Description: under third-class menu, if the parameter has no blinking digit，this function code can't be modified，possible reasons are as follows:

1> This function code shouldn't be modified, for example actual detected status parameter, run record parameter etc.；

2> This function code can't be modified under run status and can be changed after stopping running；

3> Parameter protected. All the function code can't be modified when function code F2.13=1 or 2，in order to avoid wrong operation. Need to set the function code F2.13 to 0 if you want to edit function code parameter.

(3) Specified frequency adjustment for common run

Take example modifying specified frequency from 50.00Hz to 40.00Hz at F0.00=0 during running for explanation.

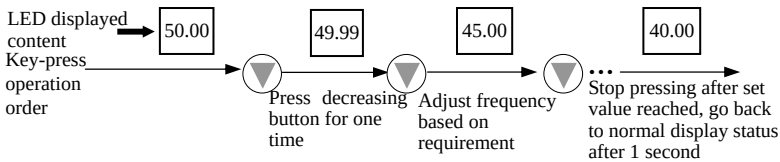


Fig. 4-8 set frequency adjustment operation example

(4) Jog run operation

For example, keypad as current run command channel, jog run frequency 5Hz, waiting status.

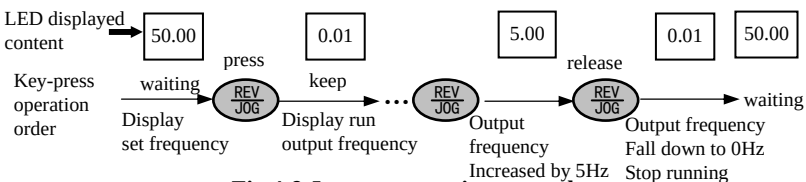


Fig.4-9 Jog run operating example

(5) Operation for entering to function code editing status after setting user password

"user password"FF.00 is set to "6886". Boldfaced digit in Fig.4-7 shows blinking bit.

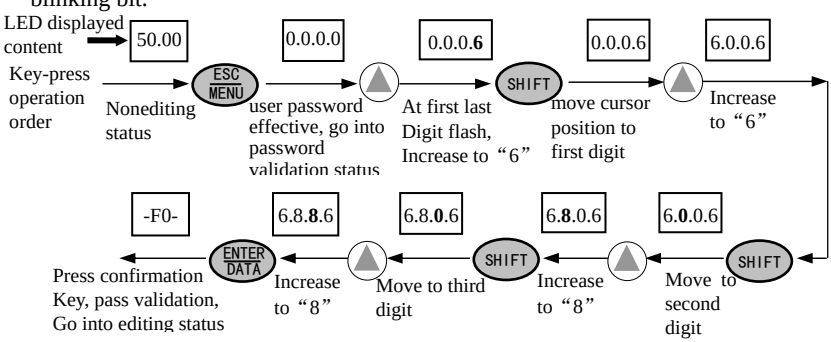


Fig.4-10 inputting password to go into function code operation

(6) See about failure parameter under failure status:

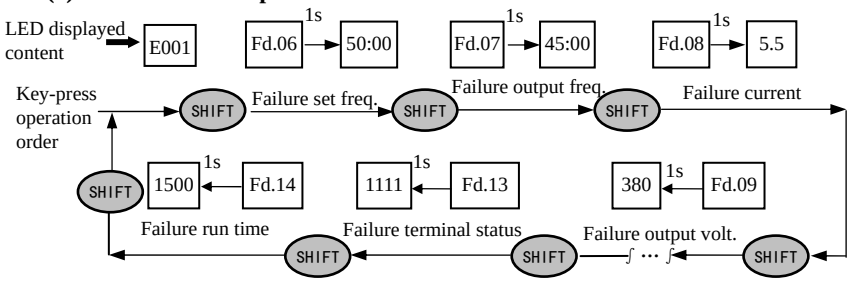


Fig.4-11 failure status searching operation example

Description:

1> If press SHIFT key under failure status the user can see about Fd group function code parameter, search range Fd.06～Fd.14，LED first display function code number when the user press SHIFT key and display parameter digit of this function code after 1s.

2> When the user see about failure parameter，can press ENTER DATA key directly to switch back to failure alarm display status (E0XX)

(7) keypad key-press locking operation

Under unlocked keypad situation，press ESC MENU key for 5s to lock the keypad. For detailed operation please refer to 2nd bit of F2.13 function code.

(8) keypad key-press unlocking operation

Under locked keypad situation，press ESC MENU key for 5s to unlock the keypad.

4.3 Inverter electrification

4.3.1 Check before electrification

Please carry on wiring based on operation requirement provided in “inverter wiring” of this Service manual.

4.3.2 First electrification

Close input side AC power supply switch after correct wiring and power supply confirmed, electrify the inverter and keypad LED display “-EN-”, contactor closed normally, LED displayed set frequency shows that electrification is finished. First electrification operation process is shown as figure in the page.

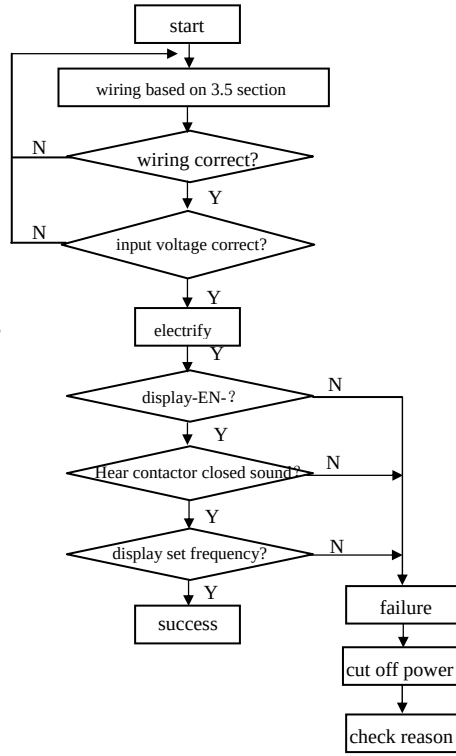


Fig. 4-12 first electrification operation flow

5 Function parameter schedule graph

5.1 Symbol description

× ---- parameter can't be changed in process of running

○ ---- parameter can be changed in process of running

* ---- read-only parameter, unmodifiable

5.2 Function parameter schedule graph

F0－Basic run function parameter group					
Function code	Name	Set range	Min. unit	Factory default	Modifi-cation
F0.00	Frequency input channel selection	0: keypad analog potentiometer setting 1: keypad digital setting 2: terminal UP/DOWN adjust setting freq. (stored after power off or stop) 3: serial port provision(not stored after power off) 4: VCI analog setting (VCI-GND) 5: CCI analog setting (CCI-GND) 6: YCI analog setting (YCI-GND) 7: terminal pulse (PULSE) setting 8: combination setting 9: terminal UP/DOWN adjust setting freq. (not stored after power off) 10: serial port provision (stored after power off) 11:terminal PWM pulse width set frequency.	1	1	○
F0.01	Freq. digit setting	Lower limit Freq.～upper limit Freq.	0.01Hz	50.00Hz	○
F0.02	Run command channel selection	0: keypad run control 1: terminal run command control (keypad stop command ineffective) 2: terminal run command control (keypad stop command effective) 3: serial port run command control (keypad stop command ineffective) 4: serial port run command control (keypad stop command effective)	1	0	○
F0.03	Run direction setting	1st bit: 0, forward run; 1, reserved 2nd bit: 0, reverse run allowed 1, reverse run banned 3rd bit: REV/JOG key selection 0: as reverse run key 1: as jog key	1	100	○
F0.04	Acce/Dece mode selection	0: linear Acce/Dece mode 1: S curve Acce/Dece mode	1	0	×
F0.05	S curve start time	10.0(%)－50.0(%)(Acce/Dece time) F0.05+F0.06≤90(%)	0.1(%)	20.0(%)	○
F0.06	S curve rising time	10.0(%)－70.0(%)(Acce/Dece time) F0.05+F0.06≤90(%)	0.1(%)	60.0(%)	○
F0.07	Acce/Dece time unit	0: second 1: minute	1	0	×
F0.08	Acce time 1	0.1－6000.0	0.1	20.0	○
F0.09	Dece time 1	0.1－6000.0	0.1	20.0	○
F0.10	Upper limit freq.	Lower limit freq.－400.00Hz	0.01Hz	50.00Hz	×

F0.11	Lower limit freq.	0.00－Upper limit freq.	0.01Hz	0.00Hz	×
F0.12	Lower limit freq. run mode	0: run at lower limit freq. 1: stop by slow down 2: free stop	1	0	×
F0.13	Torque boost mode	0: manual boost 1: automatic boost	1	0	○
F0.14	Torque boost	0.0－12.0 (%)	0.1(%)	2.0(%)	○
F0.15	V/F curve setting	0: constant torque curve 1: degressive torque curve 1(the 2.0nd power) 2: degressive torque curve 2 (the 1.7th power) 3: degressive torque curve 3 (the 1.2th power) 4: End-user sets VF curve himself(determined by F2.37~F2.44) F2.37 VF Freq. value 0 F2.38 VF voltage value 0 F2.39 VF Freq. value 1 F2.40 VF voltage value 1 F2.41 VF Freq. value 2 F2.42 VF voltage value 2 F2.43 VF Freq. value 3 F2.44 VF voltage value 3 Remark: VF frequency and voltage can't be 0 or maximum	1 0.01Hz 0.01% 0.01Hz 0.01% 0.01Hz 0.01% 0.01Hz 0.01%	0 10.00Hz 20.00% 20.00Hz 40.00% 25.00Hz 50.00% 40.00Hz 80.00%	×
F0.16	G/P type setting	0: G type 1: P type	1	0	×

F1－Start, stop, braking function parameter group					
Function code	Name	Set range	Min. unit	Factory default	Modifi-cation
F1.00	Start run mode	0: start from starting freq. 1: first brake, then start from starting freq. 2: Start after inspecting speed	1	0	×
F1.01	starting freq.	0.0－10.00Hz	0.01Hz	0.00Hz	○
F1.02	starting freq. duration time	0.0－20.0S	0.1s	0.0s	○
F1.03	DC brake volt. when starting	0－15(%)	1	0	○
F1.04	DC brake time when starting	0.0－20.0s	0.1s	0.0s	○
F1.05	Stop mode	0: Dece stop 1: free stop 2: Dece＋DC brake stop	1	0	×
F1.06	DC brake initiative freq. when stop	0.0－15.00Hz	0.01Hz	0.00Hz	○
F1.07	DC brake time when stop	0.0－20.0s	0.1s	0.0s	○
F1.08	DC brake voltage when stop	0－15(%)	1	0	○

F2－Auxiliary run function parameter group					
Function code	Name	Set range	Min. unit	Factory default	Modifi-cation
F2.00	Analog filter time constant	0.00－30.00s	0.01s	0.20s	○
F2.01	Forward reverse run dead-section time	0.0－3600.0s	0.1s	0.1s	○
F2.02	Automatic energy save run	0: no action 1: action	1	0	×
F2.03	AVR function	0: no action 1: action all the time 2: no action only during Dec	1	0	×
F2.04	Slip frequency compensation	0～150(%)0-no slip frequency compensation	1	0	×
F2.05	Carrier wave freq.	2－15.0K	0.1K	depend on machine type	×
F2.06	Jog run frequency	0.10－50.00Hz	0.01Hz	5.00Hz	○
F2.07	Jog Acce time	0.1－60.0s	0.1s	20.0s	○
F2.08	Jog Dece time	0.1－60.0s	0.1s	20.0s	○
F2.09	Frequency input channel combination	0: VCI＋CCI 1: VCI－CCI 2: YCI＋CCI 3: RS485+YCI 4: VCI＋YCI 5: reserved 6: exterior pulse provision＋CCI 7: exterior pulse provision－CCI 8: reserved 9: reserved 10: reserved 11: reserved 12: reserved 13: VCI，CCI any nonzero value effective, VCI preferred 14: reserved 15: RS485+CCI 16: RS485-CCI 17: RS485+VCI 18: RS485-VCI 19: RS485+keypad potentiometer 20: RS485- keypad potentiometer 21: VCI+ keypad potentiometer 22: VCI- keypad potentiometer 23: CCI+ keypad potentiometer 24: CCI- keypad potentiometer 25: reserved 26: reserved 27: reserved 28: reserved	1	0	×
F2.10	Main & sub inverter communication frequency provision proportion	0－500(%)	1(%)	100(%)	○

F2.11	LED display control 1	0000-1111 first bit: running time 0: not display 1: display second bit: accumulative time 0: not display 1: display third bit: input terminal status 0: not display 1: display kilobit(fourth bit): output terminal status 0: not display 1: display	1	0000	○
F2.12	LED display control 2	0000-1111 first bit: analog input VCI 0: not display 1: display second bit: analog input YCI 0: not display 1: display third bit: analog input CCI 0: not display 1: display kilobit(fourth bit): exterior pulse input 0: not display 1: display	1	1111	○
F2.13	Parameter operation control	LED 1st bit: 0: all parameter allowed to be modified 1: except this parameter，all other parameter not allowed to be modified 2: except F0.01 and this parameter, all other parameter not allowed to be modified LED 2nd bit: 0: no action 1: renew factory default 2: clear history failure record LED 3rd bit: 0: not locked 1: all buttons locked except STOP key 2: all buttons locked except ▲ ▼ , STOP key 3: all buttons locked except RUN, STOP key 4: all buttons locked except SHIFT, STOP key	1	0	×
F2.14	Communication configuration	LED first bit: baud rate selection 0: 1200BPS 1: 2400BPS 2: 4800BPS 3: 9600BPS 4: 19200BPS 5: 38400BPS	1	03	×

		LED second bit: data format 0: 1－8－1format, no checkout 1: 1－8－1 format, even checkout 2: 1－8－1 format, odd checkout			
F2.15	Local address	0－127，127 is broadcast address. The inverter only receive but not send when it is set to be 127, 0 is address for main device.	1	1	×
F2.16	Communication overtime checkout time	0.0－1000.0s	0.1s	0.0s	×
F2.17	Local response delay time	0－1000ms	1ms	5ms	×
F2.18	Acce time 2	0.1－6000.0	0.1	20.0	○
F2.19	Dece time 2	0.1－6000.0	0.1	20.0	○
F2.20	Acce time 3	0.1－6000.0	0.1	20.0	○
F2.21	Dece time 3	0.1－6000.0	0.1	20.0	○
F2.22	Acce time 4	0.1－6000.0	0.1	20.0	○
F2.23	Dece time 4	0.1－6000.0	0.1	20.0	○
F2.24	Acce time 5	0.1－6000.0	0.1	20.0	○
F2.25	Dece time 5	0.1－6000.0	0.1	20.0	○
F2.26	Acce time 6	0.1－6000.0	0.1	20.0	○
F2.27	Dece time 6	0.1－6000.0	0.1	20.0	○
F2.28	Acce time 7	0.1－6000.0	0.1	20.0	○
F2.29	Dece time 7	0.1－6000.0	0.1	20.0	○
F2.30	Muti-step freq. 1	Lower limit freq.－upper limit freq.	0.01Hz	5.00Hz	○
F2.31	Muti-step freq. 2	Lower limit freq.－upper limit freq.	0.01Hz	10.00Hz	○
F2.32	Muti-step freq. 3	Lower limit freq.－upper limit freq.	0.01Hz	20.00Hz	○
F2.33	Muti-step freq. 4	Lower limit freq.－upper limit freq.	0.01Hz	30.00Hz	○
F2.34	Muti-step freq. 5	Lower limit freq.－upper limit freq.	0.01Hz	40.00Hz	○
F2.35	Muti-step freq. 6	Lower limit freq.－upper limit freq.	0.01Hz	45.00Hz	○
F2.36	Muti-step freq. 7	Lower limit freq.－upper limit freq.	0.01Hz	50.00Hz	○
F2.37	VF frequency value 0	0.00-F2.39	0.01Hz	10.00Hz	○
F2.38	VF voltage value 0	0.00-F2.40	0.01%	20.00%	○
F2.39	VF frequency value 1	F2.37-F2.41	0.01Hz	20.00Hz	○
F2.40	VF voltage value 1	F2.38-F2.42	0.01%	40.00%	○
F2.41	VF frequency value 2	F2.39-F2.43	0.01Hz	25.00Hz	○
F2.42	VF voltage value 2	F2.40-F2.44	0.01%	50.00%	○
F2.43	VF frequency value 3	F2.41-high limit frquency	0.01Hz	40.00Hz	○
F2.44	VF voltage value 3	F2.42-100.0% (rated voltage)	0.01%	80.00%	○
F2.45	Jumping freq. 1	0.00－400.00Hz	0.01Hz	0.00Hz	×
F2.46	Jumping freq. 1 range	0.00－30.00Hz	0.01Hz	0.00Hz	×
F2.47	Jumping freq. 2	0.00－400.00Hz	0.01Hz	0.00Hz	×
F2.48	Jumping freq. 2 range	0.00－30.00Hz	0.01Hz	0.00Hz	×
F2.49	Jumping freq. 3	0.00－400.00Hz	0.01Hz	0.00Hz	×

F2.50	Jumping freq. 3 range	0.00－30.00Hz	0.01Hz	0.00Hz	×
F2.51	Sett run time	0－65535 hours	1	0	○
F2.52	Run time accumulation	0－65535 hours	1	0	*
F2.53	RS485/232 communication frame format selection	0: a ASCII frame of 14 byte or 18 byte 1: a hex frame of 8 byte or 10 byte, original response not changed 2: a hex frame of 8 byte or 10 byte, 12 command has no response 3: a hex frame of 8 byte or 10 byte, 14 command has no response 4: a hex frame of 8 byte or 10 byte, both 12 and 14 command have no response	1	0	×

F3－Closed-loop run function parameter group

Function code	Name	Set range	Min. unit	Factory default	Modifi-cation
F3.00	Closed-loop run control selection	0: closed-loop control ineffective 1: PID closed-loop control effective 2:constant pressure water supply PID control effective(F5.10～F5.13 must be set to 21)	1	0	×
F3.01	Provision channel selection	0: digital provision 1: VCI analog 0－10V voltage provision 2: CCI analog provision 3: keypad analog potentiometer provision	1	1	○
F3.02	Feedback channel selection	0: VCI analog input voltage 0－10V 1: CCI analog input 2: VCI+CCI 3: VCI-CCI 4: Min { VCI, CCI } 5: Max { VCI, CCI } 6: pulse feedback	1	1	○
F3.03	Specified value digital setting	0.000~9.999V(setF3.00=1,F3.21=9.999)	0.001	1.000	○
	Target pressure value setting	0.000~F3.21Mpa(setF3.00=2)	0.001	1.000	○
F3.04	Minimum specified value	0.0－maximum specified value; percentage relative to 10.00V	0.1(%)	0.000	○
F3.05	Corresponding feedback value responding of minimum specified value	0.0－100.0(%)	0.1(%)	0.000	○
F3.06	maximum specified value	Minimum specified value －100.0(%)	0.1(%)	100.0(%)	○
F3.07	Corresponding feedback value responding of maximum specified value	0.0－100.0(%)	0.1(%)	100.0(%)	○
F3.08	proportion gain Kp	0.000－9.999	0.001	0.050	○
F3.09	Integral gain Ki	0.000－9.999	0.001	0.050	○
F3.10	Differential gain Kd	0.000－9.999	0.001	0.000	○

F3.11	Sampling cycle T	0.01－1.00s	0.01s	0.10s	○
F3.12	Deviation limit	0.0－20.0(%)percentage relative to 10.00V	0.1(%)	2.0(%)	○
F3.13	Integral separation PID adjusting threshold	0.0－100.0%	0.1%	100.0%	○
F3.14	Closed-lop preset frequency	0－upper limit frequency	0.01Hz	00.00	○
F3.15	Closed-loop preset frequency holding time	0.0－6000s	0.1s	000.0	○
F3.16	Sleep frequency threshold	0.00－400.00Hz	0.01Hz	30.00	○
F3.17	Wake pressure threshold	0.000－F3.21Mpa	0.001	0.500	○
F3.18	Sleep delay time	0.0－6000.0s	0.1	000.0	○
F3.19	Revival delay time	0.0－6000.0s	0.1	000.0	○
F3.20	Constant pressure water supply mode 1	0: inverter works in one-drive-two water supply mode 1: constant pressure water supply board acts in one-drive-two mode 2: constant pressure water supply board acts in one-drive-three mode 3: constant pressure water supply board acts in one-drive-four mode	1	0	×
F3.21	Long-distance manometer range	0.001－9.999Mpa	0.001	9.999	○
F3.22	Allowed offset to upper limit frequency and lower limit frequency when add or reduce pumps	0.1－100.0%	0.1	001.0	○
F3.23	Pump switch judging time	0.0－999.9s	0.1	005.0	○
F3.24	Magnetic control conductor switch delay time	0.1－10.0s	0.1	00.5	○
F3.25	Automatic switch intervel	0000－9999minutes	1	0000	×
F3.26	Water supply supervision parameter display	0: C-11, C-12 denote voltage value of VCI, CCI 1: C-11, C-12 denote PID specified pressure and feedback pressure	1	0	○
F3.27	Closed-loop adjusting characteristic	0: Forward function 1: Reverse function		0	○
F3.28	LED initial supervision parameter selection	0: set frequency 1: output frequency 2: output current 3: output voltage 4: DC bus bar voltage 5: motor speed 6: heat sink temperature 7: run time 8: accumulative run time 9: input terminal status 10: output terminal status 11: analog input VCI/PID provision 12: analog input CCI/PID feedback		1	○

		13: analog input YCI 14: exterior pulse inputs			
F3.29	YCI run-in delay time	0.0－999.9s	0.0	10.0	○
F3.30	Failure relay TA，TB，TC function selection	0: inverter running(RUN) 1: frequency arriving signal(FAR) 2: frequency level detect signal (FDT1) 3: reserved 4: overload warning alarm signal (OL) 5: output frequency reach high limit(FHL) 6: output frequency reach low limit(FLL) 7: inverter under voltage blockage stop (LU) 8: external failure stop-running(EXT) 9: inverter zero speed running 10: PLC running 11: simple PLC section running finished 12: PLC finish a cycle running 13: reserved 14: inverter ready to run (RDY) 15: inverter failure 16: traverse high and low limit restriction 17: interior counter reach final value 18: interior counter reach specified value 19: set run time arriving 20: interior timing arriving 21: reserved 22: reserved 23: reserved 24: reserved		15	○
F3.31	Reserved				

F4－Simple PLC function parameter group

Function code	Name	Set range	Min. unit	Factory default	Modifi-cation
F4.00	Simple PLC running setting	LED first bit: 0: no action 1: stop after single circulation 2: keep final value after single circulation 3: consecutive circulation LED second bit: 0: start from first step 1: continue to run from step freq. of interruption moment LED third bit: PLC run time unit 0: second 1: minute	1	000	×
F4.01	Section 1 setting	000－621 LED first bit: frequency setting 0: multisection freq. i (i=1~7) 1: freq. determined by function code F0.00 LED second bit: run direction selection 0: forward run 1: reverse run 2: determined by run command(FWD, REV) LED third bit: Acc/Dec time selection	1	000	○

		0: Acce/Dece time 1 1: Acce/Dece time 2 2: Acce/Dece time 3 3: Acce/Dece time 4 4: Acce/Dece time 5 5: Acce/Dece time 6 6: Acce/Dece time 7			
F4.02	Section 1 run time	0－6000.0	0.1	10.0	○
F4.03	Section 2 setting	000－621	1	000	○
F4.04	Section 2 run time	0－6000.0	0.1	10.0	○
F4.05	Section 3 setting	000－621	1	000	○
F4.06	Section 3 run time	0－6000.0	0.1	10.0	○
F4.07	Section 4 setting	000－621	1	000	○
F4.08	Section 4 run time	0－6000.0	0.1	10.0	○
F4.09	Section 5 setting	000－621	1	000	○
F4.10	Section 5 run time	0－6000.0	0.1	10.0	○
F4.11	Section 6 setting	000－621	1	000	○
F4.12	Section 6 run time	0－6000.0	0.1	10.0	○
F4.13	Section 7 setting	000－621	1	000	○
F4.14	Section 7 run time	0－6000.0	0.1	10.0	○

F5－Terminal correlative function parameter group

Function code	Name	Set range	Min. unit	Factory default	Modifi-cation
F5.00	Input terminal X1 function selection	0: leave control terminal unused 1: multi-step speed control terminal 1 2: multi-step speed control terminal 2 3: multi-step speed control terminal 3 4: multi-step speed control terminal 4 5: external forward run jog control 6: external reverse run jog control 7: Acce/Dece time selecting terminal 1 8: Acce/Dece time selecting terminal 2 9: Acce/Dece time selecting terminal 3 10: external device failure input 11: external reset input 12: free stop input 13: external stop command 14: stop DC braking input command DB 15: inverter run prohibition 16: frequency increasing control (UP) 17: frequency degression control (DOWN) 18: Acce/Dece prohibited command 19: three-line run control 20: closed-loop ineffective 21: PLC ineffective 22: simple PLC pause control 23: PLC stop status reset 24: frequency provision channel selection 1 25: frequency provision channel selection 2 26: frequency provision channel selection 3 27: frequency switched to CCI 28: command switched to terminal 29: run command channel selection 1 30: run command channel selection 2 31: run command channel selection 3	1	0	×

		32: swing frequency jump-in 33: external interruption input 34: interior counter clearing end 35: interior counter triggering end 36: interior timer clearing end 37: interior timer triggering end 38: pulse frequency input(only effective forX7,X8) 39: reserved 40: reserved 41: reserved 42: reserved			
F5.01	Input terminal X2 function selection	Same as above			×
F5.02	Input terminal X3 function selection	Same as above			×
F5.03	Input terminal X4 function selection	Same as above			×
F5.04	Input terminal X5 function selection	Same as above			×
F5.05	Input terminal X6 function selection	Same as above			×
F5.06	Input terminal X7 function selection	Same as above			×
F5.07	Input terminal X8 function selection	Same as above			×
F5.08	FWD/REV run mode selection	0: 2-wire control mode 1 1: 2-wire control mode 2 2: 3-wire control mode 1 3: 3-wire control mode 2	1	0	×
F5.09	UP/DOWN velocity	0.01－99.99Hz/s	0.01Hz/s	1.00Hz/s	○
F5.10	Open circuit collector output terminal OC1 output setting	0: inverter running signal(RUN) 1: frequency arriving signal(FAR) 2: frequency level detect signal (FDT1) 3: reserved 4: overload warning signal (OL) 5: output frequency reach high limit(FHL) 6: output frequency reach low limit(FLL) 7: inverter under voltage blockage stop (LU) 8: stop for exterior failure(EXT) 9: inverter zero rotate speed running 10: PLC running 11: simple PLC segment running finished 12: PLC finish one cycle run 13: reserved 14: inverter ready to run (RDY) 15: inverter failure 16: swing frequency high&low limit restriction 17: interior counter reach final value 18: interior counter reach specified value 19: set runtime arrive 20: interior timing arrive 21: OC1-variable frequency for the 1st pump OC2-power source for the 1st pump OC3- variable frequency for the 2nd pump OC4-power source for the 2nd pump 22: reserved 23: reserved	1	0	×

		24: reserved			
F5.11	Open circuit collector output terminal OC2 output setting	Same as above	1	0	×
F5.12	Open circuit collector output terminal OC3 output setting	Same as above	1	0	×
F5.13	Open circuit collector output terminal OC4 output setting	Same as above	1	0	×
F5.14	Frequency arriving (FAR) detect range	0.00－50.00Hz	0.01Hz	5.00Hz	○
F5.15	FDT1 (frequency level) electric level	0.00－high limit frequency	0.01Hz	10.00Hz	○
F5.16	FDT1 lag	0.00－50.00Hz	0.01Hz	1.00Hz	○
F5.17	Analog output (AO1) selection	0: output frequency(0－high limit frequency) 1: set frequency(0－high limit frequency) 2: output current(0－2×rated current) 3: output voltage(0－1.2×load motor rated voltage) 4: bus-bar voltage(0－800V) 5: PID provision (0.00-10.00V) 6: PID feedback (0.00-10.00V) 7: reserved 8: reserved 9: reserved	1	0	○
F5.18	Analog output (AO1) gain	0.00－2.00	0.01	1.00	○
F5.19	Analog output (AO1) offset	0.00－10.00V	0.01	0.00	○
F5.20	Analog output (AO2) selection	Same as F5.17	1	0	○
F5.21	Analog output (AO2) gain	0.10－2.00	0.01	1.00	○
F5.22	Analog output (AO2) offset	0.00－10.00V	0.01	0.00	○
F5.23	DO terminal output function selection	Same as F5.17	1	0	○
F5.24	DO maximum pulse output frequency	0.1－20.0(max. 20KHz)Max. DO port output pulse frequency corresponds to Max. value selected by F5.23	0.1KHz	10.0	○
F5.25	Set interior count number arriving provision	0－9999	1	0	○
F5.26	Specified interior count number arriving provision	0－9999	1	0	○
F5.27	Interior timer setting	0.1－6000.0s	0.1	60.0	○

F6－Traverse special function parameter group					
Function code	Name	Set range	Min. unit	Factory default	Modifi-cation
F6.00	Traverse function selection	0: traverse function not used 1: traverse function used	1	0	×
F6.01	traverse run mode	LED first bit: jump-in mode 0: automatic jump-in mode 1: terminal manual jump-in mode LED second bit: 0: changing traverse amplitude 1: fixed traverse amplitude notice: traverse center frequency input channel set by F0.00 function parameter	1	00	×
F6.02	Traverse amplitude threshold	0.0－50.0(%)	0.1(%)	0.0(%)	○
F6.03	Sudden jumping frequency	0.0－50.0(%)	0.1(%)	0.0(%)	○
F6.04	traverse cycle	0.1－999.9s	0.1s	10.0s	○
F6.05	Triangle wave rising time	0.0－98(%)(traverse cycle)	0.1(%)	50.0(%)	○
F6.06	traverse preset frequency	0.00－400.00Hz	0.01Hz	0.00Hz	○
F6.07	traverse preset frequency latency time	0.0－6000s	0.1s	0.0s	○

F7－Frequency provision function parameter group					
Function code	Name	Set range	Min. unit	Factory default	Modifi-cation
F7.00	VCI min. provision	0.00－F7.02	0.01V	0.00V	○
F7.01	VCI min. provision corresponding freq.	0.00－high limit frequency	0.01Hz	0.00 Hz	○
F7.02	VCI max. provision	0.00－10.00V	0.01V	9.9V	○
F7.03	VCI max. provision corresponding freq.	0.00－high limit frequency	0.01 Hz	50.00 Hz	○
F7.04	CCI min. provision	0.00－F7.06	0.01V	0.00V	○
F7.05	CCI min. provision corresponding freq.	0.00－high limit frequency	0.01 Hz	0.00 Hz	○
F7.06	CCI max. provision	0.00－10.00V	0.01V	9.9V	○
F7.07	CCI max. provision corresponding freq.	0.00－high limit frequency	0.01 Hz	50.00 Hz	○
F7.08	YCI min. provision	0.00－F7.10	0.01V	0.00V	○
F7.09	YCI min. provision corresponding freq.	0.00－high limit frequency (reverse run)	0.01 Hz	50.00 Hz	○
F7.10	YCI max. provision	0.00－10.00V	0.01V	9.9V	○
F7.11	YCI max. provision corresponding freq.	0.00－high limit frequency (forward run)	0.01 Hz	50.00 Hz	○
F7.12	YCI dead area setting	0.00V－2.00V	0.01V	0.10V	○
F7.13	PULSE max. input pulse	0.01－20.0K	0.01K	10.0K	○
F7.14	PULSE min. provision	0.0－F7.16(PULSE max. provision)	0.01K	0.0K	○
F7.15	PULSE min. provision corresponding freq.	0.00－high limit frequency	0.01Hz	0.00Hz	○
F7.16	PULSE max. provision	F7.14 (PULSE min. provision)－F7.13 (max. input pulse)	0.1K	10.0K	○

F7.17	PULSE max. provision corresponding freq.	0.00－high limit frequency	0.01 Hz	50.00 Hz	○

F8－Motor and vector control parameter group					
Function code	Name	Set range	Min. unit	Factory default	Modifi-cation
F8.00	Control mode setting	0: V/F control 1: vector control remark: for EDS1300 it can't be 1	1	0	×
F8.01	Motor rated voltage	1－480V	1V	Depend on device type	×
F8.02	Motor rated current	0.1－999.9A	0.1A	Depend on device type	×
F8.03	Motor rated frequency	1.00－400.00Hz	0.01 Hz	Depend on device type	×
F8.04	Motor rated speed	1－9999r/min	1r/min	Depend on device type	×
F8.05	Motor pole quantity	2－14	2	Depend on device type	×
F8.06	Motor rated power	0.1－999.9KW	0.1	Depend on device type	×
F8.07	Motor stator resistance	0.000－9.9999ohm	0.001 ohm	Depend on device type	×
F8.08	Motor rotor resistance	0.000－9.9999ohm	0.001 ohm	Depend on device type	×
F8.09	Motor stator leakage inductance	0.0－999.9mH	0.1 mH	Depend on device type	×
F8.10	Motor rotor leakage inductance	0.0－999.9mH	0.1 mH	Depend on device type	×
F8.11	Motor mutual inductance	0.0－999.9mH	0.1 mH	Depend on device type	×
F8.12	Torque limit	50.0－200.0%(rated current)	0.1%	150.0%	×
F8.13	Speed loop proportion gain	0.000－6.000	0.001	0.700	×
F8.14	Speed loop integral time constant	0.000－9.999	0.001	0.360	×
F8.15	Motor stability coefficient	0－4		3	×
F8.16	Filter time displayed instead freq.	0~999	1	6	×
F8.17	Motor speed correction factor	0－9999%	0	100%	×

