Shlin

S2000 Series

Ver. 1.0

0.4-450KW

Contents

1 Safety information and use notice points

To make ensure the personal & equipment safety, this chapter must be read carefully before the inverter come into use.

1.1 Safety precautions

There are three kinds of symbols in this manual as below:

Symbol	Symbol Description
	It may cause human death, serious injury, or heavy property loss with wrong operation.
	It may result body or device damage with wrong and timeless precautions under operation.
Note	Tips on some matters that require special attention when using.

Forbid to cut off the power source directly when inverter under running, acceleration or deceleration status. Power source could cut off when inverter completely in halt and standby status. Otherwise user should be responsible for inverter and device damage and human injury.

(1) Forbid to connect AC power source to output terminal U,V,W, otherwise it could cause inverter completely damage.
(2) Not allow for short circuit between(-)and(+)，otherwise it could cause inverter damage and power source short circuit.
(3) Forbid to install inverter on flammable objects, otherwise it may cause fire.
(4) Do not install inverter in a environment with explosive gas, it may cause explosion.
(5) Bare connection terminal should be insulation treatment after main loop connection, otherwise it may cause electric shock.
(6) Do not operate inverter with wet hands when inverter power on, otherwise it may cause electric shock.
(7) Inverter earth terminal should be well grounding connection.
(8) Do not open the front cover for wiring when inverter power on. Inverter wiring and check must handle after 10 minutes of inverter power off.
(9) Wiring connection should handle by qualified person and not allow to slip any conductive objects inside inverter, otherwise it may cause a electric shock or inverter damage.
(10) When inverter stocked for more than 6 months, using voltage regulator to boost voltage up and keep inverter in standy status for 1 hour, otherwise it may cause electric shock and explosion.

(1) Forbid to connect control terminals except TA, TB, TC to AC 220V/380V signal, otherwise it may cause inverter completely damage.
(2) Do not install and run inverter when inverter damage or spare part less, otherwise it may cause fire or human injury.
(3) Inverter should install in a place where can accept itself weight, otherwise it may cause inverter drop down or belongings damage.

1.2 Application range

(1) This kind of inverter apply to 3 phase ac asynchronous motor and three-phase permanent magnet synchronous motors only for general industry.
(2) If the inverter is used in equipment with very high reliability requirements related to life, major property, safety equipment, etc., it must be handled with caution and please consult the manufacturer.
(3) This frequency converter is a general industrial motor control device. If it is used in dangerous equipment, safety protection measures must be taken into consideration when the frequency converter fails.

1.3 Use notice points

(1) S2000 series inverter belong to voltage type inverter, and it is normal with up temperature, noise and vibration of motor increasing over power frequency run slightly.
(2) It is required to match inverter with variable frequency motor running at low speed with constant torque for long time. When match inverter with general asynchronous motor running at low speed, it should take measures to make motor heat dissipation or monitoring motor temperature in avoid of motor flash.
(3) It is necessary to take measures in advance for the damage caused for the bad lubrication of the reduction box and wheel gear mechanical devices running at low speed for long time.
(4) It is necessary to assure at first that the use speed range of motor bearings and mechanical devices, also the increasing of motor vibration and noise should be considered, when motor run over rated frequency.
(5) It is necessary to select the suitable brake assembly for hoisting device and big inertia load to make sure the normal work when inverter stripping from power grid for the overcurrent or overvoltage failure.
(6) Inverter start and stop control through terminal or other normal command channel, otherwise it may cause inverter damage via connecting inverter input terminal to big current switch just like contactor direct to start and stop inverter frequently.
(7) It is necessary to make sure inverter cut off from operation without output, when inverter and motor connect through switch components just like contactor etc. Otherwise it will cause inverter damage.
(8) When inverter output frequency within some range, it may meet mechanical resonance point of load device, through setting jump frequency to avoid it.
(9) Checking power supply voltage within allowed working range before usage, otherwise, it need to change voltage or custom special voltage inverter.
(10) When inverter usage site altitude over1000 meters， inverter should decrease current to use, output current decrease about 10% of rated current per 1000 meters increase.
(11) Motor should do insulation check before first usage or reusage after lay aside for long time.

Checking method show as graph 1-1 below with 500V voltage type megohm meter , insulation resistance should not smaller than 5 MΩ， otherwise inverter maybe damaged.

(12) Forbid inverter output side to assemble capacitor to improve power factor or anti-thunder dependent resistor etc, otherwise it may cause inverter fault trip or component damage show as graph 1-2.

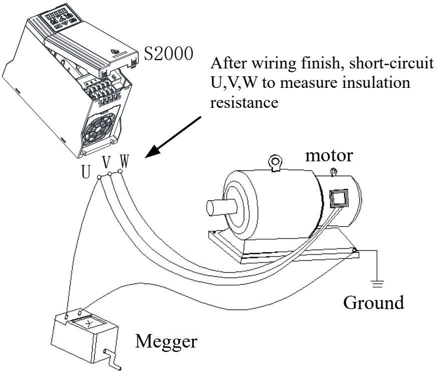


Fig.1-1 Motor insulation check

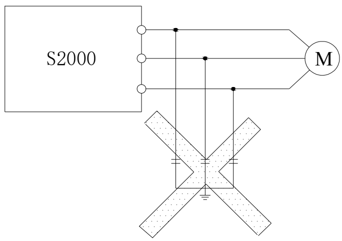


Fig.1-2 Capacitor at output side forbidden

1.4 Scrapping handling notice

Notices when handling with scrapped inverter and components:

(1) The unit: dispose the inverter as industrial waste.

(2) Electrolytic capacitor: It may cause explosion when electrolytic capacitor under burning.

(3) Plastic: it may result in harmful and poisonous gas when plastic and rubber of inverter burning, and safeguard preparations should be taken before burning.

2 Inverter Type and Specification

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 nameplate 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 Inverter type description

S2000 - 4T 0015 B

Code	Name
S2000	Serial

Code	Volt. grade
2S	Single phase 220V
4T	Three-phase 380V

Code	Name
B	Built-in braking

Code	Adaptable motor power (KW)
0004	0.4
0007	0.75
…	…
4000	400
4500	450

Fig. 2-1 Type description

2.3 Inverter type description

Input voltage	Inverter type	Incoming current(A)	Rated output current (A)	Adapted motor (KW)
Simplex 220V	S2000-2S0004B	3	2.5	0.4
	S2000-2S0007B	6	4	0.75
	S2000-2S0015B	12	7	1.5
	S2000-2S0022B	17	10	2.2
Three-phase 380V	S2000-4T0007B	3	2.3	0.75
	S2000-4T0015B	5	3.7	1.5
	S2000-4T0022B	7	5	2.2
	S2000-4T0037B	11	8.5	3.7
	S2000-4T0055B	17	13	5.5
	S2000-4T0075B	22	17	7.5
	S2000-4T0110B	33	25	11
	S2000-4T0150B	43	33	15
	S2000-4T0185B	51	39	18.5
	S2000-4T0220B	59	45	22
	S2000-4T0300	78	60	30
	S2000-4T0370	98	75	37
	S2000-4T0450	118	91	45
	S2000-4T0550	146	112	55
	S2000-4T0750	195	150	75
	S2000-4T0900	229	176	90
	S2000-4T1100	273	210	110
	S2000-4T1320	239	253	132
	S2000-4T1600	288	304	160
	S2000-4T2000	365	380	200
	S2000-4T2200	409	426	220
	S2000-4T2500	441	474	250
	S2000-4T2800	495	520	280
	S2000-4T3150	570	600	315
	S2000-4T3550	617	650	355
	S2000-4T3750	646	680	375
	S2000-4T4000	712	750	400
	S2000-4T4500	760	800	450

2.4 Appearance and part names of the inverter

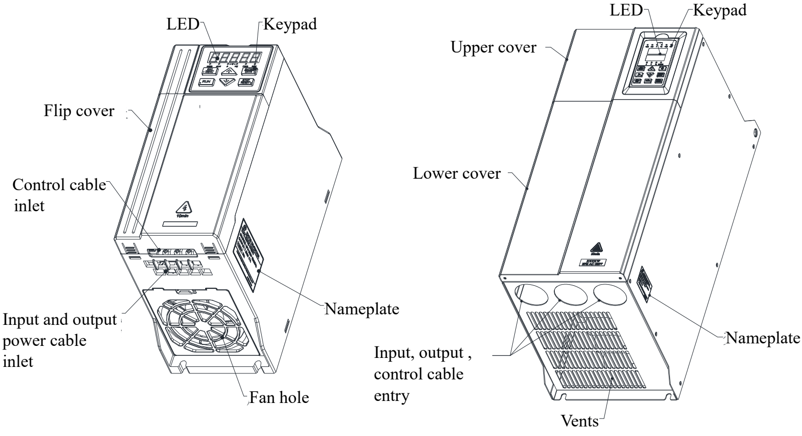


Fig. 2-2 Parts name sketch

2.5 Dimensions

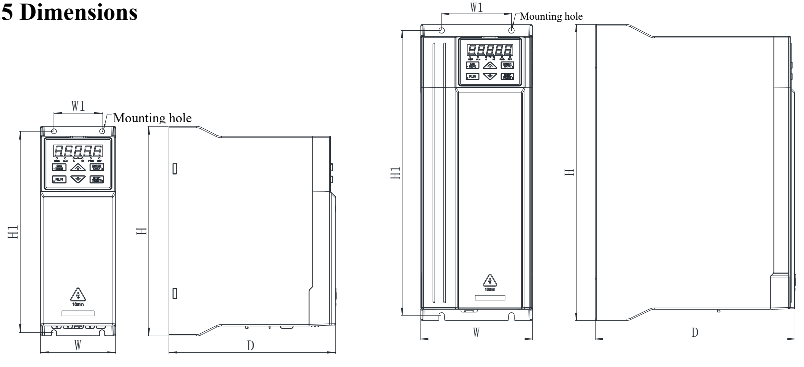


Fig. a **Fig. b**

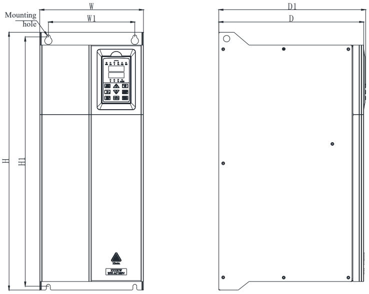


Fig.c

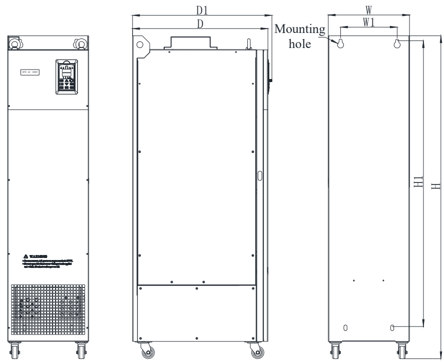


Fig.d

Fig. 2-3 Outer dimension

Table 2-1 Mounting size

Inverter type	W (mm)	H (mm)	D (mm)	W1 （mm）	H1 (mm)	D1 （mm）	Install Aperture (mm)	Fig. No.
S2000-2S0004B	67	177	145	40	167	-	5	Fig. a
S2000-2S0007B								
S2000-2S0015B								
S2000-4T0007B								
S2000-4T0015B								
S2000-4T0022B								
S2000-2S0022B	75	210	166	48	201.5	-	5	Fig. a
S2000-4T0037B								
S2000-4T0055B	100	242	180	71	232.5	-	6	Fig.b
S2000-4T0075B								
S2000-4T0110B	120	320	214.7	75	308	-	6	Fig.b
S2000-4T0150B								
S2000-4T0185B	142	408	225	110	394	-	6	Fig.b
S2000-4T0220B								
S2000-4T0300	172	466	230	142	452	-	7	Fig.b
S2000-4T0370								
S2000-4T0450	225	550	315	185	530	319.5	7	Fig.c
S2000-4T0550								
S2000-4T0750	240	600	335	200	580	339.5	9	Fig.c
S2000-4T0900								
S2000-4T1100	280	680	390	210	660	394.5	9	Fig.c
S2000-4T1320	310	730	390	230	710	394.5	9	Fig.c
S2000-4T1600	335	750	405	245	730	409.5	9	Fig.c
S2000-4T2000	300	1150	505	180	1005	509.5	13	Fig.d
S2000-4T2200								
S2000-4T2500	330	1310	550	230	1165	554.5	13	Fig.d
S2000-4T2800								
S2000-4T3150								
S2000-4T3550	340	1415	555	240	1270	559.5	13	Fig.d
S2000-4T3750								

S2000-4T4000								
S2000-4T4500								

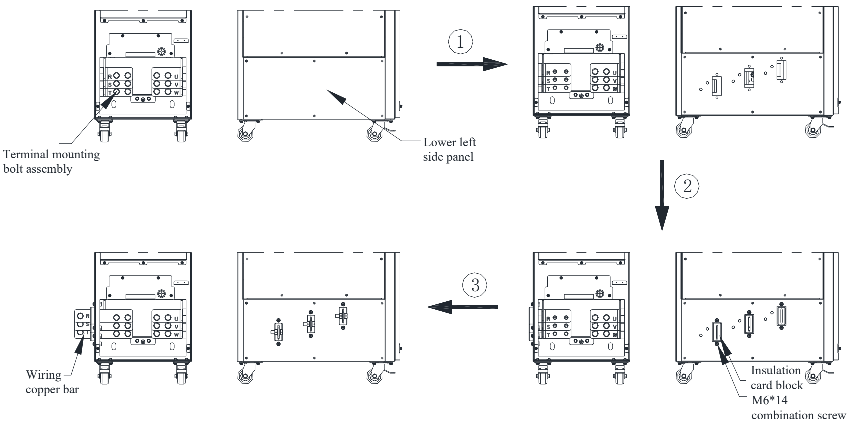
2.6 Three-phase Input Transfer Copper Busbar Assembly

2.6.1 Correspondence Table Between Inverter and Three-phase Input Transfer Copper Busbar Assembly

Inverter type	Three-phase Input Transfer Copper Busbar Assembly Model
S2000-4T2000	SP-CTP-2200
S2000-4T2200	
S2000-4T2500	SP-CTP-2800
S2000-4T2800	
S2000-4T3150	
S2000-4T3550	SP-CTP-4000
S2000-4T3750	
S2000-4T4000	
S2000-4T4500	

2.6.2 Installation of three-phase input transfer copper busbar assembly:

Step 1: Remove the left lower panel and remove the RST terminal mounting bolt assembly (for spare);
Step 2: Install the insulating card block from the inside of the chassis to the outside, and tighten it from the outside with M6*14 combination screws;
Step 3: Align the RST wiring copper busbar with the corresponding mounting hole and secure it with the removed RST terminal mounting bolt assembly.



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

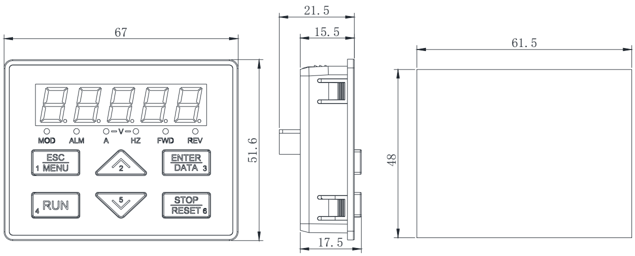
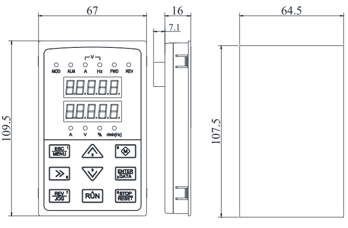


Fig.2-4 S-LED15 appearance and opening size of keypad



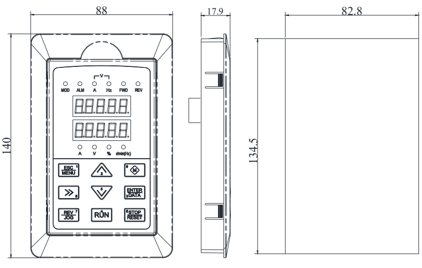


Fig.2-5 S-LED16 Mounting size of keypad **Fig.2-6 S-LED16 Hole size of keypad**

Note

1. S-LED15、S-LED15-D long-distance keypad outer lead, do not support keypad holder installed, only keypad installed support, mounting size refer to Fig.2-4.
2. Except S-LCD16、S-LED16-D long-distance keypad, when other keypad outer lead, user can adjust the hole size under actual situation on keypad or keypad holder; thickness of install board between 1.0～1.5mm is suggested.
3. When installed with keypad holder, it need to buy extra.

2.8 Product technical indicators and specifications

Project			Project description
Input	Rated volt., frequency		Single-phase 220V level: single-phase 220V, 50Hz/60Hz; Three-phase 380 volt level: three-phase 380V, 50Hz/60Hz;
	Allowable volt. fluctuation range		Single-phase 220 volt level: 200~240V; Three-phase 380 volt level: 320~460V;
Output	Voltage		0～input voltage
	frequency		0～600Hz (High-frequency version 3000Hz)
	Overload capacity		150% rated current for 1 minute
Control performance	control method		① No PG vector control (supports synchronous and asynchronous motors); ② With PG vector control (supports synchronous and asynchronous motors); ③ V/F control; ④ No PG torque control (supports synchronous and asynchronous motors); ⑤ With PG torque control (supports synchronous and asynchronous motors); ⑥ Position control (supports synchronous and asynchronous motors).
	Speed control accuracy		±0.5% rated synchronous speed (without PG vector control); ±0.1% rated synchronous speed (with PG vector control); ±1% rated synchronous speed (V/F control);
	Speed range		1:2000 (with PG vector control); 1:200 (no PG vector control); 1:50 (V/F control).
	Start-up torque		1.0Hz: 150% rated torque (V/F control); 0.25Hz: 150% rated torque (no PG vector control); 0Hz: 180% rated torque (with PG vector control).
	speed fluctuation		±0.3% rated synchronous speed (without PG vector control); ±0.1% rated synchronous speed (with PG vector control).
	Torque control accuracy		±8% rated torque (no PG vector control, no PG torque control); ±5% rated torque (with PG vector control and PG torque control).
	Torque response		≤20ms (without PG vector control); ≤10ms (with PG vector control).
	Frequency precision		Digital setting: max. frequency × ±0.01%; Analog setting: max. frequency × ±0.5%.
	Freq. resolution	Simulation settings	0.1% of the max frequency
		Digital setting accuracy	0.01Hz
		external pulse	0.1% of the max. frequency
	Torque boost		Automatic torque boost; The manual torque is increased by 0.1～30.0%.
	V/F curve (volt. frequency characteristics)		Setting rated frequency at the range of 5～650Hz，by choosing constant torque, degressive torque 1, degressive torque 2, degressive torque 3, self-defined V/F、VF total 6 kinds of curve.
	Acceleration and deceleration curve		Two modes：straight line acceleration and deceleration; S curve acceleration and deceleration; 15 kinds of acceleration and deceleration time，time unit (0.01s、0.1s、1s) for option ，max. time for 1000 minutes.

	brake	Power consumption braking	Three phase and under power range with inbuilt brake unit. only add brake resistor between （+） and PB. 18.5KW & up power range is possible to add brake unit between（+）and（-）outside; or extra connect brake unit with adding brake resistor between （+） and PB.
		DC braking	Start, stop action for option, action frequency 0～15Hz，action current 0～100% of rated current， action time 0～30.0s
	Jog		Jog frequency range：0Hz～up limit frequency；jog acceleration and deceleration time 0.1～6000.0 seconds for setting.
	Multi-section speed run		Realized by inbuilt PLC or control terminal; with 15 section speed, each section speed with separately acceleration and deceleration time; with inbuilt PLC can achieve reserve when power down.
	Inbuilt PID controller		Convenient to make closed-loop control system
	Automatic voltage regulation (AVR)		Automatically keep output voltage constant, when the power grid voltage fluctuation
	Automatic current limiting		Current limited automatically under run mode in avoid of inverter over-current frequently to trip.
	carrier modulation		Modulate carrier wave automatically according to the load characteristic.
	Speed tracking restart		Make rotating motor smoothly start without shocking
Run function	Run command specified channel		Keypad specified, control terminal specified, communication specified can switch through various means..
	Running frequency specified channel		Main & auxiliary specified to a realize one main adjusting and one fine control. Digital specified, analog specified, pulse specified, pulse width specified, communication specified and others, which can be switched by many means at any time.
	Bundled function		Run command channel and frequency specified channel can bind together randomly and switch synchronously
Input output charact eristic	Digital input channel		Channel 5 for universal digital input, max. Frequency 1KHz, channel 1 can be used as pulse input channel, max. Input 50KHz， which can realize expansion terminals.
	Analog input channel		Channel 2 for analog input, AI1 is 0～10V input, AI2 can select 4～20mA or 0～10V or 0～20mA input. which can realize expansion terminals.
	Pulse output channel		0.1～20KHz pulse square signal output to achieve setting frequency, output frequency and other physical quantity output.
	Analog output channel		1 analog signal output, the AO channel can be selected from 0 to 20mA or 0 to 10V to achieve the output of physical quantities such as set frequency and output frequency, and can be expanded to multiple analog outputs.
Unique Function	Rapid current limit		Limit inverter over current to the greatest point, and make it run more stably
	Monopulse control		Suitable for working site where need one button to control inverter start and stop, first press to start, then press to stop, and that cycle repeats. Its very simple and reliable.
	Fixed length control		Realize fixed length control
	Timing control		Timing control function: setting time range 0.1Min～6500.0Min.
	Virtual terminal		Five group virtual input & output IO can realize simply logical control
operating Keypad	Keypad display		The parameters as setting frequency, output frequency, output voltage, output current can be displayed
	Button Locked		Lock all or part of the buttons

Protection function		Motor power on Shot circuit test, input & output phase loss protection, over-current protection, over voltage protection, under voltage protection, over heat protection, overload protection, short-circuit protection to ground, terminal protection, terminal protection and no stop protection under power off., etc. .
environ ment	Application site	Indoor, not bare to sunlight, no dust, no corrosive gas, no flammable gas, no vapor, no water drop or salt etc.
	altitude	Under 1000 meter.（above 1000 meter require to reduce volume to use, output current reduce about 10% of rated currenvolt per 1000 meter high）
	Environment temperature	-10℃～+40℃ (environment temperature between 40℃～50℃, need to reduce volume or strengthen heat sink)
	Environment humidity	Smaller than 95%RH，no drop condenses
	vibration	Smaller than 5.9 M/S²(0.6g)
	storage temperature	-40℃～+70℃
structure	Protection grade	160KW & down power: IP20; 200KW & up power: IP00.
	cooling mode	Forced air cooling and natural
Installation mode		160KW & down power: Wall-mounted; 200KW & up power: Cabinet, supports installation inside the cabinet.

Note

To get a perfect usage performance of the inverter, Please check and select right type according to this chapter before wiring.

It is necessary to select right type, otherwise it may cause motor abnormal run or inverter damage.

3 Installation and wiring

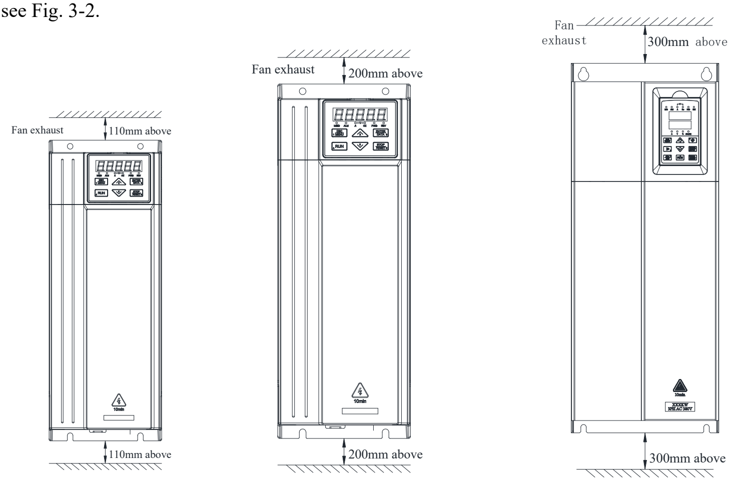
3.1 Installation ambient

3.1.1 The demands for installation ambient

(1) Installed in drafty indoor place，the ambient temperature should be within-10ºC~40ºC，it needs external compulsory heat sink or reduce the volume if temperature is over than 40ºC; when temperature under -10℃, please preheat inverter first.
(2) Avoid installing in places with direct sunlight, much dust, floating fiber and metal powder.
(3) Don't install in place with corrosive, explosive gas.
(4) The 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 installing multiple inverters up and down, leading divider must be applied between them, see Fig. 3-2.



a: 22KW & down power　　b: 30KW～55KW　　c: 75KW & up power

Fig. 3-1 Installation space

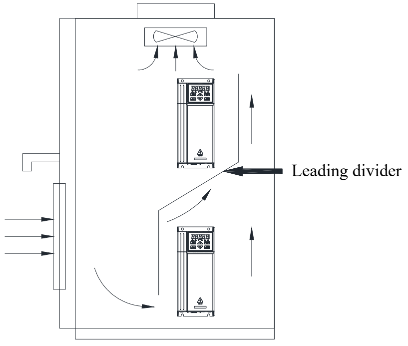


Fig. 3-2 mounting of multiple inverters

3.2 keypad disassembly and installation

3.2.1 keypad disassembly and installation

(1) Disassembly

Press the top of the keypad with your thumb to secure the spring tabs. Pull it out to separate the keypad from the socket and then remove it Operate the keypad.

(2) Assembly

After aligning the keypad with the socket, press down on the keypad with your index finger. Use the fixed spring tab at the top of the keypad and push it inward until reaches the key. The surface of the plate and the shell can be flush.
As shown in Fig. 3-3.

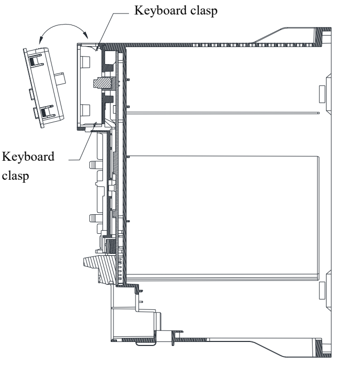


Fig. 3-3 Keypad assembly

3.2.2Cover disassembly and installation

3.2.2.1 Cover disassembly and installation

(1) Disassembly

Place the thumbs of your left and right hands on the buckle under the flip cover position, and then press inward firmly while lifting up until until the two buckles under the flip cover and the slot of the outer body are disengaged, and then Move the cover back until the latch at the top of the cover disengages The shell can be removed with a flip cover.

(2) Assembly

Align and assemble the latch above the flip cover with the outer shell, and then press the flip cover down until the two buckles below the flip cover enter the slot of the outer shell, as shown in Fig. 3-4.

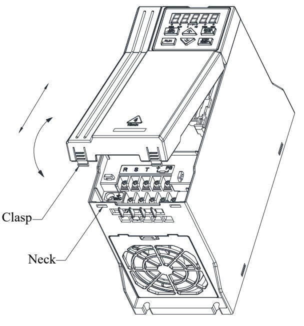


Fig.3-4 metal cover disassemble and assembly

3.2.2.2 Removal and installation of sheet metal cover

(1) Disassembly:

First remove the two screws at the bottom of the cover, and then translate outward, then tilt the cover 15 degrees, as shown in the Fig. Pull outward to remove the cover.

(2) Assembly

First put the cover down parallel to the chassis so that the cover is just if it is stuck on both sides of the chassis, push the cover forward firmly to make it insert the top fixing piece into the housing fixing groove, and then slide the cover tighten the two screws at the bottom and the cover is installed. As shown in Fig. 3-5.

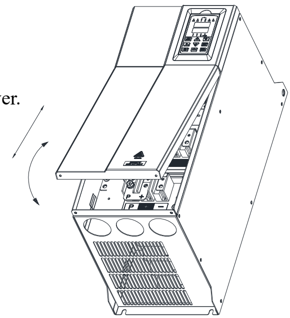


Fig. 3-5 Disassembly and installation

3.3 Wiring notice points

1. Assure power of the 220V/380V be cut off completely for above 10 minutes before wiring, otherwise there is danger of getting electric shock.
2. Forbid connecting power wire to output U, V, W of the inverter.
3. If there is current leakage inside inverter, inverter and motor must be earth grounding for safety assurance, please refer to clause 8 in Chapter 3.4.1 for grounding wiring.
4. Before shipment compression resistance test of the inverter is Passed, so users should not conduct compression resistance test again.
5. Do not add absorbing capacitor or other resistance-capacitor absorbing device between inverter and motor; also do not add electromagnetic contact. If contactor and other switch component needed to add, please make sure inverter suspended without output, show as Fig.3-6
6. To provide inverter over-current protection in output side and convenient aintenance under power off, it should be connected to power source through air switch and contactor.
7. Control signal wire should select multicore stranded wire or shielding wire. One end of the shielding layer hang in the air, and the other end connect to inverter earth grounding terminal, connection wire shorter than 20m.

1. Before wiring, assure power supply is cut off completely for 10 minutes and all LED or LCD indicator light extinguished.
2. Before inverter 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 power on, check if voltage grade of the inverter is in line with that of power supply volt., otherwise will cause personnel injured and device damaged.

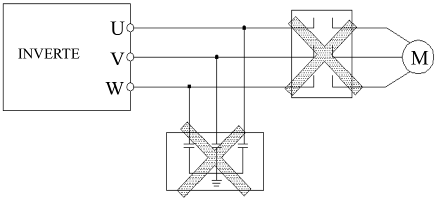


Fig.3-6 Forbid to use contactor and absorbing capacitor

3.4 Main loop terminal wiring

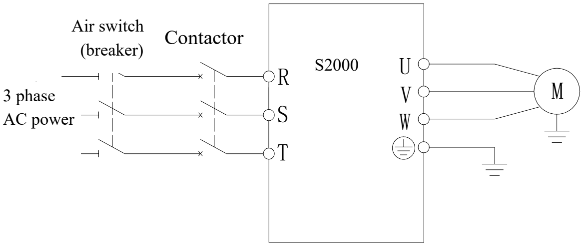


Fig.3-7 Main loop simple wiring

To keep user power grid safety, please choose proper air switch, breaker, wiring at power input side, parameter recommended show as Table 3-1（Remark：wire must choose PVC insulation copper conductor).

Table 3-1 parameter recommended for air switch（breaker), contactor and wire selection

Type	Air switch or breaker(A)	Contactor (A)	Input power wire (mm^2)	Output motor wire (mm^2)	Control signal wire (mm^2)
S2000-2S0004	6	9	0.75	0.75	0.5
S2000-2S0007	10	12	0.75	0.75	0.5
S2000-2S0015	16	18	1.5	1.5	0.5
S2000-2S0022	16	18	1.5	1.5	0.5
S2000-4T0007B	6	9	0.75	0.75	0.5
S2000-4T0015B	10	12	0.75	0.75	0.5
S2000-4T0022B	16	18	1.5	1.5	0.5
S2000-4T0037B	16	18	1.5	1.5	0.5
S2000-4T0055B	20	25	2.5	2.5	0.75
S2000-4T0075B	25	25	4.0	4.0	0.75
S2000-4T0110B	32	32	6.0	6.0	0.75
S2000-4T0150B	40	40	6.0	6.0	0.75
S2000-4T0185B	50	50	10	10	1.0
S2000-4T0220B	50	50	10	10	1.0
S2000-4T0300	63	63	16	16	1.0
S2000-4T0370	80	80	25	25	1.0
S2000-4T0450	100	115	35	35	1.0
S2000-4T0550	125	125	50	50	1.0
S2000-4T0750	250	160	70	70	1.5

S2000-4T0900	250	160	75	75	1.5
S2000-4T1100	350	350	120	120	1.5
S2000-4T1320	400	400	120	120	1.5
S2000-4T1600	500	500	150	150	1.5
S2000-4T2000	630	630	185	185	1.5
S2000-4T2200	700	700	240	240	1.5
S2000-4T2500	800	800	120*2	120*2	1.5
S2000-4T2800	800	800	120*2	120*2	1.5
S2000-4T3150	1000	1000	150*2	150*2	1.5
S2000-4T3550	1000	1000	185*2	185*2	1.5
S2000-4T3750	1250	1250	240*2	240*2	1.5
S2000-4T4000	1250	1250	240*2	240*2	1.5
S2000-4T4500	1250	1250	270*2	270*2	1.5

3.4.1 Connection between inverter and fitting parts

(1) Breaking device like isolation Switch must assemble between power source and inverter to keep persona safety under repairing and inverter requirement for compulsory power off.

(2) There must be over-current Protection breaker or fuse in inverter power supply circuit to avoid failure expanding because of the second device failure.

(3) AC input reactor
When high harmonics between inverter and power supply is strong which cannot meet system requirement or input side power factor need to improve, ac input reactor can be added.

(4) Contactor is used to power supply only, do not use it to control inverter start and stop.

(5) Input side EMI filter
hoosing optionally EMI filter to restrain high frequency transduction interference and radio-frequency interference from inverter power line.

(6) Output side EMI filter
Choosing optionally EMI filter to restrain radio-frequency Interference and wire leakage current from inverter output side.

(7) AC output reactor
Installing AC output reactor is suggested to avoid motor insulation damage, oversize current leakage and inverter frequent protection when connecting wire between inverter and motor exceeds 50m.

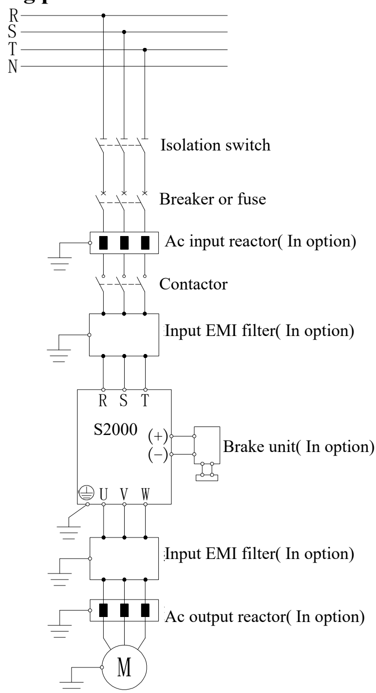


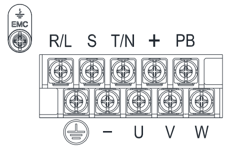
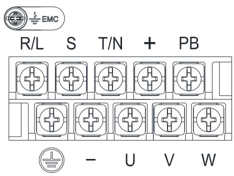
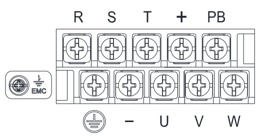
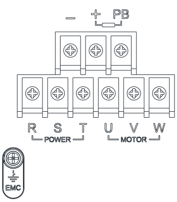
Fig.3-8 Connection of inverter and fitting parts

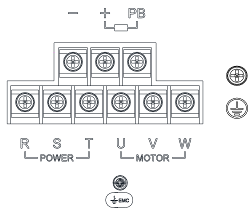
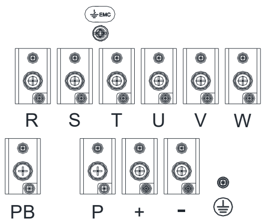
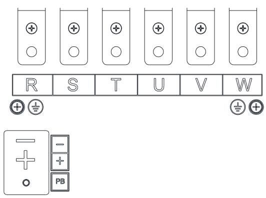
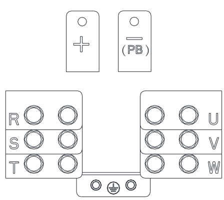
(8) Safety earth ground wire
Inverter and motor must be earth ground connection, connection wire should select as shorter and thicker as above 3.5mm² multicore copper wire, and earth grounding resistance smaller than10Ω.

3.4.2 Main loop terminal wiring

(1) Main loop input output terminal show as table 3-2

Table 3-2 Main loop input output terminal description

Adapted type	Main loop terminal	Terminal name	Function Description
S2000-2S0004B ~ S2000-2S0015B S2000-4T0007B ~ S2000-4T0022B		R,S,T	3 phase AC input terminal, connect power source
		L, N	1phase AC input terminal, connect power source
		-	DC volt. Negative terminal
		+	DC volt. Positive terminal
		U, V, W	3 phase AC output terminal，connect to motor
		PB	External connect to brake resistor reverse terminal
		⏚	Ground terminal
		⏚ EMC	EMC ground terminal
S2000-2S0022B S2000-4T0037B		R,S,T	3 phase AC input terminal, connect power source
		L,N	1phase AC input terminal, connect power source
		-	DC volt. Negative terminal
		+	DC volt. Positive terminal
		U, V, W	3 phase AC output terminal，connect to motor
		PB	External connect to brake resistor reverse terminal
		⏚	Ground terminal
		⏚ EMC	EMC ground terminal
S2000-4T0055B S2000-4T0075B		R,S,T	3 phase AC input terminal, connect power source
		-	DC volt. Negative terminal
		+	DC volt. Positive terminal
		U, V, W	3 phase AC output terminal，connect to motor
		PB	External connect to brake resistor reverse terminal
		⏚	Ground terminal
		⏚ EMC	EMC ground terminal
S2000-4T0110B S2000-4T0150B		R,S,T	3 phase AC input terminal, connect power source
		-	DC volt. Negative terminal
		+	DC volt. Positive terminal
		U, V, W	Three-phase AC output terminal, connected to the motor
		PB	External connect to brake resistor reverse terminal
		⏚	Ground terminal
		⏚ EMC	EMC ground terminal

S2000-4T0185B ~ S2000-4T0370		R,S,T	3 phase AC input terminal, connect power source
		-	DC volt. Negative terminal
		+	DC volt. Positive terminal
		U, V, W	Three-phase AC output terminal, connected to the motor
		PB	External connect to brake resistor reverse terminal
		⏚	Ground terminal
		⏚ EMC	EMC ground terminal
S2000-4T0450 ~ S2000-4T1100		R,S,T	3 phase AC input terminal, connect power source
		-	DC volt. Negative terminal
		+	DC volt. Positive terminal
		U, V, W	Three-phase AC output terminal, connected to the motor
		P, +	External connect to DC reactor
		PB	External connect to brake resistor reverse terminal
		⏚	Ground terminal
		⏚ EMC	EMC ground terminal
S2000-4T1320 ~ S2000-4T1600		R,S,T	3 phase AC input terminal, connect power source
		-	DC volt. Negative terminal
		+	DC volt. Positive terminal
		U, V, W	Three-phase AC output terminal, connected to the motor
		PB	External connect to brake resistor reverse terminal
		⏚	Ground terminal
S2000-4T2000 ~ S2000-4T4500		R,S,T	3 phase AC input terminal, connect power source
		-	DC volt. Negative terminal
		+	DC volt. Positive terminal
		U, V, W	Three-phase AC output terminal, connected to the motor
		PB	External connect to brake resistor reverse terminal
		⏚	Ground terminal

The wiring of main loop must connect right according to the description above. Wrong wiring will cause device damage and personal injury. injury.

Note

1. If the frequency converter is used in a power grid system with an ungrounded neutral point, the screw on the EMC grounding terminal needs to be removed.
2. If the protection trip occurs during startup, you can remove the screw on the EMC ground terminal.

3.5 Basic operation wiring diagram

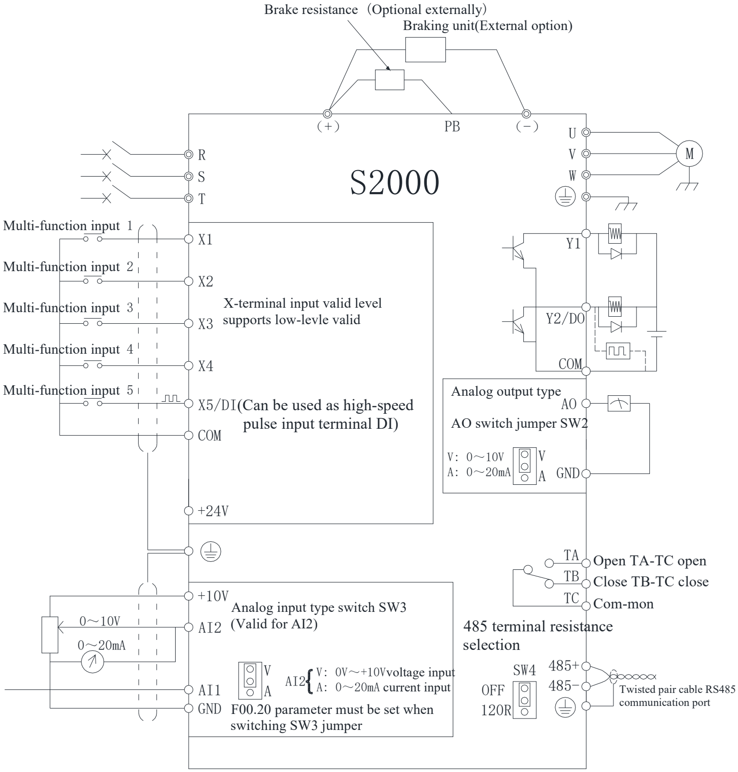


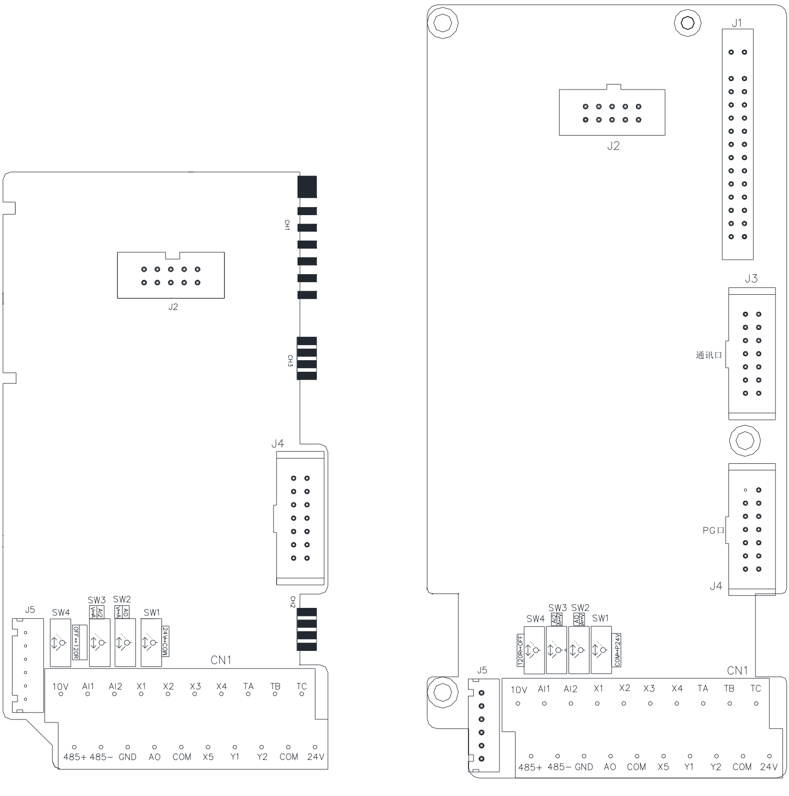
Fig.3-9 Basic wiring diagram

3.6 Control loop collocation and wiring

3.6.1 Relative location and function for control board terminal and slide switch:

Control board terminal and slide switch location show as Fig 3-10.

The terminal j5 is used by the manufacturers, and J2 is for keypad .The J3, J4, and CN1 for users can be seen in table 3-3. The functions of the toggle switch and check Table 3-4 for setting instructions. Please read the following contents carefully before using the inverter.



A control panel **B control panel**

Fig.3-10 Sketch map of CPU board

Table 3-3 **function description of terminal provided for user**

No.	Function	description
CN1	Input and output control of external terminal	Used when using external terminals to control the operation of the inverter, see 3.6.2 for details.
J3	expansion port	Can be expanded to multiple types of communication cards and I/O cards.

J4	expansion port	1. The A control panel only supports one expansion card, which can be expanded with various communication cards or universal encoder expansion cards; 2. Control board B can only be expanded with universal encoder

Table 3-4 Slide switch function description for users

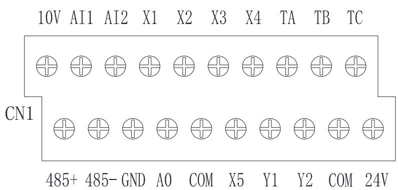
Serial number	Function	Setting	Default value
SW1	Common terminal PW connection signal selection, that is, X terminal polarity selection	24V: PW connects to 24V X terminal is active at low level COM: PW connects to COM X terminal is active at high level	24V
SW3	AI2 analog input signal selection	V: F00.20 is set to XX0X, 0～+10V voltage signal input A: F00.20 is set to XX1X, 0～20mA current signal input	Set F00.20 to 0000 0V～+10V
SW2	AO analog output signal selection	V: Set F00.21 to XX00 0～+10V voltage signal output A: Set F00.21 to XX11 0～20mA current signal output	Set F00.21 to 0000 0～+10V
SW4	485 terminal resistor selection	OFF: No terminating resistor 120R: Connect to 120R terminal resistor	OFF

Note

In the graphic of slide switch, black square means switch slidable location.

3.6.2 Descriptions for control board terminal

(1) CN1 terminal layout as following



(2) CN1 terminal function description show as Table 3-5.