F9－Protection function parameter group					
Function code	Name	Set range	Min. unit	Factory default	Modifi-cation
F9.00	Waiting time for starting again when power off	0.0－20.0S (0 means do not enable this function)	0.1S	0	×
F9.01	Failure self-renew times	0－10 0 shows no automatic reset function	1	0	×
F9.02	Failure self-renew interval	0.5－20.0S	0.1S	5.0S	×
F9.03	Motor overload protection mode selection	0: no action 1: inverter close off output	1	1	×
F9.04	Motor overload protection coefficient	20.0－120.0(%)	0.1(%)	100.0(%)	×

F9.05	Overload warning alarm checkout level	20－200(%)	1(%)	130(%)	○
F9.06	Overload warning alarmDelay time	0.0－20.0s	0.1s	5.0s	○
F9.07	Overvoltage stall selection	0: ban 1: allow	1	1	×
F9.08	Overvoltage stall point	120－150(%)	1(%)	130(%)	○
F9.09	Automatic current limit level	110－200(%)	1(%)	150(%)	×
F9.10	Frequency declining rate during current limiting	0.00－99.99Hz/s	0.01Hz/s	10.00Hz/s	○
F9.11	Automatic current limiting action selection	0: constant speed ineffective 1: constant speed effective remark: Acc/Dec always effective	1	0	×

Fd－Failure record function parameter group

Function code	Name	Setting range	Min. unit	Factory default	Modifi-cation
Fd.00	Previous one time failure record	Previous one time failure record	1	0	*
Fd.01	Previous two time failure record	Previous two time failure record	1	0	*
Fd.02	Previous three time failure record	Previous three time failure record	1	0	*
Fd.03	Previous four time failure record	Previous four time failure record	1	0	*
Fd.04	Previous five time failure record	Previous five time failure record	1	0	*
Fd.05	Previous six time failure record	Previous six time failure record	1	0	*
Fd.06	Set freq. of previous failure	Set freq. of previous failure	0.01Hz	0	*
Fd.07	output freq. at previous failure	output freq. of previous failure	0.01Hz	0	*
Fd.08	output current at previous failure	output current of previous failure	0.1A	0	*
Fd.09	output voltage at previous failure	output voltage of previous failure	1V	0	*
Fd.10	DC bus-bar voltage at previous failure	DC bus-bar voltage of previous failure	1V	0	*
Fd.11	Load motor speed at previous failure	Load motor speed of previous failure	1(r/m)	0	*
Fd.12	Module temperature at previous failure	Module temperature of previous failure	1℃	0	*
Fd.13	Input terminal status at previous failure	Input terminal status of previous failure		11111111	*
Fd.14	Accumulative run time at previous failure	Accumulative run time of previous failure		0	*

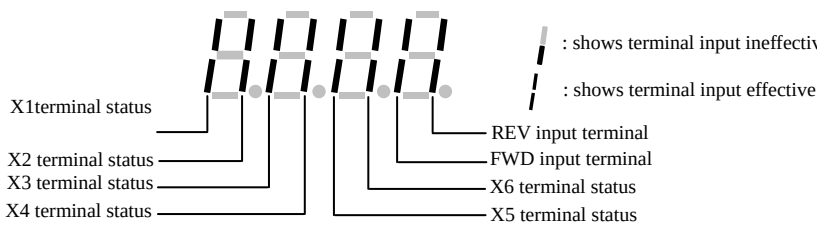
FF－Password and manufacturer function parameter group

Function code	Name	Setting range	Min. unit	Factory default	Modifi-cation
FF.00	User password	0000－9999	1	0000	×
FF.01	Manufacturer password	0000－9999	1	0000	×
FF.02-FF.0X	Manufacturer’s special parameter				×

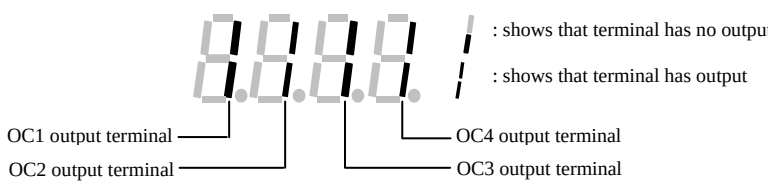
C－Supervision function parameter group					
Function code	Name	Description	Min. unit	Factory default	Modifi -cation
C-00	Set frequency	Current set frequency	0.01HZ		
C-01	Output freq.	Current output freq.	0.01HZ		*
C-02	Output current	Virtual value of current output current	0.1A		*
C-03	Output voltage	Virtual value of current output voltage	1V		*
C-04	DC bus-bar voltage	Current DC bus-bar voltage	1V		*
C-05	Load motor speed	Product of output frequency and load motor speed emendation factor	1(r/m)		*
C-06	Module temperature	IGBT heat sink temperature	1℃		*
C-07	Run time	Inverter electrification run time	1h		*
C-08	accumulative run time	Inverter accumulative run time	1h		*
C-09	Input terminal status	Switch value input terminal status	－－		*
C-10	output terminal status	Switch value output terminal status	－－		*
C-11	Analog input VCI	Analog input value of VCI	V		*
C-12	Analog input YCI	Analog input value of YCI	V		*
C-13	Analog input CCI	Analog input value of CCI	V		*
C-14	Exterior pulse input	Exterior pulse input	0.1KHz		*

FA－Stop assistant function parameter group					
Function code	Name	Set range	Mini. unit	Factory setting	Modifi -cation
FA.00	Auxiliary DC brake time	0.0—999.9s	0.1s	0.0s	○
FA.01	Auxiliary DC brake voltage	0—10.0（%）	0.1（%）	0.0（%）	○
FA.02	Reserved				
FA.03	Reserved				

(1) input terminal status corresponding relation is as follows:



(2) output terminal status corresponding relation is as follows:



6 Detailed function description

Listed column content for parameter function code description in this chapter is as follows:

Code	Name	Set range or description	Factory default

6.1 Basic run function parameter group: F0

F0.00	Frequency input channel selection	range: 0~11	1

0: keypad analog potentiometer setting. Set running frequency by keypad analog potentiometer.

1: keypad digital setting. Initial set frequency value is F0.01，can change set frequency by changing F0.01 parameter through keypad，and you can also modify F0.01 by ▲ , ▼ key.

2: terminal UP/DOWN adjust setting frequency(stored after power off or stop). Initial set frequency value is the value stored during the last power off time，and you can adjust set running frequency by terminal UP/DOWN.

3: serial port provision(not stored after power off). Serial port frequency set initial value is F0.01，change set frequency by setting F0.01 through serial port, after electic off ,it need to set the new specified frequency value.

4: VCI analog setting(VCI－GND). Frequency setting determined by VCI terminal analog voltage，input voltage range: DC0~10V.

5: CCI analog setting (CCI－GND). Frequency setting determined by CCI terminal analog voltage /current，input range: DC0~10(CCI jumping wire choose V side)，DC: 4~20mA (CCI jumping wire choose A side).

6: YCI analog setting (YCI－GND). Frequency setting determined by YCI terminal analog voltage，input range: DC0~10V(YCI jumping wire choose10V side)or DC0~5V(YCI jumping wire choose 5V side).

7: terminal pulse (PULSE) setting. Frequency set by terminal pulse(only input through X7 or X8，see F5.06~F5.07 definition)，input pulse signal spec: voltage range15~24V；frequency range 0~20.0KHz.

8: combination setting. See function parameter F2.09，set frequency by eachchannel combination setting.

9: terminal UP/DOWN adjust setting frequency(not stored after power off or stop) Initial set frequency value is F0.01，and adjust set running frequency by terminal UP/DOWN.

10:serial port provision(stored after power off):when the inverter is disconnected with electic, it will keep the currently running frequency, and next time it will keep the former frequency running the electric on .

11: terminal PWM pulse width set frequency.


note

Relation between frequency and input information is determined by function code F7.00~F7.17 when frequency input channel is 4, 5, 6, 7，please see Section 6.8.

F0.01	Freq. digit setting	range: low limit～high limit	50.00Hz

F0.01 parameter is original set frequency of the inverter when frequency setting channel is defined as number setting (F0.00＝1, 3).

F0.02	Run command channel selection	range: 0~4	0

0: keypad run control. Start and stop the inverter by RUN , STOP , REV JOG key on the keypad.

1: terminal run command control (keypad STOP command ineffective). Start and stop the inverter by exterior control terminal FWD, REV, X1~X8 etc..

2: terminal run command control (keypad STOP command effective). Start and stop the inverter by exterior control terminal FWD, REV, X1~X8 etc..

3: serial port run command control (keypad STOP command ineffective). Start and stop the inverter by RS485 interface.

4: serial port run command control (keypad STOP command effective). Start and stop the inverter by RS485 interface.

The inverter can change run command channel by modifying F0.02 during waiting and running，please confirm that modification is allowed during running on the spot.

F0.03	Run direction setting	Range: 0, 1	100

The 1st bit:

0: forward run

1: reserved

The 2nd bit:

0: reverse run allowed

1: reverse run banned. The inverter will stop output when there is reverse run command.

The 3rd bit:

REV/JOG key selection

0: as reverse run key

1: as jog key


note

If the 2nd bit is set to "1", this function is effective for keypad run command channel, terminal run command channel and serial port run command channel.

F0.04	Acce/Dece mode selection	range: 0, 1	0

0: linear Acce/Dece mode. Output frequency increases or decreases according to constant slope, just as shown in Fig.6-1.

1: S curve Acce/Dece mode. Output frequency increases or decreases according to S curve, just as shown in Fig.6-2.

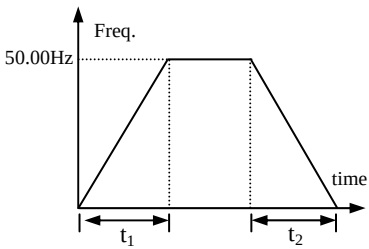


Fig.6-1 linear Acce/Dece

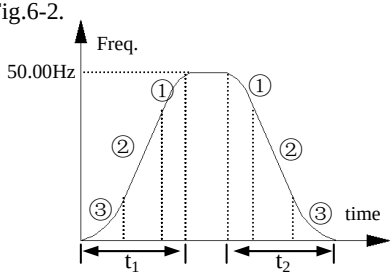


Fig.6-2 S curve Acce/Dece

F0.05	S curve starting time	range: 10.0(%)－50.0(%) (Acc/Dec time)F0.05＋F0.06≤90(%)	20.0(%)
F0.06	S curve rising time	range: 10.0(%)－70.0(%) (Acc/Dec time)F0.05＋F0.06≤90(%)s	60.0(%)

F0.05, F0.06 is only effective when S curve Acce/Dece mode(F0.04＝1)is selected during Acc/Dec selection, and **F0.05 ,F0.06**≤90%.

S curve starting time is shown as Fig. 6-2③，slope of output frequency variation increases by degrees from 0.

S curve rising time is shown as Fig.6-2②，slope of output frequency variation is constant.

S curve ending time is shown as Fig.6-2①，slope of output frequency variation steps down to 0.

note

S curve Acce/Dece mode，suitable for starting and stopping elevator, deferent belt, carrier transporter load etc..

F0.07	Acce/Dece time unit	range: 0, 1	0

This function determines Acce/Dece time unit.

0: second

1: minute

note

(1) This function is effective for all Acce/Dece process except for jog run.
(2) To choose second as time unit is recommended.

F0.08	**Acce time 1**	**range: 0.1－6000.0**	**20.0**
F0.09	**Dece time 1**	**range: 0.1－6000.0**	**20.0**

Accelerating time is defined as time for inverter accelerating from 0Hz to high limit frequency，see t1 in Fig.6-3，Dece time is defined as time for inverter decelerating from high limit frequency to 0Hz, see t2 in Fig.6-3.

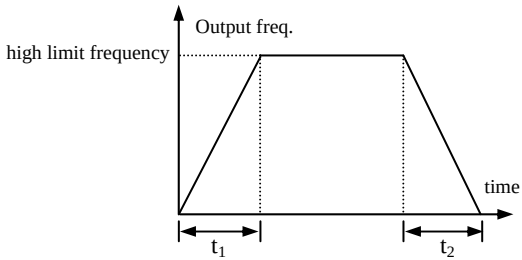


Fig.6-3 Acce/Dece time definition

note

(1) In DGI1000 series inverter 7 kinds of Acce/Dece time are defined in total，here we only define Acce/Dece time 1，Acc/Dec time 2~7 are defined in F2.18~F2.29，please refer to Section 6.3.

(2) Can choose time unit minute or second for Acce/Dece time 1~7 by F0.07, factory default is second.

F0.10	**Upper limit freq.**	**range: lower limit freq.－400.00Hz**	**50.00Hz**
F0.11	**lower limit freq.**	**range: 0.00－upper limit freq.**	**0.00Hz**
F0.12	**Lower limit freq. run mode**	**range: 0:run at lower limit freq. 1: stop by slow down 2: Free stop**	**0**

The inverter will decrease output frequency gradually in set decelerating time when actual set frequency is lower than low limit frequency，after reaching low limit frequency，the inverter will run at low limit frequency if low limit frequency running mode set to 0；The inverter will reduce output frequency sequentially to zero frequency run if low limit frequency running mode set to 1; The inverter will free stop if low limit frequency running mode set to 2. The inverter will begin to re-start from 0HZ and accelerate to a given value if given value higher than low limit frequency.

F0.13	**Torque boost mode**	**Range: 0:manual boost 1:automatic boost**	**0**

0: manual boost. Torque boost voltage is determined completely by parameter F0.14，its characteristic is boost voltage fixed，but the motor is prone to magnetic

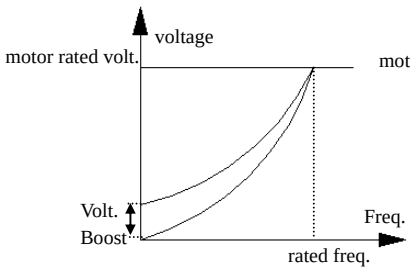
saturation when lightly loaded.

1: automatic torque boost. Torque boost voltage varies as stator current of the motor changes，bigger stator current corresponds to bigger boost voltage.

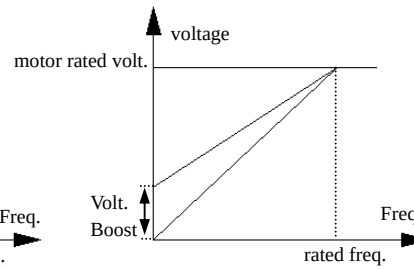
$$\text{Boost volt.}=\frac{\text{F0.14}}{100}\times\text{motor rated volt.}\times\frac{\text{inverter output current}}{2\times\text{inverter rated current}}$$

F0.14	Torque boost	Range: 0.0－12.0(%)	2.0(%)

To improve inverter's low frequency torque characteristic，can carry on boost compensation for output voltage，degressive torque curve and constant torque curve torque boost are separately shown as Fig.6-4a, b.



(a)degressive torque curve torque boost graph



(b) constant torque curve torque boost graph

Fig.6-4 torque boost graph

note

(1) Improper setting to this parameter can cause motor heating or over current protection.
(2) Advise the user to adopt manual torque boost and to adjust V/F curve according to motor parameter and usage occasion when driving synchronous motor.

F0.15	V/F curve setting	range: 0~4	0

This function code defines DGI1000 flexible V/F setting mode to satisfy different load characteristic. Can choose 4 kinds of fixed curve and one custom curve according to definition of F0.15.

If F0.15=0，V/F curve bears constant torque curve characteristic；as curve 0 in Fig.6-5a .

If F0.15=1，V/F curve bears 2.0 order power degressive torque characteristic；as curve 3 in Fig.6-5a .

If F0.15=2，V/F curve bears 1.7 order power degressive torque characteristic；as curve 2 in Fig.6-5a .

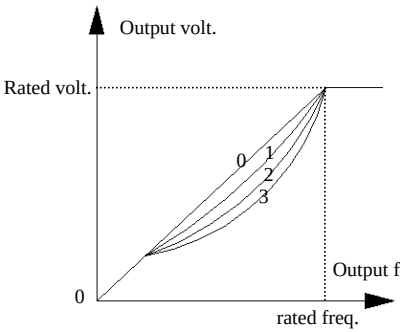
If F0.15=3，V/F curve bears 1.2 order power degressive torque characteristic；as curve 1 in Fig.6-5a .

The user can choose 1, 2, 3 V/F curve run mode according to load

characteristic to reach better energy save result while the inverter is driving degressive torque load such as blower and water pump etc..

If F0.15=4, you can set V/F curve yourself by setting F2.37-F2.44 parameters.

As shown in Fig.6-5b, by setting three inflexion point (V1,F1), (V2,F2), (V3,F3), you can define V/F curve arbitrarily to apply to special load.



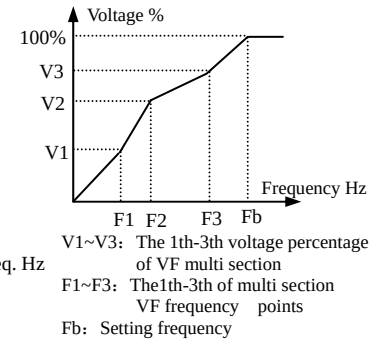


Fig.6-5a V/F curve **b Users set the general form of V/F curve**

F0.16	G/P type setting	range: 0, 1	0

0: G type

1: P type

6.2 Start, stop, braking function parameter group: F1

F1.00	Start run mode	range: 0, 1, 2	0

0: start from starting frequency. The inverter start according to F1.01 starting frequency and F1.02 starting frequency holding time.

1: first brake then start from starting freq. First brake according to DC braking voltage and time (F1.03, F1.04)，then start at starting frequency.

2: Start after inspecting speed.

note

(1) Start-up mode 0: Advise the user to adopt start-up mode 0 in common application occasion and when driving synchronous motor.

(2) Start-up mode 1: Be applicable to small inertia load with forward run or reverse run phenomena when the motor doesn't drive any device, for big inertia load, advise not to adopt start-up mode 1.

(3) Start up mode2: Be application for big inertia load haven't firm stopped start, usually cooperate with restart after power lost, fault recovery function and so on. Please notice the following two points before use the start.

A. Wait few seconds to restart after inverter free stop. If turn out over current fault in start process, please extend restart time.

B. Don't revise frequency in speed check process, otherwise it will alarm.

F1.01	Starting frequency	range: 0.0－10.00Hz	0.00Hz
F1.02	Starting freq. duration time	range: 0.0－20.0S	0.0S

Starting frequency means initial frequency at which the inverter start up，as fs shown in Fig.6-6；Starting freq. holding time means consecutive run time during which the inverter run at starting frequency，as t_1 shown in Fig.6-6.

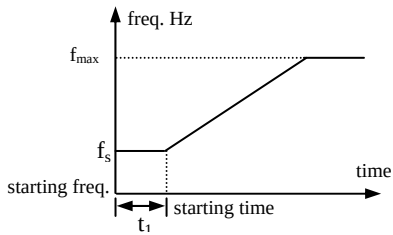


Fig.6-6 starting freq. and starting time

note Starting frequency is not limited by low limit frequency.

F1.03	DC braking volt. when starting	range: 0－15(%)	0(%)
F1.04	DC braking time when starting	range: 0.0－20.0S	0.0S

When F1.00=1，F1.03, F1.04 is effective，as shown in Fig.6-7.

F1.03 is percentage relative to inverter rated input voltage. Have no DC braking process when starting DC braking time is 0.0.

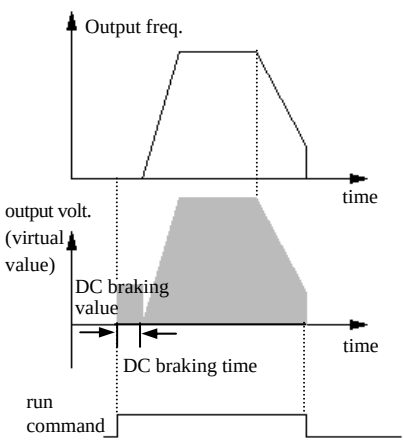


Fig.6-7 starting mode 1

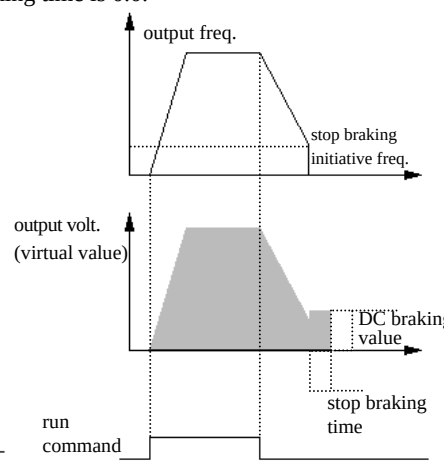


Fig.6-8 Dece stop+DC braking

F1.05	Stop mode	Range: 0, 1, 2	0

0: Dece stop. The inverter reduces output frequency gradually according to set Dece time upon receival of stop command and stops running after frequency is reduced to 0.

1: free stop. The inverter stop outputting at once when receiving stop command and the load stops freely according to mechanical inertia.

2: Dec plus DC braking stop. The inverter reduces output frequency gradually according to set Dece time upon receival of stop command and start DC braking when F1.06 stop braking initiative frequency is reached.

F1.06	DC braking initiative frequency when stop	range: 0.0－15.00Hz	3.00Hz
F1.07	DC braking time when stop	range: 0.0－20.0S	0.0S
F1.08	DC braking voltage when stop	range: 0－15(%)	0

F1.08 is percentage relative to inverter rated input voltage. Have no DC braking process if stop braking time is 0.0s，as shown in Fig.6-8.

6.3 Auxiliary run function parameter group: F2

F2.00	Analog filter time constant	range: 0.00－30.00S	0.20S

The time constant used when the inverter filter sampled value when frequency is set by exterior analog channel. Can improve the situation by increasing this filtering time constant if connecting wire is long or disturbance is serious which cause unstable set frequency.

Analog filtering time constant must be bigger than F3.11(sampling cycle), otherwise the system would run unsteadily.

F2.01	FWD REV run dead-section time	range: 0.0－3600.0S	0.1S

During process of transiting from forward run to reverse run or from reverse run to forward run, transition time during which the inverter wait at zero output frequency, as t_1 shown in Fig.6-9.

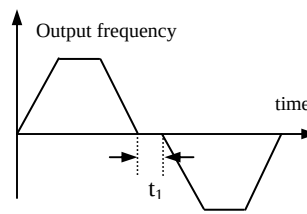


Fig.6-9 FWD REV run dead-section time

F2.02	Automatic energy save run	range: 0, 1	0

To reach better energy save result, the inverter would detect load current to get the purpose of automatic energy save.

0: no action

1: action

Empty or lightly loaded motor can get the purpose of energy save by detecting load current to adjust output voltage properly. Automatic energy save run is mainly applied to occasion of stable load, speed.

note

This function commonly applied to load such as blower and water pump etc.

F2.03	AVR function	range: 0, 1, 2	0

AVR namely automatic voltage adjusting function. Indicate that the inverter can output constant voltage by AVR function when the inverter input voltage fluctuates.

0: no action

1: action all the time

2: no action only during Dece

note

(1) when input voltage is higher than rated value, under normal situation should set F2.03=1. When F1.05=0 namely inverter in decelerating stop，motor Dec time is short and running current would be bigger. But the motor decrease speed placidly with small run current and long Dec time if choose AVR action all the time.

(2) should set F2.03=0, namely AVR function ineffective when the motor system oscillates which caused by choosing AVR function.

F2.04	Slip freq. compensation	range:0~150%	0

This function can adjust output frequency properly as the load varies to compensate slip frequency of the asynchronous motor dynamically, so that control motor speed in constant value. If act with automatic torque boost function, can get better low speed moment characteristic. As shown in Fig.6-10.

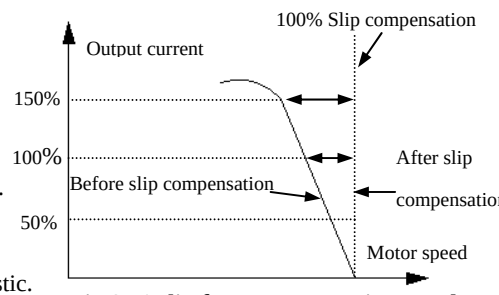


Fig.6-10 slip freq. compensation graph

F2.05	Carrier wave freq.	range: 2－15.0K	Depend on device type

Carrier frequency mainly affects motor noise and heat consumption during running. Relation between carrier frequency and motor noise, current leakage, disturbance is as follows:

Carrier frequency increase(↑)，motor noise decrease(↓)，motor current leakage increase(↑)，disturbance to environment increase(↑)；

Carrier frequency decrease (↓)，motor noise increase (↑)，motor current leakage decrease (↓)，disturbance to environment decrease (↓)。

Should decrease carrier frequency properly to reduce heat consumption of the inverter when ambient temperature is high and motor load is heavy. Relation of DGI1000 each type and carrier frequency is as shown in Table 6-1.

Table 6-1 Relation table of device type and carrier frequency

carrier freq. / device type	Max.carrier freq. (KHz)	Min. carrier freq (KHz)	factory default (KHz)
0.4KW	15	2.0	2
0.75KW	14	2.0	2
1.5KW	13	2.0	2
2.2KW	12	2.0	2
3.7KW	12	2.0	2
5.5KW	11	2.0	2
7.5KW	10	2.0	2
11KW	11.0	0.7	2
15KW	10.0	0.7	2
18.5KW	9.0	0.7	2
22KW	8.0	0.7	2
30KW	7.5	0.7	2
37KW	7.0	0.7	2
45KW	6.0	0.7	2
55KW	5.5	0.7	2

note

(1) To get better control characteristic，suggest that the ratio of carrier frequency to inverter max. run frequency be not smaller than 36.

(2) Error exists in current displayed value when carrier frequency is small.

F2.06	**Jog run frequency**	**range: 0.10－50.00Hz**	**5.00Hz**
F2.07	**Jog Acce time**	**range: 0.1－60.0S**	**20.0S**
F2.08	**Jog Dece time**	**range: 0.1－60.0S**	**20.0S**

Jog frequency has the highest priority. Under any status, the inverter would transit to run at jog frequency at once according to set jog accelerating, decelerating time as long as jog command is inputted, as shown in Fig.6-11.

Jog accelerating time means time during which the inverter accelerate from 0Hz to high limit frequency，Jog Dec time means time during which the inverter decelerate from high limit frequency to 0Hz.

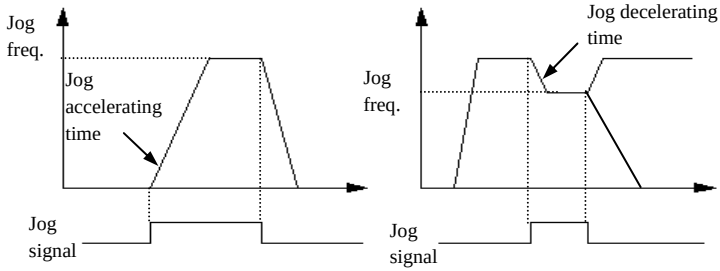


Fig.6-11 jog run

note

(1) Keypad, control terminal and serial port can do jog control all.
(2) The inverter will stop according to Dec stop mode after jog run command is withdrawn.

F2.09	Freq. input channel combination	range: 0～28	0

0: VCI＋CCI
1: VCI－CCI
2: YCI＋CCI

YCI specified frequency is positive or negative. Here YCI input 0～＋10V corresponds to frequency -50.00Hz~+50.00Hz，0~5V corresponds to frequency -50.00～0Hz，5~10V corresponds to 0~+50.00Hz.

3: RS485+YCI

When you choose RS485+YCI，YCI input voltage 0~5V—YCI dead band (F7.12) corresponds to -50.00Hz—0.00Hz，5V—YCI dead band (F7.12)≤YCI≤ 5V+YCI dead band (F7.12) corresponds to 0Hz，YCI>5V+YCI dead band (F7.12) corresponds to 0.00~+50.00Hz. You can carry out tension control by this function.

4: VCI＋YCI
5: reserved
6: external pulse provision＋CCI
7: external pulse provision－CCI
8: reserved
9: reserved
10: reserved
11: reserved
12: reserved

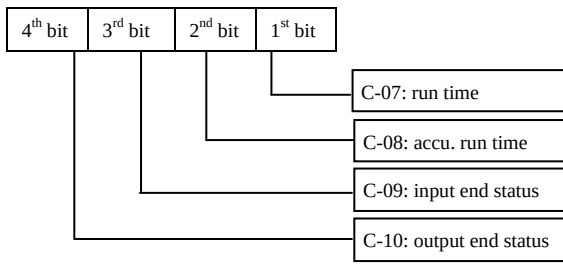
13: VCI，CCI any nonzero value effective，VCI preferred
14: reserved
15: RS485+CCI
16: RS485-CCI
17: RS485+VCI
18: RS485-VCI
19: RS485+keypad analog potentiometer
20: RS485- keypad analog potentiometer
21: VCI+ keypad analog potentiometer
22: VCI- keypad analog potentiometer
23: CCI+ keypad analog potentiometer
24: CCI- keypad analog potentiometer
25: reserved
26: reserved
27: reserved
28: reserved

F2.10	**main&sub inverter communication freq. provision proportion**	**range: 0－500(%)**	**100(%)**

Main&sub inverter communication freq. provision proportion，this parameter need to be set in sub inverter but not need in main inverter.

F2.11	**LED display control 1**	**range: 0000-1111**	**0000**

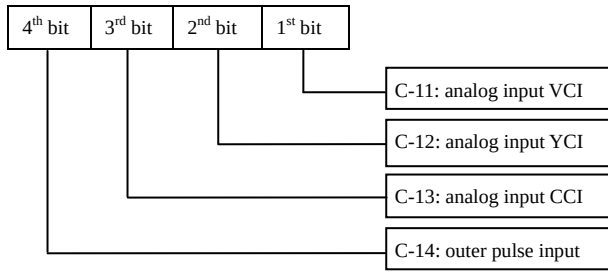
F2.11 make use of 4 bits of the parameter to set if C-07—C-10 is displayed in parameter, thereinto 0 indicates not displayed, 1 indicates displayed. Set parameter of 4 bit is as following figure:



Remark: accu. is abbreviation of accumulative.

F2.12	**LED display control 2**	**range: 0000-1111**	**1111**

F2.12 make use of 4 bit of the parameter to set if C-11—C-14 is displayed in parameter, thereinto 0 indicates not displayed, 1 indicates displayed. Set parameter of 4 bit is as following figure:



F2.13	Parameter operation control	range: LED 1st bit: 0~2 LED 2nd bit: 0~2 LED 3rd bit: 0~4	0

LED 1st bit

0: all parameter allowed to be modified

1: except this parameter，all other parameter not allowed to be changed

2: except F0.01 and this parameter，all other parameter not allowed to be changed

LED 2nd bit

0: no action

1: renew factory default

2: clear history failure record

LED 3rd bit

0: not locked

1: all buttons locked except STOP key

2: all buttons locked except ▲ ▼, STOP key

3: all buttons locked except RUN, STOP key

4: all buttons locked except SHIFT, STOP key

note

(1) Factory default of this function parameter is 0，i.e., all the function parameter can be modified. After modifying the parameter, please first set this function code to 0 if you want to modify function code setting. After modifying the parameter you can change this function code setting to expected protection grade if parameter protection is needed.

(2) After clearing memory information or renewing manufacturer parameter, the 1st bit of this function code will resume 0 automatically.

(3) After the 3rd bit of F2.13 is setted, the keypad will be locked after you press ESC for 5seconds, and then corresponding keys is locked. Please press ESC for 5 seconds again for unlocking the keypad.

F2.14	communication configuration	range: LED 1st bit: 0~5 LED 2nd bit: 0, 1, 2	03

F2.14 make use of 1st bit, 2nd bit to set baud rate and data format of serial communication，thereinto LED 1st bit represents communication baud rate, set value as follows:

0: 1200BPS

1: 2400BPS

2: 4800BPS

3: 9600BPS

4: 19200BPS

5: 38400BPS

LED 2nd bit: represents data format，set value as follows:

0: 1－8－1 format, no checkout. Namely: 1 bit for starting, 8 bits for data, 1 bit for stop, no checkout.

1: 1－8－1 format，even checkout. Namely: 1 bit for starting, 8 bits for data, 1 bit for stop, even checkout.

2: 1－8－1 format，odd checkout. Namely: 1 bit for starting, 8 bits for data, 1 bit for stop, odd checkout.