Table 3-5 Control board terminal function table

Category	Terminal label	Name	Terminal functions and specifications
Multifunction Input terminal	X1	Multi-function input terminal 1	Input impedance: 4.7KΩ Maximum input frequency: 1KHz
	X2	Multi-function input terminal 2	
	X3	Multi-function input terminal 3	
	X4	Multi-function input terminal 4	
	X5/DI	Multi-function input terminal 5/ High-speed pulse input terminal	In addition to the functions of X1~X4, it can also be used as high-speed pulse input. Input impedance: 2.2KΩ Maximum input frequency: 50KHz
Power source	+24V	+24V power supply	Provide external +24V power supply (24±4V) Maximum output current: 100mA
	+10V	+10V power supply	Provide external +10V power supply (10±0.5V) Maximum output current: 20mA
	COM	Public end	Reference ground for digital signals and +24V power supply
	GND	Public end	Reference ground for analog signals and +10V power supply
Analog input	AI1	Analog input 1	Input range: DC 0V～10V Input impedance: 30KΩ for voltage input; Resolution: 12 bits
	AI2	Analog input 2	Input range: 0V~10V/0~20mA, determined by the tens digit of parameter F00.20 and the SW3 jumper on the control board. Input impedance: 30KΩ for voltage input; 500Ω for current input. Resolution: 12 bits
Analog output	AO	Analog output 1	Voltage or current output, selected by SW2 jumper on control board Output voltage range: 0~10V Output current range: 0～20mA
Multifunction Output terminal	Y1	Open collector output terminal 1	Optocoupler isolated output, unipolar open collector output Maximum output voltage: 30V Maximum output current: 50mA
	Y2/DO	Open collector output terminal 2/high-speed pulse output	The output mode of the terminal is selected by function code F00.22. When used as open collector output, the specifications are the same as those of the Y terminal. For high-speed pulse output, the maximum frequency is 20KHz.
RLY1 output	TB—TC	Normally closed terminal	Contact capacity: AC250V/2A (cosφ=1) AC250V/1A (cosφ=0.4) DC30V/1A
	TA-TC	Always open	
Communication port	485+	485 differential signal interface	485 differential signal positive terminal
	485-		485 differential signal negative terminal

3.6.3 Analog input & output terminal wiring

(1) AI1 receive analog voltage signal single-ended input, wire as follows:

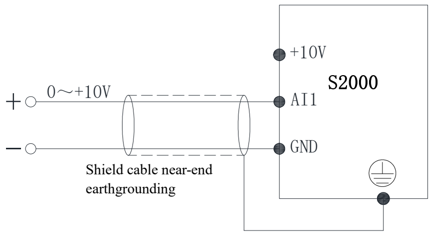


Fig.3-11 AI1 terminal wiring diagram

(2) AI2 receive analog voltage or current signal single-ended input, switch through SW3, and should match it with exact second Fig. of F00.20 setting, wire as below:

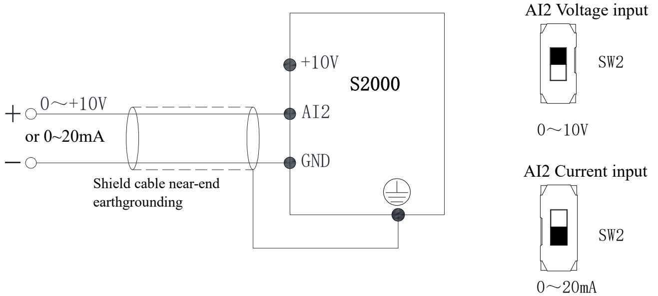


Fig.3-12 AI2 terminal wiring diagram

(3) AO terminal can connect to external analog meter, which can indicate several physical quantity, it can select analog voltage or current signal output, and switch through SW2, wire as below:

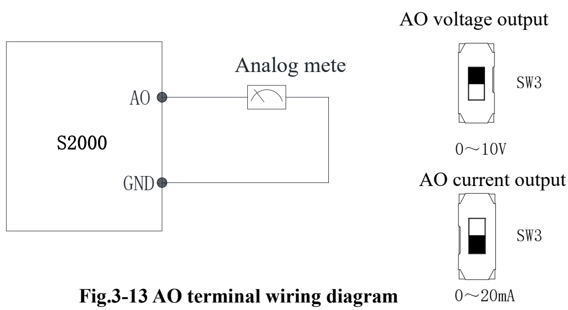


Fig.3-13 AO terminal wiring diagram

Note

(1) Under analog input mode, filter capacitor or common mode choke can be installed between AI1 and GND or AI2 and GND.
(2) Analog input and output signal can be interfered easily by ambient environment, it need use shield cable for connection and earth grounding well as short as possible.

3.6.4 Digital input terminal wiring

(1) To use inverter inbuilt +24V power supply, and NPN source type external controller connection mode.

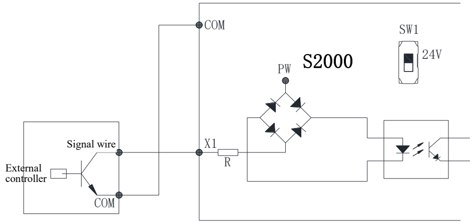


Fig. 3-14 inbuilt 24V source type connection mode

(2) To use inverter inbuilt +24V power supply, and PNP drain type external controller connection mode.

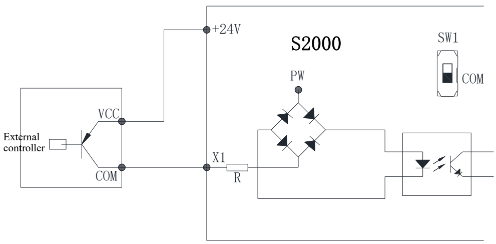


Fig. 3-15 Drain connection using internal 24V power supply

(3) To use external DC 15～30V power supply，and NPN source type external controller connection mode. (SW1 code switch is pulled to the COM terminal).

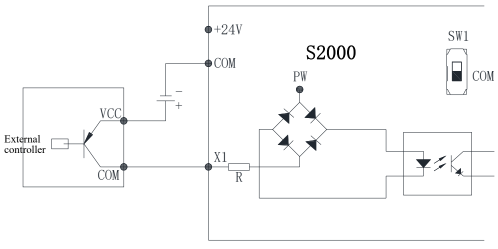


Fig. 3-16 External power supply source type connection mode

Note

The X terminal does not support the NPN source connection method when the external power supply is used!

3.6.5 Communication terminal wiring

S2000 inverter provide RS485 serial communication interface to user.
The following wire connection can make up of single-main single-sub control system or single-main multi-sub control system. To use host computer softwar（PC or PLC controller）can realize real time monitoring and operation to inverter， and to achieve complicated run control like long-distance control, high degree automation. It can also use a host inverter and the other slave inverter to make up of the cascade or synchronous control inverter network.

(1) Inverter RS485 interface and other device with RS485 interface wire connection show as following.

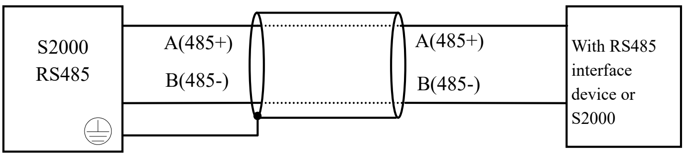


Fig. 3-17 Communication terminal wiring

(2) Inverter RS485 interface and host computer (device with RS232 interface) connection：

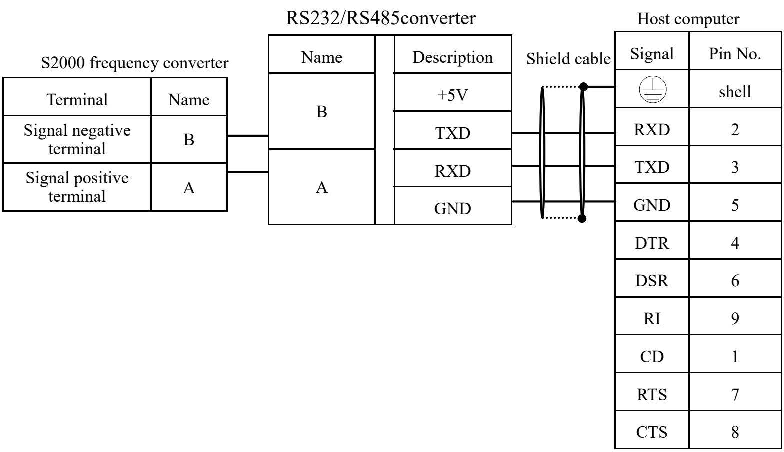


Fig. 3-18 RS485 communication wiring

4 EMC(Electromagnetic compatibility)explanation

Because of inverter working principal resulting in electromagnetic noise, and to avoid or reduce inverter interference to ambient environment, this chapter introduce installation means to restrain interference from aspect of interference restrain, field wiring, system earth grounding, leakage current and power filter usage. Inverter will have good electromagnetic compatibility under general industrial environment, when user install the inverter according to this chapter.

4.1 Noise interference restraining

Inverter interference generating for run may have effect to nearby electronic device and the effect depend on the inverter installation surrounding electromagnetic environment and the restrain interference ability of the device.

4.1.1 Interference noise type

Because of inverter working principle, There are mainly 3 kinds of noise interference source:

(1) Circuit conduction interference;

(2) Space emission interference;

(3) Electromagnetic induction interference;

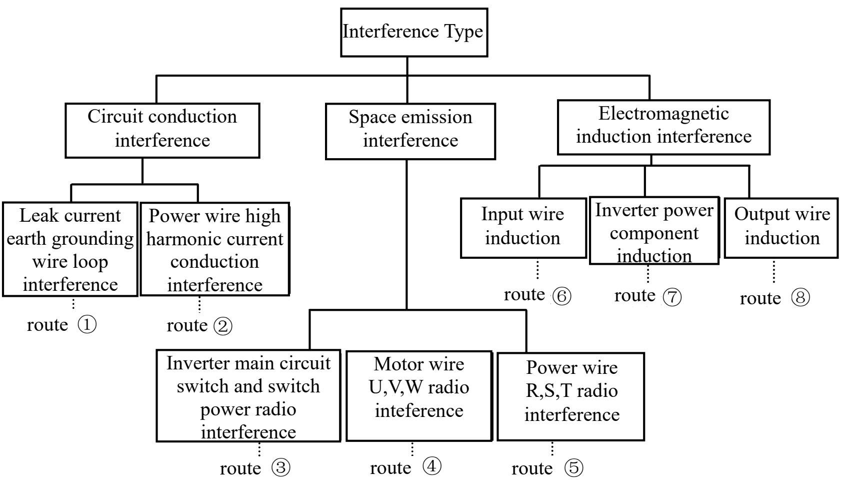


Fig.4-1 Interference noise type

4.1.2 Basic countermeasure for restrain interference

Table 4-1 Interference restrain countermeasure

Noise spread road	Countermeasure of weakening effect
①	Earth grounding cable of peripheral device and inverter wiring make up of the closed-loop and leakage current of inverter earth grounding cable will make device perform wrong action. It will decrease wrong action when device not connect to earth grounding.

②	When the power of peripheral device and inverter power belong to the same power source, high harmonic gererating from inverter will transmit the voltage and current along with the power line which will interfere other devices within the same power source system. Take some restraining measures as below：install electromagnetic noise filter at inverter input end; use isolation transformer to isolate other devices; connect power end of peripheral device to remote power grid；add power ferrite filter magnetic ring to inverter R、S、T three phase wire to restrain high harmonic current conduction
③④⑤	● Keep other sensitive devices and signal wire installed away from inverter. it should use shield wire and make the shield layer single end earth grounding. Besides keep distance from inverter and its input & output wire as possible as. When signal wire need to intersect with strong current cable, it should make them orthogonal crossing not parallel. ● Install high frequency noise filter (Ferrite common code choke, also called magnetic ring) at the bottom end of the inverter input & output to restrain radio frequency interference of dynamic wire effectively. ● Motor cable should be placed in protective object with large thickness, such as placed in larger thickness (over 2mm) pipeline or buried in cemented tank. Putting dynamic wire in metal tube and connect to earth grounding with shield wire (motor cable use 4-core cable, one side is earthed through the inverter, the other side connected to motor casing).
⑥⑦⑧	To prevent wire parallel or bundled of strong and weak current, it should keep away from inverter assemble device, and wiring should away from inverter R,S,T,U,V,W equipower line. Devices with high field and high magnetic field should notice the corresponding installation position of inverter and keep distance and orthogonal crossing.

4.2 Field wiring and earth grounding

(1) Inverter terminal motor connection wire (U, V, W terminal output wire) and inverter terminal power connection wire (R, S, T terminal input wire) should keep distance enough as possible as can.

(2) U, V, W terminal 3 motor wires should be placed in metal tube or metal wiring tank as possible as.

(3) Generally control signal wire should use shield cable, when shield layer connect to inverter ⏚ terminal, it should be the single end earth grounding which closed to inverter side.

(4) Inverter ⏚ terminal earth grounding cable must directly connect to floor, it cannot connect to earth grounding through other device, and the location of earth grounding should close to inverter as possible as.

(5) Strong current cable (R, S, T, U, V, W) cannot parallel wiring closely with control signal wire, and bundled together is prohibited. It should keep distance from over 20～60 cm (Relative to strong current size). When it’s necessary to intersect, it should be orthogonal crossing, show as Fig.4-2.

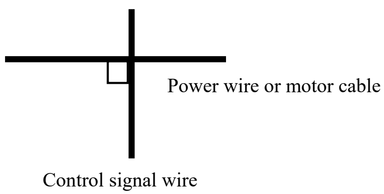


Fig.4-2 System wiring demand

(6) Earth grounding wire for strong current should separately connect to earth grounding with control signal and sensor earth grounding wire for weak current.

(7) Forbid to connect inverter input terminal(R, S, T) to other devices.

4.3 Leak current and countermeasure

The leak current flows through inverter input and output terminal for wire capacitance and motor capacitance, and its size decided by the distributed capacitance and carrier frequency. There are two kinds of leak current: leak current to earth and wire-to-wire. Restraining methods as below:

(1) Diminish the cable length between inverter and motor.

(2) Install ferrite magnetic ring or output reactor at the inverter output terminal.

When reactor installed with rated voltage drop more 5% and long wiring to U, V, W terminal， it would reduce motor's voltage apparently. When motor run at full load, it is possible to flash motor, and it should be used by derating or boosting input and output voltage.

(3) As carrier frequency low, the motor noise would increase accordingly.

4.4 Installation demand for electromagnetic on-off electronic device

It should pay attention that surge absorber must be installed when electromagnetic on-off electronic device like relay, electromagnetic contactor and electromagnetic iron generating noise easily and largely installed near to inverter or in the same control cabinet, show as Fig. 4-3.

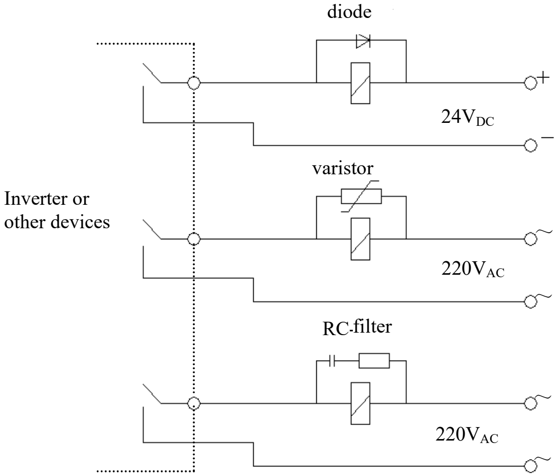


Fig.4-3 Install demand for electromagnetic on-off device

4.5 Noise filter installation instructions

(1) To use strictly as per the rated value; filter metal casing grounding must connect reliably to assemble cabinet metal grounding in large scale and it required good conductive continuity. Otherwise, it may cause electric shock and influence the EMC effect seriously.

(2) Filter grounding terminal and inverter ⏚ terminal must connect to the same common earth grounding, otherwise it will influence the EMC effect seriously.

(3) Filter installed as close as possible to inverter power input terminal.

5 Operation and operating explanation inverter

5.1 Run for inverter

5.1.1 Running order channel

There are three kinds of command channel for controlling run action of the inverter such as run, stop ,jog etc.

0: Keyboard

Use the [4 RUN] , [6 STOP/RESET] , [REV 7/JOG] on keypad(factory default).

1: Control terminal

Use two of the control terminals X1~X5 and COM to form a two-wire control, or use three of the control terminals of X1~X5 to form a three-wire control.

2: Communication port

Use control Run and stop of the inverter through upper machine or other device which can communicate with the inverter.

The selection of the command channel can be completed through the setting of function code F01.15, or through the multi-function input terminal selection (F08.18~F08.25 choose functions 49, 50, 51, 52, and 53).

You can also use multi-function keys [9 M] to switch command channels (only parts of optional keyboards are equipped with multi-function keys).

> Please switching debugging in advance when switch the order channel to check if it can fulfill system requirement. Otherwise, there is a risk of damaging the equipment and injuring people!

5.1.2 Frequency-provision channel

S2000 includes main frequency provision and auxiliary frequency provision:

Main frequency provision:

0: Keyboard analog potentiometer provision;
1: AI1 analog setting;
2: AI2 analog settings;
3: Terminal UP/DOWN adjustment provision;
4: Communication provision (Mod bus and external bus share a main frequency memory);
5: Operate keyboard knob provision;
6: Reserved;
7: High-speed pulse provision (X5 terminal needs to select the corresponding function)
8: Terminal pulse width provision (X5 terminal needs to select the corresponding function)
9: Terminal encoder provision(X3, X24terminal connect to the encoder orthogonal input)
10～14: Reserved

Auxiliary frequency provision:

0: Keyboard analog potentiometer provision;
1: AI1 analog setting;
2: AI2 analog settings;
3: Terminal UP/DOWN adjustment provision;
4: Communication provision (Mod-bus and external bus share a main frequency memory)
5: Operate keyboard knob provision;
6: Reserved
7: Terminal pulse provision (X5 terminal needs to select the corresponding function)
8:Terminal pulse width provision (X5 terminal needs to select the corresponding function)
9: Terminal encoder provision (X3, X4 are connected to the encoder orthogonal input)

10: Reserved
11: Process PID provision
12～20: Reserved

5.1.3 Work state

The working state of S2000 includes standby state, running state and parameter setting state:

Standby state: If there is no command after the inverter electrified or after stop command during running state, the inverter enters standby state.

Running state: The inverter enters running state after receiving running command.

Parameter setting state: After receiving the parameter identification command, it enters the parameter setting state, and after the setting is completed, it enters the stop state.

5.1.4 Run mode

S2000 inverter has 6 kinds of run mode, following is in turn according to their priority, jog run → closed-loop run → PLC run → multi-speed run → swing frequency run → common run. As shown in Figure 5-1.

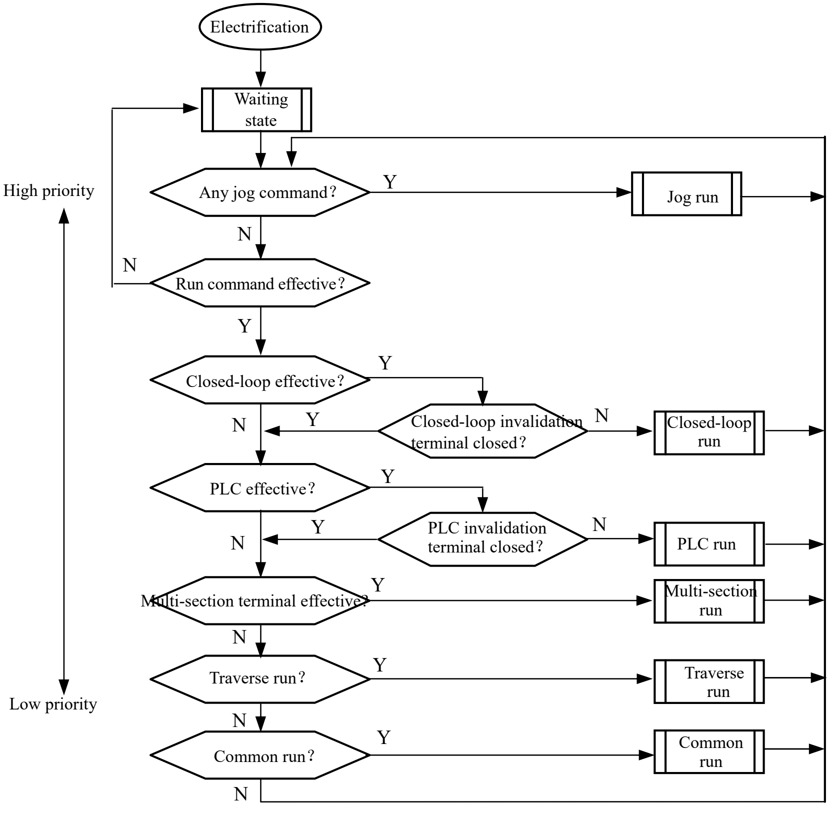


Fig. 5-1 Run mode

0: Jog run

Upon receiving the jog operation command (for instance, pressing the key REV 7 / JOG on the keypad), the inverter will run at the jog frequency (see function code F01.25~F01.29).

1: Closed loop run

The inverter will come into closed-loop run mode when closed-loop run control parameter is set(F11.00=1 or F12.00≥1),namely carry on PID adjustment to specified value and feedback value.(proportional integral calculation, see the group F11 function code) and PID adjuster output is inverter output frequency. Can make closed-loop run mode ineffective and switch to lower level run mode by multi-function terminal(function 31).

2: PLC run

The inverter will enter into PLC run mode and run according to run mode preset(see F10 group function code description)through setting PLC function effective parameter(F10.00 last bit≠0).Can make PLC run mode ineffective and switch to lower level run mode by multi-function terminal(function 36).

3: Multi-section speed run

By non-zero combination of multi-function terminals (5,6,7,8,function), choose multi-section frequency 1 to 15 (F10.31 to F10.45) to run at multi-section speed.

4: Swing frequency run

The inverter will enter the swing frequency run mode when swing frequency function effective parameter(F13.00=1) is set. Set the relevant swing frequency run special parameter according to the textile swing frequency craft to realize swing frequency run.

5: Common run

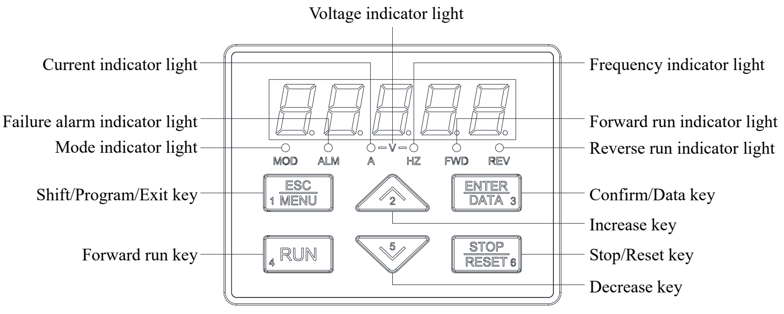
Common open-loop operation mode of general-purpose inverter.

In above 6 run modes, except "jog run", the inverters can run according to kinds of frequency setting method.

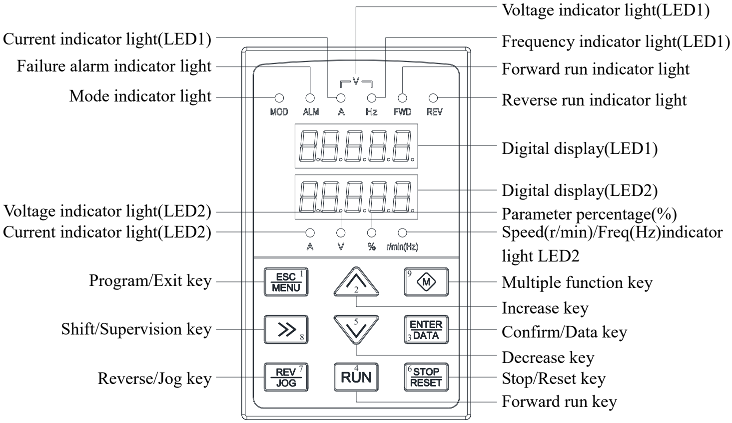
5.2 Operation and use of keyboard

5.2.1 Keyboard layout

The operation keyboard is the main unit for the inverter to accept commands and display parameters. The keyboard outline diagram is shown in Figure 5-2.



S-LED15 Keyboard layout sketch



S-LED16 Keyboard layout sketch

Fig.5-2 Keyboard layout sketch

5.2.2 Keyboard function description

The function definition of each key on the inverter operation keyboard is shown in Table 5-1.

Table 5-1 Keypad function table

Key		Name	Function description	
S-LED15	S-LED16		S-LED15	S-LED16
		Shift /Program /Exit key	Long press for 2.5s: enter and exit the menu. Press and hold for 1 to 2.5 seconds and release: Used for page change of 32-bit data display in parameter editing state. Short press: can choose modification of digital of set data under editor state. Can switch display status supervision parameter under other states. When the button is locked, press and hold for 5 seconds to unlock.	Enter or exit programming state. When the button is locked, press and hold for 5 seconds to unlock.
		Increase key	To crease data or function code (long-press can speed up the adjustment). In the monitoring state, when monitoring 32-bit data, it is used for data display page change.	To increase data or function code (long-press can speed up the adjustment). In the monitoring state, when uplink monitoring 32-bit data, it is used for data display page change.
		Confirm /Data key	Enter the subordinate menu or data confirmation. In the monitoring state, press and hold for 5S to lock the button according to hundred digit setting parameter under F00.14	
		Forward run key	Forward running under keyboard mode	

		Decrease key	Decrease of data or function code (long press can speed up the adjustment). In the monitoring state, when 32-bit data is displayed, this button is invalid.	Decrease of data or function code (long press can speed up the adjustment). In the monitoring state, when monitoring 32-bit data downlink, it is used for data display page change.
		Stop /Reset button	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.	
-		Reverse /Jog key	-	Under keypad mode: to press this key can set revers run or jog run according to the 1st bit of parameter F00.15
-		Shift /Supervision key	-	Can choose modification digit of set data under editor state; Can switch display status supervision parameter under other state. When editing 32-bit data, long press for 1S to switch display pages.
-		Multi-function key	-	The specific function of this key is determined by the tens digit of F00.15. For details, please refer to the parameter description of F00.15.

5.2.3 LED and indicator light

4 Running status indicator light: ALM (warning indication), FWD (forward rotation), REV (reverse rotation)from left to right on the LED: Their respective indicating meaning is as shown in table 5-2.

Table 5-2 Description of status indicators

Item			Function Description	
Display function	Digital display		Display the current running status parameters and setting parameters	
	Status Indicator	A, Hz, V, %	Unit for relevant current digital display physical parameter(For current is A，for voltage is V, for frequency is Hz, for rotation speed is r/min, and for percentage is %)	
		MOD	This indicator light is lit in non-supervision status and extinguished if no key pressed for one minute, then it will go back to the supervision status.	
		ALM	Alarm indicator light: indicate that the inverter is in over current or over voltage suppressing status or failure alarm status currently.	
		FWD	Forward run indicator light: indicates that the inverter output forward phase order and the connected motor rotate in forward direction.	If the FWD and REV indicators are on at the same time, it indicates that the inverter is working in DC braking state.
		REV	Reversal indicator light: indicates the inverter output reverse phase order and the connected motor rotate in reverse direction.	

5.2.4 Keyboard display status

S2000 keypad display status is divided into five statuses: standby status parameter display, function code parameter editing status display, fault alarm status display, running status parameter display and alarm display status. LED indicators will all be lit after the inverter electrified, then it will enter the standby parameter display state after normal operation. As shown in Figure 5-3 Figure a.

(1) Standby parameter display status

The inverter is in standby state, and the operation keyboard displays the standby state monitoring parameters. The initial monitoring parameters displayed on power-on are determined by the F00.13 parameter. As shown in Figure 5-3 b, the unit indicator light displays the unit of the parameter.

Press the [≫ 8] key, it can display different standby supervision parameter circularly: for detail please see C-00 to C-05 group supervision parameters details determined by F00.07 to F00.12.

(2) Operating parameter display status

After receiving a valid running command, the frequency converter enters the running state, and the operation keyboard displays the running state monitoring parameters. The displayed monitoring parameters are determined by F00.13. As shown in Figure 5-3 (c), the unit indicator light displays the unit of the parameter.

Press the "shift key" to cycle through different operating status monitoring parameters, among which the C-00 to C-05 monitoring parameters are determined by F00.01 to F00.06 respectively.

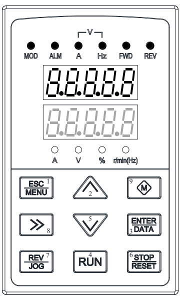


Fig.a Electrification Display 8.8.8.8.8.

Set frequency

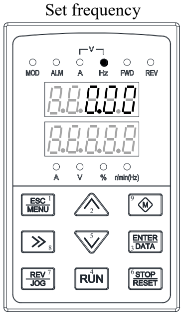


Fig.b Standby state Display standby state parameters

Output frequency

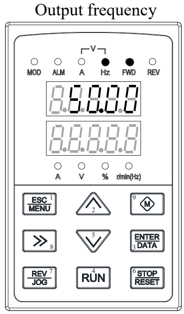
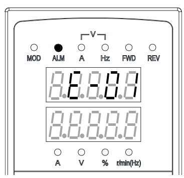


Fig.c Running status Display running status parameters

Fig. 5-3 Inverter electrification: standby, and running state display

(3) Failure alarm display status

The inverter enter failure alarm display status upon detecting failure signal and display failure code flashing.(As shown in 5-4);To press the key [≫ 8] check the relevant faults parameters; if the fault has been reset but you want to check the fault information; can press the [ESC 1 / MENU] key to enter the programming state to query the parameters of group F26 can carry on failure restoration by [6 STOP / RESET] key: control terminal or communication command on the keypad after troubleshooting. Keep displaying failure code if failure exist continuously.



Over current during

Fig.5-4

For some serious faults, such as short circuit to ground when electrified, inverter module protection, over current, over voltage, etc., must not carry on failure reset forcibly to make the inverter run again without failure elimination confirmed. Otherwise, there is a risk of damaging the inverter!

(4) Function code editing display status

Under standby, running or fault alarm status, press ESC 1 MENU key, can enter the editing state (if user password is set, can enter the editing status after inputting the password, see F27.00 description and Figure 5-11),and editing state is displayed in the secondary menu, as shown in Figure 5- 5 shown. Press the ENTER 3 DATA key to enter step by step. In the function parameter display state, press the key ENTER 3 DATA to perform parameter storage operation; the parameters modified by pressing ESC 1 MENU key will not be stored or modified, and you can only return to the upper menu.

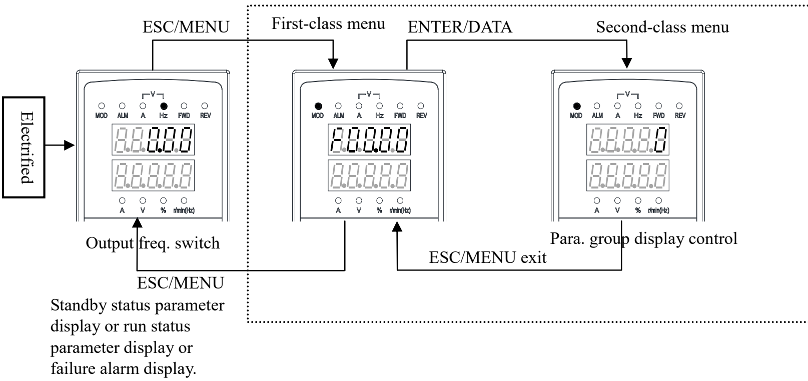
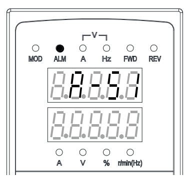


Fig. 5-5 Keypad display status switching

(5) Alarm status display

When under running or standby situation: it means enter failure alarm display status upon detecting failure signal and display failure code flashes (Fig 5-6), inverter is keeping running status but this alarm display cannot be reset button to eliminate. After only find the cause of the alarm to eliminate this factor to return to normal.



Same main/assist freq. channel

Fig. 5-6

5.2.5 Management of user parameters

In order to facilitate user parameter management, the parameter component model of the first-level menu of S2000 is displayed and managed. Parameters that do not need to be displayed can be shielded.

Method parameter setting model display:

By setting F00.00=0, 1, 2, 3, 4, the parameter mode can be set to: basic menu mode, intermediate menu mode, advanced menu mode, user menu mode and parameter verification mode respectively.

Basic menu	F00,F01,F02,F03,F26
Intermediate menu	F00,F01,F02,F03,F04,F05,F06,F07,F08,F09,F10,F11,F12,F13,F14,F15,F16,F18,F19,F26
Advanced menu	F00,F01,F02,F03,F04,F05,F06,F07,F08,F09,F10,F11,F12,F13,F14,F15,F16,F17,F18,F19,F20,F21,F22,F23,F24,F25,F26,F27
User-defined	F00.00 and F25 group definition parameters
Parameter verification	Group F00 to Group F25 (only display parameters that are inconsistent with the default values)

5.2.6 Keyboard operation method

Can carry on various operations to the inverter through the operation keyboard, for examples:

(1) Display switching of status parameters:

After pressing ≫ 8 key, the status monitoring parameters of group C are displayed. When the code of a monitoring parameter is displayed for 1 second, the parameter value will be automatically displayed. Press the ENTER 3 DATA key will go back to C- 00, which is monitoring window.

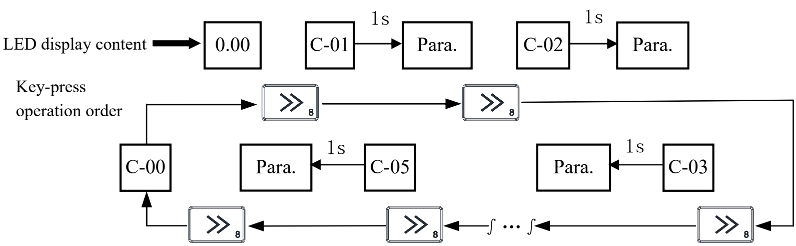


Fig. 5-7 Example of parameter display operation in standby state

(2) Setting of function code parameters

Take the function code F01.01 changed from 5.00Hz to 6.00Hz as an example to illustrate. The numbers in bold in Figure 5-8 indicate the flashing bits.

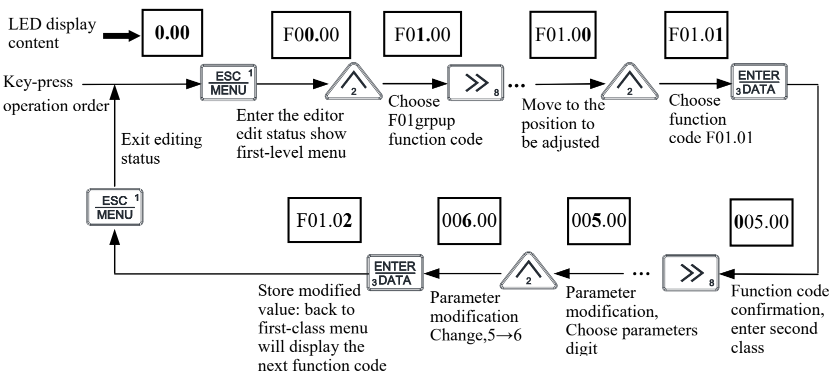


Fig.5-8 Example of parameter setting and modification operations

Note: Under secondary menu, if the parameter has no blinking digit, it means that the function code can't be modified. The possible reasons are as follows.

1> This function code is an unmodified parameter, such as monitoring function parameter group, fault information function parameter group, etc.;

2> This function code cannot be modified while running and needs to be shut down before modification can be made;

3> Parameters are protected. When the ones digit of function code F00.14 = 1 or 2, the function code cannot be modified. This is parameter protection to avoid incorrect operations. need to set the ones digit of function code F00.14 to 0 if you want to edit function code parameters.

(3) Specified frequency adjustment for common run

Take the example of changing the given frequency from 50.00Hz to 40.00Hz during operation when F01.06=1 and F01.03=0.

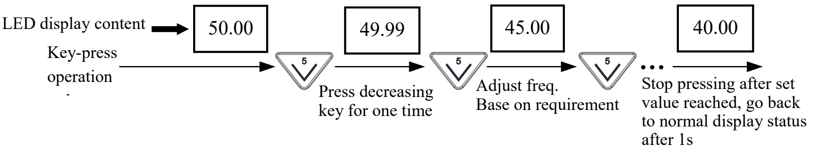


Fig. 5-9 Example of setting frequency adjustment operation

(4) Jog run operation

Take the current running command channel as the operation keyboard and the jog running frequency of 5Hz in standby state as an example.

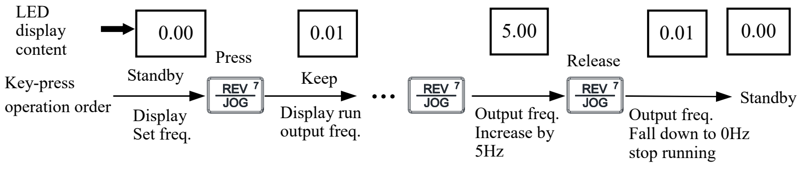


Fig.5-10 Example of jogging operation

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

For example: "User password" F27.00 has been set to "12345". The numbers in bold in Figure 5-11 indicate the blinking bit.

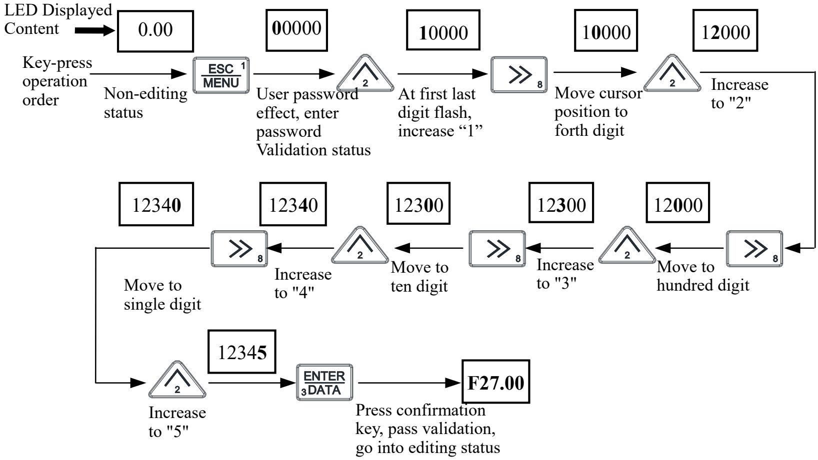


Fig. 5-11 Inputting password to go into function code operation

(6) Fault status query fault parameters:

In the fault state, the user can quickly locate the function code parameters of group F26 by pressing the shift key . Pressing the key can quickly navigate between the F26.04~F26.10 parameters and fault alarm. Quickly switch between values for easy viewing of fault records.

(7) Keypad lock operation

In the monitoring state, to press the ENTER 3 DATA key for more than 5 seconds and the keyboard will display "LOCH1.", and the keyboard keys will be locked at this time. The specific key lock is determined by the hundreds digit of F00.14.

(8) Keypad unlock operation

When the operation keyboard is locked, press the ESC 1 MENU key for more than 5 seconds to unlock the keyboard.

5.3 Inverter electrification

5.3.1 Check before electrification

Please make wiring connections according to the operating requirements provided in the installation and wiring chapter of the inverter in this manual.

5.3.2 First electrification

After checking the wiring and power supply, turn on the AC power switch on the input side of the inverter and power on the inverter. The LED on the inverter operation keyboard displays "8.8.8.8.8." and the relay is normal. When the digital tube display changes to running frequency, it indicates that the inverter has been initialized. The first electrification operation process is as follows:

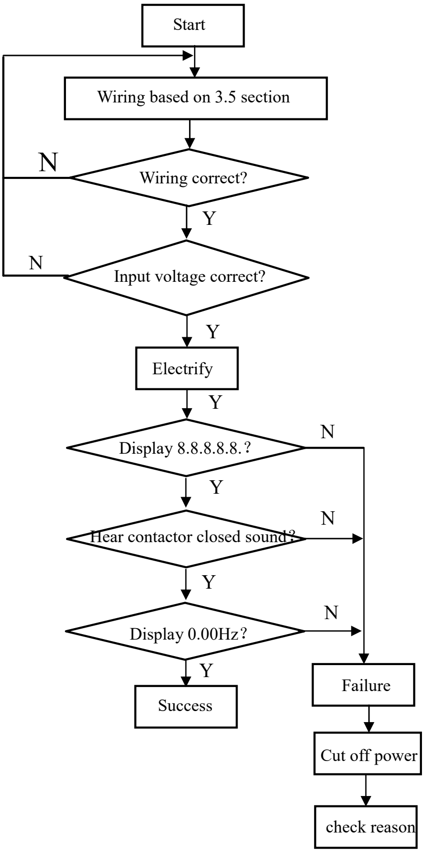


Fig.5-12 The first electrification operation flow

6 Function parameter schedule graph

6.1 Symbol description

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

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

* ---- Read-only parameter, unmodifiable

6.2 Function parameter schedule graph

F00-System Parameter Group					
Function code	Name	Set range	Min. unit	Factory Default	Modifi-cation
F00.00	Parameter group display control	0: Basic list mode (only displays F00~F03, F26 fault record parameters) 1: Middle list mode. (displays all parameters except extended and virtual parameters and reserved parameter groups) 2: Senior list mode. (displays all parameters) 3: User list mode. (displays user-defined parameters of group F25, monitoring parameters and F00.00 are displayed at any time) 4: Parameter verification mode. (only parameter items inconsistent with the default values are displayed in group F00 to group F25)	1	2	○
F00.01	C-00 displays parameter selection when operation	0: Main setting frequency (0.01Hz) 1: Auxiliary setting frequency (0.01Hz) 2: Setting frequency (0.01Hz) 3: Output synchronization frequency (0.01Hz) 4: Output current (0.1A) (motor power <7.5KW displays 0.01A) 5: Output voltage (1V) 6: DC bus voltage (0.1V) 7: Motor speed (1circle/min) with direction 8: Motor line velocity(1circle/min) 9: Inverter temperature (1℃) 10: running time currently (0.1 minutes) 11: Current cumulative running time (1 hour) 12: Current cumulative electrification time (1 hour) 13: Inverter status 14: Input terminal status 15: Output terminal status 16: Sleep state (1 represents sleep) 17: Reserved 18: Communication virtual input terminal status 19: Internal virtual input node status 20: Analog input AI1 (after calibration) (0.01V) 21: Analog input AI2 (after calibration) (0.01V or 0.01mA) 22: Z signal cumulative times 23: Encoder UVW signal status 24: Analog AO output (after calibration) (0.01V or 0.01mA) 25: Analog AO2 output(extension)(after calibration) 28: External pulse input frequency (before calibration) (1Hz) 29: Analog AI3 input(extension)(after calibration)	1	51	○

		30: Process PID provision (0.01V) 31: Process PID feedback (0.01V) 32:Process PID deviation(0.01V) with direction 33: Process PID output (0.01Hz) with direction 34: Current segment number of simple PLC 35: Current stage number of external multi-stage speed 36: Constant pressure water supply provided pressure (0.001Mpa) 37: Constant pressure water supply feedback pressure (0.001Mpa) 38: Constant pressure water supply relay status 39: Current length (m/cm/mm) 40: Cumulative length (m/cm/mm) 41: Current internal count value 42: Current internal timing value (0.1s) 43: Run command to set channel (0: Keyboard 1: Terminal 2: Communication) 44: Main frequency given channel 45: Auxiliary frequency given channel 46: Rated current (0.1A) 47: Rated voltage (1V) 48: Rated power (0.1KW) 49: Electric torque limit value (0.1% motor rated torque) 50: Braking torque limit value (0.1% motor rated torque) 51:Frequency after Acc/Dece(0.01Hz) 52:Motor rotor frequency (0.01Hz) 53: Current given torque (percentage of rated torque, with direction) 54: Current output torque (percentage of rated torque, with direction) 55: Current torque at present(0.1A) 56:Current flux at present(0.1A) 57: Setting motor rotate speed (r/min) 58: Output power (active power) (0.1KW) 59: The low digit of total power consumption(1 kwh) 60: The highdigit of total power consumption(1 represents 10,000 kwh) 61, 62: Reserved 63: Simple PLC total setting time (1s or min) 64: Simple PLC running time (1s or min) 65: Simple PLC remaining running time (1s or min) 66: The dedicated display mode of constant pressure water supply(SP-PV)(kg/cm^2) 67: Closed-loop detection frequency(With encoder card, 0.1Hz format, with direction) 68: Motor temperature 69: Current encoder position (relative to Z signal or resolver relative to zero signal, 0.0~359.9°) 70: Current spindle position(relative to zero point or Z signal, 0.0~359.9°) 71: Motor encoder feedback pulse counter (32-digit decimal display) 73: Absolute position counter (32-digit decimal display)			

		75: Input position command pulse counter (32-digit decimal display) 77: Current position segment number 78: Position deviation (Encoder unit, limited to -32768~32767) 79: Command speed(r/min, with direction, limited to -32768~32767) 80: Motor speed(r/min, with direction, limited to -32768~32767) 81: Real-time input position command counter (Instruction unit displayed in 32-digit decimal system) 83～90: Reserved			
F00.02	C-01 displays parameter selection when operation	Same as above	1	2	○
F00.03	C-02 displays parameter selection when operation	Same as above	1	4	○
F00.04	C-03 displays parameter selection when operation	Same as above	1	5	○
F00.05	C-04 displays parameter selection when operation	Same as above	1	6	○
F00.06	C-05 displays parameter selection when operation	Same as above	1	9	○
F00.07	C-00 displays parameter selection when shutdown	Same as above	1	2	○
F00.08	C-01 displays parameter selection when shutting down	Same as above	1	6	○
F00.09	C-02 displays parameter selection when shutting down	Same as above	1	48	○
F00.10	C-03 displays parameter selection when shutting down	Same as above	1	14	○
F00.11	C-04 displays parameter selection when shutting down	Same as above	1	20	○
F00.12	C-05 displays parameter selection when shutting down	Same as above	1	9	○
F00.13	Electrification default monitoring parameter selection	0～5 (C-00 to C-05)	1	0	○
F00.14	Parameter operation control	Units digit: parameter modification operation 0: All parameters are allowed to be modified 1: Except for this parameter, all other parameters are not allowed to be modified. 2: Except for F01.01, F01.04 and this parameter, all other parameters are not allowed to be modified. Tens digit: restore factory default 0: No action 1: All parameters return to factory default (excluding the fault record parameter group (F26 group) parameters). 2: All parameters except motor parameters are restored to factory values(excluding F15 and F26 group parameters).	1	500	×