F2.15	Local address	range: 0－127，127 is broadcast address	1

This function code is used to identify address of this inverter during serial port communication.127 is for main inverter during main and sub device communication between inverters.

127 is broadcast address，can only receive and execute broadcast command from upper machine but not respond to upper machine when 127 is set to broadcast address.

F2.16	Communication overtime checkout time	range: 0.0－1000.0S	0.0S

When serial port communication fails and its continuous time exceed set value of this function code，the inverter judge it as communication failure.

The inverter would not detect serial port communication signal, namely this function ineffective when set value is 0.

F2.17	Local response delay time	range: 0－200ms	5ms

Local response delay time represents the time within which the inverter serial port receive and execute command from upper device and then respond to upper device，this function is just used for setting this delay time.

F2.18	**Acce time 2**	**range: 0.1－6000.0**	**20.0**
F2.19	**Dece time 2**	**range: 0.1－6000.0**	**20.0**
F2.20	**Acce time 3**	**range: 0.1－6000.0**	**20.0**
F2.21	**Dece time 3**	**range: 0.1－6000.0**	**20.0**
F2.22	**Acce time 4**	**range: 0.1－6000.0**	**20.0**
F2.23	**Dece time 4**	**range: 0.1－6000.0**	**20.0**
F2.24	**Acce time 5**	**range: 0.1－6000.0**	**20.0**
F2.25	**Dece time 5**	**range: 0.1－6000.0**	**20.0**
F2.26	**Acce time 6**	**range: 0.1－6000.0**	**20.0**
F2.27	**Dece time 6**	**range: 0.1－6000.0**	**20.0**
F2.28	**Acce time 7**	**range: 0.1－6000.0**	**20.0**
F2.29	**Dece time 7**	**range: 0.1－6000.0**	**20.0**

Can define 3 kinds of accelerating decelerating time and can choose accelerating decelerating time 1～7 during inverter run process by different combination of control terminal，please see definition for function of accelerating decelerating time terminal in F5.00～F5.07.

note

Accelerating decelerating time 1 is defined in F0.08 and F0.09.

F2.30	**Multi-step freq. 1**	**range: low limit －high limit**	**5.00Hz**
F2.31	**Multi-step freq. 2**	**range: low limit －high limit**	**10.00Hz**
F2.32	**Multi-step freq. 3**	**range: low limit －high limit**	**20.00Hz**
F2.33	**Multi-step freq. 4**	**range: low limit －high limit**	**30.00Hz**
F2.34	**Multi-step freq. 5**	**range: low limit －high limit**	**40.00Hz**
F2.35	**Multi-step freq. 6**	**range: low limit －high limit**	**45.00Hz**
F2.36	**Multi-step freq. 7**	**range: low limit －high limit**	**50.00Hz**

These set frequency will be used in multi-step speed run mode and simple PLC run mode，please refer to multi-step speed run terminal function of F5.00～F5.07 and F4 group simple PLC function.

F2.37	**VF frequency value 0**	**0.00-F2.39**	**10.00Hz**
F2.38	**VF voltage value 0**	**0.00-F2.40**	**20.00%**
F2.39	**VF frequency value 1**	**F2.37-F2.41**	**20.00Hz**
F2.40	**VF voltage value 1**	**F2.38-F2.42**	**40.00%**
F2.41	**VF frequency value 2**	**F2.39-F2.43**	**25.00Hz**
F2.42	**VF voltage value 2**	**F2.40-F2.44**	**50.00%**
F2.43	**VF frequency value 3**	**F2.41-high limit frquency**	**40.00Hz**
F2.44	**VF voltage value 3**	**F2.42-100.0% (rated voltage)**	**80.00%**

See decription for F0.15.

F2.45	**Jumping freq. 1**	**range: 0.00－400.00Hz**	**0.00Hz**
F2.46	**Jumping freq. 1 range**	**range: 0.00－30.00Hz**	**0.00Hz**
F2.47	**Jumping freq. 2**	**range: 0.00－400.00Hz**	**0.00Hz**
F2.48	**Jumping freq. 2 range**	**range: 0.00－30.00Hz**	**0.00Hz**
F2.49	**Jumping freq. 3**	**range: 0.00－400.00Hz**	**0.00Hz**
F2.50	**Jumping freq. 3 range**	**range: 0.00－30.00Hz**	**0.00Hz**

F2.45～F2.50 function is set for keeping inverter output frequency away from resonance frequency of mechanical load.

Inverter set frequency can jump around some frequency point according to mode shown in Fig. 6-12, at most 3 jumping range can be defined.

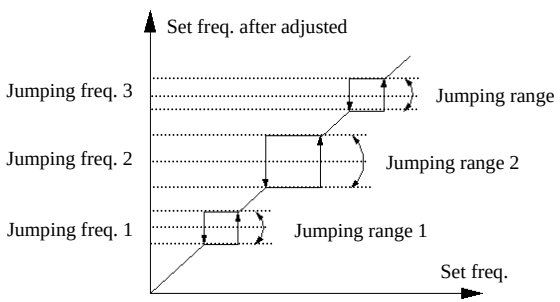


Fig.6-12 jumping frequency and range graph

F2.51	**Set run time**	**range: 0－65535h**	**0**
F2.52	**Run time accumulation**	**range: 0－65535h**	**0**

After run accumulative time reach set run time (F2.51)，the inverter will output indicator signal，please refer to F5.10～F5.13 function introduction.

F2.52 denotes accumulative run time of the inverter from leaving factory tonow.

F2.53	**RS485/232 communication frame format selection**	**range: 0－4**	**0**

0: a frame of 14 bytes or 18 bytes ASCII

1: a frame of 8 bytes or 10 bytes hex，primary response not changed

2: a frame of 8 bytes or 10 bytes hex，12 command has no response

3: a frame of 8 bytes or 10 bytes hex，14 command has no response

4: a frame of 8 bytes or 10 bytes hex，both 12 and 14 command have no Response

6.4 Closed-loop run function parameter group: F3

Analog feedback control system:

Input pressure specified value through VCI port, send 4~20mA feedback value of pressure sensor to inverter CCI input port，make up of analog closed-loop control system by built-in PID adjustor，as shown in Fig.6-13.

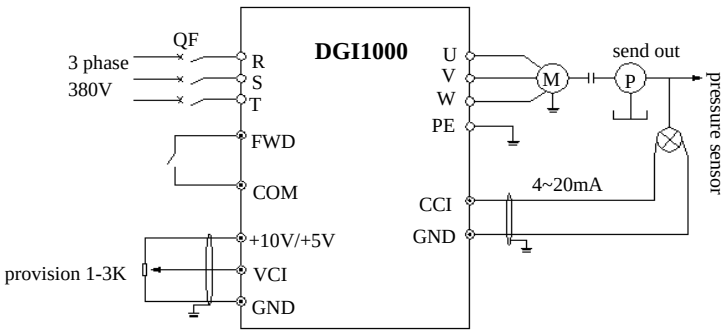


Fig.6-13 built-in PID analog feedback control system graph

note Specified value can also be provided with option by F0.00 function code.

DGI1000 built-in PID adjustor make up of control system and its work principle chart is as follows:

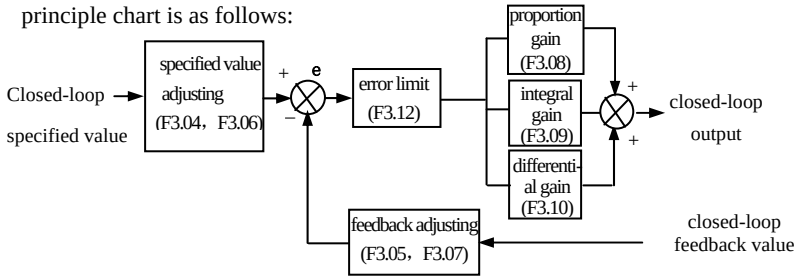


Fig.6-14 PID control principle diagram

In above diagram Kp: proportion gain；Ki: integral gain；Kd: differential gain

In above Fig.6-14 ,definition of closed-loop specified value, feedback value, error limit and proportion integral differential parameter is same as that of common PID adjustor parameter, see respectively (F3.01~F3.12) definition， relation of specified value and expected feedback value is as shown in Fig.6-15. Thereinto specified value take 10V as reference and feedback take 20mA as reference.

Specified value adjusting and feedback value adjusting in Fig.6-14 is for confirming corresponding relation and unitive dimension between specified value and feedback value.

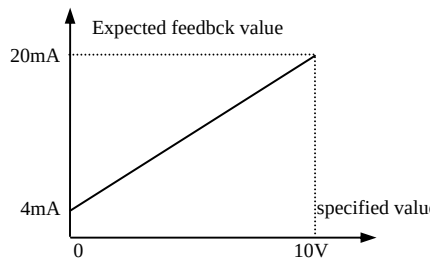


Fig.6-15 specified value and expected feedback value

When the system is determined，basic steps for setting closed-loop parameter are as follows:

(1) determine closed-loop provision and feedback channel(F3.01, F3.02)

(2) need to set relation between closed-loop provision and feedback for analog closed-loop (F3.04~F3.07)

(3) set closed-loop presetting frequency function (F3.14, F3.15)

(4) set closed-loop proportion gain, integral gain, differential gain, sampling

cycle, error limit (F3.08~F3.12)

F3.00	Closed-loop run control selection	range: 0, 1, 2	0

0: closed-loop run control ineffective

1: PID closed-loop run control effective

2: constant pressure water supply PID control effective

This parameter is mainly used for implementing one-driving-two water supply function. If need one driving three or one driving four, please choose a dedicated water supply substrates to achiveve.

Besides setting F3 group of related closed loop running parameters, F5.10－F5.13（OC1－OC4）must be set to 21.

F3.01	provision channel selection	range: 0~3	1

0: digital provision.

1: VCI analog 0－10V voltage provision

2: CCI analog provision. Can choose 0~10V voltage or 4~20mA current provision

3: keypad analog potentiometer provision

F3.02	Feedback channel selection	range: 0~6	1

0: VCI analog input voltage 0－10V

1: CCI analog input

2: VCI+CCI

3: VCI-CCI

4: Min { VCI, CCI }

5: Max { VCI, CCI }

When CCI analog input is selected to be current input, it will be converted to voltage value in the inverter.

6: pulse feedback

F3.03	Specified value digital setting	range: 0.00－9.999V	1.000V
	Target pressure value setting	Range:0.00－F3.21Mpa	1.000(Mpa)

When F3.00=1, figure given value F3.03 will be as specified value of closed-loop control system directly. At this time please setF3.21to 9.999(v);

When F3.00=2, Start PID control constant pressure water supply, At this point the water supply system F3.03 will become the target pressure value. Upper limit is F3.21Mpa.

F3.04	**min. specified value**	**range: 0.0－max. specified value**	**0.0(%)**
F3.05	**corresponding feedback value of min. specified value**	**range: 0.0－100.0(%)**	**0.0(%)**
F3.06	**max. specified value value**	**range: min. specified value -100.0(%)**	**100.0(%)**
F3.07	**corresponding feedback value of max. specified value**	**range: 0.0%－100.0(%)**	**100.0(%)**

F3.04~F3.07 define relation curve of analog closed-loop provision and expected feedback. Their set value is percentage of provision and feedback actual value relative to reference (10V or 20mA).

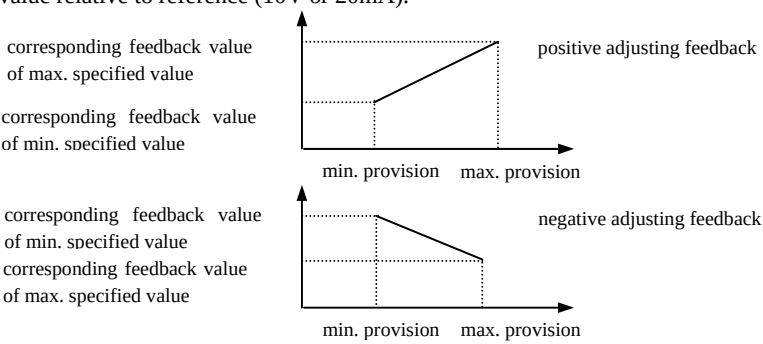


Fig.6-16 provision，feedback curve

F3.08	**Proportion gain Kp**	**range: 0.000－9.999**	**0.050**
F3.09	**Integral gain Ki**	**range: 0.000－9.999**	**0.050S**
F3.10	**Differential gain Kd**	**range: 0.000－9.999**	**0.000**
F3.11	**Sampling cycle T**	**range: 0.01－1.00S**	**0.10S**

The more big Kp proportion gain is, the more quick the response is，but overbig is prone to bringing surge.

Only applying proportion gain Kp adjustment can't eliminate offset completely，can apply integral gain Ki and differential gain to make up of PID control in order to eliminate residual offset. The bigger Ki is, the more quickly the system responds to changing offset, but overbig is prone to bringing surge.

Sampling cycle T is sampling cycle for feedback value，during each sampling cycle PID adjustor calculate for one time，the longer the sampling cycle is , the slower the system responds.

F3.12	Deviation limit	range: 0.0－20.0(%)	2.0(%)

For Max. offset of closed-loop specified value，as shown in Fig.6-17，PID adjustor stops adjusting when feedback value is within this range. To utilize this function reasonably redound to harmonizing the conflict between system output precision and stabilization.

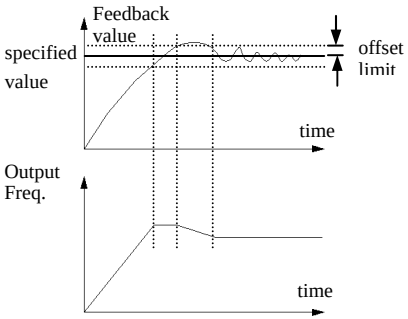


Fig.6-17 offset limit

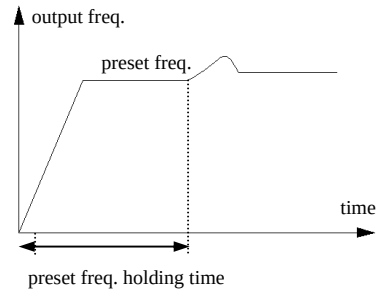


Fig.6-18 closed-loop preset freq.

F3.13	Integral separation PID adjusting threshold	range: 0.0－100.0%	100.0

PID integral separation，integral don't react when specified value and feedback value are bigger than this limit，only when specified value and feedback value are smaller than or equal to this limit，integral react. Can adjust system response speed by adjusting this parameter.

F3.14	Closed-loop preset frequency	range: 0-high limit freq.	0.00Hz
F3.15	Closed-loop preset frequency holding time	range: 0.0-6000S	0.0S

This function can make closed-loop adjusting enter into stable phase quickly. After closed-loop run starts, the inverter first accelerates to preset frequency F3.14 in terms of accelerating time，and after running at this frequency for a period of time F3.15, it runs according to closed-loop characteristic. As shown in Fig.6-18.

note Set preset freq. and holding time to "0' if closed-loop preset freq. function is not needed.

F3.16	Sleep frequency threshold	range: 0.00－400.00Hz	30.00Hz
F3.17	Wake pressure threshold	range: 0.00－F3.21Mpa	0.500Mpa

The function of sleep frequency threshold: When the system water pressure in

the scope of F3.12 (deviation limit), and the inverter operating frequency is under the F3.16 (sleep frequency), after the F3.18 (sleep delay time), the inverter will enter a sleep state, operating frequency will drop to 0.00HZ in order to save energy conservation and protect motor.

Wake function: When the system is in sleep mode, When the water feedback pressure is less than F3.17 (wake pressure). At this time the inverter had passed F3.19(Delayed recovery time) , Sleep out.

F3.18	**Sleep delay time**	**range: 0.0－6000.0S**	**0.0**

This parameter is to set delay time when entering into sleep function. Inverter will enter the delay time of sleep state. When the system pressure at this delay time does not meet the conditions of sleep, System does not enter the sleepin mode.

F3.19	**Revival delay time**	**range: 0.0－6000.0S**	**0.0**

System in sleep mode, if the feedback pressure of system less than F3. 17 wake pressure threshold value , the system will out of sleep after this delay time.

F3.20	**Constant pressure water supply mode 1**	**range: 0~3**	**0**

0: inverter works in one-drive-two water supply mode

1: constant pressure water supply board acts in one-drive-two mode

2: constant pressure water supply board acts in one-drive-three mode

3: constant pressure water supply board acts in one-drive-four mode

F3.21	**Long-distance manometer range**	**range: 0.001－9.999**	**1.000**

To set this parameter correspondingly to 10V or 20mA.

F3.22	**Allowed offset to high limit and lower limit Freq. when add or reduce pumps**	**range: 0.0－100.0%**	**1.0**

By this parameter, we defines that the inverter begins to add or reduce pumps when output frequency falls in offset range of high limit frequency or lower limit frequency. The inverter begins to add or reduce pumps at high limit frequency or lower limit frequency if this parameter is set to be 0.0%.

F3.23	**Pump switchover judging time**	**range: 0.0－999.9S**	**5.0**

This parameter defines the judging time from output frequency up to high limit to adding pump and the same from ouput frequency up to lower limit to reducing pump.

F3.24	**Magnetic control conductor switchover delay time**	**range: 0.1－10.0S**	**0.5**

This parameter defines the action delay time of magnetic control conductor when it's from power source to variable frequency or from variable frequency to power source.

F3.25	Automatic switchover interval	range: 0000－9999	0000

By setting this parameter, can achieve the function of rust-proof die of the motor, the inverter can delay time by it and then automatically smart switch run pumps and static pump.

When setting value is 0000 minutes, the automatic switching is invalid; when setting value is 0001,the system will automatically switch one time in each restarted time. when work it would't switch: when setting value is above 0002,the system will automatically switch by setting value.

F3.26	Water supply supervision Para. display	range: 0, 1	0

0: C-11, C-12 display voltage value of VCI, CCI.

1: C-11, C-12 display PID specified pressure and feedback pressure.

F3.27	Closed-loop adjusting characteristic	range: 0, 1	0

0: Forward function. motor speed increases as specified value increases.

1: Reverse function. motor speed decreases as specified value increases.

F3.28	LED initial supervision Para. selection	range: 0~14	1

This parameter defines initial supervision parameter selection during running or stop. For example F3.28=3, LED displays output voltage initially, please press SHIFT key if you want to see about other supervision parameter.

0: set frequency: Standby mode display set the frequency, output frequency is displayed after running.

1: output frequency: Display output frequency not only standby but also running .

2: output current

3: output voltage

4: DC bus bar voltage

5: motor speed

6: heat sink temperature

7: run time

8: accumulative run time

9: input terminal status

10: output terminal status

11: analog input VCI/PID provision

12: analog input CCI/PID feedback
13: analog input YCI
14: exterior pulse input

F3.29	YCI run-in delay time	range: 0.0－999.9s	10.0

The inverter first run at RS485 set frequency after start-up and change set frequency to RS485+YCI after delay time passed.

F3.30	Failure relay TA，TB，TC function selection	range: 0~24	15

Same as detailed description for F5.10.

F3.31	Reserved		

6.5 Simple PLC function parameter group:F4

The user can set by himself the output frequency direction and running time of the inverter during a running cycle by simple PLC function according to spot craft demand, as shown in Fig.6-19.

DGI1000 serial inverter simple PLC run function provide 7 kinds ofmulti-step speed run mode，see below an example of 7 step speed. In Fig.6-20，a1~a5, d1~d5 is accelerating or decelerating time of relative step， set by accelerating decelerating time parameter F0.08, F0.09 and F2.18~F2.29 in total 7 kinds of parameter，f1~f7, T1~T7 indicating set frequency and run time set by function code F4.01~F4.14.

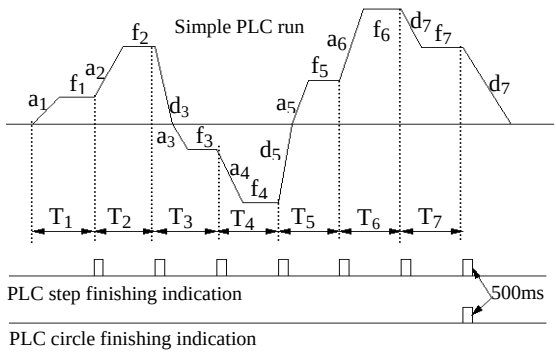


Fig.6-19 simple PLC run

DGI1000 series inverter simple PLC run function can provide 7 kinds of multi-speed operation mode, take the fowling 7speed for example Figure 6 -20 , a1~ a5, d1~d5Is the speed up time and the deceleration time of the stage, they are

setted by the acceleration time parameters F 0.08,F0.09and F2.18~F2.29, a total of seven kinds of parameters, the run frequency and run time of f1~ f7, T1~ T7 are setted by function code F4.01~f4.14.

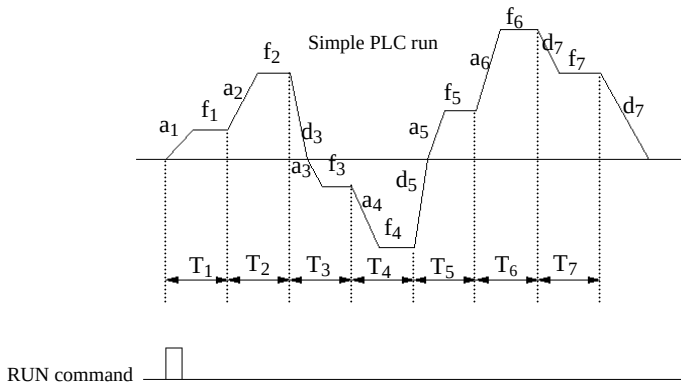


Fig.6-20 stop after PLC single circle

PLC step finishing and circle finishing indication can be realized by outputting 500mS pulse indicator signal through open circuit collector terminal OC1~OC4，detailed function defined by F5.10~F5.13.

F4.00	**Simple PLC running setting**	**range: LED 1st bit: 0~3 LED 2nd bit: 0, 1 LED 3rd bit :0, 1**	**000**

This function code make use of its 1st bit, 2nd bit, 3rd bit to set PLC run mode, PLC rerun mode after interruption，set run time unit，detail as follows:

LED 1st:

0: no action. PLC run mode ineffective.

1: stop after single circulation. As shown in Fig.6-20，the inverter stops automatically after finishing a circle，can only start when another run command is available.

2: keep final value after single circulation. As shown in Fig.6-21，the inverter keep running according to frequency, direction of final step after finishing a circle，the inverter won't stop according to set decelerating time until the stop command is available.

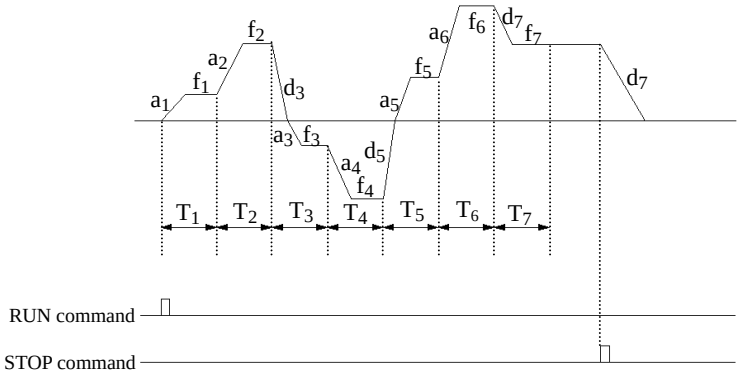


Fig.6-21 holding mode after PLC single circle

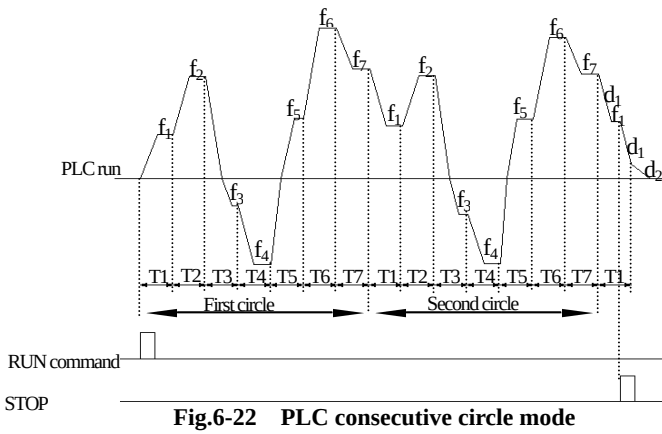


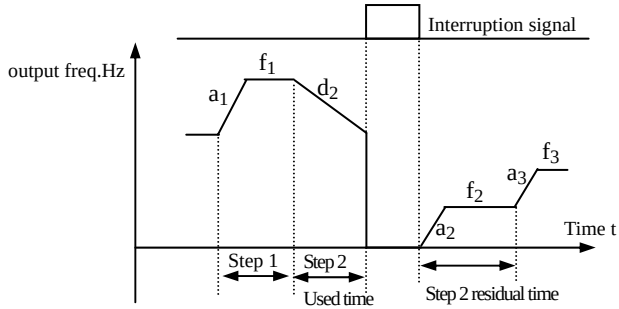
Fig.6-22 PLC consecutive circle mode

3: consecutive circulation. As shown in Fig.6-22，the inverter start next circle automatically after finishing a circle，until there is stop command.

LED 2nd bit:

0: start from first step. Stop during running caused by stop command, failure or power off，after restarting the inverter will run from first step.

1: continue to run from step frequency of interruption moment. When stop during running caused by stop command or failure，the inverter will record current step used time automatically and enter into this step automatically after restarting，continue to run for residual time according to defined frequency of this step, as shown in Fig.6-23. The inverter will rerun from first step after restarting if power off.



a_1: step 1 accelerating time
a_2: step 2 accelerating time
a_3: step 3 accelerating time
d_2: step 2 decelerating time
f_1: step 1 frequency
f_2: step 2 frequency
f_3: step 3 frequency

Fig.6-23 PLC starting mode 1

LED 3rd bit : PLC run time unit

0: second；1: minute

This unit is only effective to PLC run step time，for accelerating decelerating time of PLC run period, their unit selection is determined by F0.07.

note

(1) If run time of PLC segment is set to 0，this segment is ineffective.
(2) can make PLC process a pause, ineffective, work etc. through terminal，for detail please refer to terminal correlative function parameter group F5.

F4.01	**Section 1 setting**	**range: 000－621**	**000**
F4.02	**Section 1 runtime**	**range: 0－6000.0**	**10.0**
F4.03	**Section 2 setting**	**range: 000－621**	**000**
F4.04	**Section 2 runtime**	**range: 0－6000.0**	**10.0**
F4.05	**Section 3 setting**	**range: 000－621**	**000**
F4.06	**Section 3 runtime**	**range: 0－6000.0**	**10.0**
F4.07	**Section 4 setting**	**range: 000－621**	**000**
F4.08	**Section 4 runtime**	**range: 0－6000.0**	**10.0**
F4.09	**Section 5 setting**	**range: 000－621**	**000**
F4.10	**Section 5 runtime**	**range: 0－6000.0**	**10.0**
F4.11	**Section 6 setting**	**range: 000－621**	**000**
F4.12	**Section 6 runtime**	**range: 0－6000.0**	**10.0**
F4.13	**Section 7 setting**	**range: 000－621**	**000**
F4.14	**Section 7 runtime**	**range: 0－6000.0**	**10.0**

F4.01~F4.14 utilize LED 1st bit, 2nd bit, 3rd bit to separately define frequency setting，direction and accelerating decelerating time of PLC Run, see following for detail:

LED1st bit: frequency setting

0: multi-step frequency i i=1~7 is defined by F2.30~F2.44.

1: frequency is determined by function code F0.00

LED 2nd bit: run direction selection

0: forward run

1: reverse run

2: determined by run command (FWD,REV)

LED3rd bit: accelerating decelerating time selection

0: accelerating decelerating time 1

1: accelerating decelerating time 2

2: accelerating decelerating time 3

3: accelerating decelerating time 4

4: accelerating decelerating time 5

5: accelerating decelerating time 6

6: accelerating decelerating time 7

6.6 Terminal correlative function parameter group: F5

F5.00	**Input terminal X1 function selection**	**range: 0~42**	**0**
F5.01	**Input terminal X2 function selection**	**range: 0~42**	**0**
F5.02	**Input terminal X3 function selection**	**range: 0~42**	**0**
F5.03	**Input terminal X4 function selection**	**range: 0~42**	**0**
F5.04	**Input terminal X5 function selection**	**range: 0~42**	**0**
F5.05	**Input terminal X6 function selection**	**range: 0~42**	**0**
F5.06	**Input terminal X7 function selection**	**range: 0~42**	**0**
F5.07	**Input terminal X8 function selection**	**range: 0~42**	**0**

Multi-function input terminal X1~X8 provides 43 kinds of selection mode for the user，can choose based on spot requirement. For parameter function table please see Table 6-2.

Table 6-2 multifunction input function selection table

item	corresponding function	item	corresponding function
0	Leave control terminal unused	1	Multi-step speed control terminal 1
2	Multi-step speed control terminal 2	3	Multi-step speed control terminal 3
4	Multi-step speed control terminal 4	5	External forward run jog control
6	External reverse run jog control	7	Acce/Dece time selecting terminal 1
8	Acce/Dece time selecting terminal 2	9	Acce/Dece time selecting terminal 3
10	External device failure input	11	External reset input
12	Free stop input	13	External stop command
14	stop DC braking input command DB	15	Inverter run prohibition
16	Frequency increasing control (UP)	17	frequency descending control(DOWN)
18	Acce/Dece prohibited command	19	Three-wire run control
20	Closed-loop ineffective	21	PLC ineffective
22	Simple PLC pause command	23	PLC stop status reset (reset variable of PLC interruption moment, make it restart from first segment)
24	Frequency provision channel selection 1	25	Frequency provision channel selection 2
26	Frequency provision channel selection 3	27	Frequency switched to CCI
28	Command switched to terminal	29	Run command channel selection 1
30	Run command channel selection 2	31	Run command channel selection 3
32	Swing frequency jumpin	33	External interruption input
34	interior counter clearing end	35	interior counter triggering end
36	Interior timer clearing end	37	interior timer triggering end
38	Pulse frequency input(only effective for X7,X8)	39	Reserved
40	Reserved	41	Reserved
42	Reserved		

Now explain listed function in Table 6-2 as follows:

1~4: Multi-step speed control terminal. Can set 15 step speed run frequency by choosing ON/OFF combination of these function terminal.

Table 6-3 multi-step speed run selection table

K_4	K_3	K_2	K_1	Frequency setting
OFF	OFF	OFF	OFF	Common run frequency
OFF	OFF	OFF	ON	Multi-step frequency 1
OFF	OFF	ON	OFF	Multi-step frequency 2
OFF	OFF	ON	ON	Multi-step frequency 3
OFF	ON	OFF	OFF	Multi-step frequency 4
OFF	ON	OFF	ON	Multi-step frequency 5
OFF	ON	ON	OFF	Multi-step frequency 6
OFF	ON	ON	ON	Multi-step frequency 7

Above multi-step frequency can be used in multi-step speed run and simple PLC run, please see below an example of multi-step speed run:

We now define control terminal X1, X2, X3, separately as follows:

After set F5.00=1, F5.01=2, F5.03=3, X1, X2, X3, are used for realizing multi-step run，as shown in Fig.6-24.

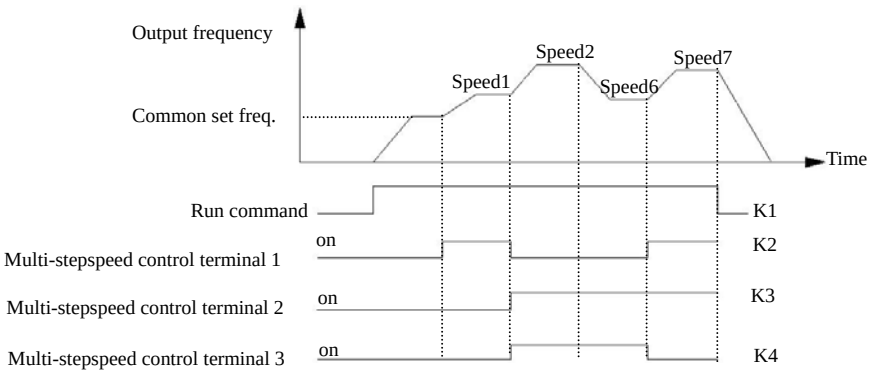
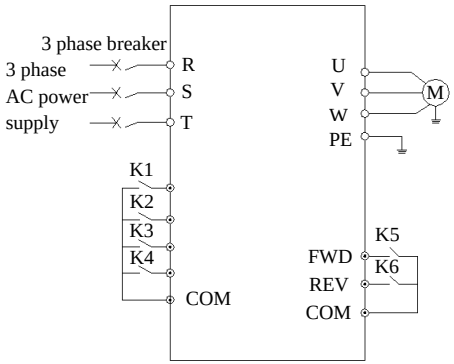


Fig.6-24 multi-step run

In fig.6-25 see an example of terminal run command channel，can make forward, reverse run control by K5, K6. In Fig.6-24, by different logic combination of K2, K3, K4，the inverter can run according to common set frequency or 1~7multi-step frequency multi-speed operation based on above table.