		3: Restore extended parameters return to factory default(only parameters in groups F21 to F24 return to default). 4:Virtual parameters return to default(only the F20 group parameters are restored to factory values). 5: The fault record returns to default (only the fault record parameter group (F26 group) parameters return to default). Hundreds digit: Key operation 0: All locked 1: Except 6 STOP/RESET button, the others locked 2: Except ∧2 ∨5 6 STOP/RESET button, the other locked. 3: Except 4 RUN 6 STOP/RESET button, the others locked locked 4: Except ≫8 6 STOP/RESET button, the other locked 5: Invalid Lock.			
F00.15	Button function selection	Units digit: Panel REV/JOG 7 button selection (valid only on optional keyboard) 0: Reverse command action button 1: Jog action button Tens digit: multi-function 9 M button function selection (keypad support) 0: invalid 1: Jog run 2: For/revswitching 3: Free stop 4: Switching to run command provide mode as the set up order of F00.16 5: For/rev torque switching 6: Reverse command keys 7～9: Reserved Hundreds digit: terminal run command control 0: Keyboard 6 STOP/RESET button invalid 1: Keyboard 6 STOP/RESET keys valid Thousands digit: Communication run command control 0: Keyboard 6 STOP/RESET key invalid 1: Keyboard 6 STOP/RESET keys valid	1	0001	○
F00.16	Multi-function key operation command channel switching sequence selection	0: Keyboard control → Terminal control → Communication control 1: Keyboard control←→Terminal control 2: Keyboard control←→communication control 3: Terminal control←→communication control	1	0	○
F00.17	Motor speed display coefficient	0.1～999.9%	0.1%	100.0%	○
F00.18	Line velocity display coefficient	0.1～999.9%	0.1%	1.0%	○
F00.19	Encoder expansion port type	0: ABZ incremental encoder card (no UVW signal) 1: ABZ UVW incremental encoder card 2: Resolver expansion card	1	10	×

		3: Reserved 4～9: Reserved 10: No encoder expansion card			
F00.20	Analog input terminal configuration	Units digit: reserved Tens digit: AI2 configuration/ Hundreds digit: AI3 configuration(extension) 0: 0~10V voltage input 1: 0~20mA current input 2: 4~20mA current input Thousands digit: reserved	1	0000	×
F00.21	Analog output terminal configuration	Units digit: AO configuration 0: 0~10V voltage output 1: 0~20mA current output Tens digit: AO2 configuration(extension) 0: 0~10V voltage output 1: 0~20mA current output Hundreds, thousands digit: reserved	1	0000	×
F00.22	Y output terminal configuration	Units to hundreds digit: reserved Thousands digit: Y2 output configuration 0: Open collector output 1: DO output	1	0000	×
F00.23	Reserved				
F00.24	Motor control mode	0: V/F control 1: Speed sensor-less vector control (SVC) 2: Closed-loop vector control (FVC) Note 1: VF only supports speed control Note 2: SVC only supports speed and torque control Note 3: FVC supports position, speed and torque control	1	1	×
F00.25	Monitoring parameter 2 selection	Same as F00.01 (dual display keyboard is valid)	1	4	○
F00.26	Bus-bar voltage adjustment coefficient	0.900～1.100	0.001	1.000	○
F00.27	Parameter copy and language selection	Units digit: language selection (reserved) 0: Chinese 1: English 2: Reserved Tens digit: parameter upload and download (S-LED16 and S-LED16-D keyboard available) 0: Inaction 1: Parameter upload 2: Parameter download 1 (without motor parameters) 3: Parameter download 2 (with motor parameters)	1	00	×
F00.28	Output power display calibration coefficient	20%～300%	1%	100%	○
F00.29 ~ F00.60	Reserved				
F00.61	The fault type of the current fault	0～65535	1	0	*
F00.62 ~ F00.70	Reserved				

F01-Basic Run Function Parameter Group					
Function code	Name	Set range	Min. unit	Factory Default	Modifi-cation
F01.00	Main frequency input channel selection	0: Operation keyboard number setting 1: AI1 analog setting 2: AI2 analog setting 3: Terminal UP/DOWN adjustment setting 4: Communication provision (communication address: 1E01) 5: Operate keyboard knob to set 6: AI3 analog setting (extension) 7: High-speed pulse setting (X5 terminal needs to select the corresponding function) 8: Terminal pulse width setting (X5 terminal needs to select the corresponding function) 9: Terminal encoder setting (X1, X2 are connected to the encoder quadrature input) 10～14: Reserved	1	0	○
F01.01	Main frequency digital setting	0.00Hz～Upper limit frequency	0.01Hz	50.00Hz	○
F01.02	Main frequency digital control	Only valid for F01.00=0, 3, 4 Units digit: power-down storage setting 0: Main frequency power down reserve 1: Main frequency power down no reserve Tens digit: Halt reserve settings 0: Halt main main frequency hold 1: Halt main frequency recovery F01.01 Hundreds digit: Set of communication presetting frequency setting 0: Preset of absolute frequency mode (preset 5000 represent 50.00Hz) 1: Preset 10000 represent upper limit frequency (F01.11)	1	000	○
F01.03	Auxiliary frequency input channel selection	0: Operation keyboard digit setting 1: AI1 analog setting 2: AI2 analog settings 3: Terminal UP/DOWN adjustment setting 4:Communicationprovision(communication address: 1E01) 5: Operate keyboard knob to set 6: AI3 analog setting (extension) 7: Terminal pulse setting (X5 terminal needs to select the corresponding function) 8: Terminal pulse width setting (X5 terminal needs to select the corresponding function) 9: Terminal encoder setting (X3, X4 are connected to the quadrature input of the encoder) 10: Reserved 11: Process PID setting 12～20: Reserved	1	20	○
F01.04	Auxiliary frequency digital setting	0.00Hz～upper limit frequency	0.01Hz	0.00Hz	○
F01.05	Auxiliary frequency digital control	Units digit: power-down reserve setting 0: Auxiliary frequency power down reserve 1: Auxiliary frequency power down reserve Tens digit: Haltreserve settings	1	11	○

		0: Halt auxiliary frequency hold 1: Halt Auxiliary frequency recovery parameter F01.04			
F01.06	Main and auxiliary provide calculating setup	0: Main frequency (Current complex current freq. is the main frequency) 1:Auxiliary frequency (Current complex current the auxiliary frequency) 2:Plus(Polarity oppose of complex frequency andmain frequency, complex is zero) 3:Minus(Polarity oppose of complex frequency auxiliary frequency, complex frequency is zero) 4:Multiplication (Polarity oppose of main and auxiliary frequency, complex frequency is zero) 5:Max(The max frequency of main and auxiliary absolute value) 6:Min(The min frequency of main and auxiliary absolute value) 7:Select the non-zero value (Auxiliary frequency is not negative, main frequency prior; Auxiliary freq. is negative, complex frequency is zero) 8: Main frequency × auxiliary frequency × 2/F01.11 (Polarity opposed of main and auxiliary freq. , complex frequency is zero)	1	0	○
F01.07	Auxiliary frequency provided coefficient	0.00～10.00	0.01	1.00	○
F01.08	Coefficient after main and auxiliary combined	0.00～10.00	0.01	1.00	○
F01.09	Auxiliary frequency range selection	0: Relative upper limit frequency 1: Relative main frequency	1	0	○
F01.10	Auxiliary frequency source range	0.00～1.00	0.01	1.00	○
F01.11	Upper limit frequency	Low limit frequency～600.00Hz Note: the upper limit frequency cannot be less than the rated frequency of the motor	0.01Hz	50.00Hz	×
F01.12	Low limit frequency	0.00Hz～upper limit frequency Note: For position control and inertia identification, this parameter should be set to 0.00Hz.	0.01Hz	0.00Hz	×
F01.13	Low limit frequency run mode	0: Run at the upper limit frequency 1: Run according to the set frequency 2: Run at zero frequency 3: Sleep, PWM clockedat sleep mode	1	2	×
F01.14	Sleep run hysteresis frequency	0.01Hz ~ upper limit frequency (this function can be used to complete the sleep function, realizing energy-saving operation process, and the hysteresis width can avoid inverter starting frequently in threshold.)	0.01Hz	0.01Hz	○
F01.15	Run command channel selection	0: Operation keyboard operation control 1: Terminal operation command control 2: Communication operation command control	1	0	○
F01.16	Running direction setting	Units digit: keyboard command For/Rev setting (only valid for jog) 0: Forward 1: Reverse Tens digit: For/Rev forbid (applicable to all command channels, excluding jog) 0: For/Rev available 1: Reversenot available(Imposing on reverse, stop at	1	1000	×

		the halt mode) 2:Forward not available(Imposing on forward, stop at the halt mode) Hundreds digit: reverse running direction (only valid for keyboard and communication channel) 0: invalid 1: valid Thousands digit: Terminal multi-section speed acceleration and deceleration time control 0: Respectively, Corresponding to acceleration and deceleration 1~15. 1: Determined by F01.17 and F01.18			
F01.17	Acceleration time 1	0～60000 (Acceleration time refers to the time required to accelerate from zero frequency to upper limit frequency)	1	Base on motor type	○
F01.18	Deceleration time 1	0~60000 (Deceleration time refers to the time required to decelerate from the upper limit frequency to zero frequency)	1	Base on motor type	○
F01.19	Acc/Dece control selection	Units digit: acceleration and deceleration time unit 0:0.01s 1:0.1s 2:1s Ten digit: Acceleration and deceleration time unit display format 0: No decimal point format 1: The decimal point is related to F01.19	1	11	×
F01.20	Acc/Dece mode selection	0: Linear acc/Dec mode 1: S-curve acc/Dec mode	1	0	×
F01.21	S-curve acceleration initiation segment time	10.0%～50.0% (acceleration and deceleration time) S curve acceleration starting time + S curve acceleration rising time ≤90%	0.1%	20.0%	○
F01.22	S-curve acceleration up segment time	10.0%～70.0% (acceleration and deceleration time) S curve acceleration starting time + S curve acceleration rising time ≤90%	0.1%	60.0%	○
F01.23	S-curve deceleration initiation segment time	10.0%～50.0% (acceleration and deceleration time) S-curve deceleration starting time + S-curve deceleration rising time ≤90%	0.1%	20.0%	○
F01.24	S-curve deceleration up segment time	10.0%～70.0% (acceleration and deceleration time) S-curve deceleration starting time + S-curve deceleration rising time ≤90%	0.1%	60.0%	○
F01.25	Keyboard jog running frequency	0.00Hz～upper limit frequency	0.01Hz	5.00Hz	○
F01.26	Terminal jogging run frequency	0.00Hz～upper limit frequency	0.01Hz	5.00Hz	○
F01.27	Jog interval time	0.0～100.0s	0.1s	0.0s	○
F01.28	Jog acceleration time	0.1～6000.0s	0.1s	20.0s	○
F01.29	Jog deceleration time	0.1～6000.0s	0.1s	20.0s	○
F01.30	The maximum operating frequency is set digitally	0.00～600.00Hz	0.01Hz	600.00Hz	○
F01.31	Select the maximum operating frequency channel	0: The maximum operating frequency is set digitally 1: AI1 simulation Settings. 2: AI2 simulation Settings. 3: UP/DW terminal adjustment Settings. 6: AI3 analog setting (extension) 7: High speed pulse setting. 8: Terminal pulse width setting.	1	0	○

F02-Start, Stop, Forward and Reverse, Braking function parameter group					
Function code	Name	Set range	Min. unit	Factory Default	Modifi-cation
F02.00	Start running mode	0: Start from the starting frequency 1: Brake first and then start from the starting freq. (Invalid under synchronous machine closed loop) 2: Start by revolving speed tracking 3: SVC quick start (only valid for asynchronous machine SVC)	1	0	×
F02.01	Start delay time	0.0～60.0s	0.1s	0.0s	×
F02.02	Start frequency	0.0～10.00Hz	0.01Hz	0.00Hz	×
F02.03	Start frequency duration time	0.0～60.0s	0.1s	0.0s	×
F02.04	DC braking current at start-up	0.0～100.0% (G type motor rated current)	0.1%	50.0%	×
F02.05	DC braking time when starting	0.0～30.0s	0.1s	0.0s	×
F02.06	Speed tracking starting frequency selection	0: Start from the stop frequency 1: Start from the power frequency 2: Start from the upper limit frequency Note: Valid in VF control mode	1	0	×
F02.07	Tracking speed	1～100 Note: Valid in VF control mode	1	20	○
F02.08	Tracks the current according to the rotational speed	30%～150% Note: Valid in VF control mode	1%	Base on motor type	×
F02.09	Demagnetization time	0.00～20.00s Note: Valid forasynchronous machine VF and SVC speed tracking	0.01s	Base on motor type	○
F02.10	Speed tracking closed-loop current KP (VF)	0～1000	1	Base on motor type	○
F02.11	Stop mode	0: Decelerationstop 1: Free stop 2: Deceleration + DC braking stop (invalid under synchronous machine closed-loop vector)	1	0	○
F02.12	Deceleration stop holding frequency	0.00～upper limit frequency (Only valid for stop mode 0)	0.01Hz	0.00Hz	×
F02.13	Deceleration stop holding time	0.00～10.00s	0.01s	0.00s	×
F02.14	Stop DC braking starting frequency	0.00～15.00Hz	0.01Hz	0.50Hz	×
F02.15	Stop DC braking waiting time	0.00～30.00s	0.01s	0.00s	×
F02.16	Stop DC braking current	0.0～100.0% (G type motor rated current)	0.1%	0.0%	×
F02.17	Shutdown DC braking time	0.0～30.0s	0.1s	0.0s	×
F02.18	Stop auxiliary braking current	0.0～100.0% (G type motor rated current)	0.1%	0.0%	×
F02.19	Stop auxiliary braking time	0.0～100.0s	0.1s	0.0s	×
F02.20	Forward and reverse dead time	0.0～3600.0s	0.1s	0.0s	×
F02.21	Forward and reverse switching mode	0: Over zeros witch over 1: Over starting frequency switchover	1	0	×

F02.22	Energy consumption braking option	1: No braking when stopped 2: Braking can also be performed during shutdown	1	1	○
F02.23	Energy consumption braking voltage	100.0～145.0% (rated bus-bar voltage)	0.1%	Base on motor type	○
F02.24	Reserved				
F02.25	Encryption time	0～65535h	1	0	○
F02.26	Vector control stop frequency	0.00Hz～5.00Hz	0.01	0.40Hz	○
F02.27	Zero-speed retention coefficient during shutdown	1～1000	1	3	○
F02.28	Reserved				
F02.29	Reserved				
F02.30	Speed tracking closed-loop current KI (VF)	0～1000	1	Base on motor type	○
F02.31	Reserved				
F02.32	Synchronous machine SVC speed tracking Kp	0～1000	1	10	○
F02.33	Synchronous machine SVC speed tracking Ki	0～200	1	10	○
F02.34	Synchronous machine SVC speed tracking current size	10～100%	1%	30%	○
F02.35	Reserved				
F02.36	Reserved				
F02.37	Reserved				

F03-V/F Control parameter group

Function code	Name	Set range	Min. unit	Factory Default	Modifi-cation
F03.00	V/F curve setting	0: Constant torque curve 1: Decreasing torque curve 1 (1.2 power) 2: Decreasing torque curve 2 (1.7 power) 3: Decreasing torque curve 3 (2.0 power) 4: User-set V/F curve (determined by F03.04~F03.11) 5: V/F separation control (voltage channel is determined by F03.15) 6: V/F semi-separation mode (voltage channel is determined by F03.15 and operating frequency)	1	0	×
F03.01	Reserved				
F03.02	Torque boost	0.0～30.0%	0.1%	Base on motor type	○
F03.03	Torque boost cutoff frequency	0.0～100.0% (motor rated frequency)	0.1%	100.0%	○
F03.04	V/F frequency value 0	0.00～V/F frequency value 1	0.01Hz	10.00Hz	×
F03.05	V/F voltage value 0	0.00～V/F voltage value 1	0.01%	20.00%	×
F03.06	V/F frequency value 1	V/F frequency value 0～V/F frequency value 2	0.01Hz	20.00Hz	×
F03.07	V/F voltage value 1	V/F voltage value 0～V/F voltage value 2	0.01%	40.00%	×
F03.08	V/F frequency value 2	V/F frequency value 1～V/F frequency value 3	0.01Hz	25.00Hz	×
F03.09	V/F voltage value 2	V/F voltage value 1～V/F voltage value 3	0.01%	50.00%	×
F03.10	V/F frequency value 3	V/F frequency value 2～upper limit frequency	0.01Hz	40.00Hz	×
F03.11	V/F voltage value 3	V/F voltage value 2～100.00%(motor rated voltage)	0.01%	80.00%	×

F03.12	V/F oscillation suppression gain	0～100	1	40	○
F03.13	V/F over-excitation gain	0～300	1	100	○
F03.14	V/F slip frequency gain	0.0～200.0%	0.1%	0.0%	×
F03.15	V/F separation control voltage provided channel	0: Digital setting (determined by 03.16) 1: AI1 analog setting 2: AI2 analog settings 3: Terminal UP/DOWN adjustment setting 5: Operate keyboard knob to set 6: AI3 analog setting (extension) 7: High-speed pulse setting(The X5 terminal needs to select the corresponding function) 8: Terminal pulse width setting (The X5 terminal needs to select the corresponding function) Note: The maximum value of channels 0 to 8 corresponds to the rated voltage of the motor.	1	1	○
F03.16	V/F separation control voltage digital setting	0.0%～100.0%	0.1%	0.0%	○
F03.17	V/F separation voltage acceleration time	0.0～1000.0s (time from 0V to rated motor voltage)	0.1s	0.0s	○
F03.18	V/F separation voltage deceleration time	0.0～1000.0s (time from 0V to rated motor voltage)	0.1s	0.0s	○
F03.19	Reserved				
F03.20	V/F over-current stall enable	0: Invalid 1: Valid	1	1	×
F03.21	V/F over-current stall action current	50～200%	1%	150%	×
F03.22	V/F overpass stall suppression gain	0～100	1	20	○
F03.23	V/F double speed over-speed stall action current compensation coefficient	50～200%	1%	50%	×
F03.24	V/F overvoltage stall enable	0: Invalid 1: Valid	1	1	×
F03.25	V/F overvoltage stall action voltage	100～150% (rated bus voltage)	1%	Base on motor type	×
F03.26	V/F overvoltage stall suppression freq. gain	0～100	1	30	○
F03.27	V/F overvoltage stall suppression voltage gain	0～100	1	30	○
F03.28	V/F overvoltage stall maximum rising limit frequency	0.00～50.00Hz	0.01Hz	5.00Hz	×

F04-Auxiliary running parameter group

Function code	Name	Set range	Min. unit	Factory Default	Modifi-cation
F04.00	Jump freq.1	0.00Hz～upper limit frequency	0.01Hz	0.00Hz	×
F04.01	Jump freq.1 range	0.00Hz～upper limit frequency	0.01Hz	0.00Hz	×
F04.02	Jump freq.2	0.00Hz～upper limit frequency	0.01Hz	0.00Hz	×
F04.03	Jump freq.2 range	0.00Hz～upper limit frequency	0.01Hz	0.00Hz	×
F04.04	Jump freq.3	0.00Hz～upper limit frequency	0.01Hz	0.00Hz	×
F04.05	Jumpfreq.3range	0.00Hz～upper limit frequency	0.01Hz	0.00Hz	×

F04.07	Synchronous motor SVC carrier freq. liberalise selection	0: Invalid 1: Valid	1	0	×
F04.08	Synchronous motor SVC carrier freq. liberalise return freq.	0.5～3.0Hz	0.1Hz	1.0Hz	×
F04.09	Carrier freq.	0.5～16.0K Note: During position control, the carrier wave cannot be modified while the inverter is running.	0.1K	Base on motor type	○
F04.10	PWM optimized adjustment	Units digit: Carrier frequency automatically adjusts according to temperature 0: Forbidden 1: Allowed Tens digit: low-speed carrier frequency limit mode 0: No limit 1: Limit Hundreds digit: carrier wave modulation system 0: Forbidden 1: Enable (when the inverter is overloaded and the carrier wave reduction is invalid during position control) Thousands: reserved	1	0111	×
F04.11	Reserved				
F04.12	Random PWM adjustment depth	0: Random PWM is invalid 1～10: PWM carrier frequency random depth	1	0	○
F04.13	Reserved				
F04.14	Acceleration time 2 and 1 switching frequency	0.00Hz～upper limit frequency	0.01Hz	0.00Hz	×
F04.15	Deceleration time 2 and 1 switching frequency	0.00Hz～upper limit frequency	0.01Hz	0.00Hz	×
F04.16	Acceleration time 2	0～60000 Note: Motor speed acceleration in torque mode is determined by F04.16	1	200	○
F04.17	Deceleration time 2	0～60000 Note: Motor speed deceleration in torque mode is determined by F04.17	1	200	○
F04.18	Acceleration time 3	0～60000	1	200	○
F04.19	Deceleration time 3	0～60000	1	200	○
F04.20	Acceleration time 4	0～60000	1	200	○
F04.21	Deceleration time 4	0～60000	1	200	○
F04.22	Acceleration time 5	0～60000	1	200	○
F04.23	Deceleration time 5	0～60000	1	200	○
F04.24	Acceleration time 6	0～60000	1	200	○
F04.25	Deceleration time 6	0～60000	1	200	○
F04.26	Acceleration time 7	0～60000	1	200	○
F04.27	Deceleration time 7	0～60000	1	200	○
F04.28	Acceleration time 8	0～60000	1	200	○
F04.29	Deceleration time 8	0～60000	1	200	○
F04.30	Acceleration time 9	0～60000	1	200	○
F04.31	Deceleration time 9	0～60000	1	200	○
F04.32	Acceleration time 10	0～60000	1	200	○
F04.33	Deceleration time 10	0～60000	1	200	○
F04.34	Acceleration time 11	0～60000	1	200	○
F04.35	Deceleration time 11	0～60000	1	200	○
F04.36	Acceleration time 12	0～60000	1	200	○
F04.37	Deceleration time 12	0～60000	1	200	○
F04.38	Acceleration time 13	0～60000	1	200	○

F04.39	Deceleration time 13	0～60000	1	200	○
F04.40	Acceleration time 14	0～60000	1	200	○
F04.41	Deceleration time 14	0～60000	1	200	○
F04.42	Acceleration time 15	0～60000	1	200	○
F04.43	Deceleration time 15	0～60000 (The above acceleration and deceleration time unit is determined by the unit digit of F01.19)	1	200	○

F05-Terminal correlative function parameter group					
Function code	Name	Set range	Min. unit	Factory Default	Modifi-cation
F05.00	Protocol selection	0: Modbus protocol 1: Reserved 2: Profibus protocol (extended valid) 3: CanLink protocol (extended valid) 4: CANopen protocol/EtherCAT protocol (extended valid) 5: Free Agreement 1 6: Free Agreement 2	1	0	×
F05.01	Baud rate configuration	Units digit: free protocol and Modbus baud rate selection 0: 300BPS 1: 600BPS 2: 1200BPS 3: 2400BPS 4: 4800BPS 5: 9600BPS 6: 19200BPS 7: 38400BPS 8: 57600BPS 9: 115200BPS Tens place: reserved Hundreds digit: baud rate selection for CanLink and CANopen 0: 20K 1: 50K 2: 100K 3: 125K 4: 250K 5: 500K 6: 1M	1	005	×
F05.02	Data Format	Units digit: free protocol and Modbus protocol data format 0: 1-8-1 format, no parity, RTU 1: 1-8-1 format, even parity, RTU 2: 1-8-1 format, odd parity, RTU 3: 1-7-1 format, no parity, ASCII 4: 1-7-1 format, even parity, ASCII 5: 1-7-1 format, odd parity, ASCII Tens digit: reserved Hundreds digit: Modbus protocol or free protocol response selection 0: Respond to host commands and respond to data packets 1: Respond to host command, do not respond (respond when writing parameters)	1	0000	×

		2: Respond to host commands and do not respond (also do not respond when writing parameters) Thousands digit: Communication settings, memory power-down storage settings 0: No storage when power off 1: Power-off storage			
F05.03	Local address	0～247, In Modbus protocol, 0 is the broadcast address. The broadcast address only receives and executes commands from the host computer and does not reply to the host computer. In free protocol, 0 is the host address.	1	1	×
F05.04	Communication timeout detection time	0.0～1000.0s	0.1s	0.0s	○
F05.05	Communication error detection time	0.0～1000.0s	0.1s	0.0s	○
F05.06	Local response delay	0～200ms (Modbus valid)	1ms	2ms	○
F05.07	Master & Sub inverter communication frequency setting ratio	0～500%	1%	100%	○
F05.08	Communication virtual input terminal enable	00～FFH Bit0: CX1 virtual input terminal enable 0: Disabled 1: Enabled Bit1: CX2 virtual input terminal enable 0: Disabled 1: Enabled Bit2: CX3 virtual input terminal enable 0: Disabled 1: Enabled Bit3: CX4 virtual input terminal enable 0: Disabled 1: Enabled Bit4: CX5 virtual input terminal enable 0: Disabled 1: Enabled Bit5: CX6 virtual input terminal enable 0: Disabled 1: Enabled Bit6: CX7 virtual input terminal enable 0: Disabled 1: Enabled Bit7: CX8 virtual input terminal enable 0: Disabled 1: Enabled	1	00H	○
F05.09	Communication virtual input terminal joining node	0: Independent node 1: Terminal node	1	0	○
F05.10	Communication virtual terminal CX1 function	0～90	1	0	○
F05.11	Communication virtual terminal CX2 function	0～90	1	0	○
F05.12	Communication virtual terminal CX3 function	0～90	1	0	○
F05.13	Communication virtual terminal CX4 function	0～90	1	0	○
F05.14	Communication virtual terminal CX5 function	0～90	1	0	○
F05.15	Communication virtual terminal CX6 function	0～90	1	0	○
F05.16	Communication virtual terminal CX7 function	0～90	1	0	○
F05.17	Communication virtual terminal CX8 function	0～90	1	0	○
F05.18	Input mapping	F00.00～F26.xx	0.01	25.00	○

	application parameter 1				
F05.19	Input mapping application parameter 2	F00.00～F26.xx	0.01	25.00	○
F05.20	Input mapping application parameter 3	F00.00～F26.xx	0.01	25.00	○
F05.21	Input mapping application parameter 4	F00.00～F26.xx	0.01	25.00	○
F05.22	Input mapping application parameter 5	F00.00～F26.xx	0.01	25.00	○
F05.23	Input mapping application parameter 6	F00.00～F26.xx	0.01	25.00	○
F05.24	Input mapping application parameter 7	F00.00～F26.xx	0.01	25.00	○
F05.25	Input mapping application parameter 8	F00.00～F26.xx	0.01	25.00	○
F05.26	Input mapping application parameters 9	F00.00～F26.xx	0.01	25.00	○
F05.27	Input mapping application parameters 10	F00.00～F26.xx	0.01	25.00	○
F05.28	Profibus version	-	-	-	*
F05.29	Reserved				
F05.30	Reserved				
F05.31	Write symbols for PZD1~PZD10	0～1023	1	0	○
F05.32	Read the symbols of PZD1~PZD10	0～1023	1	0	○
F05.33	Modbus communication protection start delay time	0～600.0s	0.1s	10.0s	○
F05.34	Communication read current format	0: 0.01A (motor power <7.5KW) 1:0.1A	1	0	○
F05.35	PROFIBUS-DP control word: and	0～65535	1	0	○
F05.36	PROFIBUS-DP control word: or	0～65535	1	65535	○
F05.37	PROFIBUS-DP status word: and	0～65535	1	0	○
F05.38	PROFIBUS-DP status word: or	0～65535	1	65535	○
F05.39	Write PZD1 scale factor	0.1～6553.5%	0.1%	100.0%	○
F05.40	Write PZD2 scale factor	0.1～6553.5%	0.1%	100.0%	○
F05.41	Write PZD3 scale factor	0.1～6553.5%	0.1%	100.0%	○
F05.42	Write PZD4 scale factor	0.1～6553.5%	0.1%	100.0%	○
F05.43	Write PZD5 scale factor	0.1～6553.5%	0.1%	100.0%	○
F05.44	Write PZD6 scale factor	0.1～6553.5%	0.1%	100.0%	○
F05.45	Write PZD7 scale factor	0.1～6553.5%	0.1%	100.0%	○
F05.46	Write PZD8 scale factor	0.1～6553.5%	0.1%	100.0%	○
F05.47	Write PZD9 scale factor	0.1～6553.5%	0.1%	100.0%	○
F05.48	Write PZD10 scale factor	0.1～6553.5%	0.1%	100.0%	○
F05.49	Read PZD1 scale factor	0.1～6553.5%	0.1%	100.0%	○
F05.50	Read PZD2 scale factor	0.1～6553.5%	0.1%	100.0%	○
F05.51	Read PZD3 scale factor	0.1～6553.5%	0.1%	100.0%	○

F05.52	Read PZD4 scale factor	0.1～6553.5%	0.1%	100.0%	○
F05.53	Reading PZD5 scale factor	0.1～6553.5%	0.1%	100.0%	○
F05.54	Reading PZD6 scale factor	0.1～6553.5%	0.1%	100.0%	○
F05.55	Read PZD7 scale factor	0.1～6553.5%	0.1%	100.0%	○
F05.56	Read PZD8 scale factor	0.1～6553.5%	0.1%	100.0%	○
F05.57	Reading PZD9 scale factor	0.1～6553.5%	0.1%	100.0%	○
F05.58	Reading PZD10 scale factor	0.1～6553.5%	0.1%	100.0%	○

F06-Setting curve parameter group

Function code	Name	Set range	Min. unit	Factory Default	Modifi-cation
F06.00	Provided curve selection	Units digit: AI1 curve selection 0: Curve 1 1: Curve 2 2: Curve 3 Tens digit: AI2 curve selection: same as units digit Hundreds digit: high-speed pulse curve selection/ AI3 (extension) curve selection: same as units digit Thousands digit: pulse width given curve selection: same digit	1	0000	○
F06.01	Curve 1 minimum setting	0.0%～curve 1 inflection point setting	0.1%	0.0%	○
F06.02	Corresponding physical quantity of curve 1 min.setting	0.0～100.0%	0.1%	0.0%	○
F06.03	Curve 1 inflexion setting	Curve 1 min.setting～curve 1 max.setting	0.1%	50.0%	○
F06.04	Correspondingphysical quantity of curve 1 inflexion setting	0.0～100.0%	0.1%	50.0%	○
F06.05	Curve 1 maximum setting	The inflection point of curve 1 setting～100.0%, 100.0% is corresponding to the 5V input AD port	0.1%	100.0%	○
F06.06	Corresponding physical quantity of curve 1 maximum setting	0.0～100.0%	0.1%	100.0%	○
F06.07	Curve 2 minimum setting	0.0%～curve 2 inflexion setting	0.1%	0.0%	○
F06.08	Corresponding physical quantity of Curve 2 minimum setting	0.0～100.0%	0.1%	0.0%	○
F06.09	Curve 2 inflexion setting	Curve 2 min.setting～Curve 2 maximum setting	0.1%	50.0%	○
F06.10	The inflection point of curve 2 is given as the corresponding physical quantity	0.0～100.0%	0.1%	50.0%	○
F06.11	Curve 2 maximum setting	Curve 2 inflexion setting～100.0%	0.1%	100.0%	○
F06.12	Corresponding physical quantity of curve 2 maximum setting	0.0～100.0%	0.1%	100.0%	○
F06.13	Curve 3 minimum setting	0.0%～Curve 3 inflexion 1 setting	0.1%	0.0%	○
F06.14	Corresponding physical quantity of curve 3 maximum setting	0.0～100.0%	0.1%	0.0%	○

F06.15	Curve 3 inflexion 1 setting	Curve 3 min.setting～Curve 3 inflection 2 setting	0.1%	30.0%	○
F06.16	Corresponding physical quantity of curve 3inflexion 1setting	0.0～100.0%	0.1%	30.0%	○
F06.17	Curve 3 inflexion 2 setting	Curve 3 inflexion 1 setting～Curve 3 max. setting	0.1%	60.0%	○
F06.18	Corresponding physical quantity of curve 3inflexion 2setting	0.0～100.0%	0.1%	60.0%	○
F06.19	Curve 3 maximum setting	Curve 3 inflexion 2 setting～100.0%	0.1%	100.0%	○
F06.20	Corresponding physical quantity of curve 3 maximum setting	0.0～100.0%	0.1%	100.0%	○
F06.21	Curve lower than min. input corresponding selection	Units digit: Curve 1 setting 0: Corresponds to minimum setting corresponding physical quantity 1:0.0% of the corresponding physical quantity Tens digit: Curve 2 setting Same as unit bit Hundreds digit: Curve 3 setting Same as unit bit Thousands and tens of thousands digit: reserved	1	00111	○

F07-Analog, pulse input function parameter group					
Function code	Name	Set range	Min. unit	Factory Default	Modifi-cation
F07.00	AI1 input filter time	0.000～9.999s	0.001s	0.050s	×
F07.01	AI1 setting gain	0.000～9.999	0.001	1.007	○
F07.02	AI1 setting deviation	-100.0～100.0%	0.1%	-0.5%	○
F07.03	AI2 input filter time	0.000～9.999s	0.001s	0.050s	×
F07.04	AI2 setting gain	0.000～9.999	0.001	1.005	○
F07.05	AI2 setting deviation	-100.0～100.0%	0.1%	-0.5%	○
F07.06	AI3(extension) input filter time	0.000～9.999s	0.001s	0.050s	×
F07.07	Pulse input filter time	0.000～9.999s	0.001	0.000s	×
F07.08	Pulse input gain	0.000～9.999	0.001	1.000	○
F07.09	Pulse input maximum frequency	0.01～50.00KHz	0.01KHz	10.00KHz	○
F07.10	Pulse width input filter time	0.000～9.999s	0.001s	0.000s	×
F07.11	Pulse width input gain	0.000～9.999	0.001	1.000	○
F07.12	Pulse width input logic setting	0: Positive logic 1: Negative logic	1	0	○
F07.13	Maximum pulse input width	1.0～999.9ms	0.1ms	100.0ms	○
F07.14	Analog input disconnection detection threshold	0.0%～100.0%	0.1%	10.0%	○
F07.15	Analog input disconnection detection time	0.0～500.0s	0.1s	3.0s	○
F07.16	Analog disconnection protection selection	Units digit: Disconnection detection channel Selection 0: Invalid 1:AI1 2:AI2 3:AI3(extension) Tens digit: Disconnection protection mode 0: Stop according to stop mode	1	10	○

		1: Fault, free stop 2: Continue running			
F07.17	AI Input steady state threshold	0.0～20.0%	0.1%	0.0%	○
F07.18	AI3(extension) setting gain	0.000～9.999	0.001	1.005	○
F07.19	AI3(extension) setting deviation	-100.0～100.0%	0.1%	-0.5%	○

F08-ON-off input function parameter group					
Function code	Name	Set range	Min. unit	Factory Default	Modifi-cation
F08.00	Input terminal positive and negative logic setting	0000～FFFF	1	0000	○
F08.01	Input terminal filter time	0.000～1.000s	0.001s	0.010s	○
F08.02	X1 input terminal closing time	0.00～99.99s	0.01s	0.00s	○
F08.03	X1 input terminal disconnection time	0.00～99.99s	0.01s	0.00s	○
F08.04	X2 input terminal closing time	0.00～99.99s	0.01s	0.00s	○
F08.05	X2 input terminal disconnection time	0.00～99.99s	0.01s	0.00s	○
F08.06	X3 input terminal closing time	0.00～99.99s	0.01s	0.00s	○
F08.07	X3 input terminal disconnection time	0.00～99.99s	0.01s	0.00s	○
F08.08	X4 input terminal closing time	0.00～99.99s	0.01s	0.00s	○
F08.09	X4 input terminal disconnection time	0.00～99.99s	0.01s	0.00s	○
F08.10	AI1 input terminal closing time	0.00～99.99s	0.01s	0.00s	○
F08.11	AI1 input terminal disconnection time	0.00～99.99s	0.01s	0.00s	○
F08.12	AI2 input terminal closing time	0.00～99.99s	0.01s	0.00s	○
F08.13	AI2 input terminal disconnection time	0.00～99.99s	0.01s	0.00s	○
F08.14	AI3(extension) input terminal closing time	0.00～99.99s	0.01s	0.00s	○
F08.15	AI3(extension) input terminal disconnection time	0.00～99.99s	0.01s	0.00s	○
F08.16	X5 input terminal closing time	0.00～99.99s	0.01s	0.00s	○
F08.17	X5 input terminal disconnection time	0.00～99.99s	0.01s	0.00s	○
F08.18	Input terminal X1 function selection	0: The control terminal unused 1: Forward running FWD terminal 2: Reverse operation REV terminal 3: External forward jog control 4: External reverse jog control 5: Multi-speed control terminal 1 6: Multi-speed control terminal 2 7: Multi-speed control terminal 3	1	1	×

		8: Multi-speed control terminal 4 9: Acceleration and deceleration time selection terminal 1 10: Acceleration and deceleration time selection terminal 2 11: Acceleration and deceleration time selection terminal 3 12: Acceleration and deceleration time selection terminal 4 13: Main and auxiliary frequency calculation rule selection terminal 1 14: Main and auxiliary frequency calculation rule selection terminal 2 15: Main and auxiliary frequency calculation rule selection terminal 3 16: Frequency incremental control (UP) 17: Frequency Decrease Control (DOWN) 18: Frequency increasing and decreasing frequency setting 19: Multi-section closed-loop terminal 1 20: Multi-section closed-loop terminal 2 21: Multi-section closed-loop terminal 3 22: External equipment failure input 23: External interruption input 24: External reset input 25: Free stop input 26: External shutdown command—stop according to the shutdown method 27: Stop DC braking input command DB 28: Inverter running prohibited—stop according to stop mode 29: Acceleration and deceleration prohibition command 30: Three-wire operation control 31: Process PID invalid 32: Process PID pause 33: Process PID integral retention 34: Process PID integral is cleared 35: process PID function negation(Closed-loop adjustment feature negation) 36: Simple PLC invalid 37: Simple PLC halted 38: Simple PLC stop state reset 39: Main frequency switchover to digit (keyboard) 40: Switch the main frequency to AI1 41: Switch the main frequency to AI2 42: Switch the main frequency to AI3(extension) 44: Main frequency setting channel selection 1 45: Main frequency setting channel selection 2 46: Main frequency setting channel selection 3 47: Main frequency setting channel selection 4 48: Auxiliary frequency setting 49: Command switchover to panel 50: Command switchover to terminal 51: Command to switchover to communication 52: Run command channel selection 1 53: Run command channel selection 2 54: Forward rotation prohibited command---stop			

		according to the stop mode, invalid for jog command 55: Reverse rotation prohibited command---stop according to the stop mode, invalid for jog command 56: Swing frequency input 57: Swing frequency status reset 58: Internal counter reset end 59: Internal counter input end 60: Internal timer reset 61: Internal timer triggering 62: Length count input 63: Length reset 64: Reset this running time 65: Control mode switching 1 66: Control mode switching 2 70: Water shortage signal input (closed means water shortage) 71: Water signal input (closed means there is water) 72:Position command direction negation 73: Position command prohibited 74: Forward override switch 75: Reverse override switch 76: Multi-segment position command enable 77: Multi-segment position selection 1 78: Multi-segment position selection 2 79: Spindle level control enable 80: Spindle alignment index 1 81: Spindle alignment index 2 82: Spindle alignment index 3 83: Origin switch (during origin return) 84: Zero switch (when the spindle stops accurately) 85: Origin return enable (valid on rising edge) 86: Clear position deviation (valid on rising edge) 87~90: Reserved 91: Pulse frequency input (X5 is valid) 92: Pulse width PWM input (X5 is valid) 93～96: Reserved			
F08.19	Input terminal X2 function selection	Same as above	1	2	×
F08.20	Input terminal X3 function selection	Same as above	1	0	×
F08.21	Input terminal X4 function selection	Same as above	1	0	×
F08.22	Input terminal AI1 function selection	Same as above	1	0	×
F08.23	Input terminal AI2 function selection	Same as above	1	0	×
F08.24	Input terminal AI3(extension) function selection	Same as above	1	0	×
F08.25	Input terminal X5 function selection	Same as F08.18	1	0	×
F08.26	FWD/REV operating mode selection	0: Two-wire control mode 1 1: Two-wire control mode 2 2: Two-wire control mode 3 (single pulse control mode) 3: Three-wire control mode 1	1	0	×

		4: Three-wire control mode 2			
F08.27	Set internal count value to set	0～65535	1	0	○
F08.28	Specify internal count value to set	0～65535	1	0	○
F08.29	Internal timer timing setting	0.1～6000.0s	0.1s	60.0s	○
F08.30	Terminal pulse encoder frequency rate	0.01～10.00Hz (Only valid for X1 and X2 encoder settings)	0.01Hz	1.00Hz	○
F08.31	Special function selection	Units digit: Jog priority selection 0: highest priority 1: lowest priority Tens digit: Keyboard adjustment of display setting (under speed control mode) 0: Display the setting frequency 1: Display the setting rotation speed	1	00	○
F08.32～F08.35	Reserved				

F09-On-off,analog output function parameter group					
Function code	Name	Set range	Min. unit	Factory Default	Modifi-cation
F09.00	Open collector output terminal Y1 output setting	0: Terminal unused 1: Operation (RUN) 2: Frequency converter runs forward 3: Frequency converter reverse operation 4: DC braking 5: Run prepare finish(Bus-bar voltage normal, fault free, no run forbid, receive) 6: Stop command indication 7: No current detection arrived 8: Over current detection arrived 9: Current 1 arrived 10: Current 2 arrived 11: No frequency output 12: Frequency arrival signal (FAR) 13: Frequency level detection signal 1 (FDT1) 14: Frequency level detection signal 2 (FDT2) 15: The output frequency upper limit (FHL) 16: The output frequency reaches lower limit (FLL) 17: Frequency 1 arrival the output 18: Frequency 2 override the output 19: Overload early warning signal (OL) 20: under voltage lockout stop (LU) 21: External fault stop (EXT) 22: Fault 23: Alarm 24: Simple PLC operation 25: Simple PLC section operation completed 26: Simple PLC simple PLC operation finish 27: Simple PLC operation stop 28: Traverse upper and low limit 29: Set length arrival 30: Internal counter final value arrival	1	0	×

		31: The designated value of the internal counter arrival 32: Internal timer arrival--output0.5s valid signal on arrival 33: Operation stop time finish 34: Operation arrival time finish 35: The set running time arrives 36: Setup run time arrival 37: 1st pump run with variable frequency 38: 2nd pump run with variable frequency 39, 40: Reserved 41: Communication given 42: Reserved 43: Torque arriving output 44: Reserved 45: Brake logic 1 (Brake in the process of switching forward and reverse) 46: Brake logic 2 (No brake in the process of switching forward and reverse) 47: Inverter is running 1 (non-jogging operation) 48: Analog input disconnection signal output 49: valid when X1 terminal closed 50: valid when X2 terminal closed 51: Water shortage fault output 52: Lifting special brake control 53: Position control 54: Positioning finish 55: Positioning close 56: The spindle stops accurately. 57: Return to origin completed 58～60: reserved			
F09.01	Open collector output terminal Y2 output setting	Same as F09.00	1	0	×
F09.02	OC1(extension) output setting	Same as F09.00	1	0	×
F09.03	OC2(extension) output setting	Same as F09.00	1	0	×
F09.04	RLY1 output setting	Same as F09.00	1	22	×
F09.05	Frequency arrival (FAR) detection amplitude	0.00～50.00Hz	0.01Hz	5.00Hz	○
F09.06	FDT1 (frequency level) level	0.00Hz～upper limit frequency	0.01Hz	10.00Hz	○
F09.07	FDT1 hysteresis	0.00～50.00Hz	0.01Hz	1.00Hz	○
F09.08	FDT2 (frequency level) level	0.00Hz～upper limit frequency	0.01Hz	10.00Hz	○
F09.09	FDT2 hysteresis	0.00～50.00Hz	0.01Hz	1.00Hz	○
F09.10	Zero frequency signal detection value	0.00Hz～upper limit frequency	0.01Hz	0.40Hz	○
F09.11	zero frequency hysteresis	0.00Hz～upper limit frequency	0.01Hz	0.10Hz	○
F09.12	Zero current detection amplitude	0.0～50.0%	0.1%	0.0%	○
F09.13	Zero current detection time	0.00～60.00s	0.01s	0.1s	○
F09.14	Over-current detection value	0.0～250.0%	0.1%	160.0%	○
F09.15	Over-current detection	0.00～60.00s	0.01s	0.00s	○

	time				
F09.16	Current 1 arrival the detection value	0.0～250.0%	0.1%	100.0%	○
F09.17	Current 1 width	0.0～100.0%	0.1%	0.0%	○
F09.18	Current 2 arrival the detection value	0.0～250.0%	0.1%	100.0%	○
F09.19	Current 2 width	0.0～100.0%	0.1%	0.0%	○
F09.20	Frequency 1 arrival the detection value	0.00Hz～upper limit frequency	0.01Hz	50.00Hz	○
F09.21	Frequency 1 arrival detection width	0.00Hz～upper limit frequency	0.01Hz	0.00Hz	○
F09.22	Frequency 2 arrival the detection value	0.00Hz～upper limit frequency	0.01Hz	50.00Hz	○
F09.23	Frequency 2 arrival detection width	0.00Hz～upper limit frequency	0.01Hz	0.00Hz	○
F09.24	Output terminal positive and negative logic settings	0000～FFFF	1	0000	○
F09.25	Y1 output closing delay time	0.000～50.000s	0.001s	0.000s	○
F09.26	Y1 output disconnect delay time	0.000～50.000s	0.001s	0.000s	○
F09.27	Y2 output closing delay time	0.000～50.000s	0.001s	0.000s	○
F09.28	Y2 output disconnect delay time	0.000～50.000s	0.001s	0.000s	○
F09.29	OC1(extension) output closing delay time	0.000～50.000s	0.001s	0.000s	○
F09.30	OC1 (extension) output disconnect delay time	0.000～50.000s	0.001s	0.000s	○
F09.31	OC2 (extension) output closing delay time	0.000～50.000s	0.001s	0.000s	○
F09.32	OC2 (extension) output disconnect delay time	0.000～50.000s	0.001s	0.000s	○
F09.33	RLY1 output closing delay time	0.000～50.000s	0.001s	0.000s	○
F09.34	RLY1 output disconnect delay time	0.000～50.000s	0.001s	0.000s	○
F09.35	Analog output (AO) selection	0: Frequency after acceleration and deceleration (0.00Hz～upper limit frequency) 1: Output synchronization frequency (0.00Hz～upper limit frequency) 2: Set frequency (0.00Hz～upper limit frequency) 3: Main setting freq. (0.00Hz～upper limit freq.) 4: Auxiliary setting freq. (0.00Hz～upper limit freq.) 5: Output current 1 (0～2× rated current of the inverter) 6: Output current 2 (0～3×motor rated current) 7: Output voltage (0～1.2×rated voltage of load motor) 8: Bus bar voltage (0～1.5×rated bus voltage) 9: Motor speed (0～5 times rated speed) 10: PID provision (0.00～10.00V) 11: PID feedback (0.00～10.00V) 12: AI1 (0.00～10.00V) 13: AI2 (0.00～10.00V or 0～20mA) 14: Communication provision	1	0	○

		15: Motor rotor speed (0.00Hz～upper limit freq.) 16: Current setting torque (0~2 times rated torque) 17: Current output torque (0~2 times rated torque) 18: Current torque current (0~2 times motor rated current) 19: Current flux current (0～1 times motor rated current) 20: Position deviation (0.05V/encoder unit) 21: Command speed (-upper limit freq. ～+ upper limit freq.) 22: Feedback speed (-upper limit freq. ～+ upper limit freq.) 23: Speed feed forward (-upper limit freq. ～ + upper limit freq.) 24: Positioning completion command (positioning completion: 5V;Positioning not completed: 0V) 25: AI3(extension)			
F09.36	AO2(extension) output selection	Same as F09.35	1	0	○
F09.37	HDO function selection (Reused with Y2)	Same as F09.35	1	0	○
F09.38	Reserved				
F09.39	Analog output (AO) filter time	0.0～20.0s	0.1s	0.0s	○
F09.40	Analog output (AO) gain	0.00～2.00	0.01	1.00	○
F09.41	Analog output (AO) deviation	-100.0%～100.0%	0.1%	0.0%	○
F09.42	AO2(extension) output filter time	0.0～20.0s	0.1s	0.0s	○
F09.43	AO2(extension) output gain	0.00～2.00	0.01	1.00	○
F09.44	AO2(extension) output deviation	-100.0%～100.0%	0.1%	0.0%	○
F09.45	DO filter time	0.0～20.0s	0.1s	0.0s	○
F09.46	DO output gain	0.00～2.00	0.01	1.00	○
F09.47	DO maximum pulse output frequency	0.1～20.0KHz	0.1KHz	10.0KHz	○
F09.48	Torque arrival detection time	0.02～200.00s	0.01s	1.00s	○
F09.49	Apply macro selection	0: General model 1: Air compressor application 2: Extruder application 3: Water pump application 4: Fan application	1	0	×
F09.50 ～ F09.55	Reserved				

F10-Simple PLC/multi-speed function parameter group					
Function code	Name	Set range	Min. unit	Factory Default	Modifi-cation
F10.00	Simple PLC operation setting	Units digit: Running mode selection 0: Inaction 1: Stop after single cycle 2: Keep the final value after a single cycle	1	0000	×

		3: Continuous loop Tens digit: Interrupt operation and restart mode selection 0: Restart from the first phase 1: Continue running at the stage frequency at the time of interruption 2: Continue running at the operating frequency at the time of interruption Hundreds digit: PLC running time unit 0: second 1:Minute Thousands digit: power-down memory selection 0: No memory 1: Store the stage and frequency of the power-off moment. store of the PLC operating status during power-off, including the stage of the power-off moment, operating frequency, and elapsed running time.			
F10.01	Stage 1 setup	000H～E22H Units digit: frequency setting 0: Multi-segment frequency i (i=1～15) 1: The frequency is determined by the main and auxiliary synthesis frequencies. 2: Reserved Tens digit: PLC and multi-speed running direction selection 0: Forward 1: Reverse 2: Determined by the run command Hundreds digit: acceleration and deceleration time selection 0: Acceleration and deceleration time 1 1: Acceleration and deceleration time 2 2: Acceleration and deceleration time 3 3: Acceleration and deceleration time 4 4: Acceleration and deceleration time 5 5: Acceleration and deceleration time 6 6: Acceleration and deceleration time 7 7: Acceleration and deceleration time 8 8: Acceleration and deceleration time 9 9: Acceleration and deceleration time 10 A: Acceleration and deceleration time 11 B: Acceleration and deceleration time 12 C: Acceleration and deceleration time 13 D: Acceleration and deceleration time 14 E: Acceleration and deceleration time 15	1	020	○
F10.02	Stage 2 Setting	000H～E22H	1	020	○
F10.03	Stage 3 Setting	000H～E22H	1	020	○
F10.04	Stage 4 Setting	000H～E22H	1	020	○
F10.05	Stage 5 Setting	000H～E22H	1	020	○
F10.06	Stage 6 Setting	000H～E22H	1	020	○
F10.07	Stage 7 Setting	000H～E22H	1	020	○
F10.08	Stage 8 Setting	000H～E22H	1	020	○
F10.09	Stage 9 Setting	000H～E22H	1	020	○
F10.10	Stage 10 Setting	000H～E22H	1	020	○
F10.11	Stage 11 Setting	000H～E22H	1	020	○
F10.12	Stage 12 Setting	000H～E22H	1	020	○

F10.13	Stage 13Setting	000H～E22H	1	020	○
F10.14	Stage 14 Setting	000H～E22H	1	020	○
F10.15	Stage 15 Setting	000H～E22H	1	020	○
F10.16	Phase 1 run time	0～6000.0	0.1	10.0	○
F10.17	Phase 2 run time	0～6000.0	0.1	10.0	○
F10.18	Phase 3 run time	0～6000.0	0.1	10.0	○
F10.19	Phase 4 run time	0～6000.0	0.1	10.0	○
F10.20	Phase 5 run time	0～6000.0	0.1	10.0	○
F10.21	Phase 6 run time	0～6000.0	0.1	10.0	○
F10.22	Phase 7 run time	0～6000.0	0.1	10.0	○
F10.23	Stage 8 run time	0～6000.0	0.1	10.0	○
F10.24	Stage 9 run time	0～6000.0	0.1	10.0	○
F10.25	Stage 10 run time	0～6000.0	0.1	10.0	○
F10.26	Stage 11 run time	0～6000.0	0.1	10.0	○
F10.27	Stage 12 run time	0～6000.0	0.1	10.0	○
F10.28	Stage 13 run time	0～6000.0	0.1	10.0	○
F10.29	Stage 14 run time	0～6000.0	0.1	10.0	○
F10.30	Stage 15 run time	0～6000.0	0.1	10.0	○
F10.31	Multistage frequency 1	0.00Hz～upper limit frequency	0.01Hz	5.00Hz	○
F10.32	Multistage frequency 2	0.00Hz～upper limit frequency	0.01Hz	10.00Hz	○
F10.33	Multistage frequency 3	0.00Hz～upper limit frequency	0.01Hz	20.00Hz	○
F10.34	Multistage frequency 4	0.00Hz～upper limit frequency	0.01Hz	30.00Hz	○
F10.35	Multistage frequency 5	0.00Hz～upper limit frequency	0.01Hz	40.00Hz	○
F10.36	Multistage frequency 6	0.00Hz～upper limit frequency	0.01Hz	45.00Hz	○
F10.37	Multistage frequency 7	0.00Hz～upper limit frequency	0.01Hz	50.00Hz	○
F10.38	Multistage frequency 8	0.00Hz～upper limit frequency	0.01Hz	5.00Hz	○
F10.39	Multistage frequency 9	0.00Hz～upper limit frequency	0.01Hz	10.00Hz	○
F10.40	Multistage frequency 10	0.00Hz～upper limit frequency	0.01Hz	20.00Hz	○
F10.41	Multistage frequency 11	0.00Hz～upper limit frequency	0.01Hz	30.00Hz	○
F10.42	Multistage frequency 12	0.00Hz～upper limit frequency	0.01Hz	40.00Hz	○
F10.43	Multistage frequency 13	0.00Hz～upper limit frequency	0.01Hz	45.00Hz	○
F10.44	Multistage frequency 14	0.00Hz～upper limit frequency	0.01Hz	50.00Hz	○
F10.45	Multistage frequency 15	0.00Hz～upper limit frequency	0.01Hz	50.00Hz	○

F11-Closeloop PID run function parameter group					
Function code	Name	Set range	Min. unit	Factory Default	Modifi-cation
F11.00	Closed loop operation control selection	0:PID closed-loop operation control invalid 1: PID closed-loop operation control valid	1	0	×
F11.01	Provided channel selection	0: Digital provision 1: AI1 simulation provision 2: AI2 simulation provision 3: AI3 simulation provision(extension) 5: Pulse provision 6: Communication provision(communication address: 1D00) 7: Reserved	1	0	○
F11.02	Feedback channel selection	0: AI1 analog input 1: AI2 analog input 2: AI3 simulation provision(extension) 4: AI1+AI2 5:AI1-AI2 6:Min{AI1,AI2} 7:Max{AI1, AI2} 8: Pulse input	1	0	○

		9: Communication feedback (the address is 1DOC, 4000 stand for 10.00V)			
F11.03	Provided channel filter time	0.00～50.00s	0.01s	0.00s	×
F11.04	Feedback channel filter time	0.00～50.00s	0.01s	0.00s	×
F11.05	PID output filter time	0.00～50.00s	0.01s	0.00s	○
F11.06	Provided digital setting	0.00～10.00V	0.01V	1.00V	○
F11.07	Proportional gain Kp	0.00～100.00	0.01	0.50	○
F11.08	Integral gain Ki	0.01～10.00	0.01	0.25	○
F11.09	Differential gain Kd	0.000～10.00	0.01	0.00	○
F11.10	Sampling period T	0.01～1.00s	0.01s	0.10s	○
F11.11	Deviation limit	0.0～20.0% relative to the percentage of the provided value	0.1%	2.0%	○
F11.12	PID differential amplitude limiting	0.00～100.00%	0.01%	0.10%	○
F11.13	Closed loop regulation characteristics	0: Action 1: Reaction	1	0	○
F11.14	Feedback channel positive and negative characteristics	0: Positive characteristics 1: Negative characteristics	1	0	○
F11.15	PID regulation upper limit frequency	0.00Hz～upper limit frequency	0.01Hz	50.00Hz	○
F11.16	PID regulation lower limit frequency	0.00Hz～upper limit frequency	0.01Hz	0.00Hz	○
F11.17	Integral adjustment selection	0: When the integral reaches the separation PID threshold, stop the integral adjustment 1: When the integral reaches the separation PID threshold, continue the integral adjustment	1	0	○
F11.18	Integral separation PID threshold	0.0～100.0%	0.1%	100.0%	○
F11.19	Closed loop preset frequency	0.00Hz～upper limit frequency	0.01Hz	0.00Hz	○
F11.20	Closed-loop preset frequency holding time	0.0～6000.0s	0.1s	0.0s	○
F11.21	Closed loop output reversal selection	0: The closed-loop output is negative, and the inverter runs at the following frequency limit 1: Closed-loop output is negative, running in reverse (affected by the running direction setting) 2: Determined by the operation command	1	2	○
F11.22	Closed-loop output reversal frequency upper limit	0.00Hz～upper limit frequency	0.01Hz	50.00Hz	○
F11.23	Multi-section closed loop provision 1	0.00～10.00V	0.01V	0.00V	○
F11.24	Multi-section closed loop provision 2	0.00～10.00V	0.01V	0.00V	○
F11.25	Multi-section closed loop provision 3	0.00～10.00V	0.01V	0.00V	○
F11.26	Multi-section closed loop given 4	0.00～10.00V	0.01V	0.00V	○
F11.27	Multi-section closed loop provision 5	0.00～10.00V	0.01V	0.00V	○
F11.28	Multi-section closed loop provision 6	0.00～10.00V	0.01V	0.00V	○
F11.29	Multi-section closed loop	0.00～10.00V	0.01V	0.00V	○

	provision 7				
F11.30 ~ F11.36	Reserved				

F12-Constant pressure water supply function parameter group					
Function code	Name	Set range	Min. unit	Factory Default	Modifi-cation
F12.00	Constant pressure water supply mode selection	0: No constant pressure water supply 1: Single pump constant pressure water supply mode 2～4: Reserved 5: Select inverter Y1, Y2 as the double-pump timing alternate constant pressure water supply mode.	1	0	×
F12.01	Target pressure setting	0.000～Remote pressure gauge range	0.001MPa	0.200MPa	○
F12.02	Sleep frequency threshold	0.00Hz～upper limit frequency	0.01Hz	30.00Hz	○
F12.03	Awake pressure threshold	0.000～Remote pressure gauge range	0.001MPa	0.150MPa	○
F12.04	Sleep delay time	0.0～6000.0s	0.1s	0.0s	○
F12.05	Wake-up delay time	0.0～6000.0s	0.1s	0.0s	○
F12.06	Remote pressure gauge range	0.001～9.999Mpa	0.001MPa	1.000MPa	○
F12.07 ~ F12.09	Reserved				
F12.10	Automatic switching time interval	0000～65535 minutes	1	0	×
F12.11	Wake mode selection	0: Wake up according to the pressure defined by F12.03 1: Wake up according to the pressure calculated by F12.12*F12.01	1	0	○
F12.12	Wake-up pressure coefficient	0.01～0.99	0.01	0.75	○
F12.13	Reserved				
F12.14	Water shortage protection mode	0: Water shortage protection is invalid 1: Water shortage protection through the defined water shortage input X terminal 2: Water shortage protection through output current and frequency	1	0	○
F12.15	Water shortage protection current	10%～150%	1%	80%	○
F12.16	Wake-up time after water shortage protection	0～3000min	1min	60min	○
F12.17	Water shortage protection judgment time	1.0～100.0s	0.1s	5.0s	○
F12.18	Select the threshold of Sleep Frequency	0: F12.02 Set frequency 1: F11.16 or F12.02 Set frequency value	1	1	○

F13-Traverse/Fixed Length control function parameter group					
Function code	Name	Set range	Min. unit	Factory Default	Modifi-cation
F13.00	Traverse function selection	0: Traverse invalid 1: Traverse valid	1	0	×
F13.01	Traverse operation mode	Units digit: Enter mode 0: Automatic input method 1: Terminal enter manually Tens digit: Traverse enter model selection 0: Variable amplitude 1: Fixed amplitude Hundreds digit: Traverse stop and start mode selection 0: Restart 1: Start as previous stop record Thousands digit: Traverse status storage selection 0: Do not store 1: Store	1	0000	×
F13.02	Traverse frequency swing value	0.0～50.0%	0.1%	10.0%	○
F13.03	Sudden-jump frequency	0.0～50.0%	0.1%	2.0%	○
F13.04	Traverse cycle	0.1～999.9s	0.1s	10.0s	○
F13.05	Triangular wave rise time	0.0～98.0% (swing frequency cycle)	0.1%	50.0%	○
F13.06	Preset frequency of traverse	0.00～400.00Hz	0.01Hz	0.00Hz	○
F13.07	Traverse preset frequency waiting time	0.0～6000.0s	0.1s	0.0s	○
F13.08	Length setting	0～65535（m/cm/mm）	1	0	○
F13.09	Number of pulses for axis per cycle	1～10000	1	1	○
F13.10	Axis perimeter	0.01～655.35cm	0.01cm	10.00cm	○
F13.11	Percentage of remaining length	0.00%～100.00%	0.01%	0.00%	○
F13.12	Length correction factor	0.001～10.000	0.001	1.000	○
F13.13	Record length processing after the length arrival	Units digit: Reserved Tens digit: Length unit setting 0: Meter (m) 1: Centimeter (cm) 2: Millimeter (mm) Hundreds digit: Action when the length is reached 0: continue running 1: Stop according to stop mode 2: Loop fixed length control Thousands digit: software reset length (can be cleared through communication) 0: No operation 1: Clear the current length to 0 2: The current length and cumulative length are both cleared to 0	1	0000	○
F13.14	Record length manage	Units digit: Stop current length processing 0: Automatically cleared 1: Length maintained Tens digit: power-off length storage setting 0: No store 1: Store Hundreds digit: Length calculation at shutdown	0	011	○

		0: Don't calculate the length 1: Calculate the length			

F14-Vector control parameter group					
Function code	Name	Set range	Min. unit	Factory Default	Modifi-cation
F14.00	Speed/torque/position control selection	0: Speed control 1: Torque control 2: Position control 3: Torque mode ←→ Speed mode 4: Speed mode←→Position mode 5: Torque mode←→Position mode 6: Torque mode ←→ Speed ←→ Position mixed mode	1	0	○
F14.01	Speed loop high speed proportional gain	1～100	1	20	○
F14.02	Speed loop high speed integration time	0.01～10.00s	0.01s	1.00s	○
F14.03	Speed loop low speed proportional gain	1～100	1	30	○
F14.04	Speed loop low speed integral time	0.01～10.00s	0.01s	0.50s	○
F14.05	Speed loop parameter switching frequency 1	0.00Hz～F14.06	0.01Hz	5.00Hz	○
F14.06	Speed loop parameter switching frequency 2	F14.05～Upper limit frequency	0.01Hz	10.00Hz	○
F14.07	Maximum output voltage coefficient	100～120%	1%	105%	○
F14.08	Reserved				
F14.09	Reserved				
F14.10	Asynchronous machine excitation adjustment proportional gain	0～60000	1	2000	○
F14.11	Asynchronous machine excitation adjustment integral gain	0～60000	1	1300	○
F14.12	Asynchronous machine torque adjustment proportional gain	0～60000	1	2000	○
F14.13	Asynchronous machine torque adjustment integral gain	0～60000	1	1300	○
F14.14	Asynchronous machine without speed vector slip gain	50%～200%	1%	100%	○
F14.15	Reserved				
F14.16	Asynchronous machine speed feedback filter time (valid under SVC)	0.001～0.100s	0.001s	0.015s	○
F14.17	Asynchronous machine flux braking coefficient	100～300%	1%	100%	○
F14.18	Reserved				
F14.19	Electrictorque current limit value	0.0～250.0%	0.1%	150.0%	○
F14.20	Braking torque current	0.0～250.0%	0.1%	150.0%	○

	limit value				
F14.21	Torque provided and limit channel selection	Units digit: Torque provided channel selection 0: Digital setting (determined by F14.23) 1: AI1 analog setting 2: AI2 analog setting 3: Terminal UP/DOWN adjustment setting 4:Communication setting(communication address: 1D01) 5: Operate keyboard knob to set 6: AI3 analog setting (extension) 7: High-speed pulse setting (X5 terminal needs to select the corresponding function) 8: Terminal pulse width setting (X5 terminal needs to select the corresponding function) Note: The maximum value of channels 1 to 8 corresponds to F14.23 Tens digit: Electric torque limit channel selection 0: Digital setting (determined by F14.19) 1: AI1 analog setting 2: AI2 analog setting 3: Terminal UP/DOWN adjustment setting 4: Reserved 5: Operate keyboard knob to set 6: AI3 analog setting (extension) 7: High-speed pulse setting (X5 terminal needs to select the corresponding function) 8: Terminal pulse width setting (X5 terminal needs to select the corresponding function) Note: The maximum value of channels 1 to 8 corresponds to F14.19 Hundreds digit: Braking torque limit channel selection 0: Digital setting (determined by F14.20) 1: AI1 analog setting 2: AI2 analog setting 3: Terminal UP/DOWN adjustment setting 5: Operate keyboard knob to set 7: High-speed pulse setting (X5 terminal needs to select the corresponding function) 6: AI3 analog setting (extension) 8: Terminal pulse width setting (X5 terminal needs to select the corresponding function) Note: The maximum value of channels 1 to 8 corresponds to F14.20	1	000	○
F14.22	Torque polarity setting	0000～0102 Units digit: Torque provided polarity 0: Positive 1: Negative 2: Determined by the operation command Tens digit: reserved Hundreds digit: F14.30 compensation is weakened when the motor is stalled 0: Invalid 1: Enabled Thousands: reserved	1	0000	○
F14.23	Torque digital value setting	0.0～200.0%	0.1%	0.0%	○
F14.24	Torque control forward speed limit channel	0: digital setting 1: AI1 analog setting	1	0	×

	selection	2: AI2 analog setting 3: Terminal UP/DOWN adjustment setting 4: Communication provision(communication address: 1D0A) 5: Operate keyboard knob to set 6: AI3 analog setting (extension) 7: High-speed pulse setting (X5 terminal needs to select the corresponding function) 8: Terminal pulse width setting (X5 terminal needs to select the corresponding function)			
F14.25	Torque control reverse speed limit channel selection	0: digital setting 1: AI1 analog setting 2: AI2 analog setting 3: Terminal UP/DOWN adjustment setting 4: Communication provision(communication address: 1D0B) 5: Operate keyboard knob to set 6: AI3 analog setting (extension) 7: High-speed pulse setting (X5 terminal needs to select the corresponding function) 8: Terminal pulse width setting (X5 terminal needs to select the corresponding function)	1	0	×
F14.26	Torque control forward speed limit value	0.00Hz～upper limit frequency	0.01Hz	50.00Hz	○
F14.27	Torque control reverse speed limit value	0.00Hz～upper limit frequency	0.01Hz	50.00Hz	○
F14.28	Set torque acceleration time	0.000～60.000s	0.001s	0.100s	○
F14.29	Set torque deceleration time	0.000～60.000s	0.001s	0.100s	○
F14.30	Torque compensation	-100.0%～100.0%	0.1%	0.0%	○
F14.31	Torque compensation cutoff frequency	0.00Hz～upper limit frequency	0.01Hz	20.00Hz	○
F14.32	Positive torque gain adjustment coefficient	50.0～150.0%	0.1%	100.0%	○
F14.33	Reverse torque gain adjustment coefficient	50.0～150.0%	0.1%	100.0%	○
F14.34	Enable automatic adjustment of asynchronous motor weak magnetic torque	0: invalid 1: valid	1	0	○
F14.36	Synchronous machine excitation adjustment proportional gain	0～60000	1	2000	○
F14.37	Synchronous machine excitation adjustment integral gain	0～60000	1	1300	○
F14.38	Synchronous machine torque adjustment proportional gain	0～60000	1	2000	○
F14.39	Synchronous machine torque adjustment integral gain	0～60000	1	1300	○
F14.40	Synchronous machine flux braking coefficient	0%～150%	1%	0%	○
F14.41	Synchronous machine field weakening control	0: No magnetic weakening 1: Automatic adjustment	1	1	×

	method				
F14.42	Synchronous machine field weakening gain	0～50	1	5	○
F14.43	Synchronous machine generator torque upper limit effective enable	0: invalid 1: valid	1	0	×
F14.44	Synchronous machine output voltage upper limit margin	0%～50%	1%	5%	○
F14.45	Synchronous machine SVC initial position detection current	20%～180%	1%	80%	○
F14.46	Synchronous machine SVC initial position angle detection	0: Detect 1: No detect 2: Detect once electrified	1	0	×
F14.47	Synchronous machine salient pole rate adjustment gain	50～500	1	100	○
F14.48	Synchronous machine maximum torque current ratio control	0: invalid 1: valid	1	0	○
F14.49	Current loop KP during synchronous machine tuning	1～100	1	6	○
F14.50	Current loop KI during synchronous machine tuning	1～100	1	6	○
F14.51	Synchronous machine SVC speed filter level	10～1000	1	100	○
F14.52	Synchronous machine SVC speed estimation proportional gain	5～200	1	40	○
F14.53	Synchronous machine SVC speed estimation integral gain	5～200	1	30	○
F14.54	Synchronous machine SVC low speed excitation current	0～80%	1%	30%	○
F14.55	Synchronous machine SVC low speed carrier frequency	0.8K～F04.09	0.1K	1.5K	○
F14.56	Synchronous machine SVC initial position detection minimum current	20～80%	1%	50%	○
F14.57	Synchronous machine SVC online tuning enable(synchronous machine debugging-free mode)	0: off 1: Tuning before powering on and running for the first time 2: Tune once before each run	1	0	○
F14.58	Synchronous motor SVC online back electromotive force identification	0: Close 1: open	1	0	○
F14.59	SVC initial position compensation angle	0～360.0°	0.1°	0.0°	○
F14.60	Second gain mode setting	0: Fixed use of the first gain (F16.20~F16.23) 1: First and second gain switching mode. (When	1	0	○

		the speed is lower than F14.05, use the first gain (F16.20~F16.23), and when the speed is higher than F14.06, use the second gain (F14.61~F14.64) Note: F14.60 to F14.64 are valid when F16.34=0 or 1.			
F14.61	Second speed loop gain	0.1～1000.0	0.1	30.0	○
F14.62	Second speed loop integration time	0.36ms～512.00ms	0.01ms	26.53ms	○
F14.63	Second position loop gain	0.0～1570.0	0.1	48.0	○
F14.64	Second torque command filter time	0.00ms～30.00ms	0.01ms	0.66ms	○
F14.65～F14.69	Reserved				

F15-Motor parameter group					
Function code	Name	Set range	Min. unit	Factory Default	Modifi-cation
F15.00	Motor type	0: Asynchronous motor 1: Synchronous motor	1	0	×
F15.01	Motor rated power	0.1～6553.5KW	0.1KW	Base on motor type	×
F15.02	Motor rated voltage	1～800V	1V	Base on motor type	×
F15.03	Motor rated current	0.01～655.35A (motor power＜7.5KW) 0.1～6553.5A (motor power ≥7.5KW)	0.01A /0.1A	Base on motor type	×
F15.04	Motor rated frequency	0.00～upper limit frequency	0.01Hz	Base on motor type	×
F15.05	Motor rated speed	0～32000r/min	1r/min	Base on motor type	×
F15.06	Number of motor pole pairs No.	1～100	1	2	*
F15.07	Asynchronous motor stator resistance	0.001～65.535Ω (motor power＜7.5KW) 0.0001～6.5535Ω (motor power ≥7.5KW)	0.001Ω 0.0001Ω	Base on motor type	×
F15.08	Asynchronous motor rotor resistance	0.001～65.535Ω (motor power＜7.5KW) 0.0001～6.5535Ω (motor power≥7.5KW)	0.001Ω 0.0001Ω	Base on motor type	×
F15.09	Asynchronous motor leakage inductance	0.01～655.35mH (motor power＜7.5KW) 0.001～65.535mH (motor power ≥7.5KW)	0.01mH 0.001mH	Base on motor type	×
F15.10	Asynchronous motor mutual inductance	0.1～6553.5mH (motor power＜7.5KW) 0.01～655.35mH (motor power ≥7.5KW)	0.1mH 0.01mH	Base on motor type	×
F15.11	Asynchronous motor no-load current	0.01～655.35A (motor power＜7.5KW) 0.1～6553.5A (motor power ≥7.5KW)	0.01A 0.1A	Base on motor type	×
F15.12	Synchronous machine stator resistance	0.001～65.535Ω (motor power＜7.5KW) 0.0001～6.5535Ω (motor power ≥7.5KW)	0.001Ω 0.0001Ω	Base on motor type	×

F15.13	Synchronous machine D-axis inductor	0.01～655.35mH (motor power＜7.5KW)	0.01mH	Base on motor type	×
		0.001～65.535mH (motor power ≥7.5KW)	0.001mH		
F15.14	Synchronous machine Q-axis inductor	0.01～655.35mH (motor power＜7.5KW)	0.01mH	Base on motor type	×
		0.001～65.535mH (motor power≥7.5KW)	0.001mH		
F15.15	Synchronous motor back electromotive force	0.0～6553.5V	0.1V	Base on motor type	×
F15.16	Motor moment of inertia Jm	0.01～655.35Kg.cm^2(motor power below 7.5KW) 0.1～6553.5Kg.cm^2(motor power 7.5KW and above) 1～65535Kg.cm^2(motor power 75KW and above) Note: This parameter is valid under closed-loop vector and F16.34=0 or 1.	0.01 /0.1 /1 Kg.cm^2	Base on motor type	×
F15.17	Motor torque coefficient Kt	0.01～655.35Nm/Arms Note 1: Motor rated parameters will be updated automatically after changes Note 2: This parameter is valid under closed-loop vector and F16.34=0 or 1.	0.01 Nm/Arms	Base on motor type	×
F15.18	Reserved				
F15.19	Motor parameter self-tuning selection	0: Inaction 1: Synchronous motor staticself-tuning selection 2: Asynchronous motor rotation no-load self-tuning selection 3: Asynchronous machine full self-tuning selection 11: Synchronous machine static self-tuning 12: Synchronous machine rotation self-tuning 20: Load inertia identification Note: 1. Before tuning, the motor nameplate data and F15.00 need to be correctly set. 2. The motor parameter group can automatically set the default value according to the machine model settings, or it can be manually modified and self-tuning corrected. 3. After modifying the F15.01 parameter, other parameters of the motor will be automatically set to default values. 4. During inertia identification, press the RUN key in the monitoring interface to start the identification. After starting, you can press the STOP key at any time to end the identification. When the identification result is stable, you can long press the UP key, and the inertia value displayed on the keyboard is stored in the load inertia parameter. Inertia identification is only valid under vector control with PG. Before starting the load inertia identification, you should first set the motor parameters of groups F00.19, F16.00, F00.24, and F15 according to the encoder and motor nameplate, and then perform static or rotational tuning of the motor.	1	00	×
F15.20	Communication expansion card software version	–	–	–	*
F15.21	Reserved				
F15.22	Reserved				

F16-Encoder and position control parameters					
Function code	Name	Set range	Min. unit	Factory Default	Modifi-cation
F16.00	Encoder line number	1～10000	1	1024	×
F16.01	Encoder speed measurement direction is inversion	0: Forward 1: Reverse Note: Valid for resolver and ABZ signals, this parameter is automatically updated after motor rotation self-tuning.	1	0	×
F16.02	Number of pole pairs of rotating transformer	1～32	1	1	×
F16.03	Encoder mounting angle	0.0～359.9° Note: Valid for resolver and ABZ signals, this parameter is automatically updated after synchronous motor rotation self-learning.	0.1	0.0°	○
F16.04	UVW encoder UVW phase sequence	0: Forward 1: Reverse	1	0	×
F16.05	Reserved				
F16.06	Reserved				
F16.07	Reserved				
F16.08	Location command source	0: Pulse command 1: Multi-segment position command provision	1	0	×
F16.09	Pulse command form	0: Pulse + direction 1: A phase + B phase orthogonal pulse, 4 times frequency 2:CW+CCW	1	0	×
F16.10	Command pulse inversion	0: invalid 1: inverse	1	0	×
F16.11	Position first-order low-pass filter time	0～1000.0ms	0.1ms	0.0ms	×
F16.12	Electronic gear ratio 1 (numerator)	1～32767	1	1	○
F16.13	Electronic gear ratio 1 (denominator)	1～32767	1	1	○
F16.14	Position error clearing action selection	0: Clear the position deviation when the servo is turned off or a fault occurs. 1: Clear position deviation pulse when enable OFF or fault occurs 2: The position deviation is cleared when the enable OFF occurs or the ClrPosErr signal input through the X terminal	1	0	×
F16.15	Positioning completion output conditions	0: Output when the absolute value of position deviation is less than F16.16 1: Output when the absolute value of the position deviation is less than F16.16 and the filtered position command is 0 2: Output when the absolute value of the position deviation is less than F16.16 and the position command before filtering is 0 3: Output when the absolute value of the position deviation is less than F16.16 and the position command before filtering is 0. It will remain valid for at least the time set by F16.17.	1	0	×
F16.16	Positioning completion threshold	1～65535	1	4	×

F16.17	Positioning completion window time	0ms～30000ms	1ms	1ms	○
F16.18	Positioning completion holding time	0ms～30000ms	1ms	0ms	○
F16.19	Positioning close to threshold	1～65535	1	100	×
F16.20	First speed loop gain	0.1～1000.0	0.1	25.0	○
F16.21	First speed loop integration time	0.36ms～512.00ms	0.01ms	31.83ms	○
F16.22	First position loop gain	0.0～1570.0	0.1	40.0	○
F16.23	First torque command filter time	0.00ms～30.00ms	0.01ms	0.79ms	○
F16.24	Load inertia ratio	0.00～200.00	0.01	0.00	○
F16.25	Speed feed forward control selection	0: Internal speed feedforward 1: Reserved	1	0	○
F16.26	Speed feedforward filter time	0.00ms～64.00ms	0.00ms	1.00ms	○
F16.27	Speed feed forward gain	0.0%～100.0%	0.1%	0.0%	○
F16.28	Torque feedforward control selection	0: No torque feedforward 1: Internal torque feedforward	1	1	○
F16.29	Torque feedforward filter time	0.00ms～64.00ms	0.01ms	1.00ms	○
F16.30	Torque feedforward gain	0.0%～200.0%	0.1%	0.0%	○
F16.31	Position error deviation limit	0～65535	1	4	○
F16.32	Rigidity test running turns	1～100	1	2	×
F16.33	Rigidity test auxiliary parameters	0: No operation 1, 2: Reserved 3: Number of rotations: F16.32, direction of rotation: forward → reverse 4: Number of rotations: F16.32, direction of rotation: reverse → forward 5: Number of rotations: F16.32, direction of rotation: forward → forward 6: Number of rotations: F16.32, direction of rotation: reverse → reverse Note: After selecting the debugging action suitable for the system requirements, long press the Run key to start the system rigid debugging. During the debugging process, you can press the STOP key to exit at any time.	1	0	×
F16.34	Closed-loop PI self-adjusting mode selection	0: Manual adjustment parameter 1 1: Parameter self-adjusting mode, using the rigidity table to automatically adjust the gain parameters 2: Manual adjustment parameter 2 (determined by F14 group PI parameters and 16 group position-related PI)	1	2	×
F16.35	Rigidity level selection	0～31	1	12	○
F16.36	Offline inertia identification mode	0: Forward and reverse mode 1: Forward rotation mode 2: Inversion mode	1	0	×
F16.37	Inertia identification maximum speed	50rpm～6000rpm	1rpm	500rpm	○
F16.38	Acceleration and deceleration time during inertia identification	2ms～20000ms	1ms	125ms	○

F16.39	Waiting time after completion of single inertia identification	20ms～10000ms	1ms	1000ms	○
F16.40	Completed single inertia identification of motor revolutions	0.00～655.35	0.01	-	*
F16.41	Excessive position deviation fault threshold	1～65535 (this function is invalid when 65535)	1	10000	○
F16.42	Pulse signal filtering	Units digit: command pulse input pin filter constant 0～3 Tens digit: Quadrature encoder input pin filter constant 0～3 Hundreds digit: Z signal filter strength 0～3 Thousands digit: Z signal correction enabled 0: No correction 1: Correction	1	1223	×
F16.43	Soft limit setting	0: Disable soft limit 1: Reserved 2: Enable soft limit after returning to zero	1	0	×
F16.44	Maximum value of soft limit	-2147483648～2147483647 (2^31)	1	2147483647	×
F16.46	Minimum value of soft limit	-2147483648～2147483647 (2^31)	1	-2147483648	×
F16.48	Reserved				
F16.49	Originreturn enable control	0: Turn off origin return 1: Input the Homing Start signal through the X terminal to enable the origin return function. 2: Return to origin immediately	1	0	○
F16.50	Return to origin mode	0: Return to zero in forward direction, deceleration point and origin are motor Z signal 1: Reverse zero return, the deceleration point and origin are the motor Z signal 2: Return to zero in the forward direction, the deceleration point and origin are the origin switches 3: Reverse zero return, the deceleration point and origin are the origin switches 4: Return to zero in forward direction, the deceleration point is the origin switch, and the origin is the motor Z signal 5: Reverse zero return, the deceleration point is the origin switch, and the origin is the motor Z signal	1	0	×
F16.51	High-speed search for origin switch signal frequency	0～upper limit frequency	0.01Hz	5.00	×
F16.52	Low speed search origin switch signal frequency	0～upper limit frequency	0.01Hz	0.50	×
F16.53	Acceleration and deceleration time when searching for origin	0ms～65535ms (time from 0 to 1000rpm)	1ms	1000ms	×
F16.54	Limit the time to find the origin	0ms～65535ms	1ms	10000ms	×
F16.55	Mechanical origin offset	-1073741824～1073741824	1	0	×

F16.57	Mechanical origin offset setting	0: F16.55 is the coordinate after origin return 1: F16.55 is the relative offset relative to the origin after return to origin.	1	0	×
F16.58	Accurate stop positioning enable selection	0: off 1: Enable (needs to cooperate with the spindle orientation enable terminal)	1	0	○
F16.59	Accurate stop zero input selection	0: Encoder Z-phase signal 1: X terminal zero switch signal (high-speed X port is recommended)	1	0	×
F16.60	Accurate stop positioning settings	Units position: The running direction when the zero stop is found for the first time. 0: Current running direction 1: Setting direction (tens setting) Tens digit: The running setting direction when the zero stop point is found for the first time. 0: Positive 1: Negative Hundreds place: reserved Thousands: reserved	1	0000	×
F16.61	Accurate stop and directional running direction	0: Based on the principle of shortest positioning distance, the running direction is automatically selected. 1: Orient in the forward direction 2: Orient in the reverse direction	1	0	×
F16.62	Accurate stop directional frequency	0.01～upper limit frequency	0.01Hz	5.00Hz	×
F16.63	Accurate stop directional acceleration and deceleration time	0ms～65535ms (time from 0 to 1000rpm)	1ms	3000ms	×
F16.64	Spindle position index 1	0.0°～359.9°	0.1°	0.0°	○
F16.65	Spindle position index 2	0.0°～359.9°	0.1°	45.0°	○
F16.66	Spindle position index 3	0.0°～359.9°	0.1°	90.0°	○
F16.67	Spindle position index 4	0.0°～359.9°	0.1°	135.0°	○
F16.68	Spindle position index 5	0.0°～359.9°	0.1°	180.0°	○
F16.69	Spindle position index 6	0.0°～359.9°	0.1°	225.0°	○
F16.70	Spindle position index 7	0.0°～359.9°	0.1°	270.0°	○
F16.71	Spindle position index 8	0.0°～359.9°	0.1°	315.0°	○
F16.72	Main shaft transmission ratio numerator (main shaft side gear)	1～32767	1	1	○
F16.73	Main shaft transmission ratio denominator (motor side gear)	1～32767	1	1	○
F16.74	Multi-position operation mode	0: Stop after a single operation (F16.75 selects the number of segments) 1: Loop operation (F16.75 selects the number of segments) 2: X terminal switching operation (selected through X terminal) 3: Sequential operation (F16.75 selects the number of segments)	1	1	×
F16.75	Number of end segments of displacement command	1～4	1	1	×
F16.76	Sequential operation starting section selection	0～4	1	0	×
F16.77	Multi-segment run	Units place: Displacement command type selection	1	0x0100	×

	settings	0: Relative displacement command 1: Absolute displacement command Tens place: time unit 0: ms 1: s Hundreds digit: Remaining processing methodafter pause (valid in the other three modes except X terminal switching operation mode) 0: Continue running the unfinished segment 1: Restart operation from segment 1 Thousands: Reserved			
F16.78	Multi-segment operation interrupt deceleration time	0ms～65535ms	1ms	1000ms	○
F16.79	Movement displacement of segment 1	-1073741824～1073741824	1	0	○
F16.81	The maximum operating frequency of the first stage displacement	0.01～upper limit frequency	0.01Hz	5.00Hz	○
F16.82	The first displacement acceleration and deceleration time	0ms～65535ms (time from 0 to 1000rpm)	1ms	1000ms	○
F16.83	Waiting time after the first displacement is completed	0ms/s～65535ms/s	1ms/s	100ms/s	○
F16.84	2nd segment movement displacement	-1073741824～1073741824	1	0	○
F16.86	Maximum operating frequency of the 2nd stage displacement	0.01～upper limit frequency	0.01Hz	5.00Hz	○
F16.87	2nd segment displacement acceleration and deceleration time	0ms～65535ms (time from 0 to 1000rpm)	1ms	1000ms	○
F16.88	Waiting time after completion of the second segment of displacement	0ms/s～65535ms/s	1ms/s	100ms/s	○
F16.89	3rd segment movement displacement	-1073741824～1073741824	1	0	○
F16.91	The maximum operating frequency of the third stage displacement	0.01～upper limit frequency	0.01Hz	5.00Hz	○
F16.92	The third segment displacement acceleration and deceleration time	0ms～65535ms (time from 0 to 1000rpm)	1ms	1000ms	○
F16.93	Waiting time after completion of the third segment of displacement	0ms/s～65535ms/s	1ms/s	100ms/s	○
F16.94	Section 4 Movement Displacement	-1073741824～1073741824	1	0	○
F16.96	The maximum operating frequency of the 4th stage displacement	0.01～upper limit frequency	0.01Hz	5.00Hz	○
F16.97	The 4th segment displacement acceleration and	0ms～65535ms (time from 0 to 1000rpm)	1ms	1000ms	○

	deceleration time				
F16.98	Waiting time after the 4th segment of displacement is completed	0ms/s～65535ms/s	1ms/s	100ms/s	○

F17-Monitoring parameter group					
Function code	Name	Set range	Min. unit	Factory Default	Modifi-cation
F17.00	Main setting frequency (no direction)	-	0.01Hz	-	*
F17.01	Auxiliary setting frequency (no direction)	-	0.01Hz	-	*
F17.02	Set frequency (no direction)	-	0.01Hz	-	*
F17.03	Output sync frequency (no direction)	-	0.01Hz	-	*
F17.04	Output current	-	0.1A /0.01A	-	*
F17.05	The output voltage	-	1V	-	*
F17.06	DC bus voltage	-	0.1V	-	*
F17.07	Load motor speed (with direction)	-32768～32767	1r/min	-	*
F17.08	Load motor line speed	-	1r/min	-	*
F17.09	Inverter temperature	-	1℃	-	*
F17.10	Elapsed running time this time	-	0.1 minutes	-	*
F17.11	Current cumulative running time	-	1 hour	-	*
F17.12	Current cumulative power-on time	-	1 hour	-	*
F17.13	Inverter status	-	-	-	*
F17.14	Input terminal status	-	-	-	*
F17.15	Output terminal status	-	-	-	*
F17.16	Sleep state	-	-	-	*
F17.17	Reserved				
F17.18	Communication virtual input terminal status	-	-	-	*
F17.19	Internal virtual input node status	-	-	-	*
F17.20	Analog input AI1 (after correction)	-	0.01V	-	*
F17.21	Analog input AI2 (after correction)	-	0.01V/0.01mA	-	*
F17.22	Encoder Z signal processing times	0～65535	-	-	*
F17.23	Encoder UVW signal status	0～7	-	-	*
F17.24	Analog AO output (after correction)	-	0.01V /0.01mA	-	*
F17.25	Analog output AO2 (extension) (after correction)	-	0.01V /0.01mA	-	*
F17.26	Reserved				
F17.27	Reserved				
F17.28	External pulse input frequency (before correction)	-	1Hz	-	*
F17.29	Analog input AI3(extension) (after correction)	-	0.01V /0.01mA	-	*
F17.30	Process PID given	-	0.01V	-	*

F17.31	Process PID feedback	-	0.01V	-	*
F17.32	Process PID error (with direction)	-	0.01V	-	*
F17.33	Process PID output (with direction)	-	0.01Hz	-	*
F17.34	Simple PLC current segment number	-	-	-	*
F17.35	Current segment number of external multi-speed	-	-	-	*
F17.36	Constant pressure water supply given pressure	-	0.001Mpa	-	*
F17.37	Constant pressure water supply feedback pressure	-	0.001Mpa	-	*
F17.38	Constant pressure water supply relay status	-	-	-	*
F17.39	Current length	-	m/cm/mm	-	*
F17.40	Cumulative length	-	m/cm/mm	-	*
F17.41	Current internal count value	-	-	-	*
F17.42	Current internal timing value	-	0.1s	-	*
F17.43	Run command to set channel	0: Keyboard 1: Terminal 2: Communication	-	-	*
F17.44	Main frequency given channel	-	-	-	*
F17.45	Auxiliary frequency given channel	-	-	-	*
F17.46	Inverter rated current	-	0.1A	-	*
F17.47	Inverter rated voltage	-	1V	-	*
F17.48	Inverter rated power	-	0.1KW	-	*
F17.49	Electric torque limit value	-	0.1% motor rated torque	-	*
F17.50	Braking torque limit value	-	0.1% motor rated torque	-	*
F17.51	Frequency after acceleration and deceleration (no direction)	-	0.01Hz	-	*
F17.52	Motor rotor frequency (no direction)	-	0.01Hz	-	*
F17.53	Current provided torque	-	0.1% motor rated torque with direction	-	*
F17.54	Current output torque	-	0.1% motor rated torque with direction	-	*
F17.55	Current torque current	-	0.1A	-	*
F17.56	Current flux current	-	0.1A	-	*
F17.57	Set motor speed	-	r/min	-	*
F17.58	Output Power	-	0.1KW	-	*
F17.59	Total power consumption is low	-	1KWH	-	*
F17.60	Total power consumption high	-	1 represents 10,000 1KWH	-	*
F17.61	Reserved				
F17.62	Reserved				
F17.63	Simple PLC total setting time	-	1s/min	-	*
F17.64	Simple PLC running time	-	1s/min	-	*
F17.65	Simple PLC remaining running time	-	1s/min	-	*
F17.66	Reserved				

F17.67	Closed loop detection frequency (with direction)	-	0.1Hz	-	*
F17.68	Motor temperature	-	1℃	-	*
F17.69	Current encoder position (relative to Z signal or resolver relative to zero signal, 0.0~359.9°)	-	0.1°	-	*
F17.70	Current spindle position (relative to zero point or Z signal, 0.0~359.9°)	-	0.1°	-	*
F17.71	Motor encoder feedback pulse counter (32-digit decimal display)	-	1	-	*
F17.73	Absolute position counter (32-digit decimal display)	-	1	-	*
F17.75	Input position command pulse counter 32-digit decimal display)	-	1	-	*
F17.77	Current position segment number		-	-	*
F17.78	Position deviation (encoder unit) (limited to -32768~32767)	-	1	-	*
F17.79	Command speed (with direction)	-32768～32767	1r/Min	-	*
F17.80	Motor speed (with direction)	-32768～32767	1r/Min	-	*
F17.81	Real-time input position instruction counter	-	1	-	*
F17.83～F17.90	Reserved				