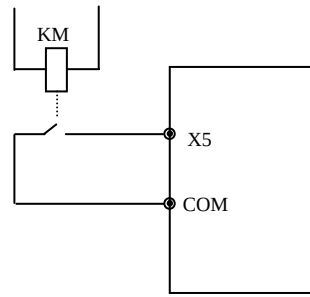


Fig.6-25 multi-step speed run **Fig.6-26 exterior device failure always-open input**

5~6: external jog run control input JOGF/JOGR. When run command channel is set to terminal run command channel F0.02=1，JOGF is jog forward run，JOGR is jog reverse run，jog operation frequency, jog accelerating decelerating time is defined in F2.06~F2.08 (remark: jog run command channel is determined by F0.02)

7~9: Acce&Dece time terminal selection

Table 6-4 Acce&Dece time terminal selection logic mode

Terminal 2	Terminal 2	Terminal 1	Acce/Dece time selection
OFF	OFF	OFF	Acce time 1/ Dece time 1
OFF	OFF	ON	Acce time 2/ Dece time 2
OFF	ON	OFF	Acce time 3/ Dece time 3
OFF	ON	ON	Acce time 4/ Dece time 4
ON	OFF	OFF	Acce time 5/ Dece time 5
ON	OFF	ON	Acce time 6/ Dece time 6
ON	ON	OFF	Acce time 7/ Dece time 7

Can realize selection for Acce&Dece time1~7 by ON/OFF combination of Acce&Dece time terminal.

10: external equipment fault input. Can input fault signal of external equipment by this terminal to be convenient for the inverter to monitor fault of external equipment. The inverter displays “E0.14”, namely external equipment fault alarm after receiving the external equipment fault signal.

11: exterior restoration input. After the fault alarm takes place in the inverter, can restore the inverter through this terminal. Its function is same as

function of RESET key on the operation panel.

12: free stop input. This function is same as free stop during running defined in F1.05，but it's realized by control terminal to be convenient for long-distance control.

13: exterior stop command. This command is effective to all run command channel，when this function is effective the inverter stops running in mode set by F1.05.

14: DC injection braking input command DB during stop. Implement DC injection braking to the motor during stop by control terminal，in order to realize urgent parking and accurate orientation of the motor. Braking initial frequency, braking time are defined in F1.06, F1.07.

15: inverter run forbiddance. The inverter during running stops freely when this terminal is effective and forbidden to start in waiting status. Mainly applied to occasion needing safe linkage.

16~17: frequency increasing control UP/descending control DOWN. Realize frequency increasing or descending by control terminal, which substitute for keypad to realize long-distance control. Effective during common run if F0.00=2.Increasing descending speed is set by F5.09.

18: Acce&Dece speed forbidden command. Let the motor not effected by any foreign signal(except stop command)，keep running at current frequency.

note

Ineffective during normal decelerating stop.

19: three-wire run control. Please refer to function description of F5.08 run mode (three-wire run mode).

20: closed-loop ineffective. Realize flexible switch to lower level runmode under closed-loop run status.

note

(1) Can switch between closed-loop and lower level run mode only during closed-loop run(F3.00=1).
(2) Start stop control, direction and Acce&Dece time are subject to setting of corresponding run mode when it's switched to lower level run mode.

21: PLC ineffective. Realize flexible switch to lower level run mode under PLC run status.

note

(1) Can switch between PLC and lower level run mode only during PLC run(F4.00≠0).
(2) Start stop control, direction and Acce&Dece time are subject to setting of corresponding run mode when it's switched to lower level run mode.

22: simple PLC pause command. Implement pause control to PLC process during running，run at zero frequency when this terminal is effective，not time for PLC run；after ineffective implement automatic speed tracking start and continue PLC run. For application method please refer to function description of F4.00~F4.14.

23: PLC stop status reset. Under stop status of PLC run mode, will clear PLC run step, runtime, run frequency etc. recorded when PLC run stops if this terminal is effective，please see F4 group function description.

24~26: terminal frequency provision channel selection. Through ON/OFF combination of frequency provision channel selection terminal 24, 25, 26，can realize frequency provision channel switch shown in Table 6-5. For relation of terminal switch and function code F0.00 setting, that is, latter effective.

Table 6-5 terminal frequency provision channel selection logic mode

frequency provision channel selection end 3	frequency provision channel selection end 2	frequency provision channel selection end 1	frequency provision channel selection
OFF	OFF	OFF	hold freq. setting
OFF	OFF	ON	potentiometer provision
OFF	ON	OFF	keypad number provision
OFF	ON	ON	terminal UP/DOWN adjusting provision
ON	OFF	OFF	serial port provision
ON	OFF	ON	VCI
ON	ON	OFF	CCI
ON	ON	ON	end PULSE provision

27: switch frequency to CCI. Frequency provision channel is switched to CCI provision compulsorily when this function terminal is effective, frequency provision channel come back to previous status when this function terminal is ineffective.

28: command switched to terminal. Run command channel is switched to terminal run command channel compulsorily when this function terminal is effective.

29~31: terminal select run command channel

Table 6-6 Run command channel logic mode

Run command channel selection terminal 3	Run command channel selection terminal 2	Run command channel selection terminal 1	Run command channel
OFF	OFF	OFF	hold run command channel
OFF	OFF	ON	keypad run command channel
OFF	ON	OFF	end run command channel (keypad STOP command ineffective)
OFF	ON	ON	end run command channel (keypad STOP command effective)
ON	OFF	OFF	serial port run command channel(keypad STOP command ineffective)
ON	OFF	ON	serial port run command channel(keypad STOP command effective)

Can realize control command selection shown in Table 6-6 by ON/OFF combination of run command channel selection terminal，For relation of terminal switch and function code F0.00 setting, that is, latter effective.

32: swing frequency jump-in. When swing frequency start mode is manual jump-in，swing frequency function effective if this terminal effective，see F6 function parameter description.

33: exterior interruption input. The inverter close off output and run at zero frequency during running upon receiving exterior interruption signal. The inverter implement automatic speed tracking start-up to resume running once external interruption signal is relieved.

34: interior counter clearing end. To clear built-in counter in the inverter with cooperation of counter triggering signal.

35: interior counter triggering end. Counting pulse input port of built-in counter，pulse max. frequency: 200Hz，see function code F5.24, F5.25.

36: interior timer clearing end. To clear built-in timer in the inverter with cooperation of timer triggering signal.

37: interior timer triggering end. Please see function description for parameter F5.27.

38: pulse frequency input(only effective to X7,X8). Only effective for multifunction input terminal X7, X8，this function terminal receive pulse signal as frequency provision, for relation between inputted signal pulse frequency and set frequency in detail, please refer to F7 group parameter.

39: reserved
40: reserved
41: reserved
42: reserved

F5.08	FWD/REV run mode selection	range: 0－3	0

This parameter defines 4 kinds of exterior terminal control mode for inverter running.

0: 2-wire control mode 1

K2	K1	run command
0	0	stop
1	0	reverse run
0	1	forward run
1	1	stop

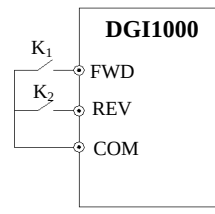


Fig.6-27 2-wire run mode 1

1: 2-wire control mode 2

K2	K1	run command
0	0	
1	0	stop
0	1	forward run
1	1	reverse run

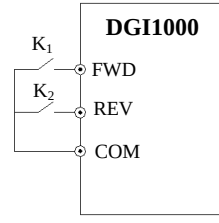


Fig.6-28 2-wire run mode 2

2: 3-wire control mode 1

Thereinto:
SB1: stop button
SB2: forward run button
SB3: reverse run button

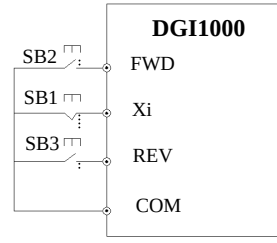


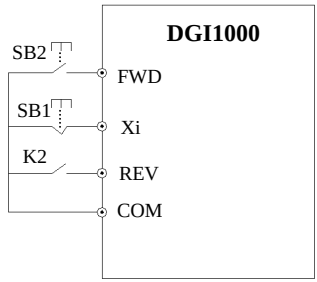
Fig.6-29 3-wire run mode 1

Xi is multifunction input terminal of X1~X8， here should define its corresponding terminal function as No. 19 “3-wire run control” function.

3: 3-wire control mode 2

SB1: stop button

SB2: run button



K2	run direction selection
0	Forward run
1	Reverse run

Fig.6-30 3-wire run mode 2

Xi is multifunction input terminal X1~X8, here should define its corresponding terminal function as No. 19 “3-wire run control” function.

The inverter restores after failure and start at once if run command channel selecting terminal and terminal FWD/REV is effective during warning alarm stop.

F5.09	UP/DOWN velocity	range: 0.01－99.99Hz/S	1.00Hz/S

This function code defines varying rate of the set frequency when it’s modified by UP/DOWN terminal.

F5.10	Open circuit collector output terminal OC1 output setting	range: 0~24	0
F5.11	Open circuit collector output terminal OC2 output setting	range: 0~24	0
F5.12	Open circuit collector output terminal OC3 output setting	range: 0~24	0
F5.13	Open circuit collector output terminal OC4 output setting	range: 0~24	0

OC1~OC4 open collector output terminal，Table 6-7 shows option of above 4 function parameter，choosing same output terminal function repeatedly is allowed.

Table 6-7 output terminal function selection table

Item	Corresponding function	Item	Corresponding function
0	Inverter running signal (RUN)	1	Frequency arriving signal (FAR)
2	Frequency level detecting signal (FDT1)	3	Reserved

4	Overload warning signal(OL)	5	Output Freq. reach high limit(FHL)
6	Output Freq. reach low limit(FLL)	7	Inverter stop for under voltage blockage (LU)
8	Stop for exterior failure(EXT)	9	Inverter zero rotate speed running
10	PLC running	11	Simple PLC segment run finished
12	PLC finish one cycle run	13	Reserved
14	Inverter ready to run(RDY)	15	Inverter failure
16	Swing Freq. high&low limit restriction	17	Interior counter final value arrive
18	Interior counter specified value arrive	19	Set runtime arrive
20	Interior timer timing arrive	21	OC1- variable Freq. for the 1st pump OC2- power source for the 1st pump OC3- variable Freq. for the 2nd pump OC4- power source for the 2nd pump
22	Reserved	23	Reserved
24	Reserved		

Now introduce function listed in Table 6-7 as follows:

0: inverter during running(RUN). The inverter is in run status，output indicator signal.

1: frequency arriving signal(FAR). Refer to function description of F5.14.

2: Frequency level detecting signal(FDT1). Refer to function description of F5.15~F5.16.

3: reserved

4: overload warning signal(OL). Inverter output current exceed F9.05 overload detect level and time exceed F9.06 overload detect time，output indicator signal.

5: output frequency reach high limit(FHL). When set frequency≥high limit frequency and run frequency reach high limit frequency，output indicator signal.

6: output frequency reach low limit(FLL). When set frequency≤low limit frequency and run frequency reach low limit frequency，output indicator signal.

7: Inverter stops for under voltage blockage(LU). When the inverter is running, LED displays“P.OFF”and output indicator signal if DC bus-bar voltage is lower than limitative level.

8: stop for exterior failure(EXT). When the inverter give the alarm (E014) and stops for exterior failure, output indicator signal.

9: inverter zero rotate speed running. When the inverter output zero

frequency but in run status, output indicator signal.

10: PLC running

11: Simple PLC segment running finished. After simple PLC current segmentrun is finished，output indicator signal(single pulse signal，width 500ms).

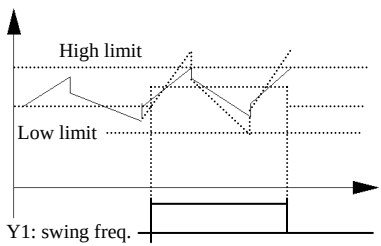
12: PLC finish one cycle run

13: reserved

14: Inverter ready to run(RDY). If this signal is effective, shows that bus-bar voltage is normal and run prohibition terminal is ineffective, the inverter can receive start-up command.

15: Inverter fault. If failure takes place when the inverter is running, the inverter output indicator signal.

16: Swing freq. high&low limit restriction. After choosing swing frequency function, if frequency fluctuant range based on center frequency of swing frequency is above high limit frequency F0.10 or under low limit frequency F0.11, the inverter will output indicator signal, as shown in Fig. 6-31.



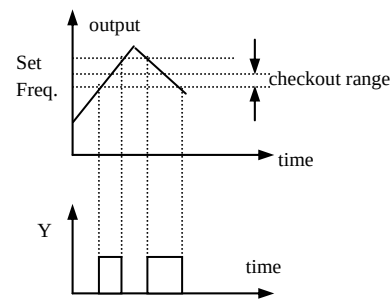


Fig.6-31 swing freq. range restriction Fig.6-32 freq. arriving signal output

17: Interior counter reach final value

18: Interior counter reach specified value

17~18 please refer to function description of F5.25~F5.26.

19: Set runtime arrive. When accumulative runtime of the inverter (F2.52) reach set runtime(F2.51)，output indicator signal.

20: Interior timing arrive. Refer to function description for F5.27.

21: OC1- variable Freq. for the 1st pump
OC2- power source for the 1st pump
OC3- variable Freq. for the 2nd pump
OC4- power source for the 2nd pump

22: Reserved

23: Reserved

24: Reserved

F5.14	**Freq. arriving(FAR)detect range**	**range: 0.00－50.00Hz**	**5.00Hz**

This parameter is supplementary definition to No. 1 function in Table 6-7.As shown in Fig.6-32，when output frequency of the inverter is within high&low detect range of set frequency，output pulse signal.

F5.15	**FDT1(freq. level) electric level**	**range: 0.00－high limit frequency**	**10.00Hz**
F5.16	**FDT1 lag**	**range: 0.00－50.00Hz**	**1.00Hz**

F5.15~F5.16 is supplementary definition to No.2 function in Table 6-7, introduce as follows: When output frequency exceed the set frequency(FDT1 electric level)，output indicator signal，till output frequency descend to be some frequency(FDT1 electric level-FDT1 lag) lower than FDT1 electric level，as shown in Fig.6-33.

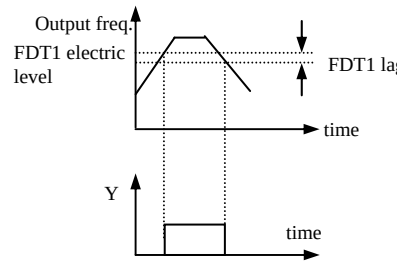


Fig.6-33 freq. level detecting

F5.17	**Analog output(AO1)selection**	**range: 0－9**	**0**

0: output frequency(0－high limit frequency)
1: set frequency(0－high limit frequency)
2: output current(0－2×rated current)
3: output voltage(0－1.2×load motor rated voltage)
4: bus-bar voltage(0－800V)
5: PID provision (0.00-10.00V)
6: PID feedback (0.00-10.00V)
7: reserved
8: reserved
9: reserved

F5.18	**Analog output(AO1)gain**	**range: 0.00－2.00**	**1.00**
F5.19	**Analog output(AO1) offset**	**range: 0.00－10.00V**	**0.00**

For AO1 and AO2 analog output, the user can modify display measuring range or emend meter head error by adjusting output gain if necessary.

F5.20	**Analog output(AO2)selection**	**range: 0－9**	**0**

Same as F5.17 function parameter description.

F5.21	**Analog output(AO2)gain**	**range: 0.10－2.00**	**1.00**
F5.22	**Analog output(AO2) offset**	**range: 0.00－10.00V**	**0.00**

Same as F5.18 and F5.19 function parameter description.

note This function makes real-time effect to analog output when it's being modified.

F5.23	**DO terminal output function selection**	**range: 0~9**	**0**

Same as F5.17 function parameter description.

F5.24	**DO max. pulse output freq.**	**range: 0.1－20.0(max. 20KHz)**	**10.0**

DO port max. output pulse frequency corresponds to maximum value optioned by F5.23，for example 0: output frequency，then max. Output pulse frequency corresponds to high limit frequency.

F5.25	**Set interior count number arriving provision**	**range: 0－9999**	**0**
F5.26	**Specified interior count number arriving provision**	**range: 0－9999**	**0**

F5.25, F5.26 is supplementary definition to No. 17, 18 function in Table 6-7.

Set count number provision，shows that when some number of pulse are inputted to Xi(count triggering signal input function terminal), OC1 (open collector Output terminal) output a indicator signal.

As shown in Fig.6-34，OC1 output an indicator signal when the 8th pulse is inputted to Xi. Here F5.25=8.

Specified count number provision，shows that when some number of pulse are inputted to Xi, Yi output a indicator signal，till set count number is reached.

As shown in Fig.6-34，OC2 start to output an indicator signal when the 5th pulse is inputted to Xi. Until set count number 8 is reached. Here F5.26=5. Specified count number is ineffective when it is bigger than set count number.

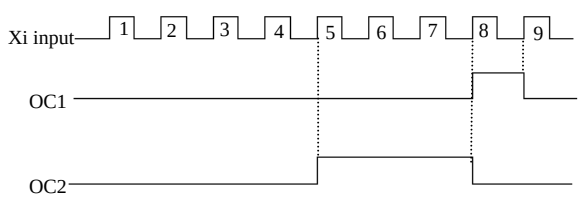


Fig.6-34 Set count number and specified count number provision

F5.27	Interior timing setting	range: 0.1－6000.0s	60.0

This parameter is used to set timing time of interior timer of the inverter. The timer is activated by exterior triggering end(triggering end selected by F5.00~F5.07), the timer begins timing upon receiving exterior triggering signal, after it's up to timing time one effective pulse signal of 0.5s will be outputted from relative OC end.

6.7 Traverse special function parameter group: F6

F6.00	Traverse function selection	range: 0, 1	0

0: traverse function ineffective

1: traverse function effective

F6.01	Traverse run mode	range: LED 1st bit: 0, 1 LED 2nd bit: 0, 1	00

LED 1st bit: jump-in mode

0: automatic jump-in mode. After start-up run at traverse preset frequency for a period of time, then enter into traverse operation automatically.

1: terminal manual run mode. When set the multifunction terminal Xi(Xi=X1~X8)to function 32 and it's effective，enter into traverse state；quit traverse state if ineffective and run frequency is at traverse preset frequency.

LED 2nd bit:

0: changing traverse amplitude. Amplitude AW varies with center frequency， for its changing rate please see F6.02 definition.

1: fixed traverse amplitude. Amplitude AW is determined by high limit frequency and F6.02.

Traverse center frequency input setting channel is set by F0.00 function.

F6.02	Traverse amplitude threshold	range: 0.0－50.0(%)	0.0(%)

changing amplitude: AW=center frequency×F6.02

fixed amplitude: AW=high limit frequency×F6.02

note

Traverse run frequency is restricted by high limit, low limit frequency；if set improperly，abnormal traverse operaion arise.

F6.03	Sudden jumping freq.	range: 0.0－50.0	0.0(%)

As shown in Fig.6-35.If this parameter is set to 0, no jumping frequency.

F6.04	Traverse cycle	range: 0.1－999.9S	10.0S

Whole time for a cycle including traverse rising, descending process.

F6.05	Triangle wave rising time	range: 0.0－98.0(%)(traverse cycle)	50.0(%)

Define runtime of traverse rising segment=F6.04×F6.05 (s)，runtime of descending segment = F6.04×(1-F6.05) (s). Please refer to description in Fig.6-35.

F6.06	Traverse preset frequency	range: 0.00－400.00Hz	0.00Hz
F6.07	Traverse preset frequency latency time	range: 0.0－6000S	0.0S

F6.06 is used for defining inverter run frequency before entering into traverse operation.

When automatic start-up mode is optioned，F6.07 is used for setting holding time running at traverse preset frequency before enter into traverse operation；When manual start-up mode is optioned，F6.07 setting is ineffective. Please see description in Fig.6-35.

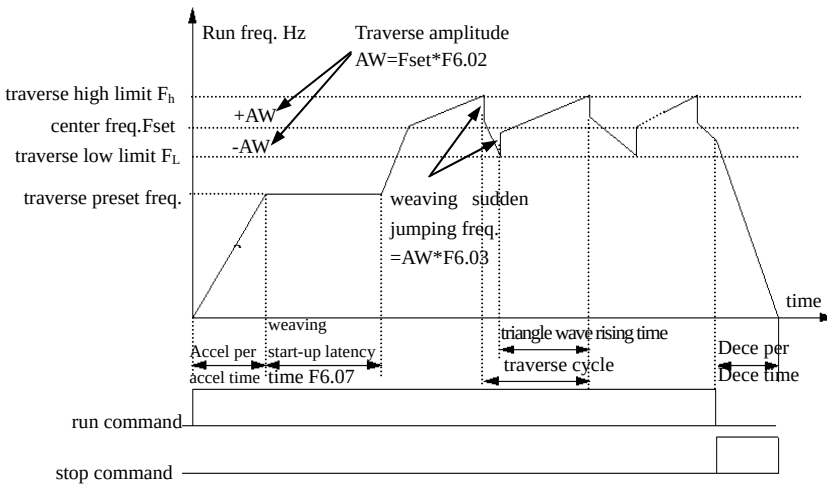


Fig. 6-35 Traverse

6.8 Frequency provision function parameter group: F7

F7.00	**VCI min. provision**	**range: 0.00－F7.02**	**0.0V**
F7.01	**VCI min. provision corresponding freq.**	**range: 0.00－high limit frequency**	**0.00Hz**
F7.02	**VCI max. provision**	**range: 0.00－10.00V**	**9.9V**
F7.03	**VCI max. provision corresponding freq.**	**range: 0.00－high limit frequency**	**50.00Hz**
F7.04	**CCI min. provision**	**range: 0.00－F7.06**	**0.00V**
F7.05	**CCI min. provision corresponding freq.**	**range: 0.00－high limit frequency**	**0.00Hz**
F7.06	**CCI max. provision**	**range: 0.00－10.00V**	**9.9V**
F7.07	**CCI max. provision corresponding freq.**	**range: 0.00－high limit frequency**	**50.00Hz**
F7.08	**YCI min. provision**	**range: 0.00－F7.10**	**0.00V**
F7.09	**YCI min. provision corresponding freq.**	**range: 0.00－high limit frequency(REV)**	**0.00Hz**
F7.10	**YCI max. provision**	**range: 0.00－10.00V/5V**	**9.9V**
F7.11	**YCI max. provision corresponding freq.**	**range: 0.00－high limit frequency(FWD)**	**50.00Hz**

F7.12	**YCI dead area setting**	**range: 0.00V－2.00V**	**0.10V**

The inverter can decide FWD run or REV run according to YCI input when YCI is selected to be frequency provision(i.e. F0.00=6). YCI frequency defined in F2.09 may be positive or negative when YCI isn't selected to be frequency provision.

Shown as the figure: 0—dead band the frequency is negative.

5V−dead band—5V+dead band YCI set frequency is 0

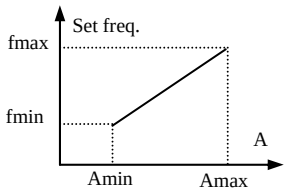
5V+ dead band—10V the frequency is positive

F7.13	**PULSE max. input pulse**	**range: 0.01－20.0K**	**10.0K**
F7.14	**PULSE min. provision**	**range: 0.0－F7.16**	**0.0K**
F7.15	**PULSE min. provision corresponding freq.**	**range: 0.00－high limit frequency**	**0.00Hz**

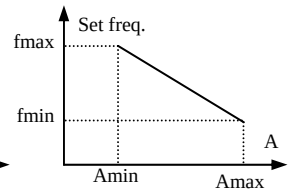
F7.16	**PULSE max. provision**	**range: F7.14(PULSE min. provision)－F7.13(max. input pulse)**	**10.0K**
F7.17	**PULSE max. provision corresponding freq.**	**range: 0.00－high limit frequency**	**50.00Hz**

F2.00 sets the analog channel filtering time constant，to filter input signal， the more long filtering time is, the more great anti-jamming ability is, but response speed descend; the more short filtering time is, the more fast the inverter respond, but anti-jamming ability is weakened.

See below relation curve of VCI and set frequency:



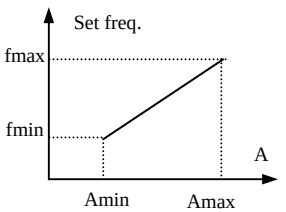
(1)plus characteristic



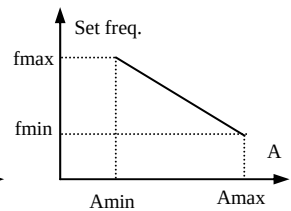
(2)minus characteristic

A:VCI provision
Amin:min. provision　　fmin:corresponding freq. of min. provision
Amax:max. provision　　fmax:corresponding freq. of max. provision

See below relation curve of CCI and set frequency:



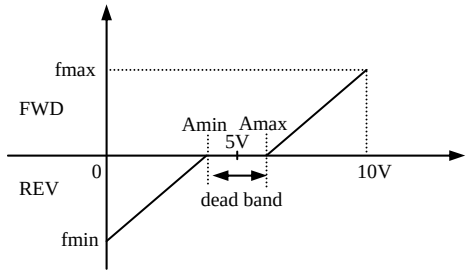
(1) plus characteristic



(2) minus characteristic

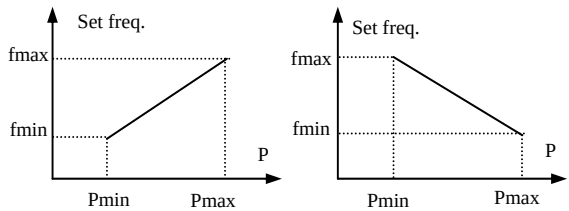
A:CCI provision
Amin: min. provision　　fmin: corresponding freq. to min. provision
Amax: max. provision　　fmax: corresponding freq. to max. provision

See below relation curve of YCI and set frequency:



A:YCI provision
Amin: min. provision fmin: corresponding freq. to min. provision
Amax: max. provision fmax: corresponding freq. to max. provision

See below relation curve of PULSE and set frequency:



(1) plus characteristic (2) minus characteristic

P: PULSE provision
Pmin: min. provision fmin: corresponding freq. to min. provision
Pmax: max. provision fmax: corresponding freq. to max. provision

6.9 Motor and vector control parameter group: F8

F8.00	Control mode setting	range: 0, 1	0

0: V/F control

Please select V/F control mode if you need to use single inverter to drive more than one motor.

1: vector control

Sensor less vector control run mode is mainly applied to speed control, torque control etc. which require high control performance.

F8.01	**Motor rated voltage**	**range: 1－480V**	**Depend on device type**
F8.02	**Motor rated current**	**range: 0.1－999.9A**	**Depend on device type**
F8.03	**Motor rated frequency**	**range: 1.00－400.0Hz**	**Depend on device type**
F8.04	**Motor rated speed**	**range: 1－9999r/min**	**Depend on device type**
F8.05	**Motor pole quantity**	**range: 2－14**	**Depend on device type**
F8.06	**Motor rated power**	**range: 0.1－999.9KW**	**Depend on device type**

Please set above parameters according to rated data of motor drived by the inverter for the sake of safe running.

F8.07	**Motor stator resistance**	**range: 0.000－9.999ohm**	**Depend on device type**
F8.08	**Motor rotor resistance**	**range: 0.000－9.999ohm**	**Depend on device type**
F8.09	**Motor stator leakage inductance**	**range: 0.0－999.9mH**	**Depend on device type**
F8.10	**Motor rotor leakage inductance**	**range: 0.0－999.9mH**	**Depend on device type**
F8.11	**Motor mutual inductance**	**range: 0.0－999.9mH**	**Depend on device type**

The inverter will set F8.07-F8.10 to be default standard motor parameter everty time after motor rated data modified.

F8.12	**Torque limit**	**range: 50.0－200.0%**	**150.0%**

This parameter is used to limit torque current outputted from speed adjustor.

Torque limit value 50.0－200.0% is percentage of inverter rated current; torque limit=100%，i.e., set torque current limit is rated current of the inverter.

F8.13	**Speed loop proportion gain**	**range: 0.000－6.000**	**0.700**
F8.14	**Speed loop integral time constant**	**range: 0.000－9.999**	**0.360**

By F8.13, F8.14 you can set proportion gain and integral time of the speed adjustor to change speed response characteristic of vector control.

F8.15	**Motor stability coefficient**	**range: 0—4**	**3**
F8.16	**Filter time displayed instead freq.**	**range: 0~999**	**6**

If surge happens or the motor run unstably, you can eliminate surge by increasing F8.15.

F8.17	**Motor speed correction factor**	**Range :0-9999%**	**100%**

This parameter check display error, have no effect on the actual value.

6.10 Protection function parameter group: F9

F9.00	**Waiting time for starting again when power off**	**0.0-20.0S (0 means do not enable this function)**	**0**

F9.01	**Failure self-renew times**	**range: 0－10**	**0**
F9.02	**Failure self-renew interval**	**range: 0.5－20.0S**	**5.0S**

During run process, failure will take place accidently due to load fluctuation and the inverter will cut off output, here failure self-restoration function can be applied in order to let the device continue to run. During self-restoration, the inverter will try to resume running in speed checking restart mode but stop outputting and failure protected if the inverter can't resume running successfully within set times. Self-restoration function will be shut down if failure self-restoration times is set to 0.

When the inverter is under running, due to the system power supply it may appear short time power failure so that the Inverter stops output, in order not to suspend the equipment operation when the power on, please adopt F9.00 function. After starting the inverter, though setting the parameter of F9.00, automatically resume run as inspection speed start method.

(1) To use failure self-restoration function must take device allowance and no essential failure in the inverter as preconditions.
(2) Self-restoration function is ineffective to failure protection caused by overload and over heat.
(3) When F9.00 is not 0, the restart function works without personnel operation, so this feature needs to be used with caution.
(4) Regardless of forward or reverse before power failure, it will be forward after restart.

F9.03	**Motor overload protection mode selection**	**range: 0, 1**	**1**

This parameter defines protecting action mode when overload, overheat take place in the inverter.

0: no action. No motor overload protection characteristic(apply with caution)，here the inverter have no overload protection for load motor；

1: inverter cut off output at once. The inverter cut off output and motor stop freely when overload, overheat take place.

F9.04	Motor overload protection coefficient	range: 20.0-120.0(%)	100.0(%)

This parameter sets sensibility of the inverter implementing thermal relay protection to load motor, can implement correct heat protection to the motor by setting this value when output current value of load motor don't match rated current of the inverter, as shown in Fig.6-36.

Value of this parameter can be determined by following formula:

$$[F9.04]=\frac{\text{motor rated current}}{\text{inverter rated output current}}\times 100$$

note

The inverter will lose thermal relay protecti on function when a piece of inverter drive multi ple motors in parallel. Please assemble heat protection relay at input side of each motor to protect them effectively.

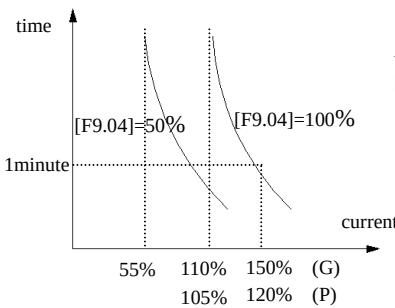


Fig.6-36 electronic thermal relay protection

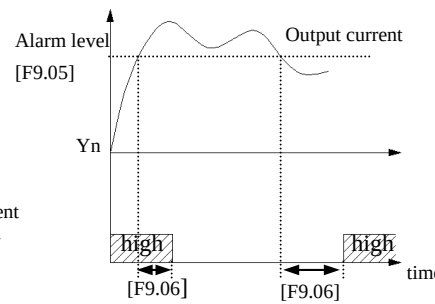


Fig.6-37 overload alarm

F9.05	Overload warning alarm checkout level	range: 20－200(%)	130(%)
F9.06	Overload warning alarm delay time	range: 0.0－20.0S	5.0S

If output current exceeds electric level set by parameter F9.05 continuously，open collector outputs effective signal(refer to Fig.6-37 and interrelated description of parameter F5.10~F5.13) after delay time set by F9.06 passed.

F9.07	Overvoltage stall selection	range: 0, 1	1
F9.08	Overvoltage stall point	range: 120-150(%)	130(%)

0: banned

1: allowed

Actual descending rate of motor speed may be lower than that of output frequency due to effect from load inertia when the inverter is in decelerating run process, here the motor will feed electric energy back to inverter which will make DC bus-bar voltage of the inverter increase, overvoltage protection will takes place if not take steps.

Overvoltage stall protection function, indicates that output frequency of the inverter stops descending if bus-bar voltage detected during run process exceed stall voltage point defined by F9.08 (relative to standard bus-bar voltage) and the inverter continue to implement decelerating run when bus-bar voltage detected again is lower than stall overvoltage point. As shown in Fig. 6-38.