F18-Enhanced control parameter group					
Function code	Name	Set range	Min. unit	Factory Default	Modifi-cation
F18.00	Operation panel control frequency bundling	0: No binding 1: Keyboard digital setting 2: AI1 analog setting 3: AI2 analog setting 4: Terminal UP/DOWN adjustment setting 5: Communication provided (Modbus and external bus share a main frequency memory) 6: Operate the keyboard knob to set 7: AI3 analog setting(extension) 8: High-speed pulse setting (X5 terminal needs to select the corresponding function) 9: Terminal pulse width setting (X5 terminal needs to select the corresponding function) 10: Terminal encoder reference (determined by X1, X2) 11～15: Reserved	1	0	○
F18.01	Terminal control frequency bundling	Same as above	1	0	○
F18.02	Communication control frequency bundling	Same as above	1	0	○

F18.03	Digital frequency integration function selection	Units digit: keyboard UP/DOWN integral control 0: With integration function 1: Without integration function Tens place: Terminal UP/DOWN integral control 0: With integration function 1: Without integration function Hundreds digit: keyboard shuttle knob is enabled (the shuttle keyboard is valid) 0: The shuttle knob is valid in the monitoring interface 1: The shuttle knob is invalid in the monitoring interface 2: In the monitoring interface, the UP DW and shuttleknob adjustments are invalid. Thousands place: keyboard adjustment frequency classic mode selection 0: Invalid 1: Valid, the adjustment range is determined by F18.05	1	0000	○
F18.04	Keyboard UP/DOWN integration rate	0.01～50.00Hz	0.01Hz	0.10Hz	○
F18.05	Keyboard no integral single step step size setting	0.01～10.00Hz	0.01Hz	0.01Hz	○
F18.06	Terminal UP/DOWN integration rate	0.01～50.00Hz	0.01Hz	0.20Hz	○
F18.07	Terminal without integral single step step size setting	0.01～10.00Hz	0.01Hz	0.10Hz	○
F18.08	Droop control descent rate	0.0%～100.0%	0.1%	0.0%	○
F18.09	Set cumulative power-on time	0～65535 hours	1	0	○
F18.10	Set cumulative running time	0～65535 hours	1	0	○
F18.11	Timing operation function enabled	0: Invalid 1: Valid	1	0	○
F18.12	Scheduled running downtime	0.1～6500.0Min	0.1Min	2.0Min	○
F18.13	Arrival time of this run	0.0～6500.0Min	0.1Min	1.0Min	○
F18.14	Keyboard UP/DOWN selection in monitoring mode	0: Adjust the keyboard frequency provided 1: PID digital given for adjustment 2: Reserved 3: Torque given adjustment 4～6: Reserved	1	0	○
F18.15	Reserved				
F18.16	Advanced control features	Units digit: reserved Tens digit: reserved Hundreds digit: Fast crossing enable when the frequency is lower than the lower limit 0: Invalid 1: Valid Thousands digit: During torque control, low torque reference PWM blockade is enabled (this bit is valid when F00.24=1) 0: Invalid	1	0000	○

		1: Valid			
F18.17	Cooling fan control options	Units digit: fan control mode 0: Intelligent fan 1: The inverter keeps running after power on 2: The fan is prohibited from running, but will automatically turn on if the temperature is greater than 75 degrees. Tens digit: Adjustable speed fan control mode 0: Intelligent PWM speed regulation 1: Running at maximum speed	1	10	○
F18.18	Reserved				
F18.19	Total power consumption is low	0～9999	1KWH	0	○
F18.20	Total power consumption high	0～65535 (1 represents 10000KWH)	10000 KWH	0	○
F18.21	Power consumption calculation calibration coefficient	50.0%～200.0%	0.1%	100.0%	○
F18.22	OC internal account	0～65535	1	-	×
F18.23	OC recording current	0.1～6553.5A	0.1A	-	*
F18.24	Output phase loss current detection coefficient	0～500	1	200	○
F18.25	Output phase loss detection level	3～10	1	6	○

F19-Protective relative function parameter group					
Function code	Name	Set range	Min. unit	Factory Default	Modifi-cation
F19.00	Power off restart waiting time	0.0～20.0s (0 means no start function)	0.1s	0.0s	×
F19.01	Fault self-recovery times	0～10 (0 means no automatic reset function)	1	0	×
F19.02	Failure self-recovery interval	0.5～50.0s	0.1s	5.0s	×
F19.03	Motor overload protection action selection	0: Alarm, continue running 1: Alarm, stop as halt mode 2: Failure, free stop	1	2	○
F19.04	Motor overload protection coefficient	10.0～2000.0%	0.1%	100.0%	○
F19.05	Inverter overload pre-alarm detection selection	0: Always detect 1: Only constant speed detection	1	0	○
F19.06	Inverter overload pre-alarm detection level	20～180% (inverter rated current)	1%	130%	○
F19.07	Inverter overload pre-alarmdelay time	0.0～20.0s	0.1s	5.0s	○
F19.08	Motor underload pre-alarm detection level	0.0～120.0% (motor rated current)	0.1%	50.0%	○
F19.09	Motor underload pre-alarm detection time	0.1～60.0s	0.1s	2.0s	○

F19.10	Motor underload alarm detection action	Units digit: detection selection 0: No detection 1: Always detect during operation 2: Only detected at constant velocity Tens digit: action selection 0: Alarm, continue running 1: Alarm, stop running as halt mode 2: Failure, free stop	1	00	○
F19.11	Input and output phase loss and short circuit detection action	Units digit: Input phase loss 0: No detection 1: Fault, free stop Tens digit: Output phase loss 0: No detection 1: Fault, free stop Hundreds digit: Enable detection of short-circuit protection to ground after power-on 0: No detection 1: Fault, free stop Thousands digit: short-circuit detection and protection to ground before operation is enabled 0: No detection 1: Fault, free stop	1	1111	○
F19.12	Overvoltage stall gain	0～100 Note: Valid under vector	1	30	○
F19.13	Overvoltage stall protection voltage	100～150% (rated bus bar voltage) Note: Valid under vector	1%	Base on the motor type	○
F19.14	Motor over-temperature protection selection	0：Invalid 1～3：Reserved 4：Protection with PT100 Note: One port of the PT sensor is connected to 10V, and the other port is connected to AI2 (AI2 is change to the current side) to achieve motor temperature sampling.	1	0	○
F19.15	Motor overheat protection threshold	0～200	1	110	○
F19.16	Motor overheating warning threshold	0～200	1	90	○
F19.17	Fast current limit enable	0: Invalid 1: Enabled	1	1	○
F19.18	Non-stop function selection when instant power off	0: Prohibited 1: Bus voltage constant control 2: Deceleration and stop	1	0	×
F19.19	Freq. droop rate when instant power off	80～100% (rated bus bar voltage)	1%	85%	×
F19.20	Voltage rebound estimate time when instant power off	0.0～100.0s	0.1s	0.5s	×
F19.21	Action estimate voltage when instant power off	60～100% (rated bus bar voltage)	1%	80%	×
F19.22	Instant stop and non-stop gain Kp	0～100	1	40	○
F19.23	Terminal external device fault action selection	0: Alarm, continue running 1: Alarm, stop run as halt mode 2: Failure, free stop	1	2	×
F19.24	Power-on terminal protection selection	0: Invalid 1: Valid	1	0	×

F19.25	Provided missing detection value	0～100%	1%	0%	○
F19.26	Provided loss checkout time	0.0～500.0s	0.1s	0.5s	○
F19.27	Feedback missing detection value	0～100%	1%	12%	○
F19.28	Feedback loss detection time	0.0～500.0s	0.1s	0.5s	○
F19.29	Error amount abnormality detection value	0～100%	1%	50%	○
F19.30	Error amount abnormality detection time	0.0～500.0s	0.1s	0.5s	○
F19.31	Protection action selection 1	Units digit: PID given loss detection action 0: No detection 1: Alarm, continue running 2: Alarm, stop according to stop mode 3: Fault, free stop Tens digit: PID feedback loss detection action 0: No detection 1: Alarm, continue running 2: Alarm, stop according to stop mode 3: Fault, free stop Hundreds digit: PID error amount abnormality detection action 0: No detection 1: Alarm, continue running 2: Alarm, stop according to stop mode 3: Fault, free stop	1	000	○
F19.32	Protection action selection 2	Units digit: abnormal communication actions, including communication timeouts and errors 0: Alarm, continue running 1: Alarm, stop according to stop mode 2: Fault, free stop Tens digit: E^2PROM abnormal action selection 0: Alarm, continue running 1: Alarm, stop according to stop mode 2: Fault, free stop Hundreds digit: Inverter overload selection 0: Fault, free stop 1: Use with derating Thousands digit: Operation undervoltage fault indication action selection 0: No detection 1: Fault, free stop	1	1000	×
F19.33	Protection action selection 3	Units digit: UVW encoder UVW signal error enable 0: Invalid 1: Fault, free stop Tens digit: Synchronous machine initial position angle identification fault enable 0: Invalid 1: Fault, free stop Hundreds digit: Synchronous machine load tuning failure 0: Invalid 1:Fault,free stop Thousands digit: Output phase loss detection is enabled at startup 0: Invalid 1: Valid	1	0111	×
F19.34	Protection action selection 4	Units digit: Frequency division output expansion card CAN communication fault detection action . 0：Do not detect 1：Fault, free stop	1	0011	×

		Tens digit: Frequency division output over-speed fault detection action. 0：Do not detect 1：Fault, free stop Hundreds digit, Thousands digit: Reserved			
F19.35	Fault indication and fault lockout during self-recovery	Units digit: Fault indication selection during automatic fault reset 0: action 1: no action Tens digit: Fault locking function selection to realize fault display before power failure, etc. 0: Prohibited 1: Open	1	00	×
F19.36	Frequency selection to continue running in case of alarm	Use with protective actions 0: Run at the current set frequency 1: Run at the upper limit frequency 2: Run at the lower limit frequency 3: Run at the abnormal frequency for standby	1	0	×
F19.37	Abnormal backup frequency	0.00Hz～upper limit frequency	0.01Hz	10.00Hz	×
F19.38	Encoder disconnection detection time	0.0～8.0s Note: No detection at 0, hardware detection mode at 8.0, some encoder cards have hardware disconnection detection mode	0.1s	0.0s	○
F19.39	Over speed (OS) detection value	0.0～120.0% (relative to the upper limit frequency)	0.1%	120.0%	○
F19.40	Over speed (OS) detection time	0.00～20.00s (no detection when it is 0)	0.01s	0.00s	○
F19.41	Speed deviation excessive (DEV) detection value	0.0～50.0% (relative to the upper limit frequency)	0.1%	10.0%	○
F19.42	Speed deviation excessive(DEV) detection time	0.00～20.00s (no detection when it is 0)	0.01s	0.00s	○
F19.43	Reserved				
F19.44	Fan starting temperature	0～100℃	1	75℃	○
F19.45	Instantaneous stop integral coefficient Ki	0～100	1	30	○
F19.46	Instant stop and non-stop action deceleration time	0～300.0s	0.1s	20.0s	○
F19.47	Reserved				
F19.48	Fault detection time of motor temperature detection element	0.1～50.0s	0.1s	2.0s	○
F19.49	Temperature probe calibration	0～99	1	0	○

F20-Internal Virtual Input & Output Node Parameter Group					
Function code	Name	Set range	Min. unit	Factory Default	Modifi-cation
F20.00	Virtual input VDI1 function selection	0～90	1	0	○
F20.01	Virtual input VDI2 function selection	0～90	1	0	○
F20.02	Virtual input VDI3 function selection	0～90	1	0	○
F20.03	Virtual input VDI4 function selection	0～90	1	0	○
F20.04	Virtual input VDI5 function selection	0～90	1	0	○
F20.05	Virtual output VDO1 function selection	0～60	1	0	○

F20.06	Virtual output VDO2 function selection	0～60	1	0	○
F20.07	Virtual output VDO3 function selection	0～60	1	0	○
F20.08	Virtual output VDO4 function selection	0～60	1	0	○
F20.09	Virtual output VDO5 function selection	0～60	1	0	○
F20.10	Virtual output VDO1 opening delay time	0.00～600.00s	0.01s	0.00s	○
F20.11	Virtual output VDO2 opening delay time	0.00～600.00s	0.01s	0.00s	○
F20.12	Virtual output VDO3 activation delay time	0.00～600.00s	0.01s	0.00s	○
F20.13	Virtual output VDO4 activation delay time	0.00～600.00s	0.01s	0.00s	○
F20.14	Virtual output VDO5 activation delay time	0.00～600.00s	0.01s	0.00s	○
F20.15	Virtual output VDO1 turn-off delay time	0.00～600.00s	0.01s	0.00s	○
F20.16	Virtual output VDO2 turn-off delay time	0.00～600.00s	0.01s	0.00s	○
F20.17	Virtual output VDO3 turn-off delay time	0.00～600.00s	0.01s	0.00s	○
F20.18	Virtual output VDO4 turn-off delay time	0.00～600.00s	0.01s	0.00s	○
F20.19	Virtual output VDO5 turn-off delay time	0.00～600.00s	0.01s	0.00s	○
F20.20	Virtual input VDI enable control	00～FF	1	00	○
F20.21	Virtual input VDI status digital settings	00～FF	1	00	○
F20.22	Virtual input and output connection relationships	00～FF Bit0: Connection relationship between VDI1 and VDO1 0: Positive logic 1: Negative logic Bit1: Connection relationship between VDI2 and VDO2 0: Positive logic 1: Negative logic Bit2: Connection relationship between VDI3 and VDO3 0: Positive logic 1: Negative logic Bit3: Connection relationship between VDI4 and VDO4 0: Positive logic 1: Negative logic Bit4: Connection relationship between VDI5 and VDO5 0: Positive logic 1: Negative logic	1	00	○

F21- Frequency division output dedicated parameter group					
Function code	Name	Set range	Min. unit	Factory Default	Modifi-cation
F21.19	Frequency division output CAN communication enable	0: Frequency division output is invalid 1: Frequency division output is valid	0	0	×
F21.20	Pulse output source selection	0: Encoder frequency division output 1: Pulse command synchronous output 2: Frequency division and synchronization output disabled	0	0	×
F21.21	Encoder frequency division pulse number	Range: 1～40000 Note: Pulse output resolution: Pulse output resolution for one motor rotation = F21.21 × 4	1	500	×
F21.22	Z pulse output polarity selection	0: Positive polarity output (Z pulse is high level) 1: Negative polarity output (Z pulse is low level) Note: If needs the accuracy of the Z signal frequency division output is high, it is recommended to use the effective changing edge of the Z signal output.	0	1	×

F21.23	Frequency division pulse output phase selection	0: A ahead B 1: A behind B	0	0	×
F21.24	Frequency division pulse output limiting coefficient	0～20.000	0	2.800	○

F22-Retain Parameter Group					
Function code	Name	Set range	Min. unit	Factory Default	Modifi-cation
F22.00 ～ F22.40	Reserved				

F23-Retain Parameter Group					
Function code	Name	Set range	Min. unit	Factory Default	Modifi-cation
F23.00 ～ F23.40	Reserved				

F24-Promote dedicated parameter group					
Function code	Name	Set range	Min. unit	Factory Default	Modifi-cation
F24.00	Rising brake release frequency	0.0～10.00Hz	0.01Hz	0.00Hz	×
F24.01	Rising gate release freq. delay	0.01～10.00s	0.01s	0.40s	×
F24.02	Rising gate release current value (percentage of motor rated current)	0～200.0%	0.1%	50.0%	×
F24.03	Rising brake release action time	0～10.00s	0.01s	0.20s	×
F24.04	Decrease gate release freq.	0.60～10.00Hz	0.01Hz	1.00Hz	×
F24.05	Decrease gate release frequency delay	0.01～10.00s	0.1s	1.00s	×
F24.06	Decrease gate release current value	0～200.0%	0.1%	20.0%	×
F24.07	Descending brake release action time	0～10.00s	0.1s	0.4s	×
F24.08	Increase the stopping brake frequency	0.60～10.00Hz	0.01Hz	1.00Hz	×
F24.09	Rising stop brake delay	0～10.00s	0.01s	0.40s	×
F24.10	Rising stop brake action time	0～10.00s	0.01s	0.10s	×
F24.11	Reduce shutdown brake freq.	0.60～10.00Hz	0.01Hz	1.00Hz	×
F24.12	Lowering stop brake delay	0～10.00s	0.1s	0.50s	×
F24.13	Lowering and stopping brake action	0～10.00s	0.1s	0.50s	×
F24.14	Reserved				
F24.15	Reserved				

F25-User-Defined Display Parameter Group					
Function code	Name	Set range	Min. unit	Factory Default	Modifi-cation
F25.00	User function code 1	F00.00～F25.xx	0.01	25.00	○

F25.01	User function code 2	F00.00～F25.xx	0.01	25.00	○
F25.02	User function code 3	F00.00～F25.xx	0.01	25.00	○
F25.03	User function code 4	F00.00～F25.xx	0.01	25.00	○
F25.04	User function code 5	F00.00～F25.xx	0.01	25.00	○
F25.05	User function code 6	F00.00～F25.xx	0.01	25.00	○
F25.06	User function code 7	F00.00～F25.xx	0.01	25.00	○
F25.07	User function code 8	F00.00～F25.xx	0.01	25.00	○
F25.08	User function code 9	F00.00～F25.xx	0.01	25.00	○
F25.09	User function code 10	F00.00～F25.xx	0.01	25.00	○
F25.10	User function code 11	F00.00～F25.xx	0.01	25.00	○
F25.11	User function code 12	F00.00～F25.xx	0.01	25.00	○
F25.12	User function code 13	F00.00～F25.xx	0.01	25.00	○
F25.13	User function code 14	F00.00～F25.xx	0.01	25.00	○
F25.14	User function code 15	F00.00～F25.xx	0.01	25.00	○
F25.15	User function code 16	F00.00～F25.xx	0.01	25.00	○
F25.16	User function code 17	F00.00～F25.xx	0.01	25.00	○
F25.17	User function code 18	F00.00～F25.xx	0.01	25.00	○
F25.18	User function code 19	F00.00～F25.xx	0.01	25.00	○
F25.19	User function code 20	F00.00～F25.xx	0.01	25.00	○
F25.20	User function code 21	F00.00～F25.xx	0.01	25.00	○
F25.21	User function code 22	F00.00～F25.xx	0.01	25.00	○
F25.22	User function code 23	F00.00～F25.xx	0.01	25.00	○
F25.23	User function code 24	F00.00～F25.xx	0.01	25.00	○
F25.24	User function code 25	F00.00～F25.xx	0.01	25.00	○
F25.25	User function code 26	F00.00～F25.xx	0.01	25.00	○
F25.26	User function code 27	F00.00～F25.xx	0.01	25.00	○
F25.27	User function code 28	F00.00～F25.xx	0.01	25.00	○
F25.28	User function code 29	F00.00～F25.xx	0.01	25.00	○
F25.29	User function code 30	F00.00～F25.xx	0.01	25.00	○

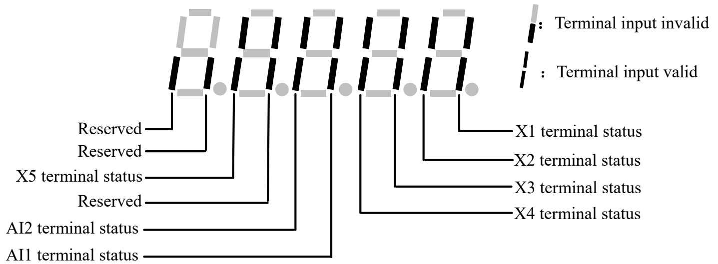
F26-Fault Record Function Parameter Group					
Function code	Name	Set range	Min. unit	Factory Default	Modifi-cation
F26.00	Previous fault record	0: No fault 1: Overcurrent during inverter acceleration 2: Overcurrent during inverter deceleration 3: Overcurrent in the constant speed of the frequency converter 4: Overvoltage during inverter acceleration 5: Overvoltage during inverter deceleration 6: Inverter constant speed medium overvoltage 7: Overvoltage when the inverter is shut down 8: Under voltage during operation 9: Frequency converter overload protection 10: Motor overload protection 11: Motor underload protection 12: Input phase loss 13: Output phase loss 14: Inverter module protection 15: Short circuit fault to ground before operation 16: Short circuit to ground after electrified 17: Inverter overheating 18: External device failure	1	0	*

		19: Current detection circuit failure 20: Reserved 21: Internal interference—main clock, etc. 22: PID given is lost 23: PID feedback lost 24: Abnormal PID error amount 25: Start terminal protection 26: Communication failure 27: Reserved 28: Frequency division output expansion card CAN communication fault 29: Frequency division pulse output is over-speed 30: E^2PROM read and write error 31: Temperature detection disconnection 32: Auto-tuning failure 33: Contactor abnormality 34: FactoryFault 1 (system disorder) 35: Factory fault 2 (watchdog fault) 36: Capacitor overheating (some models have this protection) 37: Encoder disconnected 38: Over speed protection 39: Excessive speed deviation protection 40: Reserved 41: Analog channel disconnection protection 42: Water shortage fault 43: Reserved 44: UVW encoder UVW signal failure 45: Wave-by-wave current limiting fault 46: Reserved 47: Synchronous machine initial position detection failure 48: Motor overheating fault 49: Excessive position deviation fault 50: Origin return to zero abnormality 51: Origin return timeout 52: Encoder failure 53: Synchronous motor not self-tuning under vector control			
F26.01	Previous two fault records	Same as above	1	0	*
F26.02	Records of the first three failures	Same as above	1	0	*
F26.03	The first four fault records	Same as above	1	0	*
F26.04	The set frequency at the time of the previous fault	0.00Hz～upper limit frequency	0.01Hz	0.00Hz	*
F26.05	Output frequency at the time of previous fault	0.00Hz～upper limit frequency	0.01Hz	0.00Hz	*
F26.06	Output current at the previous fault	0.0～6553.5A	0.1A	0.0A	*
F26.07	DC bus voltage at the time of the previous fault	0.0～6553.5V	0.1V	0.0V	*
F26.08	Module temperature at the time of previous failure	0～125℃	1℃	0℃	*
F26.09	Input terminal status at the time of previous fault			0	*
F26.10	Running time at the time of previous failure	0～65535min	1min	0min	*
F26.11	The setting frequency for the first two faults	0.00Hz～upper limit frequency	0.01Hz	0.00Hz	*
F26.12	Output frequency during the	0.00Hz～upper limit frequency	0.01Hz	0.00Hz	*

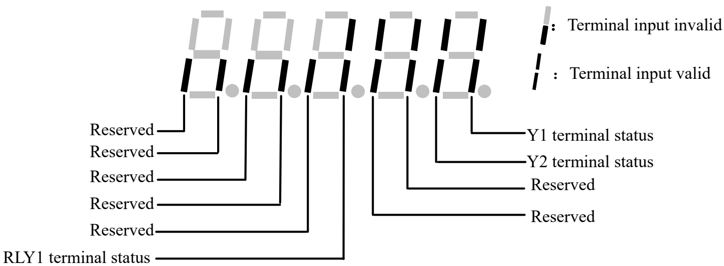
	first two faults				
F26.13	Output current during the first two faults	0.0～6553.5A	0.1A	0.0A	*
F26.14	DC bus voltage during the first two faults	0.0～6553.5V	0.1V	0.0V	*
F26.15	Module temperature during the first two faults	0～125℃	1℃	0℃	*
F26.16	Input terminal status during the first two faults			0	*
F26.17	Running time during the first two failures	0～65535min	1min	0min	*

F27-Password and Manufacturer Function Parameter Group					
Function code	Name	Set range	Min. unit	Factory Default	Modifi-cation
F27.00	User password	00000～65535	1	00000	○
F27.01	Manufacturer password	00000～65535	1	00000	○

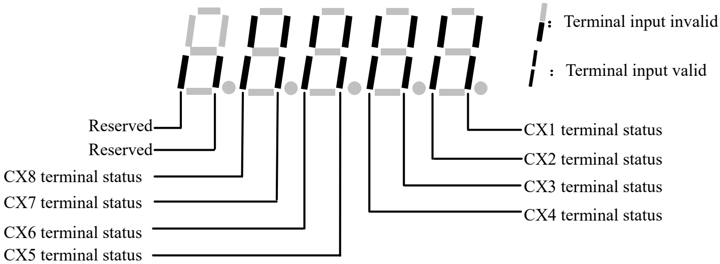
(1) Corresponding relationship between input terminal status is as follows:



(2) The corresponding relationship between the standard output terminal states is as follows:



(3) Corresponding relationship between the communication virtual input terminal status is as follows:



(4) Inverter status:

BIT0: 1=Bus voltage established

BIT1: 1=Normal running commands are valid

BIT2: 1=Jog running command is valid

BIT3: 1=The inverter is running

BIT4: 1=The current running direction is reverse

BIT5: 1=The operation command direction is reverse

BIT6: 1=Deceleration and braking

BIT7: 1=The motor is accelerating

BIT8: 1=The motor is decelerating

BIT9: 1=Inverter alarm

BIT10: 1=Inverter fault

BIT11: 1=position reached

BIT12: 1=Fault self-recovery

BIT13: 1=Auto-tuning

BIT14: 1=free stop state

BIT15: 1=speed tracking starts

7 Detailed function description

The parameter function code of this chapter listed content as below:

Code No.	Description	Setup Range /Explanation	Factory Default

7.1 System Parameter Group: F00

F00.00	Parameter group display control	Range: 0～4	2

0: Basic list mode. Display only **[F00]**, **[F01]**, **[F02]**, **[F03]**basic control parameter groupand **[F26] f**ault record parameter group.

1: Middle list mode. Display all parameters except for extension: virtual and reserve parameter groups.

2: Senior list mode. All parameter groups can be displayed.

3: User list mode. Display parameter defined by user: and monitor parameter: F00.00 display all the time.

4: Parameter verification mode. In this mode, only parameter items that are inconsistent with the default values are displayed (the parameter verification range is F00 to F25 groups. After entering the calibration mode, you can use the UP DW key to view the modified parameters, and you can also enter the specified parameters. If you modify the parameter value again. The SHIFT key is invalid during parameter review. Note that some parameters such as**[F00.00]**and**[F03.02]**are special parameters in the calibration mode and will always be displayed.

Note

[F00.00]display all the time. Under intermediate menu mode, irrelevant parameter groups can be covered according to different control mode.

F00.01	C-00 displays parameter selection when operation	Range: 0～90	51
F00.02	C-01 displays parameter selection when operation	Range: 0～90	2
F00.03	C-02 displays parameter selection when operation	Range: 0～90	4
F00.04	C-03 displays parameter selection when operation	Range: 0～90	5
F00.05	C-04 displays parameter selection when operation	Range: 0～90	6
F00.06	C-05 displays parameter selection when operation	Range: 0～90	9

The above parameters display when inverter run by C-00~C-05 parameter groups, pressing "shift key" to switch between these parameters. Pressing ENTER 3 DATA and then return to C-00 parameter monitor. For example, pressing"shift key"parameter switch from C-00 toC-01:continuous pressing the same button: parameter switch from C-01 to C-02, then passing ENTER 3 DATA return to C-00 parameter monitor.

When monitoring 32-digit valuesor one page of digital tubes cannot display all the data, you can switch the display page by pressing the key △ 2 . Pressing the key △ 2 to switch to the next page. Pressing the key  on the highest page to switch back to the first page. When the monitoring is in this state, the key  frequency adjustment or related given functions are invalid and can only be used for page switching.

0: Main setup frequency (0.01Hz)

1: Auxiliary setup frequency (0.01Hz)

2: Setup frequency (0.01Hz)

3: Output Sync frequency (0.01Hz)

4: Output current (0.1A) (Motor power <7.5KW displays 0.01A)

5: Output voltage (1V)

6: DC busbar voltage (0.1V)

7: Load motor speed (1 circle/min) (it has direction)

8: Load motor line velocity (1 circle/min)

9: Inverter temperature (1℃)

10: Run time already this time (0.1 min)

11: Current accumulate run time (1 h)

12: Current accumulative power-on time (1 h)

13: Inverter status. (Displays the working state of inverter, show it with decimal, after change it into binary, the definition is on the parameter details.)

14: Input terminal status

15: Output terminal status

16: Sleep state. (1 means entering sleep state)

17: Reserved

18: Communication virtual input terminal status

19: Internal virtual input node status

20: Analog input AI1 (after checkout). (0.01V/ 0.01mA)

21: Analog input AI2 (after checkout). (0.01V / 0.01mA)

22: Number of Z signal processing times

23: Encoder UVW signal status

24: Analog AO1 output (after checkout). (0.01V /0.01mA)

25: Analog AO2 output(extension)(after calibration)

28: External pulse input frequency (before checkout) (1Hz). When the F07.09 is set bigger than 50Khz, the display of this monitoring item is in 0.01Khz format.

29: Analog AI3 input(extension)(after calibration)

30: Process PID provide (0.01V)

31: Process PID feedback (0.01V)

32: Process PID deviation (0.01V), it has direction

33: Process PID output (0.01Hz), it has direction

34: Simple PLC current segment No

35: External multi-speed current segment No

36: Constant pressure water supply provide pressure(0.001Mpa)

37: Constant pressure water supply feedback pressure (0.001Mpa)

38: Constant pressure water supplies relay status

39: Current length (m/cm/mm)

40: Accumulative length (m/cm/mm)

41: Current internal count value

42: Current internal time value (0.1s)

43: Run command setup channel(0: Keyboard 1: Terminal 2: Communication)

44: Main frequency provide channel

45: Auxiliary frequency provide channel

46: Rated current (0.1A)

47: Rated voltage (1V)

48: Rated power (0.1KW)

49: Electric torque limit value. (0.1% motor rated torque)

50: Braking torque limit value. (0.1% motor rated torque)

51: The frequency after acceleration and deceleration (0.01Hz)

52: Motor rotor frequency (0.01Hz). (Thefrequency estimated on the open0-loop, actual measurement for close-loop)

53: Present provide torque. (Relative to rated torquepercentage, it has direction)

54: Present output torque. (Relative to rated torquepercentage, it has direction)

55: Present torque current (0.1A)

56: The present flux current (0.1A)

57: Setting motor rotate speed (r/min)

58: Output power (Active power) (0.1KW)

59: The low digit of Total power consumption (1 kwh)

60: The high digit total power consumption. (1 represents 10,000 kwh)

61, 62: Reserved

63: Basic PLC total setting time (1s or 1 min)

64: Basic PLC elapsed time. (1s or 1 min)

65: Basic PLC remaining running time (1s or min)

66: The dedicated display mode for constant pressure water supply. (Provide-Feedback) (kg/cm^2).

67: Closed-loop detection frequency. (With encoder card, 0.1Hz format, it has direction)

68: Motor temperature

69: Present encoder position. (Relative Z signal or resolver relative to zero signal, 0.0~359.9°)

70: Present spindle position. (relative to zero point or Z signal, 0.0~359.9°)

71: Motor encoder feedback pulse counter. (32-digit decimal display)

73: Absolute position counter. (32-digit decimal display)

75: Input position command pulse counter. (32-digit decimal display)

77: Present position segment No

78: Position deviation. (Encoder unit, limited to -32768~32767)

79: Command speed. (1 circle/min, it has direction, limited to -32768~32767)

80: Motor speed. (1 circle/min, it has direction, limited to -32768~32767)

81: Real-time input position command counter. (Instruction unit displayed in 32-digit decimal system)

83～90: Reserved

F00.07	**C-00 displays parameter selection when stop**	**Range: 0～90**	**2**
F00.08	**C-01 displays parameter selection when stop**	**Range: 0～90**	**6**
F00.09	**C-02 displays parameter selection when stop**	**Range: 0～90**	**48**

F00.10	**C-03 displays parameter selection when stop**	**Range: 0～90**	**14**
F00.11	**C-04 displays parameter selection when stop**	**Range: 0～90**	**20**
F00.12	**C-05 displays parameter selection when stop**	**Range: 0～90**	**9**

The above parameters display when inverter stop by C-00~C-05 parameter group,pressing"shift key" to switch between these parameters. Pressing ENTER 3 DATA and then return to C-00 parameter monitor. For example, pressing"shift key" parameterswitch from C-00 to C-01, continuous pressing the same button: parameter switch from C-01 to C-02, then pressing ENTER 3 DATA return to C-00 parameter monitor. Monitor contents various as different monitor parameter:refer to parameter F00.01.

When monitoring 32-digit valuesor one page of digital tubes cannot display all the data, you can switch the display page by pressing the key ∧ 2 . Pressing the key ∧ 2 to switch to the next page. Pressing the key ∧ 2 on the highest page to switch back to the first page.

When the monitoring is in this state, the key ∧ 2 frequencyadjustment or related given functions are invalid and can only be used for page switching.

Note

Monitor parameters C-00~C-05 have run and stop modes. For example, C-00 display different physical value under run and stop two modes.

F00.13	**Power-onfault monitor parameter selection**	**Range: 0～5**	**0**

When the parameter power on first time: C monitor parameter group display under drive run or stop status. For example, [F00.13=1], power on or stop to monitor, display parameter setup by C-01; when [F00.02=3], [F00.08=6], power on, inverter stop,busbar voltage display; inverteruns, output frequency and keypad displays. Pressing ENTER 3 DATA monitor C-00 for the setting motor value.

F00.14	**Parameter operation control**	**Range: Unitsdigit: 0～2** **Tens digit: 0～5** **Hundreds digit: 0～5**	**500**

Units digit: To define which parameters will be allowed to modify

0: All parameters are allowed to modification

1: Except for this parameter, the other parameters are not allowed to modification.

2: Except **[F01.01]**,**[F01.04]**and this parameter, the other parameters are not allowed to modification

Tens digit: To define which parameters will be resumed factory default value

0: No action

1: All parameters return to default. (Not include fault record parameter group (F26 group) parameter)

2: Except for motor parameter:all parameter return to default. (Not include F15 and F26 group parameters)

3: Extension parameter return to default. (Only F21 to F24 groupparameter return to default)

4: Virtual parameter return to default. (Only F20 groupparameters return to default)

5: Fault record return to default. (Only fault record parameter group (F26 group) return to default)

Hundreds digit: Locked keys that definite keypadwhen locking function is valid.

0: All locked

1: Except [6 STOP / RESET] button: The others locked

2: Except [∧ 2] [∨ 5] [6 STOP / RESET] button: The others locked

3: Except [RUN 4] [6 STOP / RESET] button: The others locked

4: Except [≫ 8] [6 STOP / RESET] button: The others locked

5: Invalid lock

Note

(1) In factory status, the unit of this function code parameter is 0, and it is default, and allowed to change all the other function code parameters: when user finish: and want to change the function code setup: this function code parameter should set up 0 first.When all changes finish and need to do parameterprotect: this function code setup into the IP grade you need.

(2) The decade recovers to 0 automatically after record remove or factory default operation.

(3) The hundred digit of this function code defaults to 5, and the lock is invalid. After the user modifies the hundreds digit of **[F00.14]**, press the key [ENTER / 3 DATA] for more than 5 seconds to lock the keypad, and then the corresponding keypad key [ESC 1 / MENU] will be locked. If you want to unlock the keypad, press the key for more than 5 seconds to unlock the keypad.

F00.15	**Button function selection**	**Range: Units digit: 0, 1** **Tens digit: 0～9** **Hundreds digit: 0, 1** **Thousands digit: 0, 1**	**0011**

Units digit: Panel [REV 7 / JOG] button selection

0: Reversal command action button

1: Jog action button

Tens digit: Multi-function key [9 M] function selection

0: Invalid

1: Jog run. Multi-function button as a jog run button, run direction decided by unit bit of **[F01.16]**. After setting this function, the jog function on the keypad [REV 7 / JOG] button is invalid.

2: For/Rev switching. Press this button to change the run direction when run:the press the same button change to another direction. The function key is not used as a start key,only for signalswitch.

3: Free stop. Setup free stop function and stop mode **[F02.11]** the same function with 1 Jog run.

4: Switching to run command provide mode as the setup order of **[F00.16]**.

5: For/Rev torque switching. After this function is valid, it can realize the direction switching after torque model.

6: Reverse command key. (This button is used as a reverse run button)

7～9: Reserved

Hundreds: terminal run command control

0: Keypad 6 STOP/RESET is invalid

1: Keypad 6 STOP/RESET is valid

Thousands: communication run command control

0: Keypad 6 STOP/RESET is invalid

1: Keypad 6 STOP/RESET is valid

F00.16	**Multi-function key run command channel switching order selection**	**Range: 0～3**	**0**

0: Keyboard control→Terminal control→Communication control

1: Keyboard control←→Terminal control

2: Keyboard control←→Communication control

3: Terminal control←→Communication control

These parameterscooperate with multi-function key to run command channel switching function: with special switch to command channel switching order.

Note

(1) Command channel priority terminal switch to (terminal function code 49, 50, 51)→Terminal run command channel selection (terminal function code 52, 53) → multi-function key switch→[F01.15], when switching to terminal control, be ensure that the terminal command invalid. Terminal switch to and terminal run command channel selection refer to the [F08] group parameter about the detailed description of terminal function.

(2) We suggest alter the mode at the stop state.

F00.17	**Motor speed display coefficient**	**Range: 0.1～999.9%**	**100.0%**

This function code is used to check speed scale display error,there is no effect to motor actual speed.

F00.18	**Line velocity display coefficient**	**Range: 0.1～999.9%**	**1.0%**

This function code is used to check speed scale display error,there is no effect to motor actual speed.

F00.19	**Encoder expansion port type**	**Range: 0～10**	**10**

0: ABZ incremental encoder card (no UVW signal)

1: ABZ UVW incremental encoder card

2: Resolver expansion card

3～9: Reserved

10: No encoder expansion card

This function code selects parameters for the encoder expansion port expansion card type,after plugging in the expansion card,**[F00.19]**selects the corresponding expansion card number before the expansion card is used normally.

F00.20	**Analog input terminal configuration**	**Range: Units digit: reserved** **Tens digit: 0～2** **Hundreds digit: 0～2** **Thousands: reserved**	**0000**

This parameter can configurate analog input AI2 to be current input typeor voltage input type. When selecting different types of current and voltage signals, the corresponding hardware DIP switches should be moved to the corresponding positions.

Units digit: reserved

Tens digit: AI2 configuration/ Hundreds digit: AI3 configuration(extension)

0: 0~10V input

1: 0~20mA input

2: 4~20mA input

Thousands digit: reserved

Note

Dial switch (SW3) under the left corner of CPU to the corresponding position: When AI2 configuration.

F00.21	**Analog output terminal configuration**	**Range: Units digit: 0, 1** **Tens digit: 0, 1** **Hundreds, thousands: reserved**	**0000**

This parameter can configurate AO analog signal output to be voltage typeor current type. When selecting different types of current and voltage signals, the corresponding hardware DIP switches should be moved to the corresponding positions.

Units digit: AO configuration/Tens digit: AO2 configuration (extension)

0: 0~10V output

1: 0~20mA output

Hundreds, thousands: reserved

Note

Dial switch (SW2) under the left corner of CPU to the corresponding position: When AO configuration.

F00.22	**Y output terminal configuration**	**Range: Units digit, Tens digit,** **Hundreds digit: reserved** **Thousands digit: 0, 1**	**0000**

Units digit~Hundreds digit: Reserved

Thousands digit: Y2 output configuration

0：Open collector output.

1: DO output.

The thousand digit decide the Y2 output terminal type. When 0 means open collector output, when 1means high-speed pulse DO output.

F00.23	**Reserved**		

F00.24	Motor control mode	Range: 0～2	1

0: V/F control (Only supports speed control)

Generally, when one driver drives multiple motors and the motor load is uneven, and the rated current of the motor is less than 1/3 of the driver, please choose the V/F control method. When the transmission drives a higher voltage motor through a step-up transformer, please use VF control. When using VF control, there is generally no need to identify the motor parameters.

1: Speedlesssensor vector control (SVC) supports synchronous machines and asynchronous machines.

Speed lesssensor vector control run mode, mainly used to speed control, torque control in the application site which require high control performance, such as machine tools, centrifuges, wire drawing machines, etc. To get better control performance, we need to be set up motor parameter groupF15according to the motor nameplate details, and doing the self-learning to motor parameter. One VFD can only drive one motor in vector control, and VFD power need match up with motor, normally one class less or more of the VFD power than motor is allowed. Supports speed and torque control.

2: Closed-loop vector control (FVC). Supports synchronous machines and asynchronous machines.

When choose the closed-loop vector control, the AC motor should be installed with an encoder, and the inverter shouldoptional a PG card with the same type of the encoder. It can be used on the high-accuracy speed control & torque control applications. One inverter onlycan drive one AC motor such as high-speed paper-make machinery, cranes, elevators and other loads.

When using the closed-loop control, in addition to setting motor parameter**[Group F15]**, we should also set the encoder parameter group**[Group F16],** and the encoder expansion port option**[F00.19]**parameter.

When using FVC control, it can support speed, torque, and position control.

F00.25	Monitoring parameter 2 selection	Range: 0～90	4

When user choose S-LED16 or S-LED16-D keypad, under monitoring we can use F00.25 parameter to modify monitoring content of keypad digital display(LED2).

For monitoring content**[F00.25]** parameter , please refer to the description of**[F00.01]**.

F00.26	Busbar voltage adjustment	Range: 0.900～1.100	1.000

We can use this parameter to adjust the busbar voltage;to make the inverter bus voltage is according to the exact figures.

F00.27	Parameter copying and language selection	Range: Units digit: Reserved Tens digit: 0～3	00

Units digit: Reserved.

Tens digit: parameter upload and download. (valid for S-LED16, S-LED16-D keypad)

0: No action.

1: Parameter upload.

2: Parameter download 1. (Without motor parameters)

3: Parameter download 2. (With motor parameters)

When all motors carried by inverter are the same typein one system, we can use parameters download 1parameter. Otherwise use the parameters download 2.

F00.28	**Output power display calibration coefficient**	**Range: 20%～300%**	**100%**

Adjustment coefficient for output power (monitoring item No. 58).

F00.29 ～ F00.60	**Reserved**		

F00.61	**The fault type of the current fault**	**Range: 0~65535**	**0**

When some faults occur, you can use the**[F00.61]**parameters to further understand the type of fault and use it to determine the source of the fault. For details, see the fault description chapter.

F00.62 ～ F00.70	**Reserved**		

7.2 Basic operating function parameter group: F01

F01.00	**Main frequency input channel selection**	**Range: 0～14**	**0**

Total 15 types input channels for selection to choose inveter input channel of the main provide frequency, among 11~14 are reserve channels, currently there is no corresponding functions.

0: Operation keyboard digital setup. Whenmain frequency setup initial value to **[F01.01]** modify**[F01.01]**parameter to change main setting frequency with operation keypad:or with , button to modify the value of **[F01.01]**.

1: AI1 analog setup. Main frequency setup confirmed by AI1 analog voltage, input range: 0~10V.

2: AI2 analog setup. Main frequency setup confirmed by AI2 analog voltage/current, input range: 0~10V (AI2 jumper wire selection V side) or 4~20mA/0~20mA (AI2 jumper wire selection A side). At the same time,**[F00.20]**Tens digit needs to be set correctly.

3: Terminal UP/DOWN adjustment setup. Whenmain frequency initial value is parameter**[F01.01],** through terminal UP/DOWN function to adjust the main setting frequency. Terminal function setupinto 16 (frequency increase progressively control (UP)) or 17 (frequency decrease progressively control (DOWN)).

4: Communication provide (Communication address: 1E01). Whenmain frequency initial value is parameter**[F01.01],** main frequency provide by communication mode **[F05.00]**.

5: Operate keyboard knob provide. During speed control, the output frequency can be adjusted by rotating the knob on the panel. The maximum value of the knob corresponds to the upper limit frequency of**[F01.11]**.

6: AI3 analog setting (extension).

7: High-speed pulse setting. Main frequency setup by the frequency signal of terminal pulse (onlycan be input by the X5 terminal), input pulse specifications: voltage range 15~30V; frequency range 0.00~50.00KHz.

8: Terminal pulse width setting. Main frequency setting setup by pulse width signal of terminal pulse (only canbe input by X5), input pulse specifications: voltage range 15~30V; pulse width range 0.1~999.9ms.

9: Terminal encoder setup. Main frequency setup byterminal encoder pulse (only canbe input by X1 and X2) and frequency velocity set by parameter **[F08.30]**.

10～14: Reserved.

Note

When PID run is valid, run direction is confirmed by PID error polarity and parameter **[F11.21]** completely.

Except for the terminal encoder reference **[F01.00=9]**, the main and auxiliary reference channels cannot be set to the same frequency source. If set to the same frequency source, the ALM (alarm) light on the panel will light up and display at the same time A-51.

F01.01	**Main frequency digital setting**	**Range: 0.00Hz～upper limit freq.**	**50.00Hz**

When F01.00=0, 3 or 4, F01.01 is the initial frequency value of main frequency.

F01.02	**Main frequency digital control**	**Range: 000～111**	**000**

Units digit: power down reserve setup

0: Main frequency power down reserve. When main frequency channel provide is valid, power down in run status, current main frequency of run frequency is record in parameter**[F01.01]**.

1: Main frequency power down no reserve.

Tens digit: halt reserve setup

0: Halt main frequency hold. When main frequency channel provide is valid, current runfrequency only recorded after halt.

1: Haltmain frequency recovery**[F01.01]**. main setting frequency recorded in the software is recovery to value of parameter**[F01.01]**after halt.

Hundreds digit: Set of communication presetting frequency dimension. (It is valid for both main and salve frequency communicatingpresetting)

0: Preset of absolute frequency mode(preset 5000 represent 50.00Hz).

1: Preset 10000 represent upper limit frequency**[F01.11]**.

Note Onlywhen parameter **[F01.00=0, 3, 4],** it can be valid,after power-failor stop storage function both are valid, stop the machine first, it also can serve.

F01.03	**Auxiliary frequency input channel select**	**Range: 0～20**	**20**

VFD auxiliary provide frequency input channel has 21 input channels for selection, for them 11~20 are reserved channels, and currently there is no relevant function:

0: Keyboard operation digital setup. When auxiliary frequency setup initial value is parameter **[F01.04],** modify parameter of F01.04 to change auxiliary setting frequency:

Or with 2 5 button modify the value of parameter**[F01. 04]**

1: AI1 analog setup. Auxiliary frequency setup confirmed by AI1 analog voltage/current, input range: 0~10V (AI1 jumper wire selection V side) or 4~20mA (AI1 jumper wire selection A side).

2: AI2 analog setup. Auxiliary frequency setup confirmed by by AI2 analog voltage/current, input range: -10~10V (AI2 jumper wire selection V side) or 4~20mA (AI2 jumper wire selection A side).

3: Terminal UP/DOWN adjusting setup. Auxiliary frequency initial value is parameter**[F01.04],** through terminal UP/DOWN function to adjustauxiliary setting frequency.

4: Communication setting (communication address: 1E01). The initial value of the auxiliary frequency is parameter **[F01.04]**, it will be determined by F05.00 of the communication setting.

5: Operation keyboard knob provide. During speed control, the output frequency can be adjusted by rotating the knob on the panel. The maximum value of the knob corresponds to the upper limit frequency of**[F01.11]**.

6: AI3 analog setting (extension).

7: Terminal pulse setting. Auxiliary frequency setup by the frequency signal of terminal pulse (onlyX5 input), input pulse specification: voltage range 15~30V; frequency range

0.00~20.00KHz.

8: Terminal pulse width setup. Auxiliary frequency setup by pulse width signal of terminal pulse (only X5input), input pulse specification: voltage range 15~30V; pulse width range 0.1~999.9ms.

9: Terminal encoder provide. Auxiliary frequency setup by terminal encoder pulse (only X3 or X4 input), 0.01Hz is a fixedadjusting precision.

10: Reserved.

11: Process PID setting. Through the main frequency settingand the auxiliary frequency setting, can realize PID with feedforward control,which can make the system be into a steady state quickly. Generally,it is used in the scene of process closed-loop control, such as constant pressure closed-loop control, constant tension closed-loop control, etc.

12～20: Reserved.

> Exceptterminal encoder provide **[F01.03=9]**,main and auxiliary provide channels cannotsetup to the same frequency source,they are the same, then panellight ALM and A-51 display.

F01.04	Auxiliaryfrequency digital setup	Range: 0.00Hz～upper limit freq.	0.00Hz

When**[F01.03=0, 3 or 4]**,**[F01.04]**is the initial frequency value of the auxiliary frequency.

F01.05	Auxiliary frequency digital control	Range: 00～11	11

Units digit: Power down setup .

0: Auxiliary frequency power down reserve. When the auxiliary frequency channel provide is valid and power down at run mode, the current auxiliary setting frequency reserve in parameter**[F01.04]**.

1: Auxiliary frequency power down no reserve.

Tens digit: Halt reserve setup

0: Halt auxiliary frequency hold. When auxiliary frequency channel provide is valid, recording current run frequency only after halt.

1: Halt auxiliary frequency recovery parameter **[F01.04]**, auxiliary setting frequency in software recording is recovered the value of parameter**[F01.04]**.

Note

> Onlywhen**[F01.03=0, 3, 4]**is valid .

F01.06	Main and auxiliary providecalculating setup	Range: 0～8	0

This parameter is to select the frequency provide channel: and through the complex of main frequency source and auxiliary frequency source to achieve frequency provide.

0: Main frequency. Complex frequency of current is main frequency.

1: Auxiliary frequency. Complex frequency of current is auxiliary frequency.

2: Plus. (Polarity oppose of complex and main frequency, complex frequency is zero).

3: Minus. (Polarity oppose of complex and auxiliary frequency, complex frequency is zero).

4: Multiplication. (Polarity oppose of main and auxiliary frequencies,complex frequency is zero).

5: Max. (The max frequency of main and auxiliary absolute value).

6: Min. (The min frequency of main and auxiliary absolute value).

7: Selection non-zero value. (Auxiliary frequency is not negative, main frequency prior; auxiliary frequency is negative, complex frequency is zero).

8: Main frequency × auxiliary frequency × 2/[F01.11](Polarity oppose of main and auxiliary frequency, complex freq. is zero, can realize the fine tuning based on the main freq.).

Note

(1) The initial polarity of the main frequency can notchange after main and auxiliary operation.

(2) When main and auxiliary frequency channels are complex value, and both setupintopower down reserve, parameter **[F01.01]**and**[F01.04]**reserve separately the changed part of main frequency and auxiliary frequency in the complex frequency when power down.

F01.07	**Auxiliary frequency provide coefficient**	**Range: 0.00～10.00**	**1.00**

Parameter **[F01.07]** can adjust auxiliary provide frequency gain.

F01.08	**Coefficient after complex main and auxiliary frequency**	**Range: 0.00～10.00**	**1.00**

This parameter is to setup frequency flexibly and calculates the gain of complex setting frequency by main and auxiliary frequency.

F01.09	**Auxiliary frequency range selection**	**Range: 0, 1**	**0**

0: Relative high limit frequency. Auxiliary frequency setup range is: 0.00Hz ~ high limit frequency × F01.10.

1: Relative main frequency. Auxiliary frequency setup range is: 0.00Hz ~ main frequency × F01.10.

F01.10	**Auxiliary frequency source scope**	**Range: 0.00～1.00**	**1.00**

This parameter cooperate with **[F01.09]** define the range of auxiliary provide frequency. Auxiliary provide frequency high limit value is restrained by the frequency selected by parameter**[F01.09]**through parameter **[F01.10] gain calculation**.

F01.11	**Upper limit frequency**	**Range: lower limit freq.～600.00Hz**	**50.00Hz**

This parameter’s max setting frequency of all modes should be modification carefully according to the motor nameplate detail. This parameter cannot less than the rated frequency of the motor. F01.11 is the reference frequency for all acceleration and deceleration times.

F01.12	**lower limit frequency**	**Range: 0.00Hz～upper limit freq.**	**0.00Hz**
F01.13	**Lower limit frequency run mode**	**Range: 0～3**	**2**
F01.14	**Sleep run hysteresis freq.**	**Range: 0.01Hz～upper limit freq.**	**0.01Hz**

0: As low limit frequency run.

1: As setting frequency run.

2: As zero frequency run.

3: Sleep, PWM clocked at sleep mode.

When actual setting frequency lower than low limit frequency, low limit frequency run mode selection 0, thendrive run at low limit frequency; low limit frequency run modeselection 1, drive continuously run according to setting frequency; low limit frequency run mode selection 2, drive continuouslylow output frequency and run at zero frequency; low limit frequency run mode selection 3, immediately locked the output and display frequency decline slowly to zero, when provide value over low limit frequency,drive restart to accelerate run from 0Hz to provide value after through **[F01.14]** stagnant loop.

Note

⑴When**[F01.13]**=3, this parameter can finish sleep function to achieve energy-saving run and avoid drive to start frequently at threshold value through width of return difference. When sleeping, the keyboardswitches back and forth between "currently monitored content" and "Sleep" with flashing display.

⑵ In position control mode, low limit frequency should setup to 0.00Hz.

F01.15	**Run command channel selection**	**Range: 0～2**	**0**

0: Operation keyboard run control. Use the keys on the RUN, STOP/RESET, REV/JOG, M, keyboard to start and stop, and use the external keyboard to achieve dual keyboard control.

1: Terminal run command control. Terminal X1 is forward (FWD) terminal, X2 is reverse (REV) during the function code X1~X5, AI1, and AI2 setup.Other terminals can also be regarded as for/rev input terminal.

2: Communication run command control. Start and stop with communication mode.

⑴ Drive can change run command channel through switch of multi-function key, terminal command channel in halt and run, carefullymodify command channel after confirm in site the permission to run command channel modification. After the command channelmodification: keyboard STOP/RESET button setup valid or not by parameter**[F00.15]**.

⑵ Afterrun command channelmodification, frequency channel can be defined by parameter**[F18.00]**,**[F18.01]**,**[F18.02]**or defined by parameter **[F01.00]**, **[F01.03]**, **[F01.06]** and multi-function terminal.

F01.16	**Running direction setup**	**Range: Unitsdigit: 0, 1** **Tens digit: 0～2** **Hundreds digit: 0, 1** **Thousands digit: 0, 1**	**1000**

Units digit: Keyboard command for/rev setup. (only valid for keyboard inching command)

0: Forward.

1: Reverse.

Tens digit: For/rev forbid. (Suitable for all command channels, not include inching function)

0: For/rev available.

1: Reverse notavailable (Imposing on reverse, stop as the halt mode).
2: Forward notavailable (Imposing onforward, stop as the halt mode).

Hundreds digit: Reverse running direction. (Only valid for keyboard and communication channel)
0: Invalid.
1: Valid. It can achieve the adjustment of the motorrunning direction without adjusting the UVW wiring sequence.

Note: Under the condition that realize multi-section speed control by the PLC or terminal, if the tens digit of**[F10.01～F10.15]**is equal to 0 or 1, the direction of motor running is not affected by this parameter.

Thousands digit: Terminal multi-section speed acceleration and deceleration time control.
0: Respectively, corresponds to acceleration and deceleration 1 to 15 .
1: Determined by **[F01.17]**, **[F01.18]**.

F01.17	**Acceleration time 1**	**Range: 1～60000**	**Depend on Type**
F01.18	**Deceleration time 1**	**Range: 1～60000**	**Depend on Type**

Acceleration time is interval accelerate from zero frequency to the high limit frequency, deceleration time is interval decelerate from high limit frequency to zero frequency. The unit is defined by **[F01.19]**.

Note

⑴ S2000 series drive defines 15 acceleration and deceleration time, only acceleration and deceleration time 1 is defined here, acceleration and deceleration 2～15 are defined in parameter **[F04.16～F04.43]**.
⑵ Acceleration and deceleration 1～15selecttime unit through **[F01.19],** factory default unit is 0.1 seconds.

F01.19	**Acceleration and deceleration time control selection**	**Range: Units digit: 0～2** **Tens digit: 0, 1**	**11**

Units digit: Acceleration and decelerationtime unit.
0: 0.01s.1:0.1s.2:1s.

Tens digit: Acceleration and decelerationtime decimal point display.
0: Decimal pointnot displayed.
1: Decimal point displayed (Acceleration and deceleration time 1～15).

Note

⑴ The function is valid to acceleration and deceleration time in all normal run modes except for inching acceleration and deceleration time.
⑵ Advise to select 0.1s as the time unit.

F01.20	Acceleration and deceleration mode selection	Range: 0, 1	0

0: Line acceleration and deceleration mode. Output frequency raises or decline as the constant slope, as Fig. 7-1.

1: S-curve acceleration and deceleration mode. Output frequency raises or declineas S-shaped curve, as Fig. 7-2.

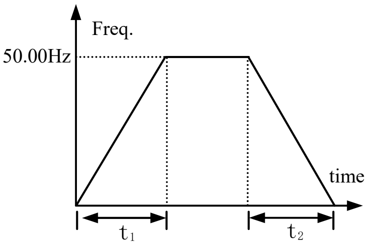


Fig. 7-1 Line acc/dece

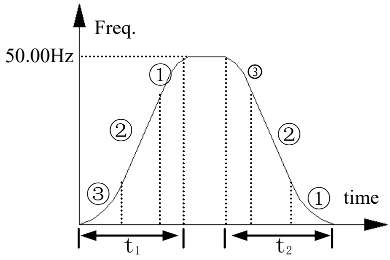


Fig.7-2 S curve acc/ dece

F01.21	S-curve acceleration initiation segment time	Range: 10.0%～50.0%	20.0%
F01.22	The S-curve accelerates up segment time	Range: 10.0%～70.0%	60.0%
F01.23	S-curve deceleration initiation segment time	Range: 10.0%～50.0%	20.0%
F01.24	The S-curve decelerates up segment time	Range: 10.0%～70.0%	60.0%

[F01.21～F01.24] select S-curve acceleration and deceleration mode**[F01.20＝1]**valid only under acceleration and deceleration, and**[**F01.21+F01.22≤90%**]**,**[**F01.23+F01.24≤90%**]**.

S curve starts interval time asfig.7-2③ output frequency changedslope increase slowly from 0.

S curve up interval time asfig.7-2②, output frequency changedslope is constant.

S curve ends interval time asfig. 7-2①, output frequency changedslope decrease slowlyto 0.

Note

The S-curve acc/dece/mode is suitable for start and stop of elevators, conveyor belts, transport and transfer load so on.

F01.25	**Keyboard jog run freq.**	**Range: 0.00Hz～upper limit freq.**	**5.00Hz**
F01.26	**Terminal jogging run freq.**	**Range: 0.00Hz～upper limit freq.**	**5.00Hz**
F01.27	**Jog interval time**	**Range: 0.0～100.0s**	**0.0s**
F01.28	**Jog acceleration time**	**Range: 0.1～6000.0s**	**20.0s**
F01.29	**Jog deceleration time**	**Range: 0.1～6000.0s**	**20.0s**

[F01.25], **[F01.26]** defineskeyboard jog run frequency,when jog run: acceleration as the zero frequency, and is not affected bystart modedefined by parameter **[F02.00].** When jog command revocation, stop as settinghalt mode, when input another command during the deceleration, accelerate or decelerate according to the current frequency.

[F01.27] defines valid command interval time at continuously jog. When jog command invalid, the time restart jog command is short than the jog interval time, jog command ignorehere.

[F01.28], **[F01.29]**defines jog run acceleration and deceleration time, fixed unit is 0.1s.

F01.30	**The maximum operating frequency is set digitally**	**Range:0.00～600.00Hz**	**600.00Hz**
F01.31	**Select the maximum operating frequency channel**	**Range:0～8**	**0**

Select the input channel of the maximum operating frequency of the inverter. There are 8 input channels to choose. Channels 4 - 6 are reserved and have no corresponding functions. The output frequency is limited by both of [F01.11] value and the maximum operatingfrequency.

0: The maximum operating frequency is set digitally . The maximum operating frequency is set by [F01.30] .

1: AI1 simulation Settings. The maximum operating frequency is set by AI1 analog voltage, input range: 0~10V.

2: AI2 simulation Settings. The maximum operating frequency is set by AI2 analog voltage, input range: 0~10V (AI jumper changeto V side) or 4~20mA/0~20mA (AI2 jumper changeto A side). At the same time, the tens digit of [F00.20] needs to be set correctly.

3: UP/DW terminal adjustment Settings. The maximum operating frequency is adjusted through the terminal UP/DOWN function. The terminal function is set to 16 (frequency increasing control (UP)) or 17 (frequency decreasing control (DOWN)).

6: AI3 analog setting (extension).

7: High speed pulse setting. The maximum operating frequency is set by the frequency signal of the terminal pulse (can only be input by terminal X5). Input pulse specifications: voltage range 15~30V; frequency range 0.00~50.00KHz.

8: Terminal pulse width setting. The maximum operating frequency is set by the pulse width signal of the terminal pulse (can only be input from terminal X5). Input pulse specifications: voltage range 15~30V; pulse width range 0.1~999.9ms.

7.3 Start, Stop, forward/Reverse, Brake function parameter group: F02

F02.00	**Start operating mode**	**Range: 0～3**	**0**

0: Start fromstarting frequency. After receiving start commandby setting **[F02.01]**, delay time, the inverter start after setting**[F02.02]**and**[F02.03]** starting frequency duration.

1: First brake, and then start from starting frequency. First brake the current from DC t and then from time**[F02.04]**,**[F02.05]**, and then start after setting starting frequency andstarting frequency duration set by **[F02.03]**.

2: Speed tracking start. This mode can be supported by the entire motor control at the present.

3: SVC quick start. Only the asynchronous machine SVC is supported when fast startup is required.

Note

(1) Start-up mode 0: Suitable for most occasions, smooth start without reversal site is required.

(2) Start-up mode 1: Suitable for small inertia load,for example, forward or reverse occurs when the motor is not driven. For large inertia load, we suggest not to use start-up mode 1. This mode is not suitable for closed-loop vector control of synchronous motors.

(3) Start-up mode 2: Suitable for the starting of large inertia load before stopping stably. Generally this mode is used when restarting after power failure, fault self-recovery and other functions. The following points need to be noticed when this start-up mode is used.

① When the inverter stopsfreely, restart the inverter after a few seconds. If over current fault occurs when starting, please extend the **[F02.09]** time.

② Do not modify the set frequency, otherwise a fault may occur.

(4) When torque mode is valid, we suggest use start mode 2.

F02.01	**Starting delay time**	**Range: 0.0～60.0s**	**0.0s**

Starting delay time refers to the waiting time before the inverter is started state after receiving running command . There is no change in the waiting state before receiving the run command and after receiving the run command.

F02.02	**Starting frequency**	**Range: 0.0～10.00Hz**	**0.00Hz**
F02.03	**Starting frequency duration time**	**Range: 0.0～60.0s**	**0.0s**

Starting frequency refers to the initial frequency when the inverter is started, as shown in fig. 7-3; starting frequency holding time refers to consecutive running time during the inverter runs at the starting frequency, as shown in fig. 7-3 t1.

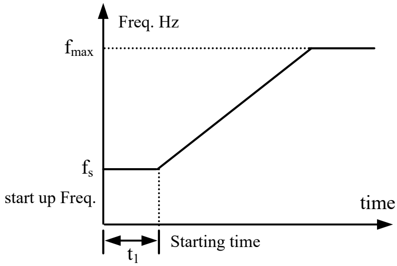


Fig. 7-3 Starting frequency and starting time

Note

Starting frequency is not limited by the lower limit frequency.

F02.04	**DCbrakingcurrent when starting**	**Range: 0.0～100.0% (Motor rated current)**	**50.0%**
F02.05	**DC braking time when starting**	**Range: 0.0～30.0s**	**0.0s**

When **[F02.00=1]**, **[F02.04]**, **[F02.05]** are valid, andstop mode is deceleration stop, as shown in the fig. 7-4.

The setting of starting DC braking current is with respect percentage of inverter rated output current. When starting DC braking time is 0.0 second, no DC braking process.

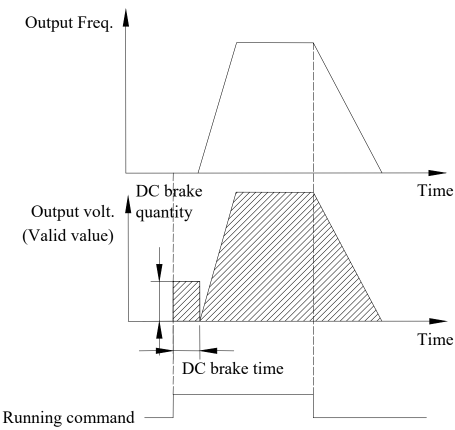


Fig. 7-4 Starting mode 1 description

F02.06	Speedtracking starting frequency selection	Range: 0～2	0

0: Start from the stop frequency.

1: Start from the power frequency.

2: Start from the upper limit frequency.

Select frequency closed to the current running frequency of the motor so as to track the current running revolving speed of the motor. For example, when current running frequency is closed to the current setting frequency, then select 0 and start to search from current setting frequency. This parameter is valid in VF control mode.

F02.07	Speed tracking speed	Range: 1～100	20

You can use this parameter to improve the tracking speedappropriately. This parameter is valid in VF control mode.

F02.08	Speed tracking current size	Range: 30%～150%	Depend on Type

This parameter is the current size during tracking and generally no need to change. This parameter is valid in VF control mode.

F02.09	Demagnetization time	Range: 0.00～20.00s	Depend on Type

This parameter defines the delay time before starting. The greater the power, the longer the setting time is. If overcurrent occurs during speed tracking, this parameter can be increased appropriately. This parameter is valid under VF and asynchronous machine SVC control.

F02.10	Speedtracking closed-loop current KP (VF)	Range: 0～1000	Depend on Type

F02.11	Stop mode	Range: 0～2	0

0: Deceleration stop. After receiving stop command, the inverter reduces output frequency gradually according to the set deceleration time, the inverter stops when frequency is 0.

1: Free stop. After receiving stop command, the inverterstops output immediately, and the load stops freely according to mechanical inertia.

2: Deceleration + DC braking stop. After receiving stop command, the inverter reduces output frequency gradually according to the set deceleration time. When reaching **[F02.14]** starting frequency ofstop braking, after**[F02.15]**defines DC braking waiting time, the inverter starts DC braking, as shown in Fig 7-5.

F02.12	Deceleration stop holding freq.	Range: 0.00Hz～upper limit freq.	0.00Hz
F02.13	Deceleration stop holding time	Range: 0.00～10.00s	0.00s

The parameters**[F02.12]**and**[F02.13]**define inverter's deceleration stop holding function. When the frequency reaches the setting value of**[F02.12]**in deceleration, it stop deceleration, and maintain the time set of **[F02.13],** and enter the deceleration state. This parameter is only valid for stop mode 0.

F02.14	Stop DC braking starting frequency	Range: 0.00～15.00Hz	0.50Hz
F02.15	Stop DC braking waiting time	Range: 0.00～30.00s	0.00s

F02.16	**Stop DC braking current**	**Range: 0.0～100.0% (Motor rated current)**	**0.0%**
F02.17	**Stop DC braking time**	**Range: 0.0～30.0s**	**0.0s**
F02.18	**Stop auxiliary braking current**	**Range: 0.0～100.0% (Motor rated current)**	**0.0%**
F02.19	**Stop auxiliary braking time**	**Range: 0.0～100.0s**	**0.0s**

[F02.14～F02.19] parameters define the current and duration inputting to the motor in the stop DC braking state. If **[F02.17]**, **[F02.19]** or **[F02.14]** parameter is 0.0s, then no DC braking process.

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

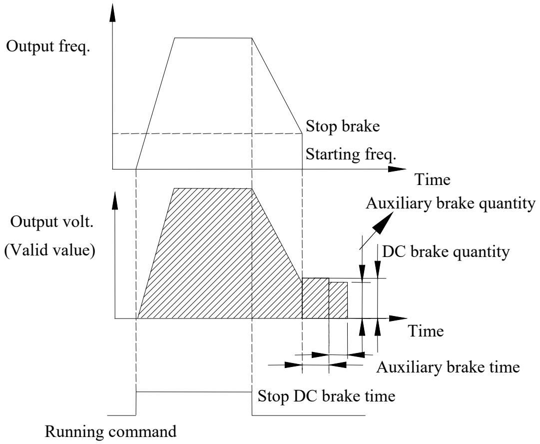


Fig. 7-5 Deceleration stop + DC braking

F02.20	**Forward/reverse dead zone time**	**Range: 0.0～3600.0s**	**0.0s**
F02.21	**Forward/reverse switching mode**	**Range: 0, 1**	**0**

0: Over zero switchover.

1: Over starting frequency switchover.

Forward and reverse dead zone time refers to the process which the inverter operates from forward to reverse, or from reverse to forward. After the output frequency reaches the definedfrequency in the switchover mode, entering into the transition time,as shown in Fig.7-6, t_1, within transition time t1, outputfrequency is 0Hz.

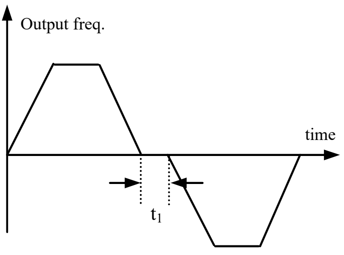


Fig. 7-6 Forward/Reverse dead zone time

F02.22	**Energy consumption braking selection**	**Range: 1, 2**	**1**

1: No braking while halting.

2: Braking while halting. This option can prevent over-voltage fault caused by high busbar voltage during the halting process.

Note

Please set the function parameter correctly according to the actual use condition. Otherwise, control feature will be affected. Before starting this function, make sure the inverter has built-in braking unit and braking resistor.

F02.23	**Energy consumption braking voltage**	**Range: 100.0～145.0%** (Rated busbar voltage)	**Depend on Type**
F02.24	**Reserved**		

Energy consumption braking function is only valid for built-in. **[F02.23]**defines the energy consumption braking busbar voltage threshold value. User needs to select proper parameter based on brake resistor and brake power.

F02.25	**Encryption time**	**Range: 0～65535h**	**0**

When **[F02.25]** is greater than 1, encryption is effective. When the inverter power-on time **[F17.12]** exceeds the **[F02.25]** defined time, the inverter stops in deceleration mode and the keyboard displays A-53, itshould be decrypted, the inverter can be started again.

F02.26	**Vector control stop frequency**	**Range: 0.00～5.00Hz**	**0.40Hz**

In the vector control deceleration stop mode, especially in the sites of quick stop, appropriately adjusting this parameter can improve the smoothness of the deceleration stop.

F02.27	**Zero-speed retention coefficient during shutdown**	**Range: 1～1000**	**3**

Slow down and stop the machine to near zero speed, maintain it for a certain period of time, and then stop the output. The larger the value of **[F02.27]** is, the longer the time will be.

F02.30	**Speed tracking closed-loop current KI (VF)**	**Range: 0～1000**	**Depend on Type**

F02.31	**Reserved**		

F02.32	**Synchronous machine SVC speed tracking Kp**	**Range: 0～1000**	**10**
F02.33	**Synchronous machine SVC speed tracking Ki**	**Range: 0～200**	**10**
F02.34	**Synchronous machine SVC speed tracking current size**	**Range: 10～100%**	**30%**

The above three parameters are related to the speed tracking performance of the synchronous machine under SVC control and generally no need to adjust.

F02.35～F02.37	**Reserved**		

7.4 V/F control parameter group: F03

F03.00	V/F curve set	Range: 0～6	0

0: Constant torque curve.
1: Degression torque curve 1 (1.2 power).
2: Degression torque curve 2 (1.7 power).
3: Degression torque curve 3 (2.0 power).
4: V/F curve setting. (Determined by **[F03.04～F03.11]**function code)
5: V/F Separation control. (voltage channel is determined by **[F03.15]**)
6: V/F semi-separated mode. (voltage channel is determined by **[F03.15]** and running freq.)

This group of function codes defines S2000 flexible V/F setting mode to satisfy different load characteristic. 4 kinds of fixed curves and a customized curve can be selected according to the definition of **[F03.00].**

When **[F03.00=0]**, V/F curve is constant torque curve characteristic; as shown in Fig. 7-7 acurve 0.

When **[F03.00=1]**, V/F curve is 1.2 power degressive torque characteristic; as shown in Fig.7-7 acurve 1.

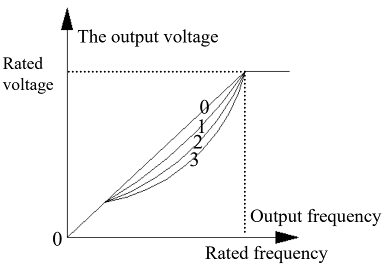
When **[F03.00=2]**, V/F curve is 1.7 power degressive torque characteristic; as shown in Fig.7-7 acurve 2.

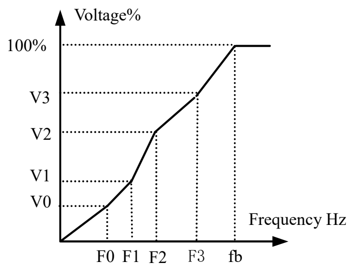
When **[F03.00=3]**, V/F curve is 2.0 power degressive torque characteristic; as shown in Fig. 7-7 acurve 3.

User can choose 1, 2, or 3 V/F curve running modes according to load characteristicsto reach better energy-saving effect when the inverter drives degressive torque load such as fan or water pump ect.

When **[F03.00=4]**, user can set V/F curve by setting **[F03.04～F03.11]** parameter.

As shown in Fig. 7-7b, V/F curve can be defined freelyby setting (V1, F1), (V2, F2), (V3, F3) (V4, F4) to meet special load environment.





V0～V3: the 1st to 4th voltage percentage of multi section V/F
F0～F3: the 1st to 4th frequency points of multi section V/F
Fb: Rated frequency

a: **V/F curve** b: **usersetting V/F curve**

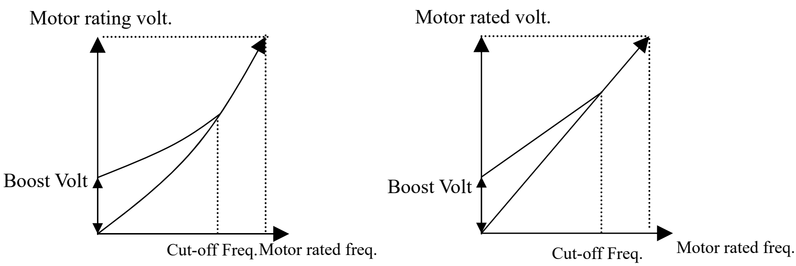
Fig. 7-7

When **[F03.00=5, 6]**and**[F00.24=0]**, VF separation control is performed. The frequency is given in the original way, and the voltage is determined by**[F03.15]**. You can choose digital given, analog given, terminal UP/DOWN given, etc., or you can modify it directly through communication. **[F03.16]**to achieve communication given. Generally, induction heating, inverter power supply, and torque motor can adopt this control method.

F03.01	**Reserved**		

F03.02	**Torque boost**	**Range: 0.0～30.0%**	**Depend on Type**
F03.03	**Torque boost cutoff frequency**	**Range: 0.0～100.0% (Motor rated frequency)**	**100.0%**

This parameter can be used to improve inverter low-frequency torque characteristics, the output voltage can be compensated.



a:Degression torque curve torque boost　　b:Constant torque curve torque boost

Fig. 7-8 Torque boost

Note

(1) **[F03.02]** improper torque boost setting may cause motor heating or over-current protection or the motor cannot accelerate and start normally.
(2) When driving synchronous motors, it is recommended to use SVC or closed-loop vector control.
(3) When **[F03.02]** is 0, the compensation adopts the self-adaptive mode. At this time, it is necessary to accurately obtain the **[F15.07]** stator resistance parameter.

F03.04	**V/F frequency value 0**	**Range: 0.00～V/F frequency value 1**	**10.00Hz**
F03.05	**V/F voltage value 0**	**Range: 0.00～V/F voltage value 1**	**20.00%**
F03.06	**V/F frequency value 1**	**Range: V/F freq. value 0～V/F freq. value 2**	**20.00Hz**
F03.07	**V/F voltage value 1**	**Range: V/F voltage value 0～V/F voltage value 2**	**40.00%**
F03.08	**V/F frequency value 2**	**Range: V/F freq. value 1～V/F freq. value 3**	**25.00Hz**

F03.09	**V/F voltage value 2**	**Range: V/F voltage value 1～V/F voltage value 3**	**50.00%**
F03.10	**V/F frequency value 3**	**Range: V/F freq. value 2～upper limit freq.**	**40.00Hz**
F03.11	**V/F voltage value 3**	**Range: V/F voltage value 2～100.00% (Motor rated voltage)**	**80.00%**

[F03.04～F03.11] Defines multi step V/F curve. Noted that 4 voltage points and frequency points relationship shall be satisfied: V0＜V1＜V2＜V3, F0＜F1＜F2＜F3. For details, please refer to Fig.7-7b.

If the voltage at low frequencyis set too high, motor to overheat or even burning may cause, over-current protectionmay occur to the inverter.

F03.12	**V/F Oscillation suppression gain**	**Range: 0～100**	**40**

Under V/F control, this parameter can be set properly to prevent motor vibration of the motor. When the inverter running at low frequency without load, the greater the motor power is, the more greater the vibration of motor will be. This parameter can be increased to restrain the vibration of motor. Whencarrier frequency is smaller, this parameter can be adjusted lower to reduce vibration.

F03.13	**V/F Over-excitation gain**	**Range: 0～300**	**100**

Under VF control, this parameter can ensure output stability despite fluctuations in bus voltage.

F03.14	**V/F Slip frequency gain**	**Range: 0.0～200.0%**	**0.0%**

Under VF control, the speed accuracy and low-speed torque characteristics at low speed can be improved by appropriately increasing this parameter.

F03.15	**V/F Separation control voltage provide channel**	**Range: 0～8**	**1**

0: Digital setting (determined by [F03.16])
1: AI1 simulation setting
2: AI2 simulation settings
3: Terminal UP/DOWN adjustment setting
5: Operate keyboard knob setting
6: AI3 analog setting (extension)
7: High-speed pulse setting (X5 terminal needs to select the corresponding function)
8: Terminal pulse width setting (X5 terminal needs to select the corresponding function)
Note: The maximum value of channels 0 to 8 corresponds to the rated voltage of the motor.

F03.16	**V/F Separation control voltage digital setting**	**Range: 0.0%～100.0%**	**0.0%**
F03.17	**V/F Separation voltage acceleration time**	**Range: 0.0～1000.0s**	**0.0s**
F03.18	**V/F Separation voltage deceleration time**	**Range: 0.0～1000.0s**	**0.0s**

Digital provide voltage for V/F separation control. 100.0% corresponds to the rated voltage of the motor. **[F03.17]**, **[F03.18]** defines the acceleration and deceleration time of the voltage from 0 to rated voltage under separate V/F control.

F03.19	**Reserved**		

F03.20	**V/F over-current stall enable**	**Range: 0, 1**	**1**
F03.21	**V/F over-current stall action current**	**Range: 50～200%**	**150%**
F03.22	**V/F overpass stall suppression gain**	**Range: 0～100**	**20**
F03.23	**V/F double speed over-speed stall action current compensation coefficient**	**Range: 50～200%**	**50%**
F03.24	**V/F over-voltage stall enable**	**Range: 0, 1**	**1**
F03.25	**V/F over-voltage stall action voltage**	**Range: 100～150%**(rated bus voltage)	**Depend on Type**
F03.26	**V/F over-voltage stall suppression frequency gain**	**Range: 0～100**	**30**
F03.27	**V/F over-voltage stall suppression voltage gain**	**Range: 0～100**	**30**
F03.28	**V/F over-voltage stall maximum rising limit frequency**	**Range: 0.00～50.00Hz**	**5.00Hz**

0: Invalid.

1: Valid.

In VF control mode, the over-current and over-voltage suppression capabilities can be improved by appropriately setting the above parameters.

7.5 Auxiliary running parameter group: F04

F04.00	**Jump freq. 1**	**Range: 0.00Hz～upper limit frequency**	**0.00Hz**
F04.01	**Jump freq. 1 range**	**Range: 0.00Hz～upper limit frequency**	**0.00Hz**
F04.02	**Jump freq. 2**	**Range: 0.00Hz～upper limit frequency**	**0.00Hz**
F04.03	**Jump freq. 2 range**	**Range: 0.00Hz～upper limit frequency**	**0.00Hz**
F04.04	**Jump freq. 3**	**Range: 0.00Hz～upper limit frequency**	**0.00Hz**
F04.05	**Jump freq. 3 range**	**Range: 0.00Hz～upper limit frequency**	**0.00Hz**

[F04.00～F04.05] is set to keep inverter's output frequency away from resonance frequency mechanical load. Invertersetting frequencycan jump around some frequency points according to mode as shown in Fig. 7-9, 3 jumping ranges can be defined at most.

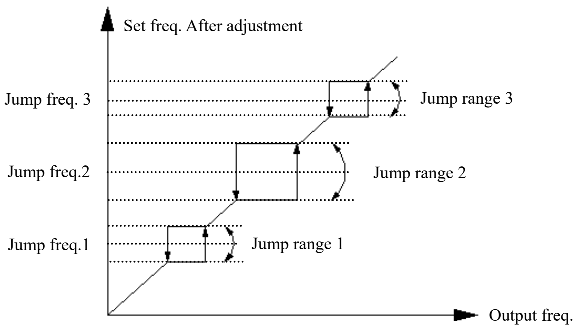


Fig. 7-9 Jump freq. And range

F04.06	**Reserved**		
F04.07	**Synchronous motor SVC carrier freq. liberalise selection**	**Range: 0,1**	**0**

0: Invalid

1: Valid

F04.08	**Synchronous motor SVC carrier freq. liberalise return freq.**	**Range:0.5～3.0Hz**	**1.0Hz**

[F04.07=1] , when the synchronous frequency output by the inverter is higher thanfN /2 (half of the rated frequency of the motor) + [F04.08] value , the carrier frequency limit is open ,the maximum limit is 10K and the minimum limit is 2K. When the synchronous frequency output by the inverter is lower than fN/2- [F04.08] , the carrier frequency is limited, the maximum limit is 6Kand the minimum limit is 2K. When the carrier frequency limit is open, it is increased in multi-stages mode to avoid shake caused by excessively high downlink at low speed. Through frequency hysteresis, the carrier frequency of the inverter is prevented from changing back and forth when the frequency is running at f N /2 when the speed fluctuations

F04.09	Carrier frequency	Range: 0.5～16.0K	Depend on type

Carrier freq. mainly affects the motor noise and heat loss when running. Relationship among carrier frequency, motor noise, and leak current is as follows:

When carrier freq.Goes up (↑), the motor noise is reduced (↓), leakage current of the motor is increased (↑), and the interference is increased (↑);

When the carrier frequency goes down (↓), the motor noise is increased (↑), leakage current of the motor is decreased (↓), and the interference is decreased (↓).

When the ambient temperature is high, and the motor load is heavy, reducethe carrier freq. properly to reduce the thermal loss to the inverter.
heat loss.

Table 7-1 Model and carrier freq. relationship

Model	Max. carrier freq.	Factory Default
0.4KW～1.5KW	16KHz	6KHz
2.2KW～11KW	16KHz	6KHz
15KW～45KW	8KHz	4KHz
55KW	8KHz	3KHz
75KW～90KW	6KHz	2KHz
110KW～375KW	5KHz	2KHz
400KW and above	5KHz	1.8KHz

Note

(1) To get better control characteristics, it is suggested that the ratio of max. running frequency between carrier frequency and inverter should not be smaller than 36.
(2) Error exists in current displayed value, when carrier frequency is small.

F04.10	PWM optimized adjustment	Range: Unitsdigit: 0, 1 Tens digit: 0, 1 Hundreds digit: 0, 1 Thousands digit: reserved	0111

Units digit: Carrier freq. is adjustedautomatically according to temperature.

0: Banned.

1: Allowed.

Carrier freq.changes based on temperature, which refers to inverter check that the radiator temperature is relatively high, it automatically reduces carrier freq.,so as to reduceinvertertemperature rise. When radiator temperature is relatively low, carrier freq. gradually restores to set value. This function can reduce inverter overheating alarm.

Tens digit: low-speed carrier freq. limit mode.

0: No limit.

1: Limit. Limit carrier wave at low speed, improve stability performance of revolving speed at low speed.Min. limit in SVC mode is 2.0KHz; Minlimit in V/F mode is 0.5KHz.

Hundreds digit: Overload carrier wave reductionenable.

0: Banned

1: Enable (Inverter overloaded carrier wave reduction is invalid during position control)

Thousands: Reserved.

Note

When unites digit is set as 1, after reaching overheat warning alarm point in V/F mode, the carrier wave will decrease to 2KHz; when the temperature decrease to 5°Clower then overheat warning alarm point, carrier freq. will automatically rise to the set carrier freq. Running in SVC mode, when the temperature reaches the pre-overheat warning alarm point, min. only decrease to 2.0KHz.

F04.11	**Reserved**		

F04.12	**Random PWM adjustment depth**	**Range: 0～10**	**0**

0: Random PWM is invalid.

1～10: PWM carrier freq. random depth. The sharp electromagnetic noise of the motor can be improved by increasing this value. The larger the value, the smaller the sharp noise, but it may cause the motor current harmonics to increase and the speed fluctuation to increase.

F04.13	**Reserved**		

F04.14	**Acceleration time 2 and 1 switchover frequency**	**Range: 0.00Hz～upper limit frequency**	**0.00Hz**
F04.15	**Deceleration time 2 and 1 switchover frequency**	**Range: 0.00Hz～upper limit frequency**	**0.00Hz**

This function is used in the process of the inverter running, and we should adopt different acceleration and deceleration times for high and low speeds to improve the site of acceleration and deceleration performance.

During the acceleration process, if the running frequency is lower than**[F04.14]**, we choose acceleration time 2; if the running frequency is bigger than**[F04.14]**, we choose acceleration time 1. During the deceleration process, if the running frequency is bigger than**[F04.15]**, we choose deceleration time 1; if the running frequency is lower than**[F04.15]**, we choose deceleration time 2.

Note

When using terminals for choose acceleration and deceleration time, **[F04.14]**, **[F04.15]** functions are invalid.

F04.16	**Acceleration time 2**	**Range: 1～60000**	**200**
F04.17	**Deceleration time 2**	**Range: 1～60000**	**200**
F04.18	**Acceleration time 3**	**Range: 1～60000**	**200**
F04.19	**Deceleration time 3**	**Range: 1～60000**	**200**
F04.20	**Acceleration time 4**	**Range: 1～60000**	**200**
F04.21	**Deceleration time 4**	**Range: 1～60000**	**200**

F04.22	**Acceleration time 5**	**Range: 1～60000**	**200**
F04.23	**Deceleration time 5**	**Range: 1～60000**	**200**
F04.24	**Acceleration time 6**	**Range: 1～60000**	**200**
F04.25	**Deceleration time 6**	**Range: 1～60000**	**200**
F04.26	**Acceleration time 7**	**Range: 1～60000**	**200**
F04.27	**Deceleration time 7**	**Range: 1～60000**	**200**
F04.28	**Acceleration time 8**	**Range: 1～60000**	**200**
F04.29	**Deceleration time 8**	**Range: 1～60000**	**200**
F04.30	**Acceleration time 9**	**Range: 1～60000**	**200**
F04.31	**Deceleration time 9**	**Range: 1～60000**	**200**
F04.32	**Acceleration time 10**	**Range: 1～60000**	**200**
F04.33	**Deceleration time 10**	**Range: 1～60000**	**200**
F04.34	**Acceleration time 11**	**Range: 1～60000**	**200**
F04.35	**Deceleration time 11**	**Range: 1～60000**	**200**
F04.36	**Acceleration time 12**	**Range: 1～60000**	**200**
F04.37	**Deceleration time 12**	**Range: 1～60000**	**200**
F04.38	**Acceleration time 13**	**Range: 1～60000**	**200**
F04.39	**Deceleration time 13**	**Range: 1～60000**	**200**
F04.40	**Acceleration time 14**	**Range: 1～60000**	**200**
F04.41	**Deceleration time 14**	**Range: 1～60000**	**200**
F04.42	**Acceleration time 15**	**Range: 1～60000**	**200**
F04.43	**Deceleration time 15**	**Range: 1～60000**	**200**

S2000 defines15 kinds of acceleration/deceleration time, select acceleration and deceleration time 1～15 during the inverter running by can different combinations of control terminals. Please refer todefinitions of acceleration and deceleration time terminal function in **[F08.18～F08.25]**. Cooperating with the simple PLC function can also realize each step ofPLC adopting different acceleration and deceleration times to complete specific requirements.

The time units ofacceleration and deceleration times 2～15 above is the same as that of acceleration and deceleration time 1, all are decided by F01.19 parameter of acceleration and deceleration time unit .

When torque control is valid, the acceleration and deceleration time of the motor can be controlled by acceleration and deceleration time 2 **[F04.16]**, **[F04.17]**.

Note

Acceleration and deceleration time 1 is defined in**[F01.17]** and **[F01.18]**.

7.6 Communication control parameter group: F05

F05.00	**Protocol selection**	**Range: 0～6**	**0**

0: Modbus protocol.

1: Reserved.

2: Profibus protocol. External expansion card needs to be purchased if needed.

3: CanLink protocol. External expansion card needs to be purchased if needed.

4: CANopen protocol/EtherCAT protocol. External expansion card needs to be purchased if needed.

5: Free Agreement 1. Can realize the revision of all S2000function parameters.

6: Free Agreement 2. Can only realize the revision of part S2000function parameters.

F05.01	**Baud rate configuration**	**Range: Units digit: 0～9** **Tens digit: Reserved** **Hundreds digit: 0～6**	**005**

F05.01 is for choosing communication baud rate when using different communication modules.

Units digit: Free protocol and Modbus baud rate selection.

0: 300BPS
1: 600BPS
2: 1200BPS
3: 2400BPS
4: 4800BPS
5: 9600BPS
6: 19200BPS
7: 38400BPS
8: 57600BPS
9: 115200BPS

Tens digit: Reserved

Hundreds digit: CANLink and CANopen Baud rate selection.

0: 20K
1: 50K
2: 100K
3: 125K
4: 250K
5: 500K
6: 1M

F05.02	**Data Format**	**Range: Units digit: 0～5** **Tens digit: Reserved** **Hundreds digit: 0～2** **Thousands digit: 0, 1**	**0000**

Units digit: Free protocol and Modbus protocol data format.

0: 1-8-1 format, no parity, RTU. 1 for start bit, 8 for data bits, 1 for stop bit, no parity’s RTU communication mode.

1: 1-8-1 format, even parity, RTU. 1 for start bit, 8 for data bits, 1 for stop bit, even parity’s RTU communication mode.

2: 1-8-1 format, odd parity, RTU. 1 for start bit, 8 for data bits, 1 for stop bit, odd parity's RTU communication mode.

3: 1-7-1 format, no parity, ASCII. 1 for start bit, 7 data bits, 1 for stop bit, no parity's ASCII communication mode.

4: 1-7-1 format, even parity, ASCII. 1 for start bit, 7 data bits, 1 for stop bit, even parity's ASCII communication mode.

5: 1-7-1 format, odd parity, ASCII. 1 for start bit, 7 data bits, 1 for stop bit, odd parity's ASCII communication mode.

Tens digit: Reserved.

Hundreds digit: Modbus protocol or free protocol response selection.

Under the condition that Modbus protocol or free protocol, and the the hundreds digit**[F05.02]**is 1, when slave sends mainframe the demand of running, frequency reviseand hide parameter inside, the slave is without response to increase the salve respond speed. But when mainframe reads inverter parameters, status or revise inverterany parameter, the hundred digits of**[F05.02]**would not influence the slave respond. The read-only instruction will respond only when the hundreds digit of **[F05.02]**is 2.

Thousands digit: Communication sets power down reserve setup.

If this bit = 1, the communication addresses like 1D00H, 1D01H, 1D02H, 1D03H, 1D06H, 1D0AH, and 1D0BH reserve when power off, otherwise not reserved when power off.

F05.03	**Local address**	**Range: 0～247**	**1**

During serial port communication, this function code is used to identify inverter's address.

Under free protocol communication, 00 is set and the inverter is master station, can be the master-slave communication.

Under Modbus communication, 00 is broadcast address. When setting broadcast address, it can only receive and execute upper computerbroadcast command,while can not respond to upper computer.

F05.04	**Communication overtime checkout time**	**Range: 0.0～1000.0s**	**0.0s**

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

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

F05.05	**Communication error 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 judges it as communication failure.

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

F05.06	**Local response delay time**	**Range: 0～200ms(Modbus is valid)**	**2ms**

Local response delay time represents the time within which the inverter serial port receives and executes command from upper device and then responds to upper device.