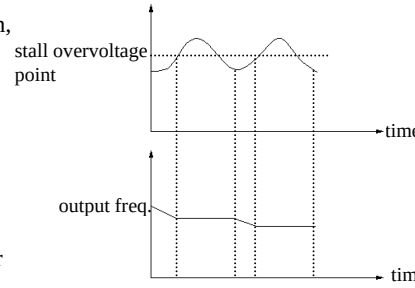


Fig.6-38 overvoltage stall function

F9.09	**Automatic current limit level**	**range: 110－200(%)**	**150(%)**
F9.10	**Frequency descending rate during current limiting**	**range: 0.00－99.99Hz/S**	**0.00Hz/S**
F9.11	**Automatic current limiting action selection**	**range: 0, 1**	**0**

By automatic current limiting function the inverter can limit load current not to exceed automatic current limiting level set by F9.09 to avoid tripping out for failure caused by rushing current. This function is especially suitable for some biggish inertia or acutely changing load occasion.

Automatic current limiting (F9.09) defines current threshold value of automatic current limiting action, its value is the percentage relative to inverter rated current.

Frequency descending rate during current limiting (F9.10) defines adjusting rate to output frequency during automatic current limiting action.

If frequency descending rate during automatic current limiting F9.10 is too small，inverter isn't easy to get rid of automatic current limiting state which may cause overload failure finally；If descending rate F9.10 is too big, the inverter may be in generating state for long time which will cause overvoltage protection.

Automatic current limiting function is effective in accelerating decelerating state and whether it's effective in constant speed run state is determined by automatic current limiting action selection (F9.11).

F9.11=0 indicates that automatic current limiting is ineffective during constant speed running；

F9.11=1 indicates that automatic current limiting is effective during constant speed running；

Output frequency may varies during automatic current limiting action，so automatic current limiting function is not suitable for occasion demanding stable output frequency during constant speed run.

6.11 Failure record function parameter group: Fd

Fd.00	**Previous one time failure record**	**range: 0~23**	**0**
Fd.01	**Previous two time failure record**	**range: 0~23**	**0**
Fd.02	**Previous three time failure record**	**range: 0~23**	**0**
Fd.03	**Previous four time failure record**	**range: 0~23**	**0**
Fd.04	**Previous five time failure record**	**range: 0~23**	**0**
Fd.05	**Previous six time failure record**	**range: 0~23**	**0**

0: no failure

1－23: failure E0.01-E0.23，please see chapter 7 for specified failure type

Fd.06	**Set freq. at previous failure**	**range: 0-high limit**	**0**
Fd.07	**Output freq. at previous failure**	**range: 0-high limit**	**0**
Fd.08	**Output current at previous failure**	**range: 0-999.9A**	**0**
Fd.09	**Output volt. at previous failure**	**range: 0-999V**	**0**
Fd.10	**DC bus-bar volt. at previous failure**	**range: 0~800V**	**0**
Fd.11	**Load motor speed at previous failure**	**range: 0~9999**	**0**
Fd.12	**Module temp. at previous failure**	**range: 0~100**	**0**
Fd.13	**Input end state at previous failure**		**0**
Fd.14	**Accu. runtime at previous failure**	**range: 0~65535h**	**0**

6.12 Password and manufacturer function parameter group: FF

FF.00	**User password**	**range: 0000－9999**	**1**

User password setting function is used for prohibiting unauthorized personnel from consulting and modifying function parameter.

Set this function code to 0000 when user password function isn't wanted.

First input 4 bits number as user password and press ENTER DATA key to confirm, then the password will come into effect at once.

Password modification:

Enter into password verification state by pressing ESC MENU key, after inputting primary 4 bits password parameter editing state is available，choose FF.00(here FF.00=0000)，input new password and press ENTER DATA key to confirm，then the password come into effect at once.

note

Please keep the password you set without fail, in case the password is missing please consult the manufacturer.

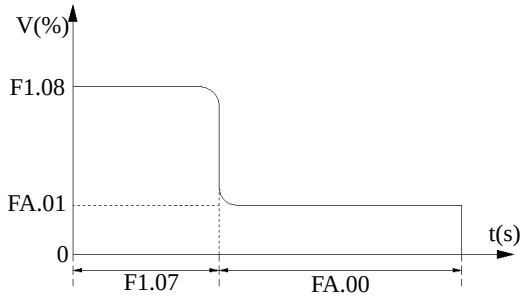
FF.01	**Manufacturer password**	**range: 0000－9999**	**0000**

Setting function for the manufacturer, user need not modify it.

6.13 Stop assistant function parameter group: FA

FA.00	**Auxiliary DC brake time**	**Range：0.0－20.0s**	**0.0s**
FA.01	**Auxiliary DC brake voltage**	**Range：0－15（%）**	**0**

Auxiliary DC brake means when the inverter stop DC brake is finished give the second stage DC braking. Role in some special circumstances require rapid braking, and stop long time in the state of DC braking, but to prevent motor heat circumstances.



FA.02	**Reserved**		
FA.03	**Reserved**		

7 Troubleshooting

7.1 Failure and countermeasure

Possible failure types in DGI1000 are shown in Table 7-1 and failure code is from E001 to E023. Some failure code is reserved for intelligent automatic diagnosis function which will be executed continuously in future. When failure takes place in the inverter, the user should check according to note of this table first and record failure phenomena detailedly. Please contact our after-sale service and technical support Department or agent in your local place when technical service is needed.

Table 7-1 Failure type and the countermeasure

Failure code	Failure type	Possible reason	Countermeasure
E001	overcurrent during accelerating process	Accelerating time is too short	Prolong accelerating time
		Improper V/F curve	Adjust V/F curve setting，adjust manual torque boost or change to automatic torque boost
		Restart rotating motor	Set speed checking restart function
		Low power source voltage	Check input power supply
		Too small power of the inverter	Choose inverter with high-power
E002	overcurrent during decelerating process	Decelerating time is too short	Prolong decelerating time
		Have potential energy load or big Inertia load	Increase braking power of external energy consumption braking subassembly
		Power of inverter is a bit small	Choose inverter with high-power
E003	overcurrent during constant speed process	Load change suddenly or Have unwonted phenomena	Check or reduce break of the load
		Accel/Decel time is set to too short	Prolong accelerating decelerating time properly
		low power source voltage	Check input power supply
		Power of inverter is a bit small	Choose inverter with high-power
E004	overvoltage during accelerating process	Unwonted input voltage	Check input power supply
		Accel time is set to too short	Prolong accelerating time properly
		Restart rotating motor	Set speed checking restart function
E005	overvoltage during decelerating process	Decelerating time is too short	Prolong decelerating time
		Have potential energy load or big inertia load	Increase braking power of external energy consumption braking subassembly
E006	Overvoltage during constant speed process	Unwonted input voltage	Check input power supply
		Accel/Decel time is set to too short	Prolong accelerating decelerating time properly
		Input voltage change abnormally	Assemble reactor
		Load inertia is a bit big	Use energy consumption subassembly
E007	Inverter control power supply overvoltage	Unwonted input voltage	Check input power supply or look for service

E008	Inverter overload	Accel time is set to too short	Prolong accelerating time
		DC injection braking is too big	Reduce DC injection braking current，prolong braking time
		improper V/F curve	Adjust V/F curve and torque boost
		Restart rotating motor	Set speed checking restart function
		power source voltage is too low	check power source voltage
		Load is too big	Choose inverter with high-power
E009	Motor overload	improper V/F curve	Adjust V/F curve and torque boost
		power source voltage is too low	check power source voltage
		General motor run at low speed with big load	Can choose frequency conversion motor for long time low speed run
		motor overload protection factor set incorrectly	to set motor overload protection factor correctly
		motor blocked up or load change too suddenly and quickly	Check the load
E010	inverter over heating	Air-path blocked	To clear air-path or improve ventilation condition
		Ambient temperature is too high	Improve ventilation condition, lower carrier frequency
		Fan damaged	Replace the fan
E011	reserved	reserved	reserved
E012	reserved	reserved	reserved
E013	Inverting module protection	Transient overcurrent of the inverter	Refer to countermeasure for overcurrent
		phase to phase short circuit or earthing short circuit of output 3 phase	wiring again
		Air-path blocked or fan damaged	To clear air-path or replace the fan
		Ambient temperature is too high	Lower ambient temperature
		Connecting wire or insert on control board loose	Check and connect the wire again
		Unwonted current wave caused by missing output phase etc.	Check wiring
		Assistant power supply damaged and drive voltage lacking	Look for service from manufacturer or agent
		Unwonted control board	Look for service from manufacturer or agent
E014	external device failure	use sudden stop key  in non-keypad run mode	Look up operation mode
		Use sudden stop key  under condition of stall	Set running parameter correctly
		Sudden stop terminal for external failure closed	Open external failure terminal after external failure is settled
E015	current detecting circuit failure	Connecting wire or insert on control board loose	Check and connect the wire again
		Assistant power supply damaged	Look for service from manufacturer or agent
		Hall component damaged	Look for service from manufacturer or agent
		Unwonted amplifying circuit	Look for service from manufacturer or agent

E016	RS485 communication failure	Baud rate set improperly	set Baud rate properly
		Serial port communication error	press STOP RESET key to reset, look for service
		Failure warning parameter set improperly	Modify F2.16, F2.17
		Upper device doesn't work	Check if upper device work and wiring is correct
E017	reserved	reserved	reserved
E018	reserved	reserved	reserved
E019	Under voltage failure	Under voltage	check spot input voltage
E020	System disturbance	Serious disturbance	Reset by pressing STOP RESET key or Add mains filter at power supply input side
		Main control DSP read and write wrongly	Reset by the key-press, look for service
E021	reserved	reserved	reserved
E022	reserved	reserved	reserved
E023	E^2PROM read and write wrongly	Mistake take place when read or write control parameter	Reset by pressing STOP RESET Look for service from manufacturer or agent
P.OFF	Under voltage failure	Under voltage	Check spot input voltage

7.2 Failure record lookup

This series inverter can record latest 6 failure code and inverter run parameter of the last failure, to search these informations can redound to finding out reason of the failure.

Failure information is all stored in Fd group parameter，please enter into Fd group parameter to see about information by referring to keypad operation method.

code	content	code	Content
Fd.00	previous one failure record	Fd.08	output current at previous failure
Fd.01	previous two failure record	Fd.09	output volt. at previous failure
Fd.02	previous three failure record	Fd.10	DC bus-bar vlot. at previous failure
Fd.03	previous four failure record	Fd.11	load motor speed at previous failure
Fd.04	previous five failure record	Fd.12	module temp. at previous failure
Fd.05	previous six failure record	Fd.13	input end state at previous failure
Fd.06	set freq. at previous failure 设定值	Fd.14	Accu. runtime at previous failure
Fd.07	output freq. at previous failure	——	—

7.3 Failure reset

(1) Before reset you must find out reason of failure downright and eliminate it，otherwise may cause permanent damage to the inverter.
(2) If can't reset or failure takes place again after resetting, should look for reason and continuous resetting will damage the inverter.
(3) Reset should take place 5 minutes after overload, overheat protection action.

To resume normal running when failure takes place in the inverter, you can choose following any kind of operation:

(1) After you set any terminal of X1~X8 to be inputted by external RESET (F5.00~F5.07=11), you can open it after connected to COM.
(2) When failure code is displayed，press 

key after restoration is confirmed.
(3) Cut off power supply.

8 Maintenance

8.1 Routine maintenance

When you use DGI1000 series you must assemble and operate it according to demand listed in this《service manual》strictly. During run state, temperature, humidity, vibration and aging parts may affect it. To avoid this, it is recommended to perform routine inspections.

Table 8-1 Daily inspection items

Period		Inspection item	Inspection content	Criterion
daily	periodic			
√		Run state parameter	(1)output current	(1)within range of rated value
			(2)output voltage	(2)within range of rated value
			(3)inside temp.	(3)temp. increment < 35℃
√		Cooling system	(1)installing ambient	(1)good ventilation, unblocked air-path
			(2)local fan	(2)rotate normally without abnormal noise
√		Motor	(1)heating	(1)no abnormality
			(2)noise	(2)even
	√	Inverter	(1) vibration, heating	(1)vibration balanced, proper wind temp.
			(2)noise	(2) without abnormal sound
			(3)fixation of lead, terminal	(3)fixed screw don't loose
√		Run ambient	(1)temperature, humidity	(1)-10℃~+40℃ 40℃~50℃used in lower volume or execute compulsory heat dissipating
			(2)dust, water and leakage	(2)no water leakage imprint, no dust
			(3)gas	(3)no peculiar smell

Recommend to inspect with following instrument:

Input voltage: electric voltmeter; output voltage: rectifying voltmeter; inputoutput current: pincers ammeter.

8.2 Inspection and replacement of damageable parts

Some component parts in the inverter will be abraded or bear descending performance for long-term usage，to assure that the inverter can run stably and reliably, it is recommended to perform defending maintenance and replace corresponding parts if necessary.

(1) cooling fan

Abnormal noise, even oscillation may take place if the fan have wearingbearing, aging blade, here replacement of the fan should be considered.

(2) filter electrolyte capacitance

When frequent-changing load causes increasing pulsant current and aging electrolyte under high ambient temperature, the electrolyte capacitance may be damaged and here should replace it.

8.3 Repair guarantee

(1) Within 18 months from purchasing date, if failure caused by inverter itself takes place under normal conservation and usage, we will provide free repair service.

(2) We will take some upkeep if one of following situations takes place within period of repair guarantee.

a. If did not use the inverter according to《service manual》strictly or did not use it under ambient demanded in《service manual》, which cause failure.

b. Failure caused by applying the inverter to non-normal function;

c. Failure caused by self-repair, refit which is not already allowed;

d. Damage caused by bad keeping, falling down from high place or other extrinsic factor after purchasing the inverter;

e. Failure caused by natural disaster or its reason such as unwonted voltage, thunderbolt, water fog, fire, salt corroding, gas corroding, earthquake and storm etc.;

f. Make bold to tear up product logo (such as: nameplate etc.); Body serial number don't accord with that in repair guarantee card.

(3) We calculate service fee based on actual cost, which is subject to contract if any.

(4) You can contact the agent and also our company directly if you have questions. After repair guarantee period, we shall also provide lifetime charged repair service for our products.

note

Our company will also provide lifetime repair service with fee for inverter which is not within period of repair guarantee.

8.4 Storage

The user must pay attention to following points for temporary storage and long-term storage after purchasing the inverter:

(1) Avoid storing the inverter in high temperature, moist place and place of dust, metal powder and assure good ventilation.

(2) Longtime storage will cause electrolyte capacitance of low quality, so must assure that it's electrified for one time within 2 years and electrification time is not shorter than 5 hours and input voltage must be increased to rated value gradually by voltage adjustor.

9 Fitting parts

9.1 Communication subassembly

9.1.1 Long-distance operation key board

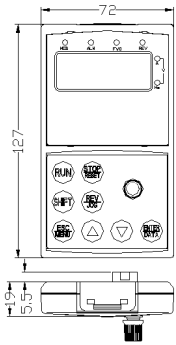
Maximum electric distance from local keypad to inverter is 2m.

RS485 communication mode is adopted between inverter and long-distance keypad，only a four-core cable is needed between them and maximum electric distance can reach 1000m.They communicate with each other in main-auxiliary mode, namely take long-distance keypad as main device and inverter as auxiliary one. Connecting wire end is fixed by common screw which is easy to maintain.

This series of inverter support usage of local keypad and long-distance keypad at the same time，no priority order，both can operate the inverter synchronously. Following function can be realized by long-distance keypad:

(1) Can control run, stop, jog, failure restoration, changing set frequency modifying function parameter and run direction of auxiliary device.

(2)Can identify auxiliary device type and monitor run frequency, set115 frequencyoutput voltage, output current, analog closed loop feedback, analog closed loop setting and exterior counting value of auxiliary device.



EN-KB8

Fig.9-1 long-distance keypad

9.1.2 Communication cable

(1) Long-distance keypad communication cable

Type: EN-LC0030 (3.0m)

Used for connecting between long-distance keypad and inverter.

Remark: 1m, 2m, 3m, 5m, 10m, 15m are standard deployment for our company's inverter，it's needed to subscribe for the cable if it exceeds 15m.

10 Examples

10.1 Common speed regulation running

10.1.1 Basic wiring diagram

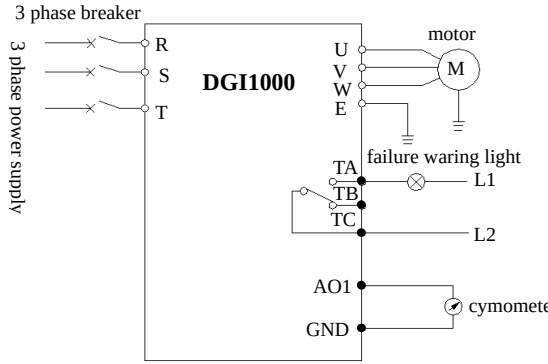


Fig.10-1

10.1.2 Set following basic parameter:

(1) set parameter F8.01-F8.06 according to rated value of the motor.
(2) set F0.00 parameter to 0，choose keypad analog potentiometer to set frequency.
(3) set F0.02 parameter to 0， choose keypad to control start-up, stop.
(4) use F0.03 parameter to set run direction.

note

(1) Press key to set frequency.
(2) To press STOP RESET key， the inverter will stop.
(3) To press ENTER DATA key， inverter enter into next menu or confirm data.
(4) Press key to increase or decrease the data.

10.1.3 Realized function

(1) Realize stepless speed regulation to the motor, use keypad to control start/stop and keypad analog potentiometer to adjust frequency.
(2) Bear failure warning function.
(3) Connect with cymometer， which indicates output frequency of the inverter.

10.1.4 Application field

Used for common speed regulation field，such as: transportation machine, china machine, baccy machine, metallurgy machine etc.

10.2 Terminal control running

10.2.1 Basic wiring diagram

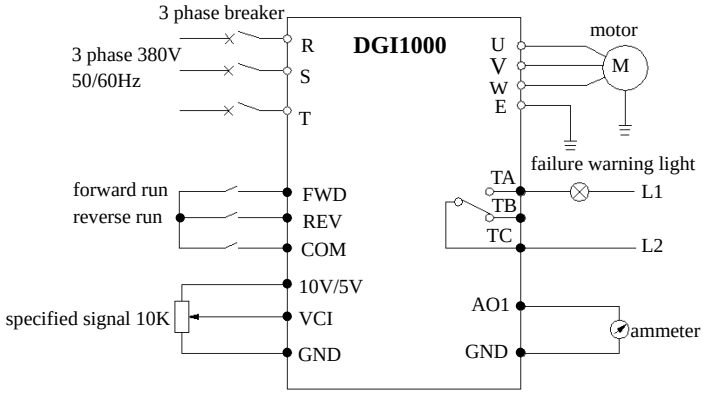


Fig.10-2

10.2.2 Parameter setting

(1) Set parameter F8.01-F8.06 according to rated value of the motor.

(2) Set F0.00 parameter to 4~6 to choose VCI, CCI, YCI accordingly, can accept frequency set signal within 0~10V.

(3) Set F0.02 parameter to 1，to choose terminal run command channel.

note

(1) If F5.08=0,namely 2 wire control mode 1: FWD and COM are closed，moter is in forward run；REV and COM are closed，motor is in reverse run；FWD, REV and COM are closed or opened together，the inverter stop.

(2) Set frequency is specified through VCI analog channel.

10.2.3 Realized function

(1) control forward run/reverse run of the motor by external on-off quantum.

(2) control speed of the motor by 0~10V signal.

(3) bear failure warning and output current indication function.

10.2.4 Application field

Used in field where need long-distance control to start/stop of the motor such as blower, food, chemical machine, packing machine, transportation machine etc.

10.3 Multi-step speed control running

10.3.1 Parameter setting

(1) Set parameter F8.01-F8.06 according to rated value of the motor.

(2) Set F0.02 parameter to 1，to choose terminal run command channel.

(3) F2.30-F2.44: multi-step speed frequency setting.

(4) F5.00-F5.07 set multi-step speed terminal control function.

(1) If F5.08=0,namely 2 wire control mode 1: FWD and COM are closed，moter is in forward run；REV and COM are closed，motor is in reverse run；FWD, REV and COM are closed or opened together，the inverter stop.

(2) If any one or more terminal of X1, X2, X3 and COM are closed together, the inverter will run according to multi-step speed frequency determined by X1, X2, X3(multi-step speed frequency set value are determined by F2.30-F2.44).Can realize manual control and automatic control for multiple frequency, and also control for forward run, reverse run, free stop, reset, warning protection.

10.3.2 Basic wiring diagram

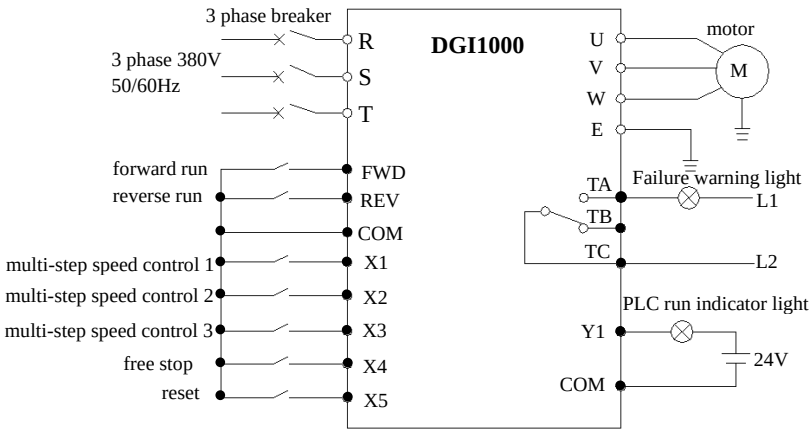


Fig.10-3

10.3.3 Realized function

(1) make use of external on-off quantum signal to control start/stop of the motor.
(2) make use of external on-off quantum signal to make the motor run at set frequency.
(3) bear free stop and reset function by utilizing external on-off quantum signal.
(4) bear warning alarm and PLC run indication function.

10.3.4 Application field:

Applied in field where need frequent multi-speed adjustment to motor speed such as toughened glass, weaving, paper making, chemical etc..

10.4 Closed-loop control system

10.4.1 Parameter setting

(1) Set parameter F8.01-F8.06 according to rated value of the motor.
(2) F3.00=1: setting channel selection，here PID closed loop run control is effective.
(3) F3.01=1: setting channel selection，here choose VCI as provision channel of PID adjustor.
(4) F3.02=1: feedback channel selection，here choose CCI as feedback channel, 4-20mA/0-10V feedback signal.
(5) F3.08-F3.11, set according to spot requirement.

10.4.2 Basic wiring diagram

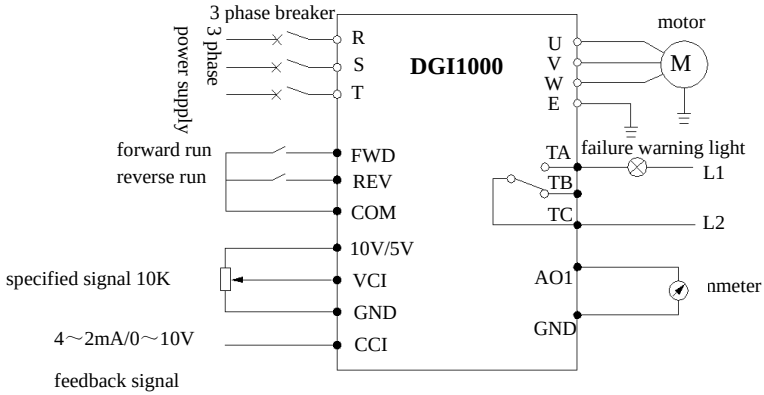


Fig.10-4

10.4.3 Realized function

(1) The inverter can adjust output automatically according to feedback signal

tomake constant voltage, constant temperature, constant current etc. available.
(2) can control start/stop of the motor from long distance.
(3) bear failure alarm and current indicator function.

10.4.4 Application field

Applied in field where need stable system, pressure, flux such as blower pump, constant pressure water supply, air compressor, air conditioner, freezer cooling tower, music fountain, heat supply etc..

10.5 Consecutive action running

10.5.1 Basic wiring diagram

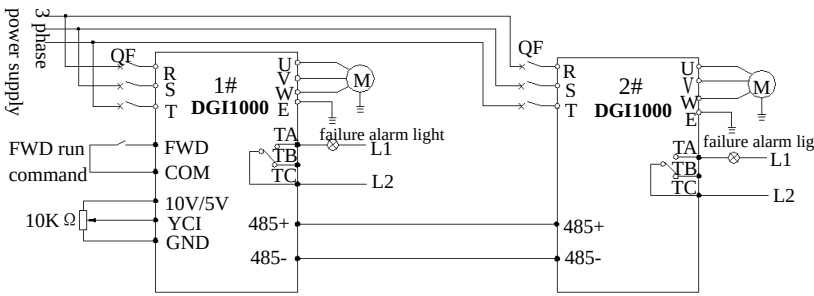


Fig.10-5

10.5.2 Parameter setting

set 1# inverter as follows:
(1) F0.00=6: YCI analog setting is frequency provision for 1# inverter.
(2) F0.02=1orF0.02=2: terminal run command control.
(3) F2.15=0:the 1#inverter will be setted as mainframe run.
set 2# inverter as follows:
(1) F0.00=3: serial port specified.
(2) F0.02=3or F0.02=4: serial port running command control.
(3) F2.15is setted between 1to 127,the 2#inverter will become the mainframe.

After above setting, can use serial communication of 1# inverter to realizeconsecutive action of 2# inverter.

10.5.3 Operation description

After receive forward run command from external switch(closed) and frequency specified value(0~10V)from analog input terminal YCI, 1# inverter run at this frequency value. At the same time, already running state of 1# inverter，make 2# inverter get forward run command through serial communication，here，run frequency value from high-speed pulse output terminal of 1# inverter is

passed to 2# inverter through serial communication.

10.5.4 Application field

Applied in field such as conveyer belt, coiler, factory production line, food chemistry etc.

10.6 Application to constant pressure water supply

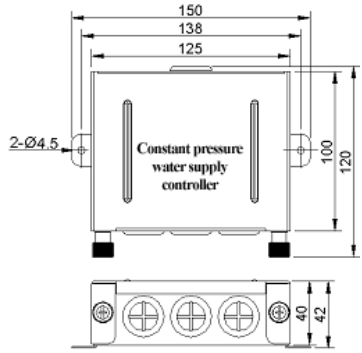
10.6.1 Summary for constant pressure water supply board

This constant pressure water supply board (hearafter in 10.6 referenced as “the board”) is constant pressure water supply controller for multiple pumps, and it has to work with DGI1000 to control constant pressure water supply system for multiple pumps effectively. This control system also has automatic control function fixed inverter driving mode and board repetition driving mode.

No need for adjustor and controller which is necessary to original system. It is a cheap system but has excellent function and reliable performance.It will make working time of every pump equal by time switching function to restrain aging of pump.

The board has eight node outputs, each of which can drive relay of AC250V. So it is capable of driving 4 pumps at best.

10.6.2 Outer dimension



10.6.3 Connection between constant pressure water supply controller and inverter

(1) Put outside

For inverter of 11KW below, put constant pressure water supply controller outside the inverter. Constant pressure water supply controller is collected with the inverter by cables, as shown in Fig.10-7:

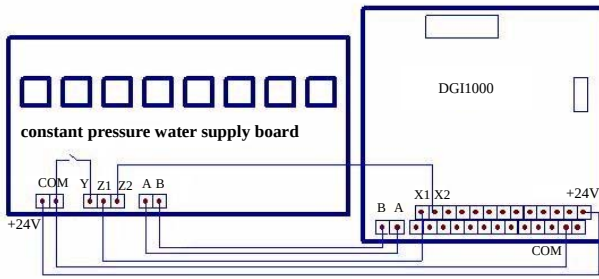


Fig.10-7 connection between water supply controller and inverter

Explanation for terminals: A, B terminals of constant pressure water supply board are for RS485 receving and sending, Z1 is over pressure signal output terminal when pump increased, Z2 is pressure falling signal output terminal when pump reduced, Y is fire fighting pump control signal input terminal, +24V, COM are respectively power supply input terminal and grounding terminal of the board.

(2) Built-in

For inverter of 11KW and above, connect constant pressure water supply controller inside the inverter. Take water supply board out from constant pressure water supply controller and fix it onto the inverter (location as shown in Fig.10-8) with accessory parts bolt and screw. Connect water supply board with the inverter directly by 8PIN terminal and with the contactor by control terminal going through cable hole of the inverter.

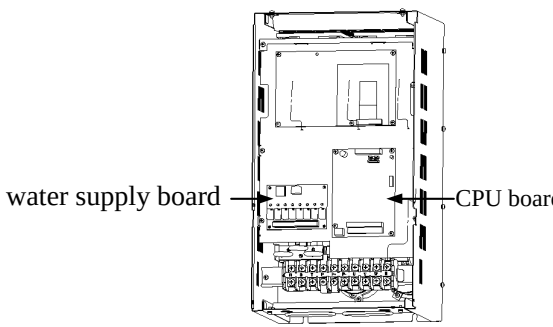


Fig.10-8 connection between water supply controller and inverter(built-in)

10.6.4 Constant pressure water supply control and its mode

(1) Variable frequency/ bypass run and switch

Variable frequency run means that the motor is controlled by inverter output

frequency. Bypass run means that the motor is connected to power source directly. Variable frequency/ bypass switch means process from inverter drive to power source drive or from power source drive to inverter drive.

(2) Operation mode

a. frequency conversion repetition mode

Inverter drives pump to run at variable frequencies, it can determine running pump quantity (within set range) according to pressure closed loop control requirement and only one pump can be drived by variable frequency at one time.Repetition mode of pump drived by the inverter is as 1—2—3—4—1—2—3—4—1, first-on first-off principle obeyed when the system reduces pump quantity.

b. frequency conversion fixed mode

The inverter drives one fixed pump, while at least one of the other three pumps has to be selected. Pump adding is according to repetition mode while pump reducing is according to the order of first-on first-off or first-on last-off.

c. shutdown mode

In the mode of a or b, all pumps stop running if the inverter is shutdown.

(3) Explanation for parameter selection of operation mode

a. frequency conversion repetition mode

If you would like to choose frequency conversion repetition mode, F3.31 must be set to 0. The board control is ineffective if F3.20 is set to 0, while F3.20 is set to other values the board will work according to description of the parameter.

b. frequency conversion fixed mode

If you would like to choose frequency conversion fixed mode, F3.31 must be set to 1 or 2. The board control is ineffective if F3.20 is set to 0, while F3.20 is set to other values the board will work according to description of the parameter.

(4) Automatic switch function

Automatic switch function is only effective in frequency conversion repetition mode(F3.31 is 0). The system will switch automatically like pump adding when switch time is up and pumps are in stable running state (no pump adding or reducing). For example, before switch board driving mode is 2G—3G—4B while it is 3G—4G—1B after switch. If drived pump quantity reaches the maximum, automatic switch function is ineffective even though switch time is up.