F05.07	**Main&sub inverter communication frequency setting percentage**	**Range: 0～500%**	**100%**

After setting this parameter when frequency sent from main inverter, as the input source of communication frequency of sub inverter, one inveter can control multiple devices with different proportional frequency.

Note

This parameter is valid only when inverter ismaster slave station and the frequency given channel is communication given.

F05.08	**Communication virtual input terminal enabled**	**Range: 00～FFH**	**00H**

Bit0: CX1 virtual input terminal enabled
Bit1: CX2 virtual input terminal enabled
Bit2: CX3 virtual input terminal enabled
Bit3: CX4 virtual input terminal enabled
Bit4: CX5 virtual input terminal enabled
Bit5: CX6 virtual input terminal enabled
Bit6: CX7 virtual input terminal enabled
Bit7: CX8 virtual input terminal enabled

F05.09	**Communication virtual input terminal joining node**	**Range: 0, 1**	**0**

0: Independent node. Communication virtual terminal function is only set in **[F05.10～F05.17]**.

1: Terminal node. Communication virtual terminal function is only set in **[F08.18～F08.25]**, regardless of X1～X5 valid or CX1～CX8 valid all execute this setting function. X1～X4 corresponds to CX1～CX4 , AI1 corresponds to CX5, AI2 corresponds to CX6.

F05.10	**Communication virtual terminal CX1 function**	**Range: 0～90**	**0**
F05.11	**Communication virtual terminal CX2 function**	**Range: 0～90**	**0**
F05.12	**Communication virtual terminal CX3 function**	**Range: 0～90**	**0**
F05.13	**Communication virtual terminal CX4 function**	**Range: 0～90**	**0**
F05.14	**Communication virtual terminal CX5 function**	**Range: 0～90**	**0**
F05.15	**Communication virtual terminal CX6 function**	**Range: 0～90**	**0**
F05.16	**Communication virtual terminal CX7 function**	**Range: 0～90**	**0**
F05.17	**Communication virtual terminal CX8 function**	**Range: 0～90**	**0**

Communication virtual terminals CX1～CX8 function and terminal X1～X5 function is same.

Note

The communication virtual terminal function is realized by setting the Modbus address and 1D09.

F05.18	**Input mapping application parameter 1**	**Range: F00.00～F26.xx**	**25.00**
F05.19	**Input mapping application parameter 2**	**Range: F00.00～F26.xx**	**25.00**
F05.20	**Input mapping application parameter 3**	**Range: F00.00～F26.xx**	**25.00**
F05.21	**Input mapping application parameter 4**	**Range: F00.00～F26.xx**	**25.00**
F05.22	**Input mapping application parameter 5**	**Range: F00.00～F26.xx**	**25.00**
F05.23	**Input mapping application parameter 6**	**Range: F00.00～F26.xx**	**25.00**
F05.24	**Input mapping application parameter 7**	**Range: F00.00～F26.xx**	**25.00**
F05.25	**Input mapping application parameter 8**	**Range: F00.00～F26.xx**	**25.00**
F05.26	**Input mapping application parameters 9**	**Range: F00.00～F26.xx**	**25.00**
F05.27	**Input mapping application parameters 10**	**Range: F00.00～F26.xx**	**25.00**

Input parameter address mapping.

This parameter is used for mapping waiting for input. Integral part corresponds with group number of the parameter, while decimal part corresponds with intra-class reference (parameter series numberwithin group parameter). For example: Setting **[F05.18=00.00]** indicates that mapping **[F00.00]** as input parameter 1.

Note

⑴ xx represents function code.

⑵ F25.xx represents not mapping.

⑶ By his way, some discontinuous parameters can be together to read the data, and using the input mapping application parameters to increase the communication efficiency.For example, if reading **[F00.00, F01.10, F02.02, F03.04]**, you can map the above-mentioned parameters to**[F05.18, F05.19, F05.20, F05.21, F05.22].**Under RTU communication mode, only one continuous reading 5 groups of parameters commands (01 03 05 12 00 05 24 D1) can read 5 groups of parameters value,thus improve communication efficiency.

F05.28	**Profibus version**	**-**	**-**

F05.29	**Reserved**		
F05.30	**Reserved**		

F05.31	**Writesigns for PZD1~PZD10**	**Range: 0～1023**	**0**

[F05.31] is used to set the sign bit for writing PZD1~PZD10. When the corresponding bit is 1, the value is negative, otherwise it is positive.

F05.32	**Read signs of PZD1~PZD10**	**Range: 0～1023**	**0**

[F05.32] is used to set the sign bit for reading PZD1~PZD10. When the corresponding bit is 1, the value is negative, otherwise it is positive.

F05.33	**Modbus communication protection start delay time**	**Range: 0～600.0s**	**10.0s**

This parameter defines the power-on communication detection delay time. When the value of **[F05.04]** or **[F05.05]** is not 0, the communication detection action is valid. The value of this parameter means that the machine will not perform communication detection delay time after initial power-on. This function cooperates with the power-on initialization process of the host computer.

F05.34	**Communication read current format**	**Range: 0, 1**	**0**

0: 0.01A (motor power <7.5KW).
1: 0.1A.

This parameter determines the format for communicationreading inverter current data. This function is effective when the motor power is below 7.5KW. The current read at 7.5KW and above is unified into 0.1A format.

F05.35	**PROFIBUS-DP control word: and**	**Range: 0~65535**	**0**
F05.36	**PROFIBUS-DP control word: or**	**Range: 0~65535**	**65535**
F05.37	**PROFIBUS-DP status word: and**	**Range: 0~65535**	**0**
F05.38	**PROFIBUS-DP status word: or**	**Range: 0~65535**	**65535**
F05.39	**Write PZD1 scale factor**	**Range: 0.1～6553.5%**	**100.0%**
F05.40	**Write PZD2 scale factor**	**Range: 0.1～6553.5%**	**100.0%**
F05.41	**Write PZD3 scale factor**	**Range: 0.1～6553.5%**	**100.0%**
F05.42	**Write PZD4 scale factor**	**Range: 0.1～6553.5%**	**100.0%**
F05.43	**Write PZD5 scale factor**	**Range: 0.1～6553.5%**	**100.0%**
F05.44	**Write PZD6 scale factor**	**Range: 0.1～6553.5%**	**100.0%**
F05.45	**Write PZD7 scale factor**	**Range: 0.1～6553.5%**	**100.0%**
F05.46	**Write PZD8 scale factor**	**Range: 0.1～6553.5%**	**100.0%**
F05.47	**Write PZD9 scale factor**	**Range: 0.1～6553.5%**	**100.0%**
F05.48	**Write PZD10 scale factor**	**Range: 0.1～6553.5%**	**100.0%**
F05.49	**Read PZD1 scale factor**	**Range: 0.1～6553.5%**	**100.0%**
F05.50	**Read PZD2 scale factor**	**Range: 0.1～6553.5%**	**100.0%**
F05.51	**Read PZD3 scale factor**	**Range: 0.1～6553.5%**	**100.0%**
F05.52	**Read PZD4 scale factor**	**Range: 0.1～6553.5%**	**100.0%**
F05.53	**Reading PZD5 scale factor**	**Range: 0.1～6553.5%**	**100.0%**
F05.54	**Reading PZD6 scale factor**	**Range: 0.1～6553.5%**	**100.0%**

F05.55	**Read PZD7 scale factor**	**Range: 0.1～6553.5%**	**100.0%**
F05.56	**Read PZD8 scale factor**	**Range: 0.1～6553.5%**	**100.0%**
F05.57	**Reading PZD9 scale factor**	**Range: 0.1～6553.5%**	**100.0%**
F05.58	**Reading PZD10 scale factor**	**Range: 0.1～6553.5%**	**100.0%**

7.7 Setting curve parameter group: F06

F06.00	**Setting curve selection**	**Range: Units digit: 0～2** **Tens digit: 0～2** **Hundreds digit: 0～2** **Thousands digit: 0～2**	**0000**

Units digit: AI1 curve selection.

0: Curve 1.

1: Curve 2.

2: Curve 3.

Tens digit: AI2 curve selection.

Same as unit digit.

Hundreds digit: Rapid pulse curve selection. /AI3 (extension) curve selection.

Same as unit digit.

Thousands digit: Pulse width setting curve selection.

Same as unit digit.

This function code tens digit, hundreds digit and thousands digits are used to select analog quantity input AI1, AI2, rapid pulse input and pulse width input signal setting curve. Curves 1 and 2 are 3-point curves, curve 3 is 4point curve. Users can select different curves for adjustmentbased on characteristic requirements of the input signal so as to realize specific input.

F06.01	**Curve 1 min.setting**	**Range: 0.0%～curve 1 inflection setting**	**0.0%**
F06.02	**Corresponding physical quantity of curve 1 min. setting**	**Range: 0.0～100.0%**	**0.0%**
F06.03	**Curve 1 inflection setting**	**Range: Curve 1 min.setting～Curve 1 max.setting**	**50.0%**
F06.04	**Corresponding physical quantity of curve 1 inflection setting**	**Range: 0.0～100.0%**	**50.0%**
F06.05	**Curve 1 max.setting**	**Range: Curve 1 inflection setting～100.0%, 100% corresponds to 5V input AD port**	**100.0%**
F06.06	**Corresponding physical quantity of curve 1 max. setting**	**Range: 0.0～100.0%**	**100.0%**
F06.07	**Curve 2 min.setting**	**Range: 0.0%～curve 2 inflection setting**	**0.0%**
F06.08	**Corresponding physical quantity of curve 2 min. setting**	**Range: 0.0～100.0%**	**0.0%**
F06.09	**Curve 2 inflection setting**	**Range: Curve 2 min.setting～Curve 2 maximum setting**	**50.0%**
F06.10	**Corresponding physical quantity of curve 2 inflection setting**	**Range: 0.0～100.0%**	**50.0%**
F06.11	**Curve 2 max.setting**	**Range: Curve 2 inflection setting～100.0%**	**100.0%**

F06.12	**Corresponding physical quantity of curve 2max. setting**	**Range: 0.0～100.0%**	**100.0%**
F06.13	**Curve 3 min. setting**	**Range: 0.0%～curve 3 inflection 1 setting**	**0.0%**
F06.14	**Corresponding physical quantity of curve 2min. setting**	**Range: 0.0～100.0%**	**0.0%**
F06.15	**Curve 3 inflection 1 setting**	**Range: Curve 3 min. Setting～curve 3inflection 2 setting**	**30.0%**
F06.16	**Corresponding physical quantity of curve 3 inflection 1 setting**	**Range: 0.0～100.0%**	**30.0%**
F06.17	**Curve 3 inflection 2 setting**	**Range: curve 3 inflection 1 setting～curve 3 max.setting**	**60.0%**
F06.18	**Corresponding physical quantity of curve 3 inflection 2setting**	**Range: 0.0～100.0%**	**60.0%**
F06.19	**Curve 3 max.setting**	**Range: curve 3 inflection2 setting～100.0%**	**100.0%**
F06.20	**Corresponding physical quantity of curve 3max. setting**	**Range: 0.0～100.0%**	**100.0%**

Take curve 1 as an example:

Parameter **[F06.01～F06.06]** are used to set analog quantity input voltage and its representative set value relationship. When analog quantity input voltage is greater than the set "max. input"**[F06.05]**, analog quantity voltage is calculated based on"max. input"; similarly, when analog input voltage is smaller than the set "min. input" **[F06.01]** set based on"curve lower then min. input setting selection" **[F06.21],** calculated by min. input or 0.0%.

Note

(1) For functions andusage of Curve 2, please refer to Curve 1 instruction.
(2) Curve 3 function is similar to curves 1 and 2, but curves 1 and 2 are three-point straight lines, while curve 3 is four-point curve, which can realize more flexible corresponding relationship.
(3) The output positive / negative polarity of curves 1, 2, and 3 is decided by the features of input analog signal. Curve will not change output positive/negative polarity.
(4) As frequency setting, 100.0% setting corresponding physical quantity is upper limit frequency **[F01.11]**.

F06.21	**Curve lower then min. input corresponding selection**	**Range: Units digit: 0, 1** **Tens digit: 0, 1** **Hundreds digit: 0, 1** **Thousands and tenthousands digit: reserved**	**00111**

Units digit: Curve 1 setting.

0: Corresponds to the min. setting corresponding physical quantity.

1: to 0.0% of the correspondsphysical quantity.

Tens digit: Curve 2 setting.

Same as unit digit.

Hundreds place: Curve 3 setting.

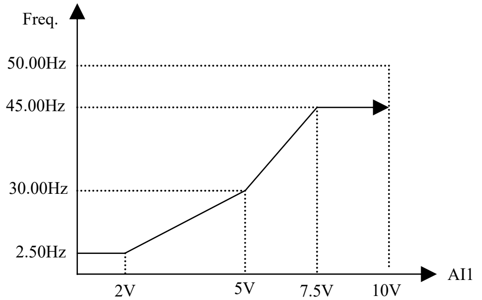
Same as unit digit.

Thousands and ten thousands: reserved.

This parameter is used to set,when curve's corresponding analog quantity input voltage is smaller than the min. setting, how to decide corresponding setting analog quantity.

For example, **[F06.21] units** = 0, when analog input is lower than **[F06.01]**, this curve output**[F06.02] c**orresponding physical quantity value, if **[F06.21] units** = 1, when analog quantity input is lower than**[F06.01]**, the curve output is 0 .

Take 0～10V AI1 for setting frequency as an example: AI1 selects curve 1, setting frequency and AI1 relationship is shown in Fig. 7-10.



F06.01=20.0%　　F06.02=5.0%
F06.03=50.0%　　F06.04=60.0%
F06.05=75.0%　　F06.06=90.0%
F06.21=0

Fig.7-10 AI1 selection curve 1 frequency setting

7.8 Analog quantity, Pulse input function parameter group: F07

F07.00	**AI1 input filter time**	**Range: 0.000～9.999s**	**0.050s**
F07.01	**AI1 setting gain**	**Range: 0.000～9.999**	**1.007**
F07.02	**AI1 settingbias**	**Range: -100.0～100.0%**	**-0.5%**

AI1 input filter time, is used to set AI1 software filter time. When field analog quantity is easily interrupted, filter time to make the analog quantity check stable, but when filter timeisgreater, the response time of analog quantity check is slower. Please set according to the actual situation.

AI1 setting bias is indicated with Max. input (10V or 20mA) percentage, which is used to set up and down translation quantity of AI1 analog input. Take voltage input as an example, the adjustment relationship of setting bias and gainadjustment before and after adjustment is as follows:

Analog input AI1 (after revise) = input gain**[F07.01]**× Analog input AI1 (before revise) + setting bias **[F07.02]**×10V

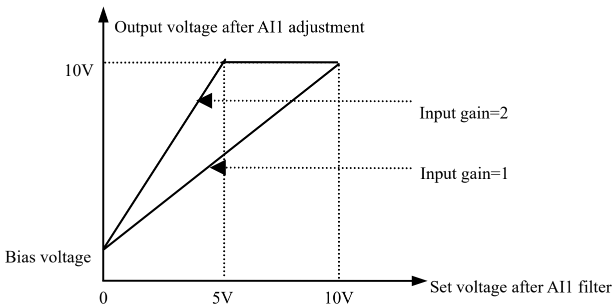


Fig. 7-11 AI1 adjustment

F07.03	**AI2 input filter time**	**Range: 0.000～9.999s**	**0.050s**
F07.04	**AI2 setting gain**	**Range: 0.000～9.999**	**1.005**
F07.05	**AI2 setting bias**	**Range: -100.0～100.0%**	**-0.5%**

Parameters**[F07.03～F07.05]**are used to set analog input AI2 filter time, gain and setting bias. For detail using method, please refer to analog quantity input AI1. Take voltage input as an example, the adjustment relationship between gain adjustment and setting bias is as follows:

Analog input AI2 (after revise) = input gain**[F07.04]**× Analog input AI2 (before revise) + setting bias **[F07.05]**×10V

Take current input as an example, the adjustment relationship between gain and setting bias is as follows:

Analog input AI2 (after revise) = input gain**[F07.04]**× Analog input AI2 (before revise) + setting bias **[F07.05]**×20mA

F07.06	**AI3(extension) input filter time**	**Range: 0.000～9.999s**	**0.050s**

F07.07	**Pulse input filter time**	**Range: 0.000～9.999s**	**0.000s**
F07.08	**Pulse input gain**	**Range: 0.000～9.999**	**1.000**
F07.09	**Pulse input Max. frequency**	**Range: 0.01～50.00KHz**	**10.00KHz**

[F07.07], **[F07.08]**parameters definefilter time and gain when the frequency channel selection terminal pulse is set. When setting filter time, please be noted that the longer the filter time, the slower the change rate output frequency is. So set filter time properly according to the actualsituation. Pulse width gain is for impulse quantity of current input impulse terminal.

[F07.09] parameter defines frequency input range when frequency setting channel selectionterminal pulse is set. When actual input frequency is greater than the set max. frequency, deal with it according to the max. frequency. When the external input pulse is less than 2Hz, disposed as 0Hz.

F07.10	**Pulse width input filter time**	**Range: 0.000～9.999s**	**0.000s**
F07.11	**Pulse width input gain**	**Range: 0.000～9.999**	**1.000**
F07.12	**Pulse width input logic setting**	**Range: 0, 1**	**0**
F07.13	**Pulse width max. input width**	**Range: 1.0～999.9ms**	**100.0ms**

[F07.10], **[F07.11]** parameters define filter time and gain when the frequency channel selectionterminal pulse width is set. When setting filter time, please be noted that when the max. pulse width set in **[F07.13]** is smaller, the filter time is not suggested to be set too long, otherwise the response time speed of output frequency will be very slow. Pulse width input gain forimpulse width duty cycle of current pulse width input terminal.

0: Positive logic.

1: Counter logic.

[F07.12] defines valid level of digital quantity input X5 channel input pulse when frequency channel selection terminal pulse width is set. The application shall go with double polarity working state of the X input terminal.

[F07.13] parameter defines the width range of the input valid pulse when the frequency setting channel selection terminal pulse width set.

F07.14	**Analog input disconnection detection threshold**	**Range: 0.0%～100.0%**	**10.0%**
F07.15	**Analog input disconnection detection time**	**Range: 0.0～500.0s**	**3.0s**

F07.16	**Analog disconnection protection option**	**Range: Units digit: 0～3** **Tens digit: 0～2**	**10**

Units digit: disconnection detection channel selection.

0: Invalid.

1: AI1.

2: AI2.
3: AI3(extension)

Tens digit: disconnection protection way.
0: Stop according to stop mode.
1: Fault, free stop.
2: Continue running.

When channel (AI1 or AI2) selected by the units of **[F07.16]**inputa value less than the threshold defined by**[F07.14]**, and it is sustained exceed the time defined by **[F07.15]**, the program will generate an analog channel disconnection signal output, which can outputsignal external by multifunctional output terminal (function48), and the inverter will action according to the command defined by tens of **[F07.16]:** when**[F07.16]**tens digit = 1, the inverter should be submitted to the E-41 fault (analog channel disconnection protection); When the tens digit**[F07.16]** = 0, inverter stops according to stop mode.

By this function, AI1 or AI2 can be used to test position signal and motor temperature of the system and take corresponding protective measure. When don't need this function, set the units of **[F07.16]** to 0.

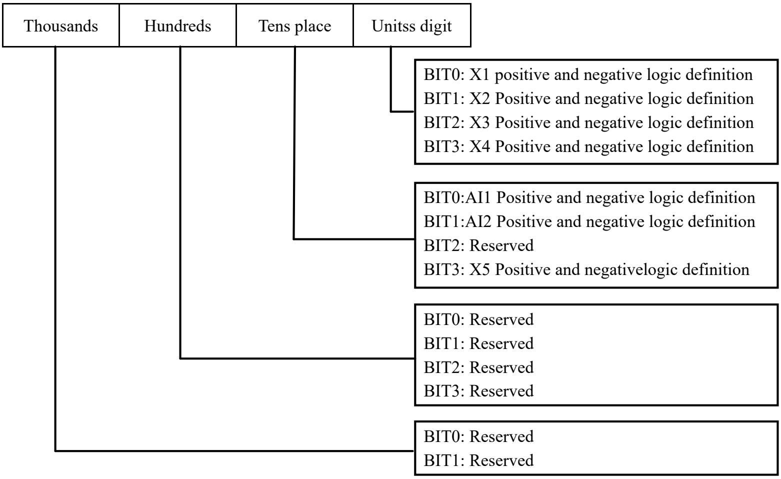
F07.17	**AI Input steady state threshold**	**Range: 0.0～20.0%**	**0.0%**

The change of AI input in one cycle (AI1 corresponds to [F07.00] , AI2 corresponds to [F07.03]) is less than [F07.17] (the percentage of the maximum given value), frequency response invalid. If the change in one cycle is less than [F07.17] , the cumulative change is higher than [F07.17] ×2, frequency response is active.

F07.18	**AI3(extension) setting gain**	**Range: 0.000～9.999**	**1.005**
F07.19	**AI3(extension) setting deviation**	**Range: -100.0～100.0%**	**-0.5%**

7.9 On-off input function parameter group: F08

F08.00	Input terminal positive and negative logic setting	Range: 0000～FFFF	0000



The setting of this parameter is finally converted to binary settings, relationship between binary setting and hexadecimal is shown in Table 7-2.

Table 7-2 Relationship between binary settings and bit display values

Binary setting				Hexadecimal (bit displayed value)
BI3	BIT2	BIT1	BIT0	
0	0	0	0	0
0	0	0	1	1
0	0	1	0	2
0	0	1	1	3
0	1	0	0	4
0	1	0	1	5
0	1	1	0	6
0	1	1	1	7
1	0	0	0	8
1	0	0	1	9
1	0	1	0	A
1	0	1	1	B
1	1	0	0	C
1	1	0	1	D
1	1	1	0	E
1	1	1	1	F

Bit refers to the units, tens, hundreds or thousands digits displayed in operation panel.

[F08.00] parameter definesvalue logic state of Xi input terminal:

Positive logic: Xi terminal and corresponding common port closed valid, opened invalid.

Negative logic: Xi terminal and corresponding common port closed invalid,opened valid.

When BIT selects 0, it indicates positive logic; 1 indicates negative logic. Properly setting of this parameter can realize correct logic input without changing terminal wiring.

F08.01	**Input terminal filter time**	**Range: 0.000～1.000s**	**0.010s**

[F08.01] parameter sets the filter time of input terminal check. When the input terminal state is changed, the terminal state change is valid only when the set filtering time is unchanged. Otherwise, it will remainthe last state , thus effectively reduce malfunctions caused by interruption. The group C monitor state is for the state of the disposed parameter. When demand terminal as high-speed function, low down the value of this parameter in case losing the signal.

F08.02	**X1 input terminal closed time**	**Range: 0.00～99.99s**	**0.00s**
F08.03	**X1 input terminal opened time**	**Range: 0.00～99.99s**	**0.00s**
F08.04	**X2 input terminal closed time**	**Range: 0.00～99.99s**	**0.00s**
F08.05	**X2 input terminal opened time**	**Range: 0.00～99.99s**	**0.00s**
F08.06	**X3 input terminal closed time**	**Range: 0.00～99.99s**	**0.00s**
F08.07	**X3 input terminal opened time**	**Range: 0.00～99.99s**	**0.00s**
F08.08	**X4 input terminal closed time**	**Range: 0.00～99.99s**	**0.00s**
F08.09	**X4 input terminal opened time**	**Range: 0.00～99.99s**	**0.00s**
F08.10	**AI1 input terminal closed time**	**Range: 0.00～99.99s**	**0.00s**
F08.11	**AI1 input terminal opened time**	**Range: 0.00～99.99s**	**0.00s**
F08.12	**AI2 input terminal closed time**	**Range: 0.00～99.99s**	**0.00s**
F08.13	**AI2 input terminal opened time**	**Range: 0.00～99.99s**	**0.00s**
F08.14	**AI3(extension) input terminal closing time**	**Range: 0.00～99.99s**	**0.00s**
F08.15	**AI3(extension) input terminal disconnection time**	**Range: 0.00～99.99s**	**0.00s**
F08.16	**X5 input terminal closed time**	**Range: 0.00～99.99s**	**0.00s**
F08.17	**X5 input terminal opened time**	**Range: 0.00～99.99s**	**0.00s**

[F08.02～F08.17] parameter defines the corresponding delay time of Xi (including AI1, AI2) input terminal from closed to opened or opened to closed so as to meet user’s multiple requirement. Require. This parameter does notaffect the monitor value of input terminal state.You can revise the parameter to control the filtering when the interruption is strong.

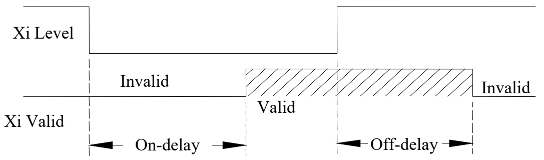


Fig. 7-12 Closed and opened delay

F08.18	**Input terminal X1 function selection**	**Range: 0～96**	**1**
F08.19	**Input terminal X2 function selection**	**Range: 0～96**	**2**
F08.20	**Input terminal X3 function selection**	**Range: 0～96**	**0**
F08.21	**Input terminal X4 function selection**	**Range: 0～96**	**0**
F08.22	**Input terminal AI1 function selection**	**Range: 0～96**	**0**
F08.23	**Input terminal AI2 function selection**	**Range: 0～96**	**0**
F08.24	**Input terminal AI3(extension) function selection**	**Range: 0～96**	**0**
F08.25	**Input terminal X5 function selection**	**Range: 0～96**	**0**

Multi-function input terminals X1~X5, AI1, and AI2 provide users with up to 96 selection, which can be selected based on actual applications. For details, please refer to parameter function Table 7-3.

Table 7-3 Multi-function input selection function table

Content	Function	Content	Function
0	Leave control terminal unused	49	Command to switchover to panel
1	Forward running FWD terminal	50	Command switchover to terminal
2	Reverse operation REV terminal	51	Command switchover to communication
3	External forward jogging control	52	Running command channel selection terminal 1
4	External reverse jogging control	53	Run command channel selection terminal 2
5	Multi-step speed control terminal 1	54	Forwardprohibition command (Stop according to stop mode, invalid for jog command)
6	Multi-step speed control terminal 2	55	Reverse prohibition command (Stop according to stop mode, invalid for jog command)
7	Multi-step speed control terminal 3	56	Swinging frequency input
8	Multi-step speed control terminal 4	57	Resetting state of swinging frequency
9	Acceleration and deceleration time selection terminal 1	58	Internal counter reset end
10	Acceleration and deceleration time selection terminal 2	59	Internal counter input
11	Acceleration and deceleration time selection terminal 3	60	Internal timer resetting
12	Acceleration and deceleration time selection terminal 4	61	Internal timer triggering
13	Main and auxiliary frequency	62	Length count input

	operational rule selection terminal 1		
14	Main and auxiliary frequency operational rule selection terminal 2	63	Length reset
15	Main and auxiliary frequency operational rule selection terminal 3	64	Reset this operation time
16	Frequency ascending command (UP)	65	Control mode switchover 1
17	Frequency descending command (DOWN)	66	Control mode switchover 2, combined with function No. 65, realizes switchover of speed, position, torque and other modes.
18	Frequency ascending/descending frequency resetting	67	Reserved
19	Multi-step closed loop terminal 1	68	Reserved
20	Multi-step closed loop terminal 2	69	Reserved
21	Multi-step closed loop terminal 3	70	Water shortage signal input (closed means water shortage)
22	External equipment failure input	71	There is water signal input (closed means there is water)
23	External interruption input	72	Position command direction is reversed
24	External resetting input	73	Position command prohibited
25	Free stop input	74	Forward overtravel switch
26	External stop instruction—stop according to stop mode	75	Reverse overtravel switch
27	Stop DC braking input command DB	76	Multi-segment position command enabled
28	Inverter running prohibited—stop according to the stop mode	77	Multiple position selection 1
29	Acceleration/deceleration prohibition command	78	Multiple position selection 2
30	Three-wire running control	79	Spindle level control enabled
31	Process PID invalid	80	Spindle alignment index 1
32	Process PID stop	81	Spindle alignment index 2
33	Process PID integral holding	82	Spindle alignment index 3
34	Process PID integral resetting	83	Origin switch (during origin return)
35	Process PID function negation (Closed-loop adjustment feature negation)	84	Zero switch (when the spindle stops accurately)
36	Simple PLC invalid	85	Origin return enable (valid on rising edge)
37	Simple PLC halted	86	Clear position deviation (valid on rising edge)
38	Simple PLC stop state resetting	87	Reserved
39	Main frequency switchover to digit (keypad)	88	Reserved
40	Switch the main frequency to AI1	89	Reserved
41	Switch the main frequency to AI2	90	Reserved
42	Switch the main freq. to AI3(extension)	91	Pulse frequency input (X5 valid)
43	Reserved	92	Pulse width PWM input (X5 valid)
44	Main frequency setting channel selection terminal 1	93	Reserved
45	Main frequency setting channel selection terminal 2	94	Reserved
46	Main frequency setting channel selection terminal 3	95	Reserved

47	Main frequency setting channel selection terminal 4	96	Reserved
48	Auxiliary frequency reset	-	-

Functions introduction in Table 7-3 are as follows:

1, 2: External command terminal. When running command channel is terminal running command, control inverter's forward and reverse rotation by external terminals.

3, 4: External jogging command terminal. Set as any running command channel setting running command, control inverter's jogging forward and jogging reverse by external terminals.

5～8: Multi-step running terminals. By setting these functions terminal ON/OFF (on/off) combination, up to 15 multi-step running frequency can be set. The acceleration and deceleration time of each step corresponds to the each step time. The corresponding motor running direction of each phase multi-speed is determined by the tens digit of**[F10.01～F10.15]**.

Table 7-4 Multi-steprunning selection table

K_4	K_3	K_2	K_1	Frequency setting
OFF	OFF	OFF	OFF	Other running frequencies
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
ON	OFF	OFF	OFF	Multi-step frequency 8
ON	OFF	OFF	ON	Multi-stepfrequency 9
ON	OFF	ON	OFF	Multi-step frequency 10
ON	OFF	ON	ON	Multi-step frequency 11
ON	ON	OFF	OFF	Multi-step frequency 12
ON	ON	OFF	ON	Multi-step frequency 13
ON	ON	ON	OFF	Multi-step frequency 14
ON	ON	ON	ON	Multi-step frequency 15

When using multi-step speed to run and simple PLC to run, use multi-step speed frequency**[F10.31～F10.45]**above, take multi-step speed running as an example:

Define control terminals X1, X2, X3,X4 :

When**[F08.18=5]**,**[F08.19=6]**,**[F08.20=7]**,**[F08.21= 8],** X1, X2, X3, X4 are used to define multi-step speed running, as shown in Fig. 7-13.

In Fig. 7-13, take the example of terminal running command channel. The tens digits of**[F10.01～F10.15]**are both 2, and X5 is set as forward running terminal, andAI1 is reverse running terminal, for the running control of forward direction and reverse direction.

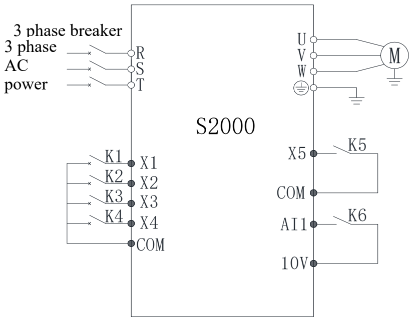


Fig.7-13 Multi- step speed running wiring

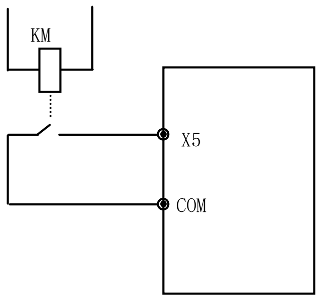


Fig. 7-14 Peripheral equipment fault Normally Open

9～12: Acceleration and deceleration time terminal selection. By ON/OFF of acceleration and deceleration time terminals, acceleration and deceleration time 1～15 can be selected. See Table 7-5:

Table 7-5 Acceleration and deceleration time terminal selection

Acceleration and deceleration time selection terminal 4	Acceleration and deceleration time selection terminal 3	Acceleration and deceleration time selection terminal 2	Acceleration and deceleration time selection terminal 1	Acceleration and deceleration time selection
OFF	OFF	OFF	ON	Acceleration and deceleration time 1
OFF	OFF	ON	OFF	Acceleration and deceleration time 2
OFF	OFF	ON	ON	Acceleration and deceleration time 3
OFF	ON	OFF	OFF	Acceleration and deceleration time 4
OFF	ON	OFF	ON	Acceleration and deceleration time 5
OFF	ON	ON	OFF	Acceleration and deceleration time 6
OFF	ON	ON	ON	Acceleration and deceleration time 7
ON	OFF	OFF	OFF	Acceleration and deceleration time 8
ON	OFF	OFF	ON	Acceleration and deceleration time 9
ON	OFF	ON	OFF	Acceleration and deceleration time 10
ON	OFF	ON	ON	Acceleration and deceleration time 11
ON	ON	OFF	OFF	Acceleration and deceleration time 12
ON	ON	OFF	ON	Acceleration and deceleration time 13
ON	ON	ON	OFF	Acceleration and deceleration time 14
ON	ON	ON	ON	Acceleration and deceleration time 15

13～15: Main and auxiliary frequency operational rule selection terminals. By ON/OFF of frequency setting channel selection terminals 13, 14, and 15, 7 kinds of main and auxiliary frequency operational rules defined in **[F01.06]**parameters can be realized. Switchoverbetween main and auxiliary operational rule terminal is prior to function code**[F01.06]**setting. For detail, please see Table 7-6:

Table 7-6 Selection table of terminal main and auxiliary frequency operational rule

Main and auxiliary operational rules Select terminal 3	Main and auxiliary operational rules Select terminal 2	Main and auxiliary operational rules Select terminal 1	Main and auxiliary operational rule selection
OFF	OFF	OFF	Decided by F01.06
OFF	OFF	ON	Synthesized frequency is sub- frequency
OFF	ON	OFF	Operation rule: addition
OFF	ON	ON	Operation rule: subtraction
ON	OFF	OFF	Operation rule: multiplication
ON	OFF	ON	Synthesized frequency is Max. value
ON	ON	OFF	Synthesized frequency is Min. value
ON	ON	ON	Synthesized frequency isnonzero value

16, 17: Frequency ascending command UP/descending command DOWN. Realize frequency ascendingor descendingby control terminal, substitute operation keypad for remote control. Normal running **[F01.00]**or**[F01.03]**set as 3 is valid. Ascending/descending rate is set in **[F18.06]**and**[F18.07]**.

18: Frequency ascending/descending frequency resetting.

When frequency setting is set as terminal UP/DOWM, this terminal can eliminate the set frequency value by terminal UP/DOWN.

19～21: Multi-step closed-loop setting terminals. By ON/OFF of multi-step closed-loop setting terminals, Table 7-7 multi-step closed-loop setting selection can be realized.

Table 7-7 Multi-step closed loop setting selection table

Multi-step closed-loop setting selection terminal 3	Multi-step closed-loop setting selection terminal 2	Multi-step closed-loop setting Selection terminal 1	Multi-step closed-loop setting selection
OFF	OFF	OFF	Closed loop setting decided by F11.01
OFF	OFF	ON	Multi-step closed loop setting 1
OFF	ON	OFF	Multi-step closed loop setting 2
OFF	ON	ON	Multi-step closed loop setting 3
ON	OFF	OFF	Multi-step closed loop setting 4
ON	OFF	ON	Multi-step closed loop setting 5
ON	ON	OFF	Multi-step closed loop setting 6
ON	ON	ON	Multi-step closed loop setting 7

22: External equipment failure jump-in. With this terminal, peripheral equipment fault signal can be input , which is convenient for inverter to perform fault monitoring for peripheral equipment. As shown in Fig. 7-14.

23: External interruption input. When the inverter is running, after receiving external interruption signal, it blocks output, and runs with zero frequency. Once external interruption signal is released, and inverter running command is still valid, inverter auto revolving speed tracking stars,the inverter restarts.

24: External resetting input. When fault alarm occurs to the inverter, you can reset fault by this terminal. Its function and operation keypad 6 STOP/RESET key function are in accordance.

25: Free stop input. The purpose of this function and free stop set in **[F02.11]** is same here, but here it use control terminal to realize, which is convenient for remote control.

26: External stop instruction. This command is valid for all running command channels. When this function terminal is valid, the inverter stop according to the mode set by **[F02.11]**.

27: Stop DC braking input command DB. Implement DC braking to the motor during during stop by control terminal so as to realize emergency stop and accurate position of the motor. During deceleration stop, if this function terminal closed, when frequency is lower than the brake starting frequency**[F02.14]**, it willbrake according tobrake currentdefined in **[F02.16]**. It will not stop until terminal is opened.

28: Inverter running prohibited. The running inverter stop freely, when this terminal is valid, and prohibited to startin waiting status. It is mainly applied to occasion needing safe linkage.

29: Acceleration and deceleration prohibited command. When this function is valid, keep the motor away from any external signal (except stop command), maintain current revolving speed running.

Note

This function is invalid in normal deceleration stop process.

30: Three-wire running control. Refer to **[F08.26]**operating mode (three-wire operating mode) function introduction.

31: Process PID invalid. Realize flexible switchoverin low-level running mode under closed-loop running status.

Note

⑴ Switchover between between closed-loop and low-level running mode can be available only when the inverter runs in closed-loop mode **[F11.00=1 or F12.00=1]**.

⑵ When switching to low-level running mode, start-stop control, direction and acceleration/deceleration time comply with relevant settings of running mode.

32: Process PID stop. Invalid when PID stop, when inverter maintains current output frequency, PID regulation of frequency source is no more performed.

33: Process PID integral holding. PID integral impact maintains, and will not regulate according to the output quantity.

34: Process PID integral resetting. When this terminal is valid, PID integral regulation function halts, but PID proportional control and differential control functions are still valid.

35: Process PID function negation. When this terminal is valid, direction of PID effect and setting direction of **[F11.13]** is opposite.

36: Simple PLC invalid. Realize flexible switchover in low-level running mode under PLC running status.

Note

⑴ Switchover between PLC and low-level running modecan be available only when the inverter runs in PLC mode **[F10.00 unit's digit is not 0]**.

⑵ When switching to low-level running mode, start-stop control, direction and acceleration/deceleration time comply with relevant settings of running mode.

37: Simple PLC halted. It is to stop the control of running PLC, when the terminal is valid, the inverter runs at zero frequency, PLC running does not time; after invalid implementation, auto revolving speed tracking starts and keep on running PLC.

38: Simple PLC stop state resetting. Under stop statue of PLC running mode, will clear

PLC run step, run time, run frequency ect. Restored when PLC running stop is this terminal is effective. Please see F10 group function description.

39: Main frequency switchover to digital setting (keypad). The main frequency provision channel is switched to the keypad digital provision when this terminal is valid (Setting frequency by keypad up and down key).

40: Switch the main frequency to AI1. The main frequency provision channel is switched to the analog quantity AI1 provision, when this terminal is valid.

41: Switch the main frequency to AI2. The main frequency provision channel is switched to the analog quantity AI2provision, when this terminal is valid.

42: Switch the main frequency to AI3(extension).

44～47: Main frequency setting channel selection terminal. By ON/OFF of selection terminal 1~4, free selection of main frequency setting channel can be realized by terminal. The priority of main frequency setting channel selection terminal (terminal function 44~47) is higher than the main frequency switchover to (terminal functions 41, 42, 43). For detail, see Table 7-8.

Table 7-8 Main frequency setting channel selection terminal

Channel selection Terminal 4	Channel selection Terminal 3	Channel selection Terminal 2	Channel selection Terminal 1	Main frequency setting channel selection terminal
OFF	OFF	OFF	ON	Operation keypad digital setting
OFF	OFF	ON	OFF	AI1 analog setting
OFF	OFF	ON	ON	AI2 analog setting
OFF	ON	OFF	OFF	Terminal UP/DOWN setting
OFF	ON	OFF	ON	Communication setting
OFF	ON	ON	OFF	Operation keypad knob provide
OFF	ON	ON	ON	Reserve
ON	OFF	OFF	OFF	Rapid pulse setting (X5)
ON	OFF	OFF	ON	Pulse width setting (X5)
ON	OFF	ON	OFF	Terminal encoder setting (X1, X2)
ON	OFF	ON	ON	Reserved
ON	ON	OFF	OFF	Reserved
ON	ON	OFF	ON	Reserved
ON	ON	ON	OFF	Reserved

48: Auxiliary frequency reset. Only valid for digital auxiliary frequency. When this function terminal is valid, reset auxiliary frequency setting quantity, setting frequency is completely decided by main frequency setting channel.

49: Command switchover to panel. When current command source is reset by terminal or communication, switchover between current command source and keypad command setting can be realized by this terminal.

50: Command switchover to terminal. When current command source is reset by keypad or communication, switchover between current command source and communication command setting can be realized by this terminal.

51: Command switchover to communication. Whencurrent command source is reset by keypad or terminal, switchover between current command source and communication command setting can be realized by this terminal.

52, 53: Running command channel selection. For details, please refer to Table 7-9 .

Table 7-9 Running command channel logicmode

Running command channel selection terminal 2	Running command channel selection terminal 1	Running command channel
OFF	OFF	Invalid
OFF	ON	Operation keypad running command channel
ON	OFF	Terminal running command channel
ON	ON	Communication running command channel

54: Forward prohibited command. Enable this terminal during the forward running process, and the inverter stop according to the stop mode. First enable this terminal, and then forward running enters zero-frequency running status. Jogging running is not affected by this.

55: Reverse prohibited command. Function and"forward prohibited command" are opposite.

56: Swinging frequency input. When the starting mode of swinging frequency is manual input, the terminal is valid, and swinging frequency function is valid. See F13 group function parameter instruction. When swinging frequency is set as manual input, this terminal is invalid, the inverter runs with preset frequency of swing frequency.

57: Resetting state of swinging frequency. When selecting swinging frequency function, no matter auto or manual input mode, closing this terminal will clear state information of the swing frequency memorized in the inverter. When opening this terminal, the swing frequency restarts. For details, please see F13 group function.

58: Interior counter reset end. Reset inverter built-incounter, and go with counter triggering signal input. For details, please see parameters**[F08.27]**and**[F08.28]**.

59: Interior counter input end. Interior counter's counting pulse input port, pulse max. frequency: 50.0KHz.

60: Interior timer reset end. Reset inverter built-intimer,goes with the timer triggering-end signal input

61: Interior timer triggering end. See parameter**[F08.29]**function.

62: Length count input. Length countinginput terminal, please see fixed length function of F13 group parameters.

63: Length reset. When the terminal is valid, reset internal length value, see **[F13]**fixed length function of parameter group.

64: Reset this running time. When the terminal is valid, the running counting time of this inverter is reset. For details, see timing running defined in **[F18]**group.

65: Control mode switchover 1.

66: Control mode switchover 2.

[F14.00]Combined with functions No. 65 and 66, can realize switchover of speed, position, torque and other modes. Please refer to the table below for details:

F14.00	Control mode switchover 1	Control mode switchover 2	Multi-step closed-loop provide selection
0	-	-	Speed control
1	-	-	Torque control
2	-	-	Position control
3	ON	-	Torque mode
	OFF		Speed control

4	ON	-	Position control
	OFF		Speed control
5	ON	-	Position control
	OFF		Torque control
6	OFF	OFF	Torque mode
	OFF	ON	Speed control
	ON	-	Position control

Note

By default, during jogging control, the priority is higher, and the jogging command is not affected by the above modes.

70: Water shortage signal input. Closed means water shortage. For details, please refer to **[F17]** group water shortage protection function parameter description.

71: Water signal input. Closed means there is water. For details, please refer to the**[F17]**group water shortage protection function parameter description.

72: Reverse the position command direction. When this terminal is closed, the system will invert the increment of the external pulse command, and the corresponding motor's running direction will also be inverted.

73: Position command prohibited. When this terminal is closed, the system does not respond to changes in external pulses until this terminal function becomes invalid.

74: Forward overtravel switch. When this terminal is valid, under the forward command, the system immediately stops at zero speed, and the reverse command is not affected at this time.

75: Reverse overtravel switch. When this terminal is valid, under the reverse command, the system immediately stops at zero speed, and the forward command is not affected at this time.

76: Multi-step position command enable. When this terminal function is valid, the internal 4-step multi-step position control function is valid.

77: Multi-step position selection 1.

78: Multi-step position selection 2. Functions No. 77 and 78 can be used with the internal 4-step multi-step position function to achieve multi-step position switching.

Please refer to the table below for details:

F16.74	Multi-step position command enable	Multi-step position selection 1	Multi-step position selection 2	Multi-step position provide selection
2	ON	OFF	OFF	Section 1 position
2	ON	OFF	ON	Section 2 position
2	ON	ON	OFF	Section 3 position
2	ON	ON	ON	Section 4 position

79: Spindle level controlenabled. When this terminal function is valid, the spindle accurate stop control function is valid.

80: Spindle alignment index 1.

81: Spindle alignment index 2.

82: Spindle alignment index 3. Functions 80 to 82 are used to select the accurate stop positioning position of the spindle.

Please refer to the table below for details:

Spindle level control enabled	Spindle alignment index 1	Spindle alignment index 2	Spindle alignment index 3	Spindle position indexing selection
ON	OFF	OFF	OFF	Graduation 1
ON	OFF	OFF	ON	Graduation 2

ON	OFF	ON	OFF	Graduation 3
ON	OFF	ON	ON	Graduation 4
ON	ON	OFF	OFF	Graduation 5
ON	ON	OFF	ON	Graduation 6
ON	ON	ON	OFF	Graduation 7
ON	ON	ON	ON	Graduation 8

83: Origin switch (during origin return).

84: Zero point switch (when the spindle stops accurately).

85: Origin return enabled (valid on rising edge).

86: Clear position deviation (valid on rising edge).

87～90: Reserved.

91: Pulse frequency input (X5 is valid). Only valid for multi-functional input terminal X5. This function terminal accepts pulse signal as frequency setting, relationship between the input signal pulse frequency and setting frequency is as shown in **[F06]** and **[F07]** group parameter.