10.6.5 Function parameter setting for constant pressure water supply

For details of function parameter for constant pressure water supply, please see detailed description of F3 group (Closed-loop run control parameter group) in Chapter 6. Please notice that accelerating or decelerating time can’t be longer than switch judging time for pumps. After wire as the figure, F5.00 must be set to 33 (external interruption input) and F5.01 must be 20 (closed-loop ineffective) in

order to avoid water pressure fluctuation when pump adding or reducing. For detailed parameter setting information, please see below table.

function code	name	set range	explanation
F0.08	Acce time 1	Set according to actual situation	
F0.09	Dece time 1	Same as above	
F0.10	Upper limit freq.	Same as above	
F0.11	Lower limit freq.	Same as above	
F3.16	The value of sleep frequency valve	Same as above	
F3.17	The value of wake pressure valve	Same as above	
F3.18	The time of delay sleeping time	Same as above	
F3.19	The time of delay waking time	Same as above	
F3.20	Constant pressure water supply mode 1 selection	0:inverter works in one-drive-two water supply mode 1:constant pressure water supply board acts in one-drive-two mode 2:constant pressure water supply board acts in one-drive-three mode 3: constant pressure water supply board acts in one-drive-four mode	This parameter needs to work with F3.31 to make constant pressure water supply control effective (for details please see description in 10.6.4)
F3.21	Long-distance pressure meter range	Set according to actual situation	
F3.22	Allowed offset for upper limit frequency and lower limit frequency when add or reduce pumps	Set according to actual situation	
F3.23	Pump switch judging time	Set according to actual situation	
F3.24	Magnetic control conductor switch delay time	Set according to actual situation	
F3.25	Automatic switch intervel	Set according to actual situation	This function will be ineffective if it is set to 0, please set according to actual situation
F3.26	Water Monitor parameter display	1	Set to 1 can see C11, C12 monitoring given water pressure mode and feedback pressure
F3.31	Constant pressure water supply mode 2 selection	0:frequency conversion repetition mode, first-on first-off 1: frequency conversion fixed mode, first-on first-off 2: frequency conversion fixed mode, first-on last-off	This parameter needs to work with F3.20 to make constant pressure water supply control effective (for details please see description in 10.6.4)

F5.00	Input terminal X1 function selection	33	This parameter must be set to 33: external interruption input
F5.10	The output setting of output terminal of open collector OC1	21	This parameter is used when choose inverter to supply water
F5.11	The output setting of output terminal of open collector OC2	21	Same as above
F5.12	The output setting of output terminal of open collector OC3	21	Same as above
F5.13	The output setting of output terminal of open collector OC4	21	Same as above

10.6.6 Setting steps and basic wiring diagram

(1) Setting steps

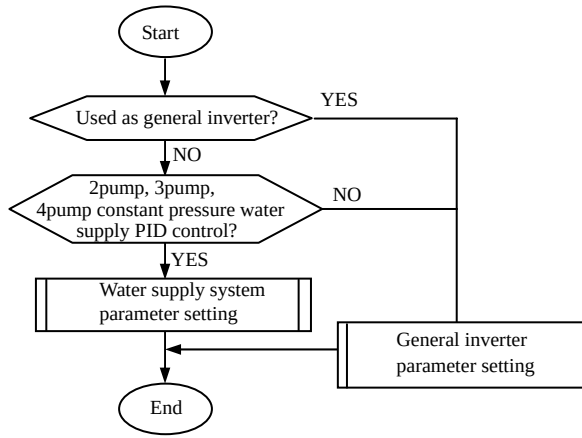


Fig. 10-9

(2) Basic wiring diagram

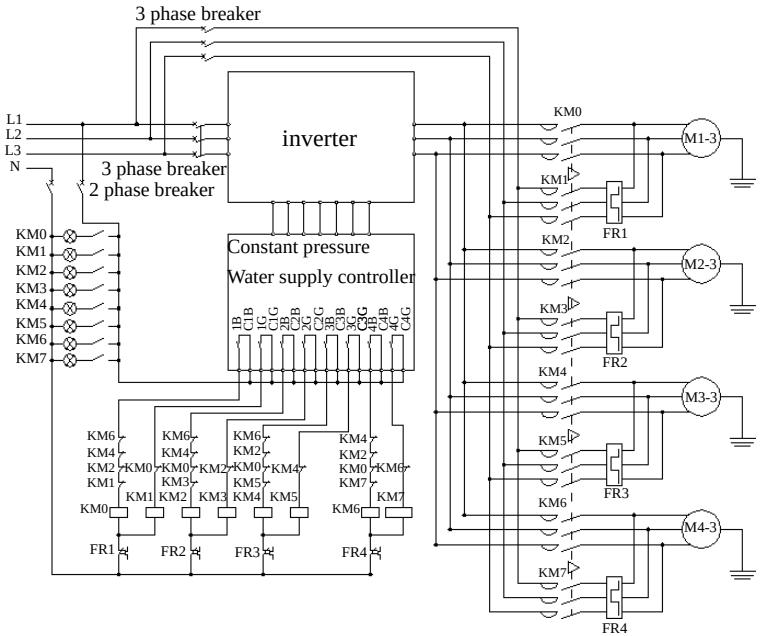


Fig.10-10 basic wiring diagram for constant pressure water supply controller

Description:

(1B,C1B), (1G,C1G), (2B,C2B), (2G,C2G), (3B,C3B), (3G,C3G), (4B,C4B), (4G,C4G) denote respectively 2 terminals corresponding to control terminal“No.1 variable frequency”, “No.1 bypass”, “ No.2 variable frequency”, “ No.2 bypass”, “ No.3 variable frequency”, “ No.3 bypass”, “ No.4 variable frequency”, “ No.4 bypass” on constant pressure water supply controller.

(1) Should apply AC contactor with mechnical interlock between inverter output andpower source bypass beside the motor, and perform logic interlock in electric control loop to avoid short circuit between inverter output and power source which will damage the inverter and interrelated device;

(2) Phase order of power source L1,L2,L3 connected with the motor should be the same as that of inverter output U, V, W，please operate after confirm with phase order table to avoid motor reverse run caused during converted frequency/ power source switch.

(3) There should be over current protection device in power source bypass to the motor.

11 Serial port RS485 communication protocol

11.1 Summarization

We provide general RS485/RS232 communication interface in our Inverters for the user. Through this communication interface upper device (such as PC, PLC controller etc.) can perform centralized monitor to the inverter (such as to set inverter parameter, control run of inverter, read work state of the inverter) and also long-distance control keypad can be connected to realize various usage requirement of the user.

This communication protocol is interface criterion file designed for realizing above-mentioned function, please read it earnestly and program according to it so that realize long-distance and network control to the inverter.

11.2 Protocol content and description

11.2.1 Communication net buildup mode

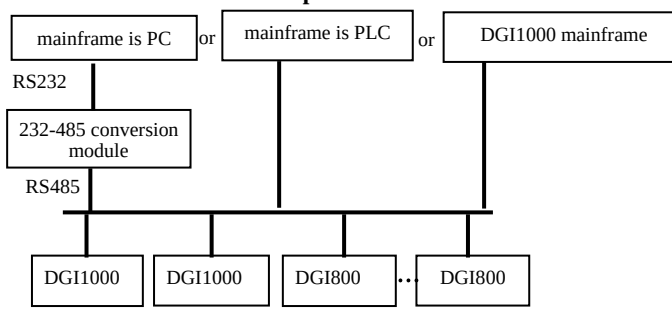


Fig.11-1 net buildup graph

11.2.2 Communication mode

At present, DGI1000 inverter can be used not only as auxiliary device but also mainframe device in RS485,if the inverter used as auxiliary ddevice,master device can be completed by PC,PLC or human interface,and if used as mainframe device ,the main- auxiliary control of the inverter can be complement by it, Specific communication mode is as mentioned below:

(1) PC or PLC as mainframe，inverter as auxiliary device，point-to-point communication between mainframe and auxiliary device.

(2) Auxiliary device don't response when mainframe send out command by broadcast address.

(3) User can set local address, baud rate and data format of the inverter through auxiliary device keypad.

(4) Auxiliary device report current failure information to mainframe in the last

response frame.

(5) DGI1000 provides RS485 interface.

11.2.3 Transport mode

Asynchronous serial，semiduplex transport mode. Default format and transport rate: 8-N-1，9600bps.For specific parameter setting please see description for F2.14~F2.17 group function code.

11.2.4 Data command frame format

Main device command frame format																		
sending order	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	frame head	auxiliary device address	auxiliary device address	main device command	main device command	assistant index	assistant index	command index	command index	set data	set data	set data	set data	checkout sum	checkout sum	checkout sum	checkout sum	frame end
Definition	head	address		command area		Index area				setting data area				checkout area				end
sending byte	1	2		2		4				4				4				1

Auxiliary device response frame format																		
sending order	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	frame head	auxiliary device address	auxiliary device address	auxiliary device reponse	auxiliary device reponse	failure index	failure index	command index	command index	run data	run data	run data	run data	checkout sum	checkout sum	checkout sum	checkout sum	frame end
Definition	head	address		reponse area		Index area				Run data area				Checkout area				end
sending byte	1	2		2		4				4				4				1

Fig.11-2 command/response frame format

Remark:

(1) “Setting data area” and “run data area” may not be existent in some command/data frame format, so in protocol command list it’s marked with “nothing”.

(2) In protocol effective character set is: ~, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F and hex data 0DH，ASCII lowercase a, b, c, d, e, f are invalid.

(3) Effective command frame length is 14 or 18 byte.

11.2.5 Explanation and description for format

(1) frame head

It’s character “~” (namely hex 7E),single byte.

(2) auxiliary device address

Data meanings: local address of auxiliary device, double byte. ASCII format. Inverter factory default is 01.

(3) mainframe command/auxiliary device respond

Data meanings: mainframe send out command and auxiliary device respond to the command. Double byte, ASCII format.

Response code function classification:

Species 1>: command code= “10”，mainframe ask auxiliary device to report current preparation state and control situation.

Table 11-1 response code meanings for command code “10”

Response code ASCII	Meanings		
	Preparation state of auxiliary device	Control from mainframe is allowed	To set frequency is allowed
10	Don’t get ready	No meaning	
11	Get ready	Allow	Allow
12	Get ready	Allow	Allow
13	Get ready	Don’t allow	Don’t allow
14	Get ready	Don’t allow	Don’t allow
20	Frame error		

Species 2>: command code=“11”~“15”, 5 kinds of function command which mainframe send to auxiliary device, for detail please see protocol command list.

Table 11-2 response code meanings for command code “11~15”

response code ASCII	Meanings of response code	description
00	Auxiliary device communication and control is normal；function code modification is effective；password is correct.	
20	(1) frame checkout error；	When this response code is reported,

	(2) “command area” data overrun; (3) “index area” data overrun; (4) frame length error/non ASCII byte exist in area except frame head, frame end.	data of “command area”, “index area” and “running data area” are not reported.
30	(1) control to auxiliary device is ineffective; (2) ineffective function code parameter modification; (3) “setting/running data” area data overrun. (4) password error.	Whether report this response code relate to current set state of auxiliary device. When report data of area”, “index area” and “run data area” are reported according to protocol requirement.

(4) auxiliary index/command index/failure index

Data meanings: include auxiliary index byte and command index byte.

For mainframe, auxiliary index, command index are used for cooperating mainframe command in realizing specific function.

For auxiliary device, auxiliary index, command index are used for reporting failure state code, command index are reported without modification.

Data type: hex，4 byte, ASCII format.

Command index occupy 2 low byte, data range: “00”～“FF”.

Auxiliary index occupy 2 high byte, data range: “00”～“FF”.

Auxiliary device failure state occupy“auxiliary index”byte，see table 11-3.

Table 11-3 failure type description

failure code	description	failure code	description
1	Accelerating run over current	13	Converting module protection
2	decelerating run over current	14	External device failure
3	Constant speed run over current	15	current detecting circuit failure
4	accelerating run over voltage	16	RS485 communication failure
5	decelerating run over voltage	17	reserved
6	Constant speed run over voltage	18	reserved
7	Controller power supply over voltage	19	Under voltage
8	Inverter overload	20	System disturbance
9	Motor overload	21	Reserved
10	Inverter over heat	22	Reserved
11	reserved	23	E^2PROM read and write error
12	reserved		

(5) checkout sum

Data meanings: frame checkout，4 byte, ASCII.

Calculation method: accumulative sum of ASCII code value of all byte from "auxiliary device address" to "run data".

(6) frame end

Hex 0D，single byte.

11.2.6 Protocol command list

Frame 7E and frame end 0D, address, checkout sum，ASCII character format are omitted in following description.

Table 11-4 protocol command table

Name		Main-frame order	Auxi-liary index	order index	run data setting range	Mainframe sending example，such as PC control operation of inverter(C language cluster format，auxiliary device address is set to 01)	run data precision	description
look up auxiliary motor state		10	00	00	no	~010A00000192\r	1	
Read parameter of auxiliary motor	current set freq.	11	00	00	no	~010B00000193\r	0.01Hz	
	current run freq.	11	00	01	no	~010B00010194\r	0.01Hz	
	Output voltage	11	00	02	no	~010B00020195\r	1V	
	Output current	11	00	03	no	~010B00030196\r	0.1A	
	Bus-bar voltage	11	00	04	no	~010B00040197\r	1V	
	Load motor speed	11	00	05	no	~010B00050198\r	1rpm	
	Module temp.	11	00	06	no	~010B00060199\r	1^0C	
	Runtime	11	00	07	no	~010B0007019A\r	1h	
	accumulative time	11	00	08	no	~010B0008019B\r	1h	
	Input terminal	11	00	09	no	~010B0009019C\r	no	
	output terminal	11	00	0A	no	~010B000A01A4\r	no	
	analog input VCI	11	00	0B	no	~010B000B01A5\r	0.01V	
	analog input YCI	11	00	0C	no	~010B000C01A6\r	0.01V	
	analog input CCI	11	00	0D	no	~010B000D01A7\r	0.01V	
	exterior pulse input	11	00	0E	no	~010B000E01A8\r	0.01Hz	
	read inverter state	11	00	0F	no	~010B000F01A9\r	no	
Run control and adjusting function	auxiliary device run command	12	00	00	no	~010C00000194\r	no	
	set current run frequency provision of auxiliary device	12	00	01	0Hz~high limit freq.	~010C00010FA0027C\r	0.01Hz	Set freq. =40.00Hz
	auxiliary device run with run freq. provision	12	00	02	0Hz~ high limit freq.	~010C00020FA0027D\r	0.01Hz	auxiliary device run set freq. =40.00Hz
	auxiliary device forward run	12	00	03	no	~010C00030197\r	no	

	auxiliary device reverse run	12	00	04	no	~010C00040198\r	no	
	auxiliary device forward run with run freq. provision	12	00	05	0Hz~ high limit freq.	~010C00050FA00280\r	0.01Hz	forward run boot-strap set freq. =40.00Hz
	auxiliary device reverse run with run freq. provision	12	00	06	0Hz~ high limit freq.	~010C00060FA00281\r	0.01Hz	reverse run boot-strap set freq. =40.00Hz
	auxiliary device stop	12	00	07	no	~010C0007019B\r	no	
	auxiliary device jog run	12	00	08	no	~010C0008019C\r	no	
	auxiliary device forward jog run	12	00	09	no	~010C0009019D\r	no	
	auxiliary device reverse jog run	12		0A	no	~010C000A01A5\r	no	
	auxiliary device stop jog run	12	00	0B	no	~010C000B01A6\r	no	
	auxiliary device failure restoration	12	00	0C	no	~010C000C01A7\r	no	
	auxiliary device urgent stop	12	00	0D	no	~010C000E01A8\r	no	
Read function code parameter	Run freq. digital setting F0.01	13	00	01	no	~010D00010196\r	0.01Hz	
	Run direction setting F0.03	13	00	03	no	~010D00030198\r	1	
	accelerating time1 F0.08	13	00	08	no	~010D0008019D\r	0.1S	
	decelerating time1 F0.09	13	00	09	no	~010D0009019E\r	0.1S	
Set function code parameter	Run freq. digital setting F0.01	14	00	01	0Hz~ high limit freq.	~010E00011388026B\r	0.01Hz	Set function code F0.01=50. 00Hz
	Run direction setting F0.03	14	00	03	0, 1	~010E00030001025A\r	1	Set function code F0.03 to reverse run
	Accelerating time1 F0.08	14	00	08	0~8CA0	~010E000803E8028B\r	0.1S	Set function code F0.08 to 10.0s
	Decelerating time1 F0.09	14	00	09	0~8CA0	~010E000903E8028C\r	0.1S	Set function code F0.09 to 10.0s

Software version query order	Query auxiliary device software version	15	00	00	no	~010F00000197\r	1	

Table 11-5 response state word meanings of reading inverter state command

Bit	Signification		
	description	0	1
Bit0	Stop/run state	Stop	Run
Bit1	Logo for under voltage	Normal	Under voltage
Bit2	FWD/REV run logo	Forward run	Reverse run
Bit3	Swing freq. run mode logo	Ineffective	Effective
Bit4	Common run mode logo	Ineffective	Effective
Bit5	Jog run mode logo	No	Jog
Bit6	PLC run mode logo	No	Yes
Bit7	Multi-step freq. run mode logo	No	Yes
Bit8	PI closed loop run mode logo	No	Yes
Bit9	Set counting value arriving logo	No	Yes
Bit10	Specified counting value arriving logo	No	Yes
Bit11~15	Reserved		

Table 11-6 read auxiliary device function code parameter

<table>
<tr><td>Function definition</td><td colspan="7">Read auxiliary device function code parameter: all function code parameter except user password and manufacturer password</td></tr>
<tr><td>Meanings</td><td>Frame head</td><td>Address</td><td>Order</td><td>Order index</td><td>Run data</td><td>Checkout sum</td><td>Frame end</td></tr>
<tr><td>Mainframe order</td><td>7EH</td><td>ADDR</td><td>13</td><td>See remark</td><td>4</td><td>BCC</td><td>0DH</td></tr>
<tr><td>Byte quantity</td><td>1</td><td>2</td><td>2</td><td>4</td><td>0</td><td>4</td><td>1</td></tr>
<tr><td>Auxiliary device respond</td><td>7EH</td><td>ADDR</td><td>06</td><td>See remark</td><td>Function code para.</td><td>BCC</td><td>0DH</td></tr>
<tr><td>Byte quantity</td><td>1</td><td>2</td><td>2</td><td>4</td><td>4</td><td>4</td><td>1</td></tr>
<tr><td rowspan="9">remark</td><td colspan="7">Command index=combinated by function code group number and hex code of function code number. For instance:
If want to read parameter of F0.05 function code, order index=0005;
If want to read parameter of F2.11 function code, order index =020B;
If want to read parameter of F2.15 function code, order index =020F;
If want to read parameter of F2.13 function code, order index =020D;</td></tr>
<tr><td colspan="7">Corresponding relation between decimal and hex value of function code group No.</td></tr>
<tr><td>function group</td><td>decimal</td><td>hex</td><td>function group</td><td>decimal</td><td colspan="2">hex</td></tr>
<tr><td>F0</td><td>0</td><td>00H</td><td>F6</td><td>6</td><td colspan="2">06H</td></tr>
<tr><td>F1</td><td>1</td><td>01H</td><td>F7</td><td>7</td><td colspan="2">07H</td></tr>
<tr><td>F2</td><td>2</td><td>02H</td><td>F8</td><td>8</td><td colspan="2">08H</td></tr>
<tr><td>F3</td><td>3</td><td>03H</td><td>F9</td><td>9</td><td colspan="2">09H</td></tr>
<tr><td>F4</td><td>4</td><td>04H</td><td>FD</td><td>13</td><td colspan="2">0DH</td></tr>
<tr><td>F5</td><td>5</td><td>05H</td><td>FF</td><td>15</td><td colspan="2">OFH</td></tr>
<tr><td>virtual data</td><td colspan="7">0~FFFF (namely 0~65535)</td></tr>
</table>

Please input correct “user password” before you set user function code parameter.

Table 11-7 set auxiliary devsice function code parameter

<table>
<tr><td>Function definition</td><td colspan="7">Set auxiliary device function code parameter: all function code parameter except user password and manufacturer password</td></tr>
<tr><td>Meanings</td><td>Frame head</td><td>Address</td><td>Order</td><td>Order index</td><td>Run data</td><td>Checkout sum</td><td>Frame end</td></tr>
<tr><td>Mainframe order</td><td>7EH</td><td>ADDR</td><td>14</td><td>See remark</td><td>4</td><td>BCC</td><td>0DH</td></tr>
<tr><td>Byte quantity</td><td>1</td><td>2</td><td>2</td><td>4</td><td>0</td><td>4</td><td>1</td></tr>
<tr><td>Auxiliary device respond</td><td>7EH</td><td>ADDR</td><td>06</td><td>See remark</td><td>Function code para.</td><td>BCC</td><td>0DH</td></tr>
<tr><td>Byte quantity</td><td>1</td><td>2</td><td>2</td><td>4</td><td>4</td><td>4</td><td>1</td></tr>
<tr><td rowspan="9">Remark</td><td colspan="7">Command index=combinated by function code group number and hex code of function code number. For instance:
If want to set parameter of F0.05 function code, order index=000B;
If want to set parameter of F2.11 function code, order index =020B;
If want to set parameter of F2.15 function code, order index =020F;
If want to set parameter of F2.13 function code, order index =020D;</td></tr>
<tr><td colspan="7">Corresponding relation between decimal and hex value of function code group No.</td></tr>
<tr><td>Function group</td><td>Decimal</td><td>Hex</td><td>Function group</td><td>Decimal</td><td>Hex</td><td></td></tr>
<tr><td>F0</td><td>0</td><td>00H</td><td>F6</td><td>6</td><td>06H</td><td></td></tr>
<tr><td>F1</td><td>1</td><td>01H</td><td>F7</td><td>7</td><td>07H</td><td></td></tr>
<tr><td>F2</td><td>2</td><td>02H</td><td>F8</td><td>8</td><td>08H</td><td></td></tr>
<tr><td>F3</td><td>3</td><td>03H</td><td>F9</td><td>9</td><td>09H</td><td></td></tr>
<tr><td>F4</td><td>4</td><td>04H</td><td>FD</td><td>13</td><td>0DH</td><td></td></tr>
<tr><td>F5</td><td>5</td><td>05H</td><td>FF</td><td>15</td><td>0FH</td><td></td></tr>
<tr><td>Virtual data</td><td colspan="7">0~FFFF (namely 0~65535)</td></tr>
</table>

Appendix 1 DGI1100 drawing machine inverter manual

1.1 Drawing machine schematic diagram

Drawing machine with retracting and releasing volume diagram shows as Diagram 1-1（a）（b）shows. It is made up of host, tensile modulus, tension balance bar, wire-retracting machine and cable machine.

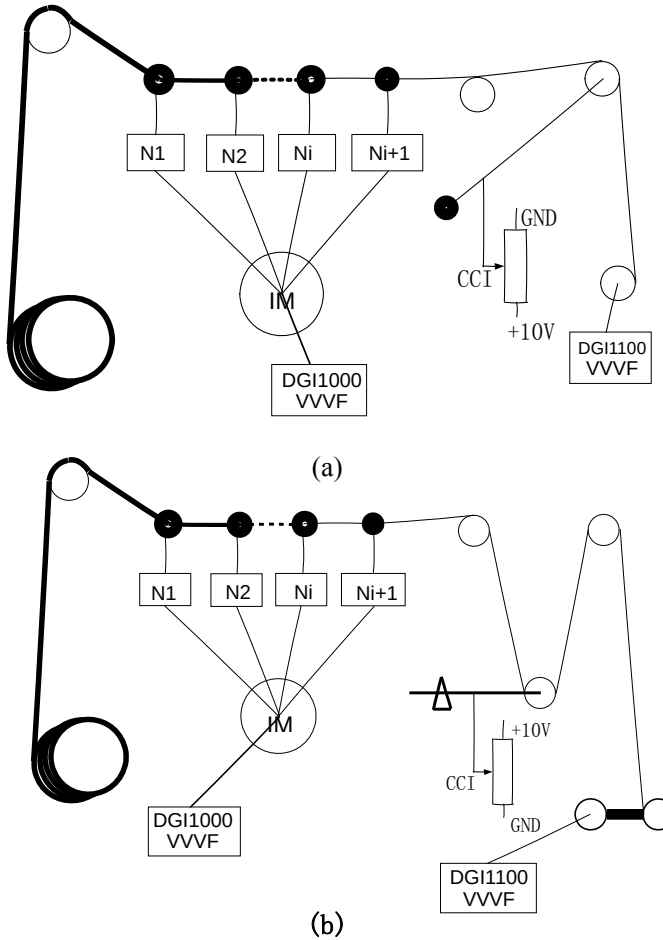


Diagram 1-1 Drawing machine with retracting and releasing volume diagram

2.1 Working Theory

2.1.1 Working Theory

To ensure the drawing machine keep constant tension in the process of receiving and releasing line and continue to line up line synchronously, especially for Micro-pulling machine, we generally take frequency output voltage signal of host as analog input voltage signal of wire retracting machine. The output frequency of wire retracting machine should be reduced gradually so as to make retracting and releasing wire in the same step with the increasing of wire retracting machine volume diameter, and the output frequency of wire-retracting machine is inversely proportional to volume diameter.

If we set the liner speed of retractable wire and releasable wire as V, and following:

$V=i*\omega*R=2\pi F*R=\pi*i*F*D$

$F=i*V/\pi*D$

F refers to output frequency of wire retracting machine,

i refers to machinery rotation ratio of retractable wire and releasable wire,

V refers to liner speed of host, which is proportional to the output frequency of host. F is inversely proportional to the volume diameter of wire-retracting drum which indicated as D.

The output frequency of DGI1100 Series inverter is:

$F=i*V/\pi*D+K2*U_{PID}$

We define $K1=i/\pi*D$，which called coil coefficient.

D_0 means empty diameter of wire-retracting coil, when the coil diameter restores, K1 there means empty path coefficients.K1 is F2.22 and K2 is F2.23.

2.1.2 Working requirements

(1) Jog lead wire must be independent

(2) Host operates with slow acceleration and deceleration

(3) Smoothly start up with continuous line

(4) Steady operation with small swing

(5) Synchronous machine stop without hitting limit down.

2.1.3 Feedback polarity detection

After DGI1100 inverter connects with tension balance bar voltage feedback as diagram 1-1 shows, then move tension balance bar as it swings when wire-retracting machine retracts wire. In the mean while, you should monitor PID feedback voltage C.12 (to revise F3.28=12, so the panel monitor parameter is PID feedback voltage), the value should change from low to high, generally change in the range of 0.00V~10.00V or 2.00V~8.00V. If the value is not in this range, the

position of tension potentiometer should be changed to make the central point as about 5.00V.This tension potentiometer should be the high-accuracy one with 360°.

2.1.4 Jog lead wire

The frequency of host jog lead wire and time of acceleration and deceleration are independent from the ones at normal work. Jog frequency is multi-section speed 2（F2.06）generally at about 6.0Hz. Jog acceleration and deceleration time（F2.07 and F2.08）is generally about 10.0S.

2.1.5 Maximum frequency

As the frequency output of host is provision linear speed of retractable and releasable wire, in order to ensure the liner relation between host frequency and wire-retracting machine frequency, we have to equate the maximum frequency between them. The high limit frequency of wire-retracting machine is just the maximum frequency of itself.

Maximum working frequency of host is decided by the maximum liner speed of drawing machine. Assuming we indicate the output frequency of host with highest linear speed as F0 and ratio between full-diameter and empty-diameter of wire-retracting machine as N=D1/D0 (N is generally 1.2~1.8). Mechanical transmission ratio between wire-retracting machine and host is i (i is usually about 1).Then the following:

$F_N/F_F=N$

F_N indicates output frequency of wire retracting machine empty- diameter

F_F indicates output frequency of wire retracting machine full-diameter.

$(F_N+ F_F)/2=i*F_0$

$F_N=N/(N+1)*2*i*F_0$

Maximum frequency of host and wire retracting machine is:

F_{MAX}=MAX（F_N，F_0）

Suppose we set i=1，N=1.8，F_0=70.0Hz,we can get F_N=90.0Hz，F_F=50.0Hz.

So the maximum frequency of host F_{MAX}=90.0Hz, and the upper limit frequency F_0=70.0Hz.

And the maximum frequency of wire receiving machine F_{MAX}=90.0Hz, and The upper limit frequency F_{MAX}=90.0Hz.

2.1.6 Smoothly start up for wire retracting machine

The wire retracting machine is generally in the machinery low limit position, while not in zero position of tension sway bar. The PID adjustment makes a certain amount provision input frequency for wire receiving machine when host frequency is at 0Hz, which will cause impact when wire retracting machine starts up if haven't made any relevant disposal, as to fine-drawing machine and

micro-puling machine, the impact will lead to wire disconnection. Therefore, the smoothly start-up disposal is needed. The method is as follows:

Start up acceleration deceleration time (acceleration deceleration time2)and smoothly switch to normal work acceleration deceleration time (acceleration deceleration time 1). Start up acceleration deceleration time is:

$T_{UP}= T_{UP4} -(T_{UP2}-T_{UP1})*t/F2.39$

$T_{DN}= T_{DN4} -(T_{DN2}-T_{DN1})*t/F2.39$ The Unit of F2.39 is millisecond(MS)

To fine-drawing machine and micro-puling machine:

F2.39=10000ms=10.000s,T_{UP2}=150.0s，T_{DN2}=150.0s，T_{UP1}=2.0s，T_{DN1}=2.0s.

To big and medium type drawing machine, we can reduce smoothly start-up time of wire retracting machine:

F2.39=2000ms=2.000s,T_{UP2}=150.0s,T_{DN2} =150.0s，T_{UP1}=2.0s，T_{DN1} =2.0s.

2.1.7 Volume diameter automatically calculate time interval

Along with the growth of wire retracting volume diameter, the output frequency of its needs to be constantly reduced. DGI1100 Series inverter has special volume calculation function interiorly, it can calculate present volume diameter dynamically in real time, in order to reach the best wire retracting effect. The time interval of automatically calculation is F2.21，and the unit is MS.(millisecond)

To ensure the accuracy of volume diameter calculation and the stability of wire retracting machine sway bar, we usually set:

F2.21=200~3200ms=0.200~3.200s

2.1.8 Dead zone range when automatically volume calculation

To insure the steady running of wire receiving machine near sway bar zero position and avoid the influence to sway bar amplitude caused by volume diameter automatically calculation,DGI1100 Series inverter set a certain dead zone which near sway bar zero position, and this result in automatically stopping volume diameter calculation in dead zone. The range of dead zone is: F2.34=0.00~2.00V.

2.1.9 Automatically volume diameter calculation

When tension balance bar deviates central position, there should be some error between volume diameter calculation result and its actual value, which needs to calculate volume diameter. And different balance bar positions adopt different calculation methods.

0.00V~F2.34: volume diameter calculation 0=dead zone

F2.34~F2.36：volume diameter calculation 1

F2.35~F2.37：volume diameter calculation 2

F2.36~F2.38：volume diameter calculation 3

F2.37~10.0V：volume diameter calculation 4

2.1.10 Volume diameter reset

When with empty diameter, the output frequency of wire retracting machine indicates as FN. And when with full diameter, the output frequency of wire retracting machine indicates as FF.

The output frequency with full diameter and empty diameter of wire retracting machine is different greatly, in order to make the liner speed of wire retracting machine and host in the same step as soon as possible, the volume diameter reset is needed when wire retracting machine changes volume. And the external terminal X6 should set as 39, this terminal is defined volume reset terminal with DGI1100 Series inverter.

2.1.11 Drawing machine tension control

F3.00=1，DGI1100 Series inverter is drawing machine tension control mode.

2.1.12 Control wiring

(1) Connect Jog switch with host X2(defined as jog).

(2) Connect external terminal start-up switch with host FWD terminal.

(3)Connect pull wire speed potentiometer with host machine+10V、VCI and GND.

(4) Connect host analog output A02 terminal and GND terminal with VCI terminal and GND terminal of wire retracting machine.

(5) Connect tension bar potentiometer with +10V, CCI and GND terminals of DGI1100 Series inverter.

(6) Other relative control signal.

3.1 DGI1100 Series inverter model No. and specification

DGI1100 Series inverter rated input power: 3 phase AC 380V;

Adaptable electric motor power range is 0.75~37kW;

Max.output voltage is the same as input voltage .

DGI1100 Series inverter model No. and rated output current show as attached list 1-1:

Attached list 1-1 DGI1100 Series drawing machine inverter model No.

Model No.	Adaptable Motor Rated power(kW)	Adaptable Motor Rated voltage(V)	Rated output current (A)
DGI1100-4T0007	0.75	3 Phase AC 380V	2.3
DGI1100-4T0015	1.5		3.7
DGI1100-4T0022	2.2		5.0
DGI1100-4T0037	3.7		8.5
DGI1100-4T0055	5.5		13

DGI1100-4T0075	7.5		17
DGI1100-4T0110	11		25
DGI1100-4T0150	15		33
DGI1100-4T0185	18.5		39
DGI1100-4T0220	22		45
DGI1100-4T0300	30		60
DGI1100-4T0370	37		75

Remark：The external brake resistance must be configured when drawing machine inverter matches wire retracting motor. The reason is that inverter need to be provided bigger start-up and brake current and it brings out higher DC bus voltage when it accelerates and decelerates in short period. Technique index and spe.of DGI1100 Series inverter indicated as attached list 1-2.

Attached list1-2 DGI1100 Series inverter technique index and spec.

Item			Item description
Output	Voltage		400V grade:0~380V; 200V grade:0~220V
	Frequency		0Hz-400Hz
	Over loading capacity		150%of rated current for 1 minute，200% rated current for 0.5 second.
Power input	Rated volt.& freq.		3 phase 380V,50Hz/60Hz; single phase 220V,50Hz/60Hz.
	Allowed work volt.range		3 phase voltage: 320V~460V single phase voltage: 200V~260V
Control performance	Control mode		Speed sensorless closed-loop slip vector control, open loop V/F control
	Speed regulation range		1：100
	Start-up torque		150% of rated torque at 1 HZ frequency
	Running speed stable state precision		≤±0.5% rated synchronous speed
	Frequency precision		Digital setting：max.frequency×±0.01% Analog setting：max.frequency×±0.2%
	Torque boost		Automatic torque boost, manual torque boost0.1%~20.0%
	V/F Curve (volt. frequency characteristic)		Set rated frequency randomly at range of 5~400Hz,can choose constant torque, degressive torque1, degressive torque 2, degressive torque 3, in total 4 kinds of curve.
	Acceleration and deceleration curve		2 modes：Straight line accelerating decelerating and S curve accelerating decelerating; 7 kinds of accelerating decelerating time(unit:minute(minute/second can be optioned) ,max.time 6000 minute.
	Brake	Power consumption brake	Interior or external brake resistance
		DC brake	Optional start-up and stop，action frequency 0~15Hz，action volt.0~15%，action time0~20.0 second

	Input order signal	Host linear speed input、PID signal control
	Standard function	**Interior PID controller:** Keep constant tension of wire retracting and releasing . **Volume diameter automatically calculate:** keep synchronous wire retracting liner speed with host. **Indentify volume diameter initial value automatically:** To identify volume diameter initial value with the fastest speed, and also limiting amplitude of instant and synchronous wire retracting and releasing, speed out of control because of over voltage, electronic heat overload relay, torque boost, rotary speed trace, DC brake, restriction of high and low limit for frequency, offset frequency, frequency gain, adjustment of carrier frequency, automatically carrier noise adjustment, analog output, motor parameter automatically identification, RS-485 computer interface and LCD Chinese and English selection.
	Jog	Jog frequency range：0.50Hz~50.00Hz； Jog acceleration deceleration time 0.1~60.0s can be set
	Multi-section speed running	Realized by interior PLC or control terminal
	interior PID controller	Be convenient to make closed-loop system
	Automatic energy saving running	Optimize V/F curve automatically based on the load to realize power saving running
	Automatic volt. regulation (AVR)	Can keep constant output volt., when power source voltage varies.
	Automatic current limit	Limit running current automatically to avoid frequent over-current which will cause trip.
	Protection function	Over-current protection, Over-voltage protection、lack-voltage protection, over-heat protection, over-load protection, lack-phase protection(can be chose), etc.
	Pulse output channel	Pulse square wave signal output of 0~20KHZ, can realize output of physical parameter such as setting frequency, output frequency ,etc.
	Analog output channel	2 channel of analog, thereinto AO1channel can be 4~20mA or 0~10V, and AO2channel is 0~10V; through them the inverter can realize output of physical parameter such as setting frequency, output frequency etc.
	Running order specified channel	Operation keyboard provision, control terminal provision, serial port provision.
	Running frequency specified channel	Digital provision, analog provision, pulse provision, serial port provision, combined provision, can be switched at any time by kinds of method.
Operation keyboard	LED display	Can display setting frequency, output frequency, output voltage, output current,etc.In total 20kinds of parameter.
	Lock the button	Lock all or part of the buttons（analog potentiometer can't be locked）
Use ambient	Use site	Indoor，not bear sunlight, no dust, no corrosive gas,no flammable gas, no oil fog, no vapor, no water drop or salt,etc.
	Altitude	Lower than 1000m.
	Ambient temperature	-10ºC~+40ºC(under ambient temperature 40ºC~50ºC,please reduce the volume or strengthen heat sink)
	Ambient humidity	Smaller than 95%RH, no condensation water

	Vibration	Smaller than 5.9m/s2(0.6g)
	Storage tempera ion	-40ºC~+70ºC
	Defending grade	IP20
	Cooling mode	Compel wind cooling，By fan with automatic temperature control
Mounting mode		Wall hanging

4.1 Function code schedule graph

4.1.1 Function code schedule graph especially for drawing machine

Telecommunication serial No. is the function code address when computer communicates.

F0—Basic run function parameter group					
Function code	Name	Parameter setting	Unit	Factory default	Modification
F0.00	Frequency input channel selection	0：keyboard analog potentiometer setting 1：operation keyboard digital setting 2：terminal UP/DOWN adjust setting frequency(stored after power off) 3：Serial port setting 4：VCI analog setting（VCI-GND） 5：CCI analog setting（CCI-GND） 6：YCI analog setting（YCI-GND） 7：terminal pulse（PULSE）frequency setting 8：combination setting 9：terminal UP/DOWN adjust setting frequency(not stored after power off)	1	0	○
F0.02	Run command channel selection	0：operation keyboard run control 1：terminal run command control(keypad STOP command ineffective) 2：terminal run command control(keypad STOP command effective) 3：serial port run command control ((keypad STOP command ineffective) 4：serial port run command control ((keypad STOP command effective)	1	0	○
F0.03	Run direction setting	Unit's digit：0：forward run, 1：reverse run Tens place：0：reverse run allowed 1：reverse run banned	1	00	○
F0.08	Acce. time 1	0.1－6000.0	0.1	20.0	○
F0.09	Dece. time 1	0.1－6000.0	0.1	20.0	○
F0.10	Upper limit freq.	Lower limit freq.－400.00Hz	0.01Hz	50.00Hz	×
F0.14	Torque boost	0.0－20.0(%)	0.1(%)	2.0(%)	○

F1－Start-up, stop, brake function parameter group					
Function code	Name	Set range	Unit	Factory default	Modification
F1.05	Stop mode	0：Deceleration stop 1：free stop 2：Deceleration＋DC brake stop	1	0	×
F1.06	DC brake initiative freq. when stop running	0.0－15.00Hz	0.01Hz	0.00Hz	○
F1.07	DC brake time when stop running	0.0－20.0s	0.1s	0.0s	○
F1.08	DC brake voltage when stop running	0－15（%）	1	0	○

F2－Auxiliary run function parameter group					
Function code	Name	Set range	Unit	Factory default	Modification
F2.00	Analog filter time constant	0.00－30.00s	0.01s	0.20s	○
F2.06	Jog run frequency	0.10－50.00Hz	0.01Hz	5.00Hz	○
F2.07	Jog acceleration time	0.1－60.0s	0.1s	20.0s	○
F2.08	Jog deceleration time	0.1－60.0s	0.1s	20.0s	○
F2.18	Acce.time2(Smoothly start-up Acce.time)	0.1－6000.0	0.1	20.0	○
F2.19	Dece.time 2(Smoothly start-up Dece.time)	0.1－6000.0	0.1	20.0	○
F2.21	Interval time 1 of retracting volume diameter calculation	0~500ms	1ms	300ms	○
F2.22	Empty diameter gain(retracting and releasing gain)	0.0~800.0%	0.1%	40.0	○
F2.23	PID adjustor gain	0.0~800.0%	0.0%	30.0	○
F2.24	Start-up volume diameter calculation gain selection	0：F2.25 1：F2.26	1	0	○
F2.25	Start-up volume diameter calculation gain(volume diameter calculation gain 4)	0.0~20.0%	0.1%	0.8	○
F2.26	Volume diameter calculation gain 3	0.0~20.0%	0.1%	0.4	○
F2.27	Volume diameter calculation gain 2	0.0~20.0%	0.1%	0.0	○
F2.28	Volume diameter calculation gain 1	0.0~20.0%	0.1%	0.0	○
F2.29	Upper limit of retracting volume gain	0.0~200.0%	0.1%	100.0	○
F2.30	Start-up retracting and releasing gain control	0：calculation 1：with out change	1	1	○
F2.31	Retracting and releasing speed gain +/- control	0：0~F2.30 1：-F2.30~F2.30	1	0	○
F2.32	Retracting and releasing recombination control	0：externally input 1：interiorly input	1	0	○
F2.33	Interval time 0 of retracting volume diameter calculation	0~500ms	1	800	○
F2.34	Dead zone of of retracting volume diameter calculation	0.01~1.00V	0.01V	0.10	○

F2.35	Range 1 of retracting volume diameter calculation	F2.34~F2.36	1	0.70	○
F2.36	Range 2 of retracting volume diameter	F2.35~F2.37	0.01V	1.20	○
F2.37	Range 3 of retracting volume diameter	F2.36~F2.38	1	1.70	○
F2.38	Range 4 of retracting volume diameter	F2.37~5.00V	0.01V	2.20	○
F2.39	Smoothly start-up time	100~1500ms	1	2000	○
F2.40	Start-up PID gain control	0：K2=F2.39 1：T<F2.39 K2=0 T>F2.39 K2=T/F2.44*F2.39	1	1	○
F2.41	Smoothly start-up PID selection	0：PID 1：PD	1	1	○
F2.42	Volume diameter reset control	0：Stop with automatically reset 1：X6 terminal manual reset	1	0	○
F2.43	Wire disconnecting and delay PID control	0：PID 1：PD	1	1	○
F2.44	Time of wire disconnecting delay	0~32000Vms	1	5000	○

F3－Closed-loop run function parameter group					
Function code	Name	Set range	Unit	Factory default	Modification
F3.00	Closed-loop run control selection	0：closed-loop run control ineffective 1：PI closed-loop run control effective 2：reserved 3：Special for drawing machine －－VCI provision, VCI ordinary PID closed-loop effective 4：Special for drawing machine－－VCI provision，VCI+PID closed-loop effective 5：Special for drawing machine－－VCI provision, feed forward control VCI＋PID closed-loop effective	1	0	×
F3.08	Proportion gain KP	0.000－9.999	0.001	0.250	○
F3.09	Integral gain KI	0.000－9.999	0.001	0.010	○
F3.12	Deviation margin	0.0－20.0(%) percentage relative to max.value of closed-loop provision	0.1(%)	1.0(%)	○
F3.20	PID proportion gain2	0.000~9.999	0.001	0.300	×
F3.21	PID integral gain 2	0.000~9.999	0.001	0.000	○
F3.22	ID Automatically parameter adjustment basis	0：Only use the first PID parameter 1：Automatic adjustment base on volume diameter(that is to select from two group of PID parameters according to the place of tension bar)	1	1	○

F3.30	Failure relay TA,TB,TC function selection	0：inverter running（RUN） 1：frequency arriving signal（FAR） 2：frequency level detecting signal（FDT1） 3：reserved 4：Over load warning alarm signal（OL） 5：Output frequency reach high limit（FHL） 6：Output frequency reach low limit（FLL） 7：inverter under voltage blockage stop (LU) 8：external failure stop running （EXT） 9： inverter zero speed running 10：PLC running 11：simple PLC section running finished 12：PLC finish a cycle running 13：reserved 14：inverter ready to run (RDY) 15：inverter malfunction 16：Swing frequency high and low limit restriction 17：interior counter reach final value 18：interior counter reach specified value 19：set run time arriving 20：interior timing arriving 21：reserved 22：reserved 23：reserved 24：reserved		15	○

F5－Terminal correlative function parameter group					
Function code	Name	Set range	Unit	Factory default	Modification
F5.00	Input terminal X1 function selection	31：Run command channel selection 3 32：Swing frequency jump-in 33：External interruption input 34： Interior counter reset end 35：Interior counter triggering end 36：Interior timer reset end 37：Interior timer triggering end 38：Pulse frequency input（Only effective for X7,X8） 39：Reserved 40：Reserved 41：Reserved 42：Reserved	1	0	×
F5.01	Input terminal X2 function selection	Same as above			
F5.02	Input terminal X3 function selection	Same as above			

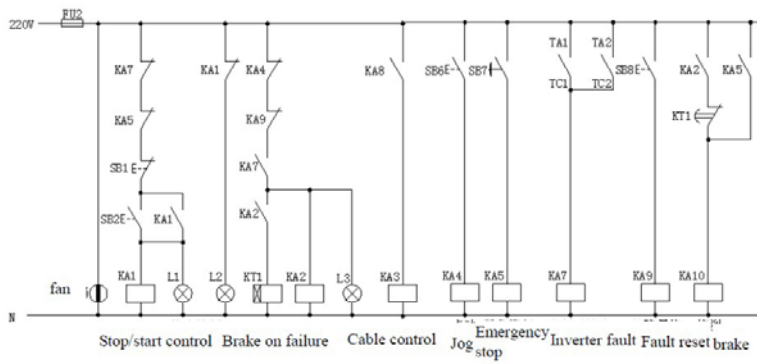
F5.10	Open circuit electric collector output terminal OC1 output setting	0：inverter running （RUN） 1：frequency arriving signal（FAR） 2：frequency level detect signal（FDT1） 3：Reserved 4：Over load warning alarm signal（OL） 5：Output frequency reach high limit（FHL） 6：Output frequency reach low limit（FLL） 7：inverter under voltage blockage stop (LU) 8：external failure stop running （EXT） 9：inverter zero speed running 10：PLC running 11：simple PLC section running finished 12：PLC finish a cycle running 13：Reserved 14：inverter ready to run (RDY) 15：inverter malfunction 16：Swing frequency high and low limit restriction 17：interior counter reach final value 18：interior counter reach specified value 19：set run time arriving 20：interior timing arriving 21：OC1- the first pump of variable frequency OC2- the first pump of bypass frequency OC3- the second pump of variable frequency OC4- the second pump of bypass frequency 22：Reserved 23：Reserved 24：Reserved			
F5.15	FDT1(frequency level) electric level	0.00－Upper limit frequency	0.01Hz	10.00Hz	○
F5.16	FDT1 lag	0.00－50.00Hz	0.01Hz	1.00Hz	○
F5.17	Analog output (AO1)selection	0：output frequency (0－high limit frequency) 1：set frequency (0－high limit frequency) 2：output current (0－2×rated current) 3：output voltage (0－1.2×load motor rated voltage) 4：Busbar voltage (0－800V) 5：PID provision (0.00－10.00V) 6：PID feedback (0.00－10.00V) 7：Reserved 8：Reserved 9：Reserved	1	0	○
F5.18	Analog (AO1)gain	0.50－2.00	0.01	1.00	○
F5.19	Analog output (AO1) offset	0.00－10.00V	0.01	0.00	○
F5.20	Analog output (AO2) selection	Same as F5.17	1	0	○
F5.21	Analog output (AO2) gain	0.50－2.00	0.01	1.00	○
F5.22	Analog output (AO2) offset	0.00－10.00V	0.01	0.00	○

F7—Frequency provision function parameter group					
Function code	Name	Set range	Unit	Factory default	Modification
F7.03	VCI max.provision corresponding frequency	0.00—high limit frequency	0.01 Hz	50.00Hz	○

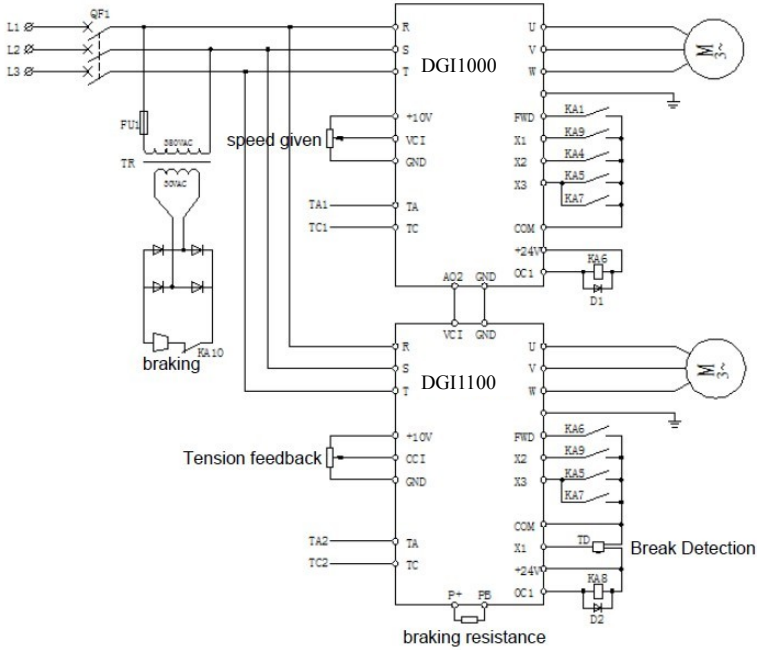
5.1.1 Wiring of host and wire retracting machine

Connect host inverter freq.output signal (AO2 terminal of DGI1100 series inverter) with VCI and GND terminals of DGI1100 Series inverter. The frequency output signal of host inverter is used as main synchronous signal of host and wire retracting machine and DGI1100 series inverter interior PID control as auxiliary synchronous adjustment signal, so as to insure constant wire retracting and releasing tension.

- Potentiometer liner speed of host provision
- Host button start-up
- Host button stop
- Host jog empty mould lead wire
- Host speed express to slave machine with forward input
- Host frequency start up slave machine horizontally
- Slave machine tension potentiometer feedback
- Slave frequency start up cable machine horizontally
- Slave machine wire disconnecting input
- Slave machine volume diameter reset
- Slave machine swift brake resistance
- Urgent stop by using urgent button
- Host and slave machine inverter malfunction stop
- Host and slave machine inverter malfunction reset



Note：Ansprechstrom current of intermediate relay KA6、KA8 should not more than 30mA，otherwise, please use external power.



5.1.2 Wiring for wire retracting machine feedback

Connect 3 ends for tension balance bar potentiometer with +10V、CCI and GND terminals of DGI1100 series drawing machine inverter, so as to insure the minimum resistance between CCI and GND terminals when balance bar in the low limit position, and the maximum resistance when balance bar in the high limit position.

5.1.3 Wiring for brake resistance

DGI1100 Series drawing machine inverter need to accelerate and decelerate in short period to ensure constant wire-retracting and releasing tension. Inverter's DC busbar voltage will rise when it decelerates with high speed, so we need connect brake resistance externally in order to ensure normal work of inverter. We connect brake resistance with P+、PB terminals of DGI1100 series inverter.

6.1 Parameters setting reference of big and medium type drawing machine

6.1.1 Host parameters of big and medium drawing machine （DGI1000 Series）

Function Code	Function Name	Factory Value	Setting
F0.00	Frequency input channel selection	1	4
F0.02	Run command channel selection	0	1
F0.08	Acceleration time 1	20.0	40.0-60.0
F0.09	Deceleration time 1	20.0	40.0-60.0
F0.10	Upper limit Frequency	50.00Hz	80.00
F0.14	Torque boost	0.5	1.0
F2.06	Jog run frequency	5.00Hz	6.00
F2.07	Jog acceleration time	20.0s	6.0
F2.08	Jog deceleration time	20.0s	6.0
F3.30	Failure relayTA,TB, TCfunction selection	15	15
F5.00	Input terminal X1 function selection	0	11
F5.01	Input terminal X2 function selection	0	5
F5.02	Input terminal X3 function selection	0	12
F5.10	Open circuit collector output terminal OCI Output setting	0	2
F5.15	FDT1(frequency level)electric level	10.00Hz	4.00
F5.16	FDT1 lag	1.00Hz	0.01
F5.17	Analog output (AO1)selection	0	0
F5.18	Analog output (AO1)gain	1.00	1.00
F5.19	Analog output (AO1)offset	0.00	0.00
F5.20	Analog output (AO2) selection	0	0
F5.21	Analog output (AO2) gain	1.00	1.00
F5.22	Analog output (AO2) offset	0.00	0.00
F7.03	VCI max. provision corresponding freq.	50.00	80.00

6.1.2 Wire receiving machine parameters of big and medium drawing machine （DGI1000 Series）

Function Code	Function Name	Factory Value	Setting
F0.02	Run command channel selection	0	1
F0.03	Run direction setting	000	010
F0.08	Acceleration time 1	20.0	2.0
F0.09	Deceleration time 1	20.0	2.0
F0.10	Upper limit Frequency	50.00Hz	75.00
F1.05	Stop mode	0	2
F1.06	DC brake initiative freq. when stop running	0.00	2.60
F1.07	DC brake time when stop running	0.0	1.5

F1.08	DC brake voltage when stop running	0	6
F2.00	Analog filter time constant	0.20s	0.03
F2.18	Acce. time 2(when start up smoothly)	20.0	150.0
F2.19	Dece. time 2(when start up smoothly)	20.0	150.0
F2.21	Interval time 1of retracting volume diameter calculation	500ms	300
F2.22	Empty diameter gain(retracting and releasing gain)	100.0	40.0
F2.23	PID adjustor gain	30.0	30.0
F2.24	Start-up volume diameter calculation gain selection	0	0
F2.25	Start-up volume diameter calculation gain(volume diameter calculation gain 4)	2.0	1.0
F2.26	Volume diameter calculation gain 3	0.4	0.4
F2.27	Volume diameter calculation gain 2	0.0	0.0
F2.28	Volume diameter calculation gain 1	0.0	0.0
F2.29	High limit of retracting volume gain	200.0	100.0
F2.30	Start-up retracting and releasing gain control	1	1
F2.31	Retracting and releasing speed gain +/- control	0	0
F2.32	Retracting and releasing recombination control	0	0
F2.33	Interval time 0of retracting volume diameter calculation	800	800
F2.34	Dead zone of retracting volume diameter calculation	0.10	0.10
F2.35	Range 1of retracting volume diameter calculation	0.70	0.70
F2.36	Range 2 of retracting volume diameter calculation	1.20	1.20
F2.37	Range 3 of retracting volume diameter calculation	1.70	1.70
F2.38	Range 4 of retracting volume diameter calculation	2.20	2.20
F2.39	Time of starting up smoothly	2000	2000
F2.40	Start up PID again control	1	1
F2.41	Start up PID smoothly selection	1	1
F2.42	Volume reset control	0	0
F2.43	Wire disconnecting delay PID control	1	1
F2.44	Time of wire disconnecting delay	5000	5000
F3.00	Closed-loop run	0	1
F3.08	proportion gain KP	0.250	0.800
F3.09	KI Integral gain KI	0.010	0.010
F3.12	Deviation margin	1.0(%)	1.0
F3.20	PID proportion gain 2	0.300	1.000
F3.21	PID Integral gain 2	0.000	0.000
F3.22	PID parameter self adjustment basis	1	1
F3.30	Failure relayTA,TB, TCfunction selection	15	15
F5.01	Input terminal X2 function selection	0	11

F5.02	Input terminal X3 function selection	0	12
F5.10	Open circuit collector output terminal OCI Output setting	0	2
F5.15	FDT1(frequency level)electric level	2.60Hz	2.60Hz
F5.16	FDT1 lag	0.01Hz	0.01Hz
F7.03	VCI max provision corresponding freq.	50.00	75.00

7.1 parameters setting reference of fine-drawing machine and micro-pulling machine

7.1.1 Host parameters of fine-drawing machine and micro-pulling machine （DGI1000 Series）

Function Code	Function Name	Factory Value	Setting
F0.00	Frequency input channel selection	1	4
F0.02	Run command channel selection	0	1
F0.08	Acceleration time 1	20.0	40.0-60.0
F0.09	Deceleration time 1	20.0	40.0-60.0
F0.10	Upper limit Frequency	50.00Hz	80.00
F0.14	Torque boost	0.5	2.5
F2.06	Jog run frequency	5.00Hz	6.00
F2.07	Jog acceleration time	20.0s	6.0
F2.08	Jog deceleration time	20.0s	6.0
F3.30	Failure relayTA,TB, TCfunction selection	15	15
F5.00	Input terminal X1 function selection	0	11
F5.01	Input terminal X2 function selection	0	5
F5.02	Input terminal X3 function selection	0	12
F5.10	Open circuit collector output terminal OCI output setting	0	2
F5.15	FDT1(frequency level)electric level	10.00Hz	5.50
F5.16	FDT1 lag	1.00Hz	0.01
F5.17	Analog output (AO1)selection	0	0
F5.18	Analog output (AO1)gain	1.00	1.00
F5.19	Analog output (AO1)offset	0.00	0.00
F5.20	Analog output (AO2) selection	0	0
F5.21	Analog output (AO2) gain	1.00	1.00
F5.22	Analog output (AO2) offset	0.00	0.00
F7.03	VCI max. provision corresponding freq.	50.00	80.00

7.1.2 Wire receiving machine parameters of fine-drawing machine and micro-pulling machine（DGI1000 Series）

Function Code	Function Name	Factory Value	Setting
F0.02	Run command channel selection	0	1
F0.03	Run direction setting	000	010
F0.08	Acceleration time 1	20.0	2.0
F0.09	Deceleration time 1	20.0	2.0
F0.10	Upper limit Frequency	50.00Hz	75.00
F1.05	Stop mode	0	2
F1.06	DC brake initiative freq. when stop running	0.00	3.00
F1.07	DC brake time when stop running	0.0	1.5
F1.08	DC brake voltage when stop running	0	8
F2.00	Analog filter time constant	0.20s	0.03
F2.18	Acce. time 2(when start up smoothly)	20.0	150.0
F2.19	Dece. time 2(when start up smoothly)	20.0	150.0
F2.21	Interval time 1of retracting volume diameter calculation	500ms	300
F2.22	Empty diameter gain(retracting and releasing gain)	100.0	40.0
F2.23	PID adjustor gain	30.0	30.0
F2.24	Start-up volume diameter calculation gain selection	0	0
F2.25	Start-up volume diameter calculation gain(volume diameter calculation gain 4)	2.0	1.0
F2.26	Volume diameter calculation gain 3	0.4	0.4
F2.27	Volume diameter calculation gain 2	0.0	0.0
F2.28	Volume diameter calculation gain 1	0.0	0.0
F2.29	High limit of retracting volume gain	200.0	100.0
F2.30	Start-up retracting and releasing gain control	1	1
F2.31	Retracting and releasing speed gain +/- control	0	0
F2.32	Retracting and releasing recombination control	0	0
F2.33	Interval time 0of retracting volume diameter calculation	800	800
F2.34	Dead zone range of retracting volume diameter calculation	0.10	0.10
F2.35	Range 1of retracting volume diameter calculation 1	0.70	0.70
F2.36	Range 2 of retracting volume diameter calculation	1.20	1.20
F2.37	Range 3 of retracting volume diameter calculation	1.70	1.70
F2.38	Range 4 of retracting volume diameter calculation	2.20	2.20
F2.39	time of starting up smoothly	2000	2000
F2.40	Start up PID again control	1	1
F2.41	Start up PID smoothly selection	1	1
F2.42	Volume diameter reset control	0	0

F2.43	Wire disconnecting delay PID control	1	1
F2.44	Time of wire disconnecting delay	5000	5000
F3.00	Closed-loop run	0	1
F3.08	proportion gain KP	0.250	0.250
F3.09	KI Integral gain KI	0.010	0.010
F3.12	Deviation margin	1.0(%)	1.0
F3.20	PID proportion gain 2	0.300	0.300
F3.21	PID Integral gain 2	0.000	0.000
F3.22	PID parameter self adjustment basis	1	1
F3.30	Failure relayTA,TB, TCfunction selection	15	15
F5.01	Input terminal X2 function selection	0	11
F5.02	Input terminal X3 function selection	0	12
F5.10	Closed-loop run	0	2
F5.15	proportion gain KP	2.60Hz	3.00Hz
F5.16	KI Integral gain KI	0.01Hz	0.01Hz
F7.03	Deviation margin	50.00	75.00

Appendix 2 The manual of DGI1300 middle frequency inverter

1 Symbol description

× ---- parameter can't be changed in process of running

○ ---- parameter can be changed in process of running

* ---- read-only parameter, unmodifiable

2 Function parameter schedule graph

F0－Basic run function parameter group					
Function code	Name	Set range	Min. unit	Factory default	Modifica-tion
F0.00	Frequency input channel selection	0: keypad analog potentiometer setting 1: keypad digital setting 2: terminal UP/DOWN adjust setting (stored after power off) 3: serial port setting(not stored after power off) 4: VCI analog setting (VCI-GND) 5: CCI analog setting (CCI-GND) 6: YCI analog setting (YCI-GND) 7: terminal pulse (PULSE) setting 8: combination setting 9: terminal UP/DOWN adjust setting (not stored after power off)	1	1	○
F0.01	Freq. digit setting	Lower limit Freq.～upper limit Freq.	0.1Hz	1000.0Hz	○
F0.02	Run command channel selection	0: keypad run control 1: terminal run command control (keypad stop command ineffective) 2: terminal run command control (keypad stop command effective) 3: serial port run command control (keypad stop command ineffective) 4: serial port run command control (keypad stop command effective)	1	0	○
F0.03	Run direction setting	1st bit: 0, forward run; 1, reverse run 2nd bit: 0, reverse run allowed 1, reverse run banned 3rd bit: REV/JOG key selection 0: as reverse run key 1: as jog key	1	100	○
F0.04	Acce/Dece mode selection	0: linear accelerating decelerating mode 1: S curve accelerating decelerating mode	1	0	×
F0.05	S curve start section time	10.0(%)－50.0(%)(Acce/Dece time) F0.05+F0.06≤90(%)	0.1(%)	20.0(%)	○
F0.06	S curve risetime	10.0(%)－70.0(%)(Acce/Dece time) F0.05+F0.06≤90(%)	0.1(%)	60.0(%)	○
F0.07	Acce Dece time unit	0: second 1: minute	1	0	×
F0.08	Acce time 1	0.1－6000.0	0.1	90.0	○
F0.09	Dece time 1	0.1－6000.0	0.1	90.0	○
F0.10	Upper limit freq.	Lower limit freq.－2500Hz	0.1Hz	1000.0Hz	×
F0.11	Lower limit freq.	0.00－Upper limit freq.	0.01Hz	0.00Hz	×
F0.12	Lower limit freq.	0: run at lower limit freq.	1	0	×

	run mode	1: stop			
F0.13	Torque boost mode	0: manual boost 1: automatic boost	1	0	○
F0.14	Torque boost	0.0－12.0 (%)	0.1(%)	00.5(%)	○
F0.15	V/F curve setting	0: constant torque curve 1: degressive torque curve 1(the 2.0nd power) 2: degressive torque curve 2 (the 1.7th power) 3: degressive torque curve 3 (the 1.2th power) 4: End-user sets VF curve himself(determined by F2.37~F2.44) F2.37 VF Freq. value 0 F2.38 VF voltage value 0 F2.39 VF Freq. value 1 F2.40 VF voltage value 1 F2.41 VF Freq. value 2 F2.42 VF voltage value 2 F2.43 VF Freq. value 3 F2.44 VF voltage value 3 Remark: VF frequency and voltage can't be 0 or maximum	1	0	×
F0.16	G/P type setting	0: G type 1: P type	1	0	×

F1－Start, stop, brake function parameter group					
Function code	Name	Set range	Min. unit	Factory default	Modifi-cation
F1.00	Start-up run mode	0: start at start-up freq. 1: first brake, then start at start-up freq. 2: reserved	1	0	×
F1.01	start-up freq.	0.0－100.0Hz	0.1Hz	0.0Hz	○
F1.02	start-up freq. duration	0.0－20.0S	0.1s	0.0s	○
F1.03	DC brake volt. at start-up	0－15(%)	1	0	○
F1.04	DC brake time at start-up	0.0－20.0S	0.1s	0.0s	○
F1.05	Stop mode	0: Dec stop 1: free stop 2: Dec＋DC brake stop	1	0	×
F1.06	DC brake initiative freq. when stop running	0.0－15.00Hz	0.1Hz	0.0Hz	○
F1.07	DC brake time when stop running	0.0－20.0s	0.1s	0.0s	○
F1.08	DC brake voltage when stop running	0－15(%)	1	0	○

F2－Auxiliary run function parameter group					
Function code	Name	Set range	Min. unit	Factory default	Modificat-ion
F2.00	Analog filter time constant	0.00－30.00s	0.01s	0.20s	○
F2.01	Forward reverse run dead-section time	0.0－3600.0s	0.1s	0.1s	○
F2.02	Automatic energy save run	0: no action 1: action	1	0	×
F2.03	AVR function	0: no action 1: action all the time 2: no action only during Dec	1	0	×
F2.04	Slip frequency compensation	0～150(%)0-no slip frequency compensation	1	0	×
F2.05	Carrier wave freq.	2－15.0K	0.1K	depend on machine type	×
F2.06	Jog run frequency	1.0－1000.0Hz	0.1Hz	50.0Hz	○
F2.07	Jog Acc time	0.1－60.0s	0.1s	20.0s	○
F2.08	Jog Dec time	0.1－60.0s	0.1s	20.0s	○
F2.09	Frequency input channel combination	0: VCI＋CCI 1: VCI－CCI 2: YCI＋CCI 3: RS485+YCI 4: VCI＋YCI 5: reserved 6: exterior pulse provision＋CCI 7: exterior pulse provision－CCI 8: reserved 9: reserved 10: reserved 11: reserved 12: reserved 13: VCI，CCI any nonzero value effective, VCI preferred 14: reserved 15: RS485+CCI 16: RS485-CCI 17: RS485+VCI 18: RS485-VCI 19: RS485+keypad potentiometer 20: RS485- keypad potentiometer 21: VCI+ keypad potentiometer 22: VCI- keypad potentiometer 23: CCI+ keypad potentiometer 24: CCI- keypad potentiometer 25: reserved 26: reserved 27: reserved 28: reserved	1	0	×

F2.10	Principal subordinate machine communication frequency provision proportion	0(%)－500(%)	1(%)	100(%)	○
F2.11	LED display control 1	0000-1111 first bit: running time 0: not display 1: display second bit: accumulative time 0: not display 1: display third bit: input terminal status 0: not display 1: display kilobit(fourth bit): output terminal status 0: not display 1: display	1	0000	○
F2.12	LED display control 2	0000-1111 first bit: analog input VCI 0: not display 1: display second bit: analog input YCI 0: not display 1: display third bit: analog input CCI 0: not display 1: display kilobit(fourth bit): exterior pulse input 0: not display 1: display	1	1111	○
F2.13	Parameter operation control	LED 1st bit: 0: all parameter allowed to be modified 1: except this parameter，all other parameter not allowed to be modified 2: except F0.01 and this parameter, all other parameter not allowed to be modified LED 2nd bit: 0: no action 1: restore default value 2: clear history failure record LED 3rd bit: 0: lock all buttons 1: lock all buttons but not STOP key 2: lock all buttons but not ▲ ▼, STOP key 3: lock all buttons but not RUN, STOP key 4: lock all buttons but not SHIFT, STOP key	1	0	×

F2.14	Communication configuration	LED first bit: baud rate selection 0: 1200BPS 1: 2400BPS 2: 4800BPS 3: 9600BPS 4: 19200BPS 5: 38400BPS LED second bit: data format 0: 1－8－1format, no checkout 1: 1－8－1 format, even checkout 2: 1－8－1 format, odd checkout	1	03	×
F2.15	Local address	0－127，127 is broadcast address. The inverter only receive but not send when it is set to be 127, 0 is address for main device.	1	1	×
F2.16	Communication overtime	0.0－1000.0s	0.1s	0.0s	×
F2.17	Local response delay	0－1000ms	1ms	5ms	×
F2.18	Acce time 2	0.1－6000.0	0.1	20.0	○
F2.19	Dece time 2	0.1－6000.0	0.1	20.0	○
F2.20	Acce time 3	0.1－6000.0	0.1	20.0	○
F2.21	Dece time 3	0.1－6000.0	0.1	20.0	○
F2.22	Acce time 4	0.1－6000.0	0.1	20.0	○
F2.23	Dece time 4	0.1－6000.0	0.1	20.0	○
F2.24	Acce time 5	0.1－6000.0	0.1	20.0	○
F2.25	Dece time 5	0.1－6000.0	0.1	20.0	○
F2.26	Acce time 6	0.1－6000.0	0.1	20.0	○
F2.27	Dece time 6	0.1－6000.0	0.1	20.0	○
F2.28	Acce time 7	0.1－6000.0	0.1	20.0	○
F2.29	Dece time 7	0.1－6000.0	0.1	20.0	○
F2.30	Multisection freq. 1	Lower limit freq.－upper limit freq.	0.1Hz	100.0Hz	○
F2.31	Multisection freq. 2	Lower limit freq.－upper limit freq.	0.1Hz	200.0Hz	○
F2.32	Multisection freq. 3	Lower limit freq.－upper limit freq.	0.1Hz	300.0Hz	○
F2.33	Multisection freq. 4	Lower limit freq.－upper limit freq.	0.1Hz	400.0Hz	○
F2.34	Multisection freq. 5	Lower limit freq.－upper limit freq.	0.1Hz	500.0Hz	○
F2.35	Multisection freq. 6	Lower limit freq.－upper limit freq.	0.1Hz	600.0Hz	○
F2.36	Multisection freq. 7	Lower limit freq.－upper limit freq.	0.1Hz	700.0Hz	○
F2.37	VF frequency value 0	0.00-F2.39	0.01Hz	10.00Hz	○
F2.38	VF voltage value 0	0.00-F2.40	0.01%	20.00%	○
F2.39	VF frequency value 1	F2.37-F2.41	0.01Hz	20.00Hz	○
F2.40	VF voltage value 1	F2.38-F2.42	0.01%	40.00%	○
F2.41	VF frequency value 2	F2.39-F2.43	0.01Hz	25.00Hz	○
F2.42	VF voltage value 2	F2.40-F2.44	0.01%	50.00%	○
F2.43	VF frequency value 3	F2.41-high limit frquency	0.01Hz	40.00Hz	○
F2.44	VF voltage value 3	F2.42-100.0% (rated voltage)	0.01%	80.00%	○

F2.45	Jumping freq. 1	0.00－400.00Hz	0.1Hz	0.00Hz	×
F2.46	Jumping freq. 1 range	0.00－30.00Hz	0.1Hz	0.00Hz	×
F2.47	Jumping freq. 2	0.00－400.00Hz	0.1Hz	0.00Hz	×
F2.48	Jumping freq. 2 range	0.00－30.00Hz	0.1Hz	0.00Hz	×
F2.49	Jumping freq. 3	0.00－400.00Hz	0.1Hz	0.00Hz	×
F2.50	Jumping freq. 3 range	0.00－30.00Hz	0.1Hz	0.00Hz	×
F2.51	Setting run time	0－65535 hours	1	0	○
F2.52	Accumulative run time	0－65535 hours	1	0	*
F2.53	RS485/232 communication frame format selection	0: a ASCII frame of 14 byte or 18 byte 1: a hex frame of 8 byte or 10 byte, original response not changed 2: a hex frame of 8 byte or 10 byte, 12 command has no response 3: a hex frame of 8 byte or 10 byte, 14 command has no response 4: a hex frame of 8 byte or 10 byte, both 12 and 14 command have no response	1	0	×

F3－Closed-loop run function parameter group					
Function code	Name	Set range	Min. unit	Factory default	Modifi-cation
F3.00	Closed-loop run control selection	0: closed-loop control ineffective 1: PID closed-loop control effective 2: reserved	1	0	×
F3.01	Provision channel selection	0: digital provision 1: VCI analog 0－10V voltage provision 2: CCI analog provision 3: keypad potentiometer provision	1	1	○
F3.02	Feedback channel selection	0: VCI analog input voltage 0－10V 1: CCI analog input 2: VCI+CCI 3: VCI-CCI 4: Min { VCI, CCI } 5: Max { VCI, CCI } 6: pulse feedback	1	1	○
F3.03	Specified value digital setting	0.00~10.00V(setF3.00=1,F3.21=9.999)	0.01	0.00	○
F3.04	Minimum specified value	0.0－maximum specified value; percentage relative to 10.00V	0.1(%)	(0.0)%	○
F3.05	feedback value responding to minimum specified value	0.0－100.0(%)	0.1(%)	(0.0)%	○
F3.06	maximum specified value	Minimum specified value －100.0(%)	0.1(%)	100.0(%)	○
F3.07	feedback value responding to maximum specified value	0.0－100.0(%)	0.1(%)	100.0(%)	○

F3.08	proportion gain Kp	0.000－9.999	0.001	0.050	○
F3.09	Integral gain Ki	0.000－9.999	0.001	0.050	○
F3.10	Differential gain Kd	0.000－9.999	0.001	0.000	○
F3.11	Sampling cycle T	0.01－1.00s	0.01s	0.10s	○
F3.12	Deviation margin	0.0－20.0(%)percentage relative to 10.00V	0.1(%)	2.0(%)	○
F3.13	Integral separation PID adjusting threshold	0.0－100.0%	0.1%	100.0%	○
F3.14	Closed-lop preset frequency	0－upper limit frequency	0.01Hz	000.0hz	○
F3.15	Closed-loop preset frequency holding time	0.0-6000s	0.1s	000.0s	○
F3.16	reserved				
F3.17	reserved				
F3.18	reserved				
F3.19	reserved				
F3.20	reserved				
F3.21	reserved				
F3.22	reserved				
F3.23	reserved				
F3.24	reserved				
F3.25	reserved				
F3.26	reserved				
F3.27	Closed-loop adjusting characteristic	0: Forward function 1: Reverse function		0	○
F3.28	LED initial supervision parameter selection	0: set frequency 1: output frequency 2: output current 3: output voltage 4: DC bus bar voltage 5: motor speed 6: heat sink temperature 7: run time 8: accumulative run time 9: input terminal status 10: output terminal status 11: analog input VCI/PID provision 12: analog input CCI/PID feedback 13: analog input YCI 14: exterior pulse inputs		1	○
F3.29	YCI run-in delay time	0.0－999.9s	0.1	10.0	○
F3.30	Failure relay TA，TB，TC function selection	0: inverter running(RUN) 1: frequency arriving signal(FAR) 2: frequency level detect signal (FDT1) 3: reserved 4: overload warning alarm signal (OL) 5: output frequency reach high limit(FHL) 6: output frequency reach low limit(FLL) 7: inverter under voltage blockage stop (LU) 8: external failure stop-running(EXT) 9: inverter zero speed running 10: PLC running 11: simple PLC section running finished 12: PLC finish a cycle running 13: reserved		15	○

		14: inverter ready to run (RDY) 15: inverter failure 16: traverse high and low limit restriction 17: interior counter reach final value 18: interior counter reach specified value 19: set run time arriving 20: interior timing arriving 21: reserved 22: reserved 23: reserved 24: reserved			
F3.31	VCLanalog input gain	0-800%		100	○

F4－Simple PLC function parameter group

Function code	Name	Set range	Min. unit	factory default	Modifi-cation
F4.00	Simple PLC running setting	LED first bit: 0: no action 1: stop after single circulation 2: keep final value after single circulation 3: consecutive circulation LED second bit: 0: start again from first section 1: continue to run at mid-section frequency LED third bit: PLC run time unit 0: second 1: minute	1	000	×
F4.01	Section 1 setting	000－621 LED first bit: frequency setting 0: multisection freq. i (i=1~7) 1: freq. determined by F0.00 function code LED second bit: run direction selection 0: forward run 1: reverse run 2: determined by run command LED third bit: Acc/Dec time selection 0: Acc/Dec time 1 1: Acc/Dec time 2 2: Acc/Dec time 3 3: Acc/Dec time 4 4: Acc/Dec time 5 5: Acc/Dec time 6 6: Acc/Dec time 7	1	000	○
F4.02	Section 1 run time	0－6000.0	0.1	10.0	○
F4.03	Section 2 setting	000－621	1	000	○
F4.04	Section 2 run time	0－6000.0	0.1	10.0	○
F4.05	Section 3 setting	000－621	1	000	○
F4.06	Section 3 run time	0－6000.0	0.1	10.0	○
F4.07	Section 4 setting	000－621	1	000	○
F4.08	Section 4 run time	0－6000.0	0.1	10.0	○
F4.09	Section 5 setting	000－621	1	000	○
F4.10	Section 5 run time	0－6000.0	0.1	10.0	○
F4.11	Section 6 setting	000－621	1	000	○

F4.12	Section 6 run time	0－6000.0	0.1	10.0	○
F4.13	Section 7 setting	000－621	1	000	○
F4.14	Section 7 run time	0－6000.0	0.1	10.0	○

F5－Terminal correlative function parameter group					
Function code	Name	Set range	Min. unit	Factory default	Modif -ication
F5.00	Input terminal X1 function selection	0: leave control terminal unused 1: multisection speed control terminal 1 2: multisection speed control terminal 2 3: multisection speed control terminal 3 4: multisection speed control terminal 4 5: external forward run jog control 6: external reverse run jog control 7: Acc/Dec time option terminal 1 8: Acc/Dec time option terminal 2 9: Acc/Dec time option terminal 3 10: external device failure input 11: external reset input 12: free stop input 13: external stop-running order 14: stop DC braking input command DB 15: inverter run banned 16: frequency increasing control (UP) 17: frequency degression control (DOWN) 18: Acc/Dec ban command 19: three-line run control 20: closed-loop ineffective 21: PLC ineffective 22: simple PLC pause control 23: PLC stop status reset 24: frequency provision channel option 1 25: frequency provision channel option 2 26: frequency provision channel option 3 27: frequency switched to CCI 28: command switched to terminal 29: run command channel option 1 30: run command channel option 2 31: run command channel option 3 32: swing frequency jump-in 33: external interruption input 34: interior counter reset end 35: interior counter triggering end 36: interior timer reset end 37: interior timer triggering end 38: pulse frequency input(only effective for X7,X8) 39: reserved 40: reserved 41: reserved 42: reserved	1	0	×
F5.01	Input terminal X2 function selection	Same as above			×
F5.02	Input terminal X3 function selection	Same as above			×

F5.03	Input terminal X4 function selection	Same as above			×
F5.04	Input terminal X5 function selection	Same as above			×
F5.05	Input terminal X6 function selection	Same as above			×
F5.06	Input terminal X7 function selection	Same as above			×
F5.07	Input terminal X8 function selection	Same as above			×
F5.08	FWD/REV run mode selection	0: double-line control mode 1 1: double-line control mode 2 2: three-line control mode 1 3: three-line control mode 2	1	0	×
F5.09	UP/DOWN velocity	0.01－99.99Hz/s	0.01Hz/s	1.00Hz/s	○
F5.10	Open circuit collector output terminal OC1 output setting	0: inverter running(RUN) 1: frequency arriving signal(FAR) 2: frequency level detect signal (FDT1) 3: reserved 4: overload warning alarm signal (OL) 5: output frequency reach high limit(FHL) 6: output frequency reach low limit(FLL) 7: inverter under voltage blockage stop (LU) 8: external failure stop-runnin(EXT) 9: inverter zero rotate speed running 10: PLC running 11: simple PLC section running finished 12: PLC finish a cycle running 13: reserved 14: inverter ready to run (RDY) 15: inverter failure 16: swing frequency high and low limit restriction 17: interior counter reach final value 18: interior counter reach specified value 19: set run time arriving 20: interior timing arriving 21: OC1-variable frequency for the 1st pump OC2-power source for the 1st pump OC3- variable frequency for the 2nd pump OC4-power source for the 2nd pump 22: reserved 23: reserved 24: reserved	1	0	×
F5.11	Open circuit collector output terminal OC2 output setting	Same as above	1	0	×
F5.12	Open circuit collector output terminal OC3 output setting	Same as above	1	0	×
F5.13	Open circuit collector output terminal OC4 output setting	Same as above	1	0	×

F5.14	Frequency arriving (FAR) checkout scope	0.00－50.00Hz	0.01Hz	5.00Hz	○
F5.15	FDT1 (frequency level) electric level	0.00－high limit frequency	0.01Hz	10.00Hz	○
F5.16	FDT1 lag	0.00－50.00Hz	0.01Hz	1.00Hz	○
F5.17	Analog output (AO1) selection	0: output frequency(0－high limit frequency) 1: set frequency(0－high limit frequency) 2: output current(0－2×rated current) 3: output voltage(0－1.2×load motor rated voltage) 4: bus-bar voltage(0－800V) 5: PID provision (0.00-10.00V) 6: PID feedback (0.00-10.00V) 7: reserved 8: reserved 9: reserved	1	0	○
F5.18	Analog output (AO1) gain	0.00－2.00	0.01	1.00	○
F5.19	Analog output (AO1) offset	0.00－10.00V	0.01	0.00	○
F5.20	Analog output (AO2) selection	Same as F5.17	1	0	○
F5.21	Analog output (AO2) gain	0.10－2.00	0.01	1.00	○
F5.22	Analog output (AO2) offset	0.00－10.00V	0.01	0.00	○
F5.23	DO terminal output function selection	Same as F5.17	1	0	○
F5.24	DO maximum pulse output frequency	0.1－20.0(max. 20KHz)Max. DO port output pulse frequency corresponds to Max. value selected by F5.23	0.1KHz	10.0	○
F5.25	Set interior counting value reaches provision	0－9999	1	0	○
F5.26	Specified interior counting value reaches provision	0－9999	1	0	○
F5.27	Interior timer setting	0.1－6000.0s	0.1	60.0	○

F6－Swing frequency special function parameter group					
Function code	Name	Set range	Min. unit	Factory default	Modifi -cation
F6.00	Reserved				
F6.01	Reserved				
F6.02	Reserved				
F6.03	Reserved				
F6.04	Reserved				
F6.05	Reserved				
F6.06	Reserved				
F6.07	Reserved				

F7－Frequency provision function parameter group					
Function code	Name	Set range	Min. unit	Factory default	Modifi-cation
F7.00	VCI min. provision	0.00－F7.02	0.01V	0.00V	○
F7.01	VCI min. provision corresponding freq.	0.00－high limit frequency	0.01Hz	000.0 Hz	○
F7.02	VCI max. provision	0.00－10.00V	0.01V	9.99V	○
F7.03	VCI max. provision corresponding freq.	0.00－high limit frequency	0.01 Hz	1000 Hz	○
F7.04	CCI min. provision	0.00－F7.06	0.01V	0.00V	○
F7.05	CCI min. provision corresponding freq.	0.00－high limit frequency	0.01 Hz	000.0 Hz	○
F7.06	CCI max. provision	0.00－10.00V	0.01V	9.99V	○
F7.07	CCI max. provision corresponding freq.	0.00－high limit frequency	0.01 Hz	1000 Hz	○
F7.08	YCI min. provision	0.00－F7.10	0.01V	00.03V	○
F7.09	YCI min. provision corresponding freq.	0.00－high limit frequency (reverse run)	0.01 Hz	500.0 Hz	○
F7.10	YCI max. provision	0.00－10.00V	0.01V	9.99V	○
F7.11	YCI max. provision corresponding freq.	0.00－high limit frequency (forward run)	0.01Hz	1000Hz	○
F7.12	YCI dead area setting	0.00V－2.00V	0.01V	0.10V	○
F7.13	PULSE max. input pulse	0.01－20.0K	0.01K	10.0K	○
F7.14	PULSE min. provision	0.0－F7.16(PULSE max. provision)	0.01K	0.0K	○
F7.15	PULSE min. provision corresponding freq.	0.00－high limit frequency	0.01Hz	000.0Hz	○
F7.16	PULSE max. provision	F7.14 (PULSE min. provision)－F7.13 (max. input pulse)	0.1K	10.0K	○
F7.17	PULSE max. provision corresponding freq.	0.00－high limit frequency	0.01Hz	1000Hz	○

F8－Motor and vector control parameter group					
Function code	Name	Set range	Unit	Factory default	Modifi-cation
F8.00	Control mode setting	0: V/F control 1: vector control remark: for DGI1300 it can't be 1	1	0	×
F8.01	Motor rated voltage	1－480V	1V	Depend on device type	×
F8.02	Motor rated current	0.1－999.9A	0.1A	Depend on device type	×
F8.03	Motor rated frequency	10.0－1000.0Hz	0.01 Hz	Depend on device type	×
F8.04	Motor rated speed	1－9999r/min	1r/min	Depend on device type	×
F8.05	Motor pole	2－14	2	Depend on device type	×
F8.06	Motor rated power	0.1－999.9KW	0.1	Depend on device type	×
F8.07	Reserved				
F8.08	Reserved				

F8.09	Reserved				
F8.10	Reserved				
F8.11	Reserved				
F8.12	Reserved				
F8.13	Reserved				
F8.14	Reserved				
F8.15	Reserved				
F8.16	Reserved				
F8.17	Reserved				

F9－Protection correlative function parameter group					
Function code	Name	Set range	Min. unit	Factory default	Modific -ation
F9.00	Instantaneous power off restarting latency time	0.0－10.0S 0 indicates ineffective power off restarting	0.1S	0.0S	×
F9.01	Failure self-renew times	0－10 0 shows no automatic reset function	1	0	×
F9.02	Failure self-renew interval	0.5－20.0S	0.1S	5.0S	×
F9.03	Motor overload protection mode selection	0: no action 1: inverter close off output	1	1	×
F9.04	Motor overload protection coefficient	20.0-120.0(%)	0.1(%)	100.0(%)	×
F9.05	Overload warning alarm checkout level	20－200(%)	1(%)	130(%)	○
F9.06	Overload warning alarmDelay time	0.0－20.0s	0.1s	5.0s	○
F9.07	Overvoltage stall selection	0: ban 1: allow	1	1	×
F9.08	Overvoltage stall point	120-150(%)	1(%)	120(%)	○
F9.09	Automatic current limit level	110－200(%)	1(%)	140(%)	×
F9.10	Frequency declining rate during current limiting	0.00－99.99Hz/s	0.01Hz/s	10.00Hz/s	○
F9.11	Automatic current limiting action selection	0: constant speed ineffective 1: constant speed effective remark: Acc/Dec always effective	1	0	×

Fd－Failure record function parameter group					
Function code	Name	Setting range	Min. unit	Factory default	Modifi -cation
Fd.00	Previous one time failure record	Previous one time failure record	1	0	*
Fd.01	Previous two time failure record	Previous two time failure record	1	0	*
Fd.02	Previous three time failure record	Previous three time failure record	1	0	*
Fd.03	Previous four time failure record	Previous four time failure record	1	0	*
Fd.04	Previous five time failure record	Previous five time failure record	1	0	*
Fd.05	Previous six time failure record	Previous six time failure record	1	0	*

Fd.06	Set freq. of previous failure	Set freq. of previous failure	0.01Hz	0	*
Fd.07	output freq. of previous failure	output freq. of previous failure	0.01Hz	0	*
Fd.08	output current of previous failure	output current of previous failure	0.1A	0	*
Fd.09	output voltage of previous failure	output voltage of previous failure	1V	0	*
Fd.10	DC bus-bar voltage of previous failure	DC bus-bar voltage of previous failure	1V	0	*
Fd.11	Load motor speed of previous failure	Load motor speed of previous failure	1(r/m)	0	*
Fd.12	Module temperature of previous failure	Module temperature of previous failure	1℃	0	*
Fd.13	Input terminal status of previous failure	Input terminal status of previous failure		11111111	*
Fd.14	Accumulative run time of previous failure	Accumulative run time of previous failure		0	*

FF－Password and manufacturer function parameter group					
Function code	Name	Setting range	Min. unit	factory default	Modific -ation
FF.00	User password	0000－9999	1	0000	×
FF.01	Manufacturer password	0000－9999	1	0000	×
FF.02-FF.0X	Manufacturer’s special parameter				

C－Supervision function parameter group					
Function code	Name	Description	Min. unit	Factory default	Modific -ation
C-00	Set frequency	Current set frequency	0.01HZ		
C-01	Output freq.	Current output freq.	0.01HZ		*
C-02	Output current	Virtual value of current output current	0.1A		*
C-03	Output voltage	Virtual value of current output voltage	1V		*
C-04	DC bus-bar voltage	Current DC bus-bar voltage	1V		*
C-05	Load motor speed	Product of output frequency and load motor speed emendation factor	1(r/m)		*
C-06	Module temperature	IGBT heat sink temperature	1℃		*
C-07	Run time	Inverter electrification run time	1h		*
C-08	Accumulative run time	Inverter accumulative run time	1h		*
C-09	Input terminal status	Switch value input terminal status	－－		*
C-10	Output terminal status	Switch value output terminal status	－－		*
C-11	Analog input VCI	Analog input value of VCI	V		*
C-12	Analog input YCI	Analog input value of YCI	V		*
C-13	Analog input CCI	Analog input value of CCI	V		*
C-14	Exterior pulse input	Exterior pulse input	0.1KHz		*

Appendix 3 Modbus communication protocol (need customized special process)

1.1 Summarization

We provide general RS485 communication interface in our inverters for the user. Through this communication interface upper device (such as HMI, PC, PLC controller and etc.) can perform centralized monitor to the inverter (such as to set inverter parameter, control run of inverter, read work state of the inverter).

This communication protocol is interface criterion file designed for realizing above-mentioned function, please read it earnestly and program according to it so that realize long-distance and network control to the inverter.

1.2 Communication net buildup mode

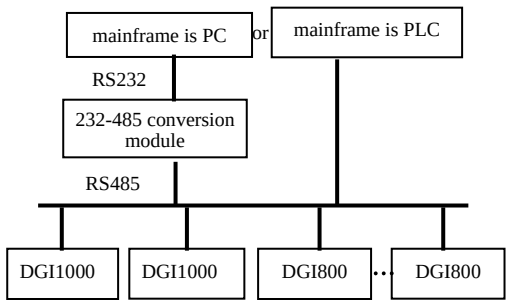


Fig.1 net buildup graph

1.3 Communication mode

At present, DGI1000 inverter can be used only as auxiliary device in RS485 net. Can realize communication between inverters through PC, PLC or HMI if it's needed. Specific communication mode is as mentioned below:

(1) PC or PLC as mainframe，inverter as auxiliary device, point-to-point communication between mainframe and auxiliary device.

(2) Auxiliary device don't response when mainframe send out command by broadcast address.

(3) User can set local address, baud rate and data format of the inverter through auxiliary device keypad or serial communication mode.

(4) DGI1000 provides optional RS485 interface.

(5) Default mode: Asynchronous serial，semiduplex transport mode. RTU mode. Default format and transport rate: 8-N-1, 9600bps.

For specific parameter setting please see description for function code F2.14~F2.17 as follows:

(remark：Below definition for F2.14~F2.17 is only effective under Modbus

communication mode, and definition for other parameters are the same as original)

F2.14	Communication configuration	LED first bit：baud rate selection 0：1200BPS 1：2400BPS 2：4800BPS 3：9600BPS 4：19200BPS 5：38400BPS LED second bit：data format 0：1-8-1 format，no checkout 1：1-8-1 format，even checkout 2：1-8-1 format，odd checkout LED third bit：response selection 0：Respond to host command and reply to data packet 1：Respond to host command, but not reply	1	003	×
F2.15	Local address	0－127，0 is broadcast address	1	1	×
F2.16	Communication timeout detection time	0.0－1000.0s, 0 means communication timeout detection invalid	0.1s	0.0s	×
F2.17	Local response delay	0－200ms	1ms	5ms	×

1.4 RTU Communication Mode：

1.4.1 Data frame format

Using RTU mode, messages are sent at least 3.5 character time interval pause. The first transmitted field is device address, the character you can transfer is hexadecimal 0x00 ~ 0xFF. Network equipment Continuously monitor the bus, including pauses. When the address field is received, all equipment determine whether it is sent to their own. when the last character of the packet transfer is complete, at least a 3.5 character times pause mean the end of the message. A new message can begin after this pause.

The entire message frame must be transmitted as a continuous flow. If a new message start transmitting in less than 3.5 character times after a message and then receiving device will consider it a continuation of the previous message. This will cause an error, because in the final CRC field value can not be right.

RTU frame format as the talbe below：

Frame Header	3.5 characters time pause
Slave address	Slave value：1~127
Communication command code	03H：read slave parameter 06H：write slave parameter
Data content DATA	The contents of packet:

Data content DATA	Parameter address（16bit）; Number of parameter or bytes of parameter value; Parameter value（16bit）
……	
……	
CRC check value low byte	16bit Unsigned check value
CRC check value high byte	
Closing Flag	3.5 characters time pause

Regarding generation method of CRC check value, please refer to this Appendix check way paragraph.

1.4.2 Host read slave parameter

Command code 03H. Host can read or one or more parameter(up to ten) by initiating a communication transaction .

E.g., read 2 contiguous inverter parameter values from the address 0000H of inverter whoes address is 01, the contents of host command ：

ADR	01H
CMD	03H
Parameters initial address high byte	00H
Parameters initial address low byte	00H
Number of parameter high byte	00H
Number of parameter low byte	02H
CRC check value low byte	Be calculated
CRC check value high byte	Be calculated

The contents of slave reply：

ADR	01H
CMD	03H
Parameter value bytes	04H
Address 0000H content high byte	00H
Address 0000H content low byte	01H
Address 0001H content high byte	13H
Address 0001H content low byte	88H
CRC check value low byte	Be calculated
CRC check value high byte	Be calculated

1.4.3 Host write slave parameter

Command code 06H. Host can write an parameter by initiating a communication transaction .

E.g.,The decimal system 5000 (1388H) written to the inverter 0001H address whose slave address is 02，host command including：

ADR	02H
CMD	06H
Parameter address high byte	00H
Parameter address low byte	01H
Parameter value high byte	13H
Parameter value low byte	88H
CRC check value low byte	Be calculated
CRC check value high byte	Be calculated

The contents of slave reply：

ADR	02H
CMD	06H
Parameter address high byte	00H
Parameter address low byte	01H
Address 0903H content high byte	13H
Address 0903H content low byte	88H
CRC check value low byte	Be calculated
CRC check value high byte	Be calculated

1.5 Data communication address allocation

1.5.1 Function code Fd-F0 group communication address

Inverter function parameter's MODBUS communication address addressing process follows PPnn way: PP means high byte of the address, corresponding to function parameter's group number; nn means low byte of the address, corresponding to function code parameter's group internal code. For example: F3.21 function code's communication address is 0315H, 03H is the hex form of group number 3, 15H is the hex form of grop internal code 21.

F0.00~F9.11 communication address is 0000H~090BH, Fd group fault record parameter start address is 0D00H.

1.5.2 control command and status word communication address

Variable Name	Communication address	Reading-writing attribute	Command data or response value meaning
run command word	2000H	Writing only	1: inching run
			2: inching stop
			3: forward inching run
			4: reversal inching run
			5: run
			6: stop
			7: forward run
			8: reversal run
			9: fault reset
			10: emergency stop

Serial port frequency provision	2001H	Reading and writing	Lower frequency~upper frequency
Inverter status	2100H	Reading only	1: forwarder running 2: reversal running 3: stop 4: alarm status
Alarm code	2180H	Reading only	0: without alarm 1~23:mean E001~E023 alarm

1.5.3 Monitor parameter communication address

Monitor parameter	Name	Communication address (read)
C-00	Set frequency	1000H
C-01	Output frequency	1001H
C-02	Output current	1002H
C-03	Output voltage	1003H
C-04	DC bus-bar vlotage	1004H
C-05	Load motor speed	1005H
C-06	module temperature.	1006H
C-07	Power on running time	1007H
C-08	Accumulative running time	1008H
C-09	Input terminal status	1009H
C-10	Output terminal status	100AH
C-11	Analog input VCI value	100BH
C-12	Analog input CCI value	100CH
C-13	Analog input YCI value	100DH
C-14	External impulse frequency	100EH

1.6 Communication error processing

Inverter receiving data packet detection error, it finds reading&writing parameter address or parameter value invalid, so reply to the host with communication error response packet. Communication error response packet (host command code +80H) as command code, with 1 byte error code.

Format for communication error response packet as follows:

ADR	01H
CMD	83H/86H
Communication error code	01H~06H (for details, please check below table)
Low byte of CRC checksum	Obtain by calculating
High byte of CRC checksum	Obtain by calculating

Meaning for each communication error code value as follows:

Communication error code value	Type of communication error
0x01	CRC checksum error
0x02	Command code illegal
0x03	Register address visited illegal
0x04	Value to register illegal
0x05	Not allow to modify parameters
0x06	Register number read illegal

1.7 Data frames examples

1.7.1 Start 1# inverter running

Data Field	Auxiliary Inverter Address	Order code	Register address High byte	Register address Low byte	Data High byte	Low High byte	CRC high bit	CRC Low bit
host command frames	01	06	20	00	00	05	42	09
Auxiliary respond frames	01	06	20	00	00	05	42	09

1.7.2 Stop 1# inverter running

Data Field	Auxiliary Inverter Address	Order code	Register address High byte	Register address Low byte	Data High byte	Low High byte	CRC high bit	CRC Low bit
host command frames	01	06	20	00	00	06	02	08
Auxiliary respond frames	01	06	20	00	00	06	02	08

1.7.3 Set 1# inverter given value to 50Hz

Data Field	Auxiliary Inverter Address	Order code	Register address High byte	Register address Low byte	Data High byte	Low High byte	CRC high bit	CRC Low bit
host command frames	01	06	20	01	13	88	DE	9C
Auxiliary respond frames	01	06	20	01	13	88	DE	9C

1.7.4 Read 1# inverter running state

Data Field	Auxiliary Inverter Address	Order code	Register address High byte	Register address Low byte	Data High byte	Low High byte	CRC high bit	CRC Low bit
host command frames	01	03	21	00	00	01	8E	36
Auxiliary respond frames	01	03	(Respond value bytecount) 20		00	00	B8	44

1.8 CRC checksum mode

CRC checksum value calculating function written by C language is as follows:

```
unsigned int cal_crc_value (unsigned char *pval, unsigned char len)
{
 unsigned int crc_value=0xFFFF;
 unsigned int i;

 while(len--)
 {
        crc_value ^= *pval++;
        for(i=0; i<8; i++)
        {
                if(crc_value & 0x0001)
                {
                        crc_value >>= 1;
                        crc_value ^= 0xA001;
                }
                else
                {
                        crc_value >>= 1;
                }
        }
 }
 return(crc_value);
}
```

Appendix 4 Braking resistance

1.1 Braking resistance

The motor's electric potential energy will charge inverter's capacitance up reversely if speed of the motor decends too quickly or load of the motor wobbles too quickly while the inverter is running, which will increase the voltage upon power modules suddenly and is easy to make the inverter damaged. The inverter will control it according to load size and performance. You only need to connect external braking resistance to realize timely energy discharge when the braking function is needed. To connect external resistance is a kind of energy consumption braking mode, as all the energy is consumed by the braking resistance.

We can add built-in braking unit for DGI1000-2S0004~2S0037 with additional cost upon receival of your requirement; DGI1000-4T0007G~4T0150G have built-in braking unit, but no braking resistance.

When braking function needed, please connect external braking resistance according to below table.

Braking unit&braking resistance configuration and External braking resistance configuration table

Type	Built-in braking unit	Built-in braking resistance	External braking resistance	Qty.	Power of external braking resistance
DGI1000-2S0004	Need to be customized	N/A	≥150Ω	1	200W
DGI1000-2S0007	Need to be customized	N/A	≥100Ω	1	250W
DGI1000-2S0015	Need to be customized	N/A	≥70Ω	1	400W
DGI1000-2S0022	Need to be customized	N/A	≥50Ω	1	600W
DGI1000-2S0037	Need to be customized	N/A	≥30Ω	1	1000W
DGI1000-4T0007G	Yes	N/A	≥300Ω	1	200W
DGI1000-4T0015G	Yes	N/A	≥300Ω	1	200W
DGI1000-4T0022G	Yes	N/A	≥300Ω	1	200W
DGI1000-4T0037G	Yes	N/A	≥125Ω	1	400W
DGI1000-4T0055G	Yes	N/A	≥80Ω	1	650W
DGI1000-4T0075G	Yes	N/A	≥80Ω	1	650W
DGI1000-4T0110G	Yes	N/A	≥50Ω	1	1000W
DGI1000-4T0150G	Yes	N/A	≥40Ω	1	1000W

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