92: Pulse width PWM input (X5 is valid). Only valid for multi-functional input terminal X5. This function terminal accepts PWM signal,check pulse width as frequency setting, relationship between input PWM pulse width and setting frequency is as shown in **[F06]** and **[F07]** group parameter.

93～96: Reserved.

F08.26	**FWD/REV operating mode selection**	**Range: 0～4**	**0**

This parameter defines five different modes by controlling external terminal inverter running.

0: Two-wire control mode 1

K2	K1	Operation command
0	0	Stop
1	0	REV
0	1	FWD
1	1	Stop

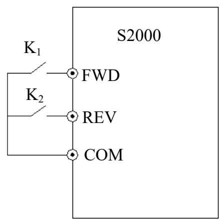


Fig. 7-15 Two-line operating mode 1

1: Two-wire control mode 2

K2	K1	Operation command
0	0	Stop
1	0	Stop
0	1	FWD
1	1	REV

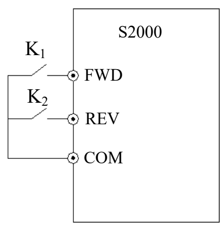


Fig.7-16 Two-line operating mode 2

2: Two-wire control mode 3 (monopulse control mode)

Monopulse control is triggered-type control. After triggering SB1 once, it forwards run. Retriggering SB1 once, it stops. Triggering SB1 once, it reversely runs. Triggering SB2 once, it stops. If it is forward running, the inverter stops when trigger SB2 once. Retriggering SB1 once,it stops. If it is reverse running, the inverter stop when triggering SB1 once.

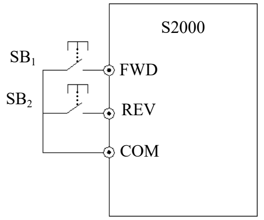


Fig. 7-17 Two-wire control mode 3

3: Three-wire control mode 1

Defines are as follows:

SB1: Stop button

SB2: Forward button

SB3: Reverse button

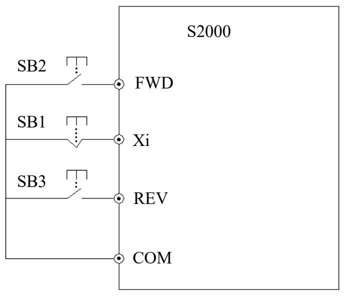


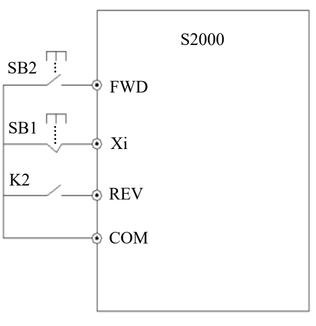
Fig. 7-18 Three-wire operation mode 1

Xi is X1~X5, AI1, AI2'sMulti-functional input terminal, at this moment, define its corresponding terminal function as "Three-wire running control" function of No. 30.

4: Three-wire control mode 2

SB1: Stop button

SB2: Run button



K2	Running direction selection
0	Forward
1	Reverse

Fig. 7-19 Three-wire operation mode 2

Xi is X1～X5, AI1, AI2'sMulti-functional input terminal, at this moment, define its corresponding terminal function as "Three-wire running control" function of No. 30.

F08.27	**Set internal count value to setting**	**Range: 0～65535**	**0**
F08.28	**Specify internal count to setting**	**Range: 0～65535**	**0**

[F08.27], **[F08.28]** are to additionally define functions of No. 30 and 31 in Table 7-10.

When Xi (counting trigger signal input function terminal) input pulse reaches **[F08.27]** defined value, Y1 (Y1 is set as internal count value final value to) outputs one indicating signal. As shown in Fig.7-20, when Xi inputs the 8th pulse, Y1 outputs one indicating signal. At this moment, **[F08.27=8]**.

WhenXi (counting trigger signal input function terminal) input pulse reaches **[F08.28]** definevalue, Y2 (Y2 is set as internal counter specified value to) outputs an indicating signal, until set count value arrives.

As shown in Fig. 7-20, when Xi inputs the fifth pulse, Y2 starts to output one indicating signal. Until set count value 8 arrives, **[F08.28=5]**. When specified count value is greater than set count value, specified count value invalid.

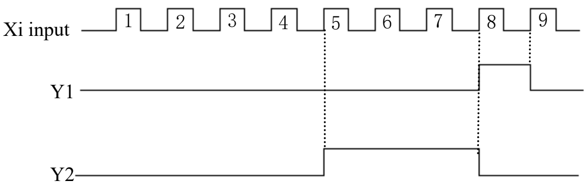


Fig.7-20 Set count value setting and specified count value setting

F08.29	**Internal timer timing setting**	**Range: 0.1～6000.0s**	**60.0s**

This parameter sets timing time of inverter internal timer,timer is triggered by external triggering terminal(Xi terminal function no. is 61). The timer starts timing upon receiving external trigger signal. After reaching timing time, Yi terminaloutputs a breadth of 0.5 seconds valid pulse signal. When internal timer clear terminal is valid(Xi terminal function is set as 60), internal timer is reset.

F08.30	**Terminal pulse encoder frequency rate**	**Range: 0.01～10.00Hz**	**1.00Hz**

This parameter defines main frequency regulation during terminal pulse encoder setting frequency**[F01.00=9]**. Main frequency terminal encoder pulse input channel can only select the channel X1 and X2 combination, auxiliary frequency terminal encoder pulse input channel can only select channel X3 and X4 combination, and the rate of the auxiliary frequency encoder frequency is the fixed rate.

Note

When 9 is selected in**[F01.00]**and**[F01.03]**, X1~X4 can only be used as encoder frequency setting,Other terminal functions defined by**[F08.18~F08 .21]** are invalid.

F08.31	**Special function selection**	**Units digit: 0, 1** **Tens digit: 0, 1**	**00**

Units digit: jogging priority level selection.
0: The highest priority level
1: The lowest priority level

Tens digit: keypadadjustmentof display setting. (Under speed control mode)
0: Display setting frequency
1: Display settingrotation speed

F08.32 **～** **F08.35**	**Reserved**		

7.10 Switch output function parameter group: F09

F09.00	**Open-collector output terminal Y1 output setting**	**Range: 0～60**	**0**
F09.01	**Open-collector output terminal Y2 output setting**	**Range: 0～60**	**0**
F09.02	**OC1(extension) output setting**	**Range: 0～60**	**0**
F09.03	**OC2(extension) output setting**	**Range: 0～60**	**0**
F09.04	**RLY1 output setting**	**Range: 0～60**	**22**

Functions of the above parameters are used to select Y1~Y2 and RLY1 output terminal. Table 7-10 shows the functions of the above 4 terminals.One function can be selected repeatedly. allowing the same output terminal function to .

Open-collector (Yi) and high-speed pulse (DO) output share terminal Y2. Y2 terminal as the high-speed pulse functionto be modified **[F00.22]**thousand digit to 1.

Table 7-10 Output terminals function selection diagram

Content	Function	Content	Function
0	No output	31	Set count value reached
1	Frequency inverter running (RUN)	32	Designated count value reached
2	Frequency inverter Forwardrunning	33	Shutdowntime arrival of the running
3	Frequency inverter Reverse running	34	Time arrival of therunning
4	Frequency inverter DC brake	35	Setup running time arrived
5	Frequency inverter ready for operation.	36	Setup power-on time arrived
6	Shutdown command indicator	37	1st pump variable frequency
7	Zero current state	38	2nd pump variable frequency
8	Overcurrent state	39	Reserved
9	Current 1 arrived	40	Reserved
10	Current 2 arrived	41	Communication given
11	Freq. inverter Zero-frequency output	42	Reserved
12	Frequency Arriving Signal (FAR)	43	Torque arriving output
13	Freq. level detection signal 1 (FDT1)	44	Reserved
14	Frequency level detection signal 2 (FDT2)	45	Brake logic 1 (brake will be held during forward and reverse switchover)
15	Output frequency arriving upper limit (FHL)	46	Brake logic 2 (no brake during forward and reverse switchover)
16	Output frequency arriving lower limit (FLL)	47	Frequency inverter running 1 (non-jogging running)
17	Frequency 1 reached	48	Analog input disconnection signal output
18	Frequency 2 arrived	49	X1 terminal closedvalid
19	Frequency converter overload prealarm signal (OL)	50	X2 terminal closedvalid
20	Frequency inverter is low volt. lock-up signal (LU)	51	Water shortage fault output
21	External stopping shutdown (EXT)	52	Lifting special brake control
22	Frequency inverter fault	53	Position control in progress
23	Frequency inverter warning	54	Positioning completed
24	Simple PLCoperation running	55	Positioning close to

25	Completion of simple PLC operation	56	Spindle stops accurately
26	Simple PLC cycle-running completed	57	Return to origin completed
27	Simple PLC suspended	58	Reserved
28	Upper and lower limit wobble	59	Reserved
29	Setup length arrived	60	Reserved
30	Internal counter final value arrived	-	-

The instruction of thefunctionoutput terminals listed in Table 7-10 are as follows:

0: Terminal function is idle.

1: Frequency inverter is running (RUN). The drive is in running state, output the indicator signal.

2: Frequency inverteris forwardrunning. The drive is in the forward running state, output the indicator signal.

3: Frequency inverteris reverserunning. The drive is in the reverse running state, output the indicator signal.

4: Frequency inverteris DC braking. The drive is in DC braking state, output the indicator signal.

5: Frequency inverter is ready to run. This signal is being valid, it means that the drive bus voltage is normal, the drive is running andforbidding terminal is invalid, it can accept a start command.

6: Shutdown command indicator. When the shutdown command is valid, output the indicator signal.

7: Zero current is arrived. When detected the output meet the zero current state, output the indicator signal.Please refer to the instruction of parameters**[F09.12]**and**[F09.13]**for details.

8: Overcurrent is arrived. When the output current meet the overcurrent detection conditions, output the indicator signal. Please refer to the instruction of **[F09.14]** and **[F09.15]** parametersfor details.

9: Current 1 arrived. When the output current reaches the detection condition to meet current 1, output the indicator signal. Please refer to the instruction of **[F09.16]** and **[F09.17]** parametersfor details.

10: Current 2 arrived. When the output current reaches the detection condition to meet current 2, output the indicator signal. Please refer to the instruction of **[F09.18]** and **[F09.19]** parametersfor details.

11:Frequency inverter Zero frequency output. Please refer to the function instruction of **[F09.10]**, **[F09.11]**.

12: Frequency arriving signal (FAR). Please refer to the function instruction of **[F09.05]**.

13: Frequency level detection signal 1 (FDT1). Please refer to the function instruction of **[F09.06]** and **[F09.07]**.

14: Frequency level detection signal 2 (FDT2). Please refer to the function instruction of **[F09.08]** and **[F09.09]**.

15: Output frequency reaches upper limit (FHL). When the running frequency reachesupper limit frequency, output the indicator signal.

16: Output frequency reaches lower limit (FLL). When the running frequency reacheslower limit frequency, output the indicator signal.

17: Frequency 1 arriving output. Please refer to the function instruction of **[F09.20]** and **[F09.21]**.

18: Frequency 2 arriving output. Please refer to the function instruction of **[F09.22]** and

[F09.23].

19: Frequency inverter overload pre-alarm signal (OL). The inverter output current exceeds**[F19.06]**overload pre-alarm detection levels, and time is greater than**[F19.07] o**verload pre-alarm delay time, output the indicator signal.

20: Frequency inverterlow voltage lock-up signal (LU). When the inverter is running, the DC bus voltage below the limit level, output indicator signal.

21: External fault shutdown (EXT). When the inverter appears external fault trip alarm (E-18), outputindication signal .

22: Frequency inverter fault. When the inverter detects a fault, the output is indicator signal.

23: Frequencyinverter warning. When the inverter detects alarm, the output is indicator signal.

24: Simple PLC is running. The simple PLC is enabled, and enter into running state, output indication signal.

25: Simple PLC stage operation completed. When the simple PLC stage operationis completed,output indication signal(single pulse signal, the width is 500ms).

26: Simple PLCends after running a cycle. When the simple PLC completes a cycle, output indication signal (single pulse signal, the width is 500ms).

27: Simple PLC pause. When the simple PLC is running into the pause state, output indication signal

28: Wobble upper and lower limit. If the frequency fluctuation range calculated by center frequency exceeds the upper limit **[F01.11]** or below lower limit **[F01.12]** after selecting the wobble function, it will outputindication signal, as shown in Fig. 7-21.

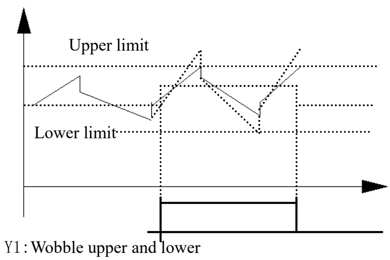


Fig. 7-21 Wobble amplitude limit

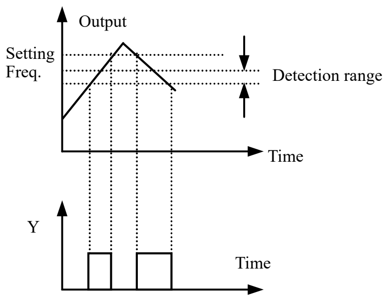


Fig. 7-22 Freq. arrival signal output diagram

29: Setup length arrived. When detected the actual length exceeds a set value of**[F13.08]**, output indication signal.

30: Internal counterfinal value arrived. Please refer to the function instruction of parameters **[F08.27]**.

31: Internal counter specified value arrived. Please refer to the function instruction of parameter **[F08.28]**.

32: Internal countertimer meter arrived. Please refer to the function instruction of parameter **[F08.29]**.

33: Shutdown time arrival of the running. Frequency inverter runs longer than the setting time of **[F18.12]**, output indication signal.

34: Time arrival of running. Frequency inverter runs longer than the setting time of **[F18.13]**, output indication signal.

35: Setup time arrived. Accumulated running time of the frequency inverter reaches the set accumulated running time**[F18.10]**, output indication signal.

36: Setup power-on time arrived. Accumulated power-on time of the inverter reaches the set accumulated running time**[F18.09]**, output indication signal.

37: 1st pump variable frequency.

38: 2nd pump variable frequency.

When Y1~Y2 is used to achieve 2-pump timing rotation and constant pressure water supply**[F12.00=5]**, the functions of Y1~Y2 are set to 37 and 38 in sequence. In constant pressure water supply mode, these two parameter values must be set before the terminal function can be achieved.

41: Communication given. At this moment, the output of Yi is controlled by communication. Please refer to the related communication protocol for details.

42: Reserved.

43: Torque arriving output. Under the mode of torque control, when the motor torque reaches to the torque command after acceleration and deceleration, and continue for time defined by F09.48, then the output active level.

44: Reserved.

45: Brake logic 1. When the output frequency is greater than the value of **[F09.10]**+**[F09.11], o**utput valid signal (Loose brake signal). When the output frequency is less than the value defined by **[F09.10]**, output brake signal. If output no current, downtime, undervoltage, that will output brake signal.

46: Brake logic 2. Decelerating to stop and the output frequency is less than**[F09.10],** output brake signal. Run the command starts, when the output frequency is greater than the value **[F09.10]**+ **[F09.11],** output valid signal (Loose brake signal). IIf output no current, downtime, undervoltage, that will output brake signal. What difference with the function No. 45 is that can not produce brake signal in the forward and reverse switching process (that is, the switching process of a controlled object from rising to falling or falling to rising), so as to prolong the life of the brake system.

47: Frequency inverter running 1. When the inverter is in the running state and not jog running state, output valid signal.

48: Analog input disconnection signal output. When the disconnection signal defined by**[F07.14～F07.16]**is valid, a valid pulse of 0.5 seconds will be output.

49: X1 terminal closed valid.

50: X2 terminal closed valid.

51: Water shortage fault output.

52: Lifting special brake control.

53: Position control in progress. When the system is in position control mode, output valid signal . Output invalid during shutdown.

54: Positioning completed. During the position positioning process, if the position error is less than the pulse defined by**[F16.16]**, output valid signal.

55: Positioning is close. During the position positioning process, if the position error is less than the pulse defined by**[F16.19]**, output valid signal.

56: The spindle stops accurately. In spindle positioning mode, if the position error is less than the pulse defined by**[F16.16]**, output valid signal.

57: Origin return completed. After the origin return is completed, output valid signal.

58～60: Reserved.

F09.05	**Detectionamplitude of freq. arrival (FAR)**	**Range: 0.00～50.00Hz**	**5.00Hz**

This parameter is added in the definition of Table 7-10 on the 12th functions. As shown in Fig. 7-22, when the inverter output frequency in the setting frequency of positive and negative detection width, output indication signal.

F09.06	**FDT1 (frequency level) level**	**Range: 0.00Hz～upper limit freq.**	**10.00Hz**
F09.07	**FDT1 lag**	**Range: 0.00～50.00Hz**	**1.00Hz**
F09.08	**FDT2 (frequency level) level**	**Range: 0.00Hz～upper limit freq.**	**10.00Hz**
F09.09	**FDT2 lag**	**Range: 0.00～50.00Hz**	**1.00Hz**

[F09.06, F09.07] is in definition of Table 7-10 on the 13th functions, **[F09.08, F09.08]** is in the definition of Table 7-10 on the 14th functions. Takean example of13th functions: when the output frequency exceeds a certain setting frequency(FDT1 level), output indicationsignal, until the output frequency drops below the certain frequency FDT1Afrequency level (FDT1 level-FDT1 lag). As shown in Fig. 7-23.

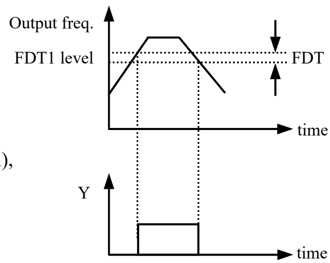


Fig.7-23 Freq. level detection diagram

F09.10	**Zero frequency signal detection value**	**Range: 0.00Hz～upper limit freq.**	**0.40Hz**
F09.11	**Zero frequency backlash**	**Range: 0.00Hz～upper limit freq.**	**0.10Hz**

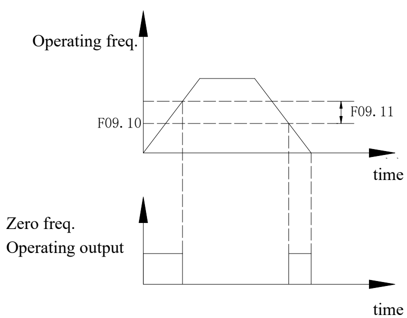


Fig.7-24 Zero frequency signal detection

Parameter **[F09.10, F09.11]** defines the zero-frequency output control function. When the output frequency is within the zero-frequency signal detection value range, if Yi's output function selects 11, Yi will output an indication signal.

F09.12	**Zero current detection amplitude**	**Range: 0.0～50.0%**	**0.0%**
F09.13	**Zero current detection time**	**Range: 0.00～60.00s**	**0.1s**

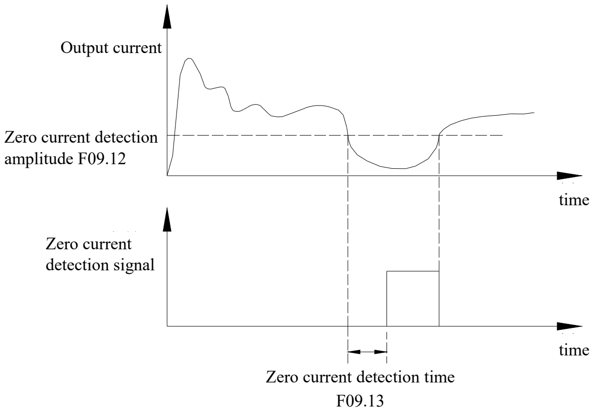


Fig. 7-25 Zero current detection diagram

When the output current of the inverter is less than or equal to zero current detection level, and last longer then the zero current detection time, then the output frequency inverter multifunction Yi is indication signal. Fig. 7-25 is the schematic of zero current detection.

F09.14	**Overcurrent detection value**	**Range: 0.0～250.0%**	**160.0%**
F09.15	**Overcurrent detection time**	**Range: 0.00～60.00s**	**0.00s**

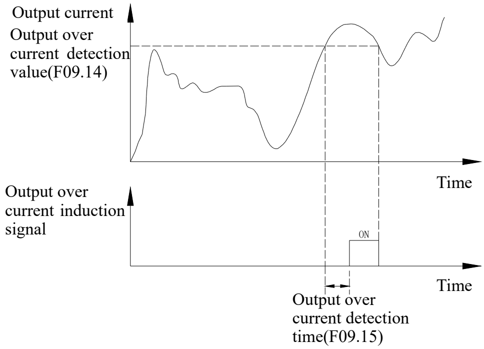


Fig. 7-26 Output over-current detection diagram

When the output current of the inverter is greater than the over-current detection points, and the lasted longer then the over-current detection time, inverter multi-function Yi output indication signal. Fig. 7-26 is the output over-current detection diagram.

F09.16	**Current 1 arriving the detection value**	**Range: 0.0～250.0%**	**100.0%**
F09.17	**Current 1 width**	**Range: 0.0～100.0%**	**0.0%**
F09.18	**Current 2 arriving the detection value**	**Range: 0.0～250.0%**	**100.0%**
F09.19	**Current 2 width**	**Range: 0.0～100.0%**	**0.0%**

When the output current of frequency inverter is within the positive and negative detection width of setting current arrival, then the output of inverter multi-function Yi is indication signal.

S2000 provides two current arrival and detection width parameters. Fig.7-27 is the functional schematic diagram.

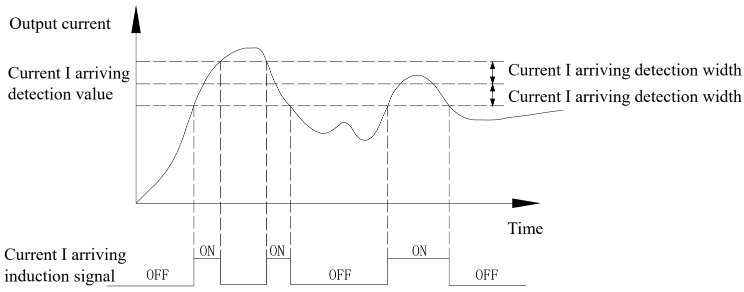


Fig. 7-27 Current arriving detection diagram

F09.20	**Frequency 1 arriving the detection value**	**Range: 0.00Hz～upper limit frequency**	**50.00Hz**
F09.21	**Frequency 1 arriving detection width**	**Range: 0.00Hz～upper limit frequency**	**0.00Hz**
F09.22	**Frequency 2 arriving the detection value**	**Range: 0.00Hz～upper limit frequency**	**50.00Hz**
F09.23	**Frequency 2 arriving detection width**	**Range: 0.00Hz～upper limit frequency**	**0.00Hz**

When the output frequency of the inverter reaches detection value of the positive and negativedetecting width range, the output of multi-function Yi is indication signal.

S2000 provides two sets of frequency arrival detection parameters, which have set the frequency value and frequency detecting width respectively. Fig. 7-28 is the diagram of this function.

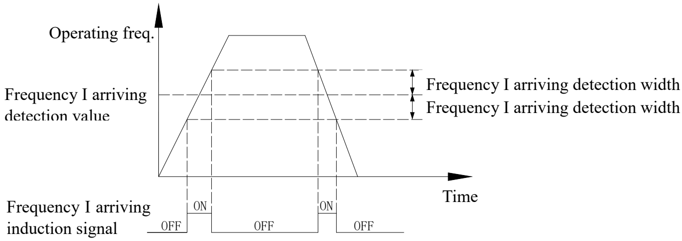


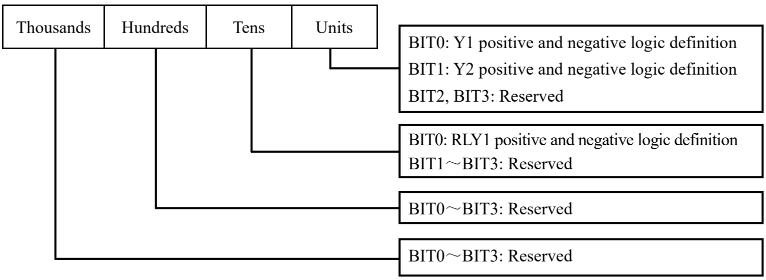
Fig. 7-28 Frequency arriving detection diagram

F09.24	**Positive and negative logic setting of output terminal**	**Range: 0000～FFFF**	**0000**

This parameter defines the output logic of the standard output terminals Yi and RLY1.

0: Positive logic, output terminal and the common terminal closed to the valid state, disconnect invalid state.

1: Reverse logic, output terminal and the common terminal closed to the invalid state, disconnect invalid state.



F09.25	**Y1 output closed delay time**	**Range: 0.000～50.000s**	**0.000s**
F09.26	**Y1 output disconnected delay time**	**Range: 0.000～50.000s**	**0.000s**
F09.27	**Y2 output closed delay time**	**Range: 0.000～50.000s**	**0.000s**
F09.28	**Y2 output disconnected delay time**	**Range: 0.000～50.000s**	**0.000s**
F09.29	**OC1(extension) output closing delay time**	**Range: 0.000～50.000s**	**0.000s**
F09.30	**OC1 (extension) output disconnect delay time**	**Range: 0.000～50.000s**	**0.000s**
F09.31	**OC2 (extension) output closing delay time**	**Range: 0.000～50.000s**	**0.000s**
F09.32	**OC2 (extension) output disconnect delay time**	**Range: 0.000～50.000s**	**0.000s**
F09.33	**Relay output closed delay time**	**Range: 0.000～50.000s**	**0.000s**
F09.34	**Relay output disconnected delay time**	**Range: 0.000～50.000s**	**0.000s**

Parameter **[F09.25～F09.34]** defines the corresponding delay time from connect or disconnect to frequency level of the multi-function output terminal. Fig.7-29 is the schematic diagram of multi-function output terminal operation.

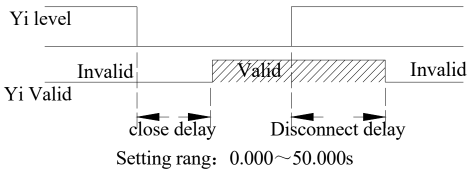


Fig.7-29 Multi-function output terminal diagram

F09.35	**Analog output (AO) selection**	**Range: 0～25**	**0**
F09.36	**AO2(extension) output selection**	**Range: 0～25**	**0**
F09.37	**HDO function selection (Reused with Y2)**	**Range: 0～25**	**0**

0: After acceleration and deceleration frequency(0.00Hz～upper limit frequency).
1: Output synchronization frequency (0.00Hz～upper limit frequency).
2: Setup frequency (0.00Hz～upper limit frequency).
3: Master setup frequency (0.00Hz～upper limit frequency).
4: Auxiliary setup frequency (0.00Hz～upper limit frequency).
5: Output current 1 (0～2× rated current of the inverter).
6: Output current 2 (0～3×motor rated current the inverter).
7: Output voltage (0～1.2×rated voltage of load motor).
8: Bus voltage (0～1.5×rated bus voltage).
9: Motor speed (0～5 rated speed).
10: PID given (0.00～10.00V).
11: PID feedback (0.00～10.00V).
12: AI1 (0.00～10.00V).
13: AI2 (0.00～10.00V or 0～20mA).
14: Communication given.
15: Motor rotor speed (0.00Hz～upper limit frequency).
16: Current given torque (0～2 times of rated torque).
17: Current output torque (0～2 times of rated torque).
18: Current torque current (0～2 times of rated motor current).
19: Current flux current (0～1 times of rated motor flux current).
20: Position deviation (0.05V/encoder unit). When the error is 0, the output is 5V.

21: Command speed (-upper limit frequency～+upper limit frequency). When the command bit is 0, the output is 5V.

22: Feedback speed (-upper limit frequency～+upper limit frequency). When the motor speed bit is 0, the output is 5V.

23: Speed feedforward (-upper limit frequency～+upper limit frequency). When the feedforward speed is 0, the output is 5V.

24: Positioning completion command. (Positioning completed: 5V; positioning not completed: 0V)

25: AI3 (extension).

Note

⑴ Terminal AO is optional terminal of 0~10V or 0～20mA which can satisfy the diverse needs of customers.
⑵ By disposing F00.21 analog output, output terminal AO can be 0～10V or 0～20mA to satisfy the diverse needs of customers.
⑶ The unit digit of F00.22 is set to 1 when DO output pulse signal.
⑷ Rated flux current = current value of F15.11 parameter.
Rated torque current = sqrt (rated motor current * rated motor current - rated flux current * rated flux current). For synchronous motors, the flux current is 0.

F09.38	**Reserved**		
F09.39	**Analog output (AO) filter time**	**Range: 0.0～20.0s**	**0.0s**
F09.40	**Analog output (AO) gain**	**Range: 0.00～2.00**	**1.00**
F09.41	**Analog Output (AO) bias**	**Range: -100.0～100.0%**	**0.0%**

Parameter **[F09.39]** defines the filter time of AO output, its reasonable setting can improve the stability of analog output, but a higher setting will influence the rate of change, which cannot quickly reflect the instantaneous value of the corresponding physical quantity.

If user want to change the display range or errorcorrectiontable headers, you can achieve it by adjusting the output gain and bias of AO.

When AO outputs voltage, the adjustment is as follows:

Analog output AO (after revise) = Output gain **[F09.40]**× Analog output AO (before revise) + Output bias**[F09 .41]**×10V

When AO outputs current, the adjustment is as follows:

Analog output AO (after revise) = Output gain **[F09.40]**× Analog output AO (before revise) + Output bias**[F09 .41]**×20mA

F09.42	**AO2(extension) output filter time**	**Range: 0.0～20.0s**	**0.0s**
F09.43	**AO2(extension) output gain**	**Range: 0.00～2.00**	**1.00**
F09.44	**AO2(extension) output deviation**	**Range: -100.0%～100.0%**	**0.0%**

F09.45	**DO filter time**	**Range: 0.0～20.0s**	**0.0s**
F09.46	**DO output gain**	**Range: 0.00～2.00**	**1.00**
F09.47	**DO maximum pulse output frequency**	**Range: 0.1～20.0KHz**	**10.0KHz**

Refer to the function introduction of parameters**[F09.39～F09.41]**.

The maximum output pulse frequency of the D corresponds to maximum set value of [F09.47]. For example,[F09.31=0], terminal DO function is output frequency after acceleration and deceleration, then the maximum output pulse freq. corresponds to the upper limit frequency.

Note

When the output frequencyDO is lessr than 1.5Hz, disposed as 0Hz.

F09.48	**Torque reaches to the detection time**	**Range: 0.02～200.00s**	**1.00s**

F09.49	**Apply macro selection**	**Range: 0～4**	**0**

For details on application macros, please refer to Appendix Application of Macros.

0: Ordinary model.

1: Air compressor application.

2: Extruder application.

3: Water pump application.

4: Fan application.

F09.50 ～ F09.55	**Reserved**		

7.11 Simple PLC/multi-speed function parameter group: F10

F10.00	**Simple PLC operate setting**	**Range: Units digit: 0～3** **Tens digit: 0～2** **Hundreds digit: 0, 1** **Thousands digit: 0, 1**	**0000**

Use the units, tens, hundreds and thousands digits to set the PLC operating mode, restart mode after interruption, running time unit and power-off storage mode, as follows:

Units digit: running mode selection.

0: No action. PLC operating mode is invalid.

1: Stop after single cycle. As shown in Fig.7-30, the drive stop automatically after one cycle of operation and will not start only when receiving RUN command again.

2: Maintain final value after one cycle. As shown in Fig.7-31, the drive will keep running with the final value and the direction after complete one cycle operation, the drive won't stop according to the set stop mode until the stop command is available.

3: Continuous operation. As shown in Fig. 7-32, the drive will starts next cycle operation automatically after completing one cycle of operation until receiving STOP command then stop according to the set stop mode.

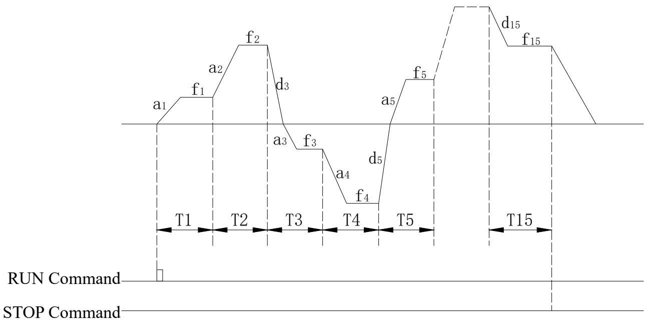


Fig. 7-30 PLC stop operation after one cycle mode

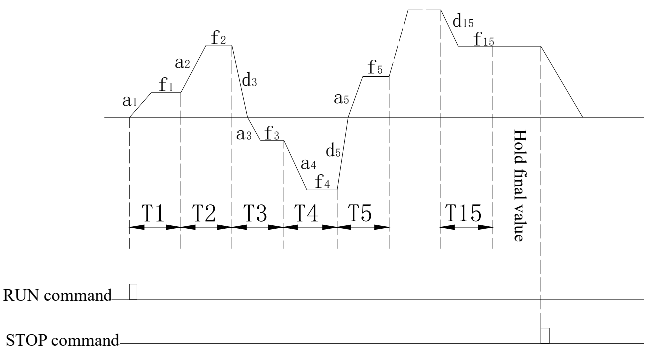


Fig. 7-31 PLC holds the final value after one cycle mode

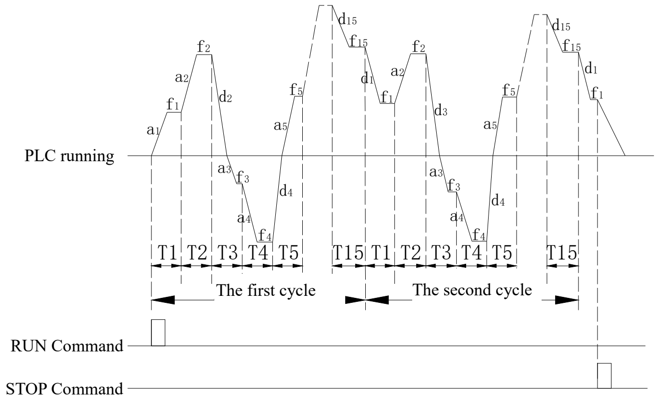


Fig. 7-32 PLC continuous operation mode

a1～a15: The acceleration time of different steps

d1～d15:The deceleration time of different steps

f1～f15: The frequency of different steps

There are 15 steps can set in Fig. 7-30, 7-31, and 7-32.

Tens digit: Restart mode after interruption.

0:Restart from the first step.

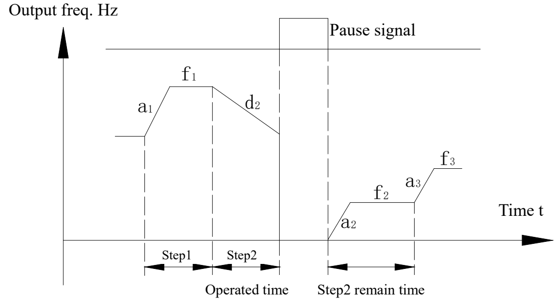
If the inverter stops during PLC operation due to receiving STOP commands, fault alarm or power failure, it will runfrom the first step after restarting.

1: Restart from the interruption step.

If the drive stops during PLC operation due to receiving STOP commands or fault alarm, the drive will record the operating time of the current step and will continue from the step where the drive stops after restart at the frequency defined for this step with the remained time, as shown in Fig.7-33. If the drive stops due to power off, it will not record the state and from the first step operate when restart.

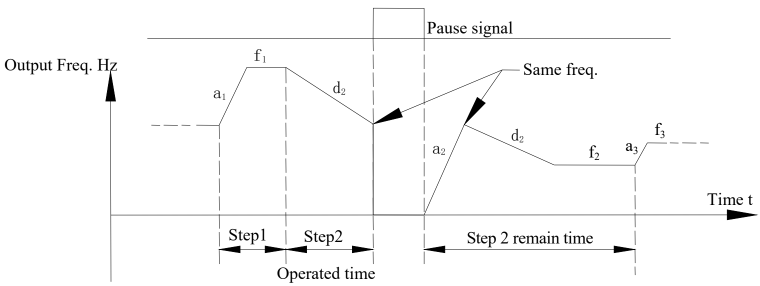
2: Restart from the interrupted frequency.

If the drive stops during PLC operation due to receiving STOP commands or fault alarm, the drive will record the operating timeand the current frequency of the interrupt step, it will operating with the record time and record frequency when restart, as shown in Fig.7-34.



a_1: Acc time of the 1st step a_2: Acc time of the 2nd step
a_3: Acc time of the 3rd step d_2: Dec time of the 1st step
f_1: Frequency of the 1st step f_2: Frequency of the 2nd step
f_3: Frequency of the 3rd step

Fig.7-33 Simple PLC restart mode 1



a_1: Acc time of the 1st step a_2: Acc time of the 2nd step
a_3: Acc time of the 3rd step d_2: Dec time of the 1st step
f_1: Frequency of the 1st step f_2: Frequency of the 2nd step
f_3: Frequency of the 3rd step

Fig. 7-34 PLC restart mode 2

Hundreds digit: PLC unit of running time.

0: Seconds.

1:Minutes.

This unit is valid for the running time of different steps only,during the operation of the PLC, the unit of acceleration and deceleration time is defined by parameter**[F01.19]**.

Note

⑴ The step is invalid if the time of PLC operation is set as zero, thereafter operate the next step.

⑵ Control the PLC process a pause, invalid, operate via terminals. For details, please refer to parameters in **[F08]** group that relative with terminal function.

Thousands digit: storage mode when power-off.

0: No storage. No record the running state when power-off, it will restart from the first step after when power on again.

1: Storage. Records the running status which include the step, running frequency and running time when power-off, it restart with the mode that set in hundreds digit after power on again.

Note

No mater power-down storage in stop status or running status, you should set thousands digit as 1 thereafter set tens digit as 1 or 2, otherwise the power-off storage function is invalid.

F10.01	**Step 1 setting**	**Range: 000H～E22H**	**020**
F10.02	**Step2 setting**	**Range: 000H～E22H**	**020**
F10.03	**Step3 setting**	**Range: 000H～E22H**	**020**
F10.04	**Step4 setting**	**Range: 000H～E22H**	**020**
F10.05	**Step5 setting**	**Range: 000H～E22H**	**020**
F10.06	**Step6 setting**	**Range: 000H～E22H**	**020**
F10.07	**Step7 setting**	**Range: 000H～E22H**	**020**
F10.08	**Step8 setting**	**Range: 000H～E22H**	**020**
F10.09	**Step9 setting**	**Range: 000H～E22H**	**020**
F10.10	**Step 10 setting**	**Range: 000H～E22H**	**020**
F10.11	**Step 11 setting**	**Range: 000H～E22H**	**020**
F10.12	**Step 12 setting**	**Range: 000H～E22H**	**020**
F10.13	**Step 13 setting**	**Range: 000H～E22H**	**020**
F10.14	**Step 14 setting**	**Range: 000H～E22H**	**020**
F10.15	**Step 15 setting**	**Range: 000H～E22H**	**020**

[F10.01～F10.15] Use the units, tens and hundreds digits to set the frequency setting, direction and acceleration and deceleration time of PLC running, as follows:

Units digit: Frequency setting.

0: MSelect multi-frequency i. i=1～15, please refer to **[F10.31～F10.45]** for definition of multi-frequency.

1: The frequency is determined by the combination of the main frequency and the auxiliary frequency.

2: Reserved.

Tens digit: The selectionrunning direction for PLC and multi-speed .

0: Forward.

1: Reverse.

2: Determined by operating commands.

Hundreds digit: acceleration and deceleration time selection.

0: Acceleration and deceleration time 1.

1: Acceleration and deceleration time 2.
2: Acceleration and deceleration time 3.
3: Acceleration and deceleration time 4.
4: Acceleration and deceleration time 5.
5: Acceleration and deceleration time 6.
6: Acceleration and deceleration time 7.
7: Acceleration and deceleration time 8.
8: Acceleration and deceleration time 9.
9: Acceleration and deceleration time 10.
A: Acceleration and deceleration time 11.
B: Acceleration and deceleration time 12.
C: Acceleration and deceleration time 13.
D: Acceleration and deceleration time 14.
E: Acceleration and deceleration time 15.

Acceleration time 1~15 is defined by **[F01.17]**, **[F01.18]**, **[F04.16～F04.43]**. The running direction of PLC and multi-speed is determined by the tens digit of **[F10.01～F10.15]**.

F10.16	**Step 1 running time**	**Range: 0～6000.0**	**10.0**
F10.17	**Step2 running time**	**Range: 0～6000.0**	**10.0**
F10.18	**Step3 running time**	**Range: 0～6000.0**	**10.0**
F10.19	**Step4 running time**	**Range: 0～6000.0**	**10.0**
F10.20	**Step5 running time**	**Range: 0～6000.0**	**10.0**
F10.21	**Step6 running time**	**Range: 0～6000.0**	**10.0**
F10.22	**Step7 running time**	**Range: 0～6000.0**	**10.0**
F10.23	**Step8 running time**	**Range: 0～6000.0**	**10.0**
F10.24	**Step9 running time**	**Range: 0～6000.0**	**10.0**
F10.25	**Step 10 running time**	**Range: 0～6000.0**	**10.0**
F10.26	**Step 11 running time**	**Range: 0～6000.0**	**10.0**
F10.27	**Step 12 running time**	**Range: 0～6000.0**	**10.0**
F10.28	**Step 13 running time**	**Range: 0～6000.0**	**10.0**
F10.29	**Step 14 running time**	**Range: 0～6000.0**	**10.0**
F10.30	**Step 15 running time**	**Range: 0～6000.0**	**10.0**

Parameter **[F10.16～F10.30]** defined the running time of each PLC step from step 1 to step 15.

Note

Each step running time includes acceleration and deceleration time.

F10.31	**Multi-frequency 1**	**Range: 0.00Hz～upper limit frequency**	**5.00Hz**
F10.32	**Multi-frequency 2**	**Range: 0.00Hz～upper limit frequency**	**10.00Hz**
F10.33	**Multi-frequency 3**	**Range: 0.00Hz～upper limit frequency**	**20.00Hz**
F10.34	**Multi-frequency 4**	**Range: 0.00Hz～upper limit frequency**	**30.00Hz**
F10.35	**Multi-frequency 5**	**Range: 0.00Hz～upper limit frequency**	**40.00Hz**
F10.36	**Multi-frequency 6**	**Range: 0.00Hz～upper limit frequency**	**45.00Hz**
F10.37	**Multi-frequency 7**	**Range: 0.00Hz～upper limit frequency**	**50.00Hz**
F10.38	**Multi-frequency 8**	**Range: 0.00Hz～upper limit frequency**	**5.00Hz**
F10.39	**Multi-frequency 9**	**Range: 0.00Hz～upper limit frequency**	**10.00Hz**
F10.40	**Multi-frequency 10**	**Range: 0.00Hz～upper limit frequency**	**20.00Hz**
F10.41	**Multi-frequency 11**	**Range: 0.00Hz～upper limit frequency**	**30.00Hz**
F10.42	**Multi-frequency 12**	**Range: 0.00Hz～upper limit frequency**	**40.00Hz**
F10.43	**Multi-frequency 13**	**Range: 0.00Hz～upper limit frequency**	**45.00Hz**
F10.44	**Multi-frequency 14**	**Range: 0.00Hz～upper limit frequency**	**50.00Hz**
F10.45	**Multi-frequency 15**	**Range: 0.00Hz～upper limit frequency**	**50.00Hz**

Frequency will be used in multi-speed operation mode and simple PLC operation mode. Please refer to the multi-speed terminal operation function in the parameter group **[F08]** and simple PLC operation function in parameter group **[F10]**.

7.12 Closed-loop PID Operation Parameter Group: F11

Analog feedback control system:

Pressure reference is input through the AI1, and water pressure sensor send a 0～20mA to the terminal AI2 ofinverter as a feedback signal. All of them make up of analog closed-loop control system via built-in PID adjuster, as shown in Fig. 7-35.

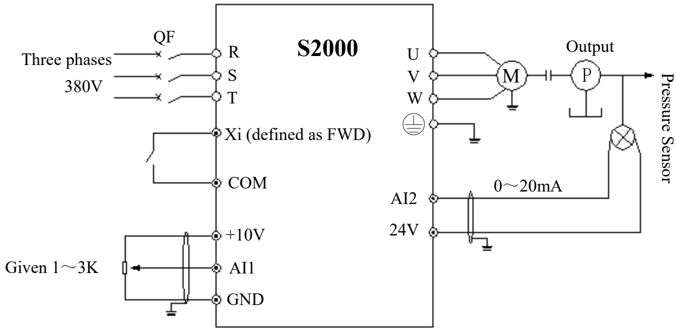


Fig. 7-35 Built-in PID adjuster control diagram

Note

Setting the value of F11.01 can also choose the channel of pressure reference.

Operating principle of built-in PID function of S2000 is as follows:

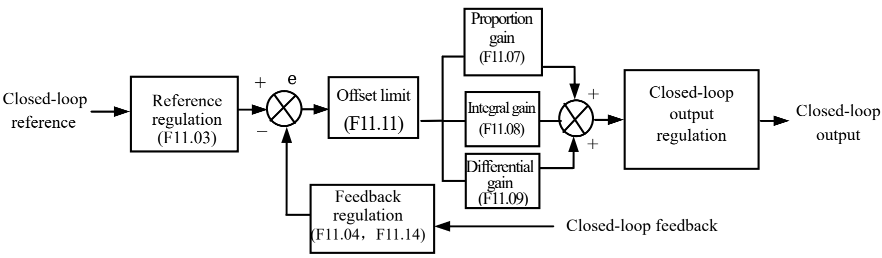


Fig. 7-36 PID block control principle diagram

In above diagram, the definition of the closed-loop reference, feedback error limit, and PI parameters are similar with the general PID adjuster. The relationship between reference and the expected (or target) feedback is shown in Fig. 7-37. The reference and feedback are converted and based on 10.00V.

In Fig.7-36, real values of closed-loop reference and feedback can be regulated in group **[F06]**and**[F07],** so that can reach a good performance.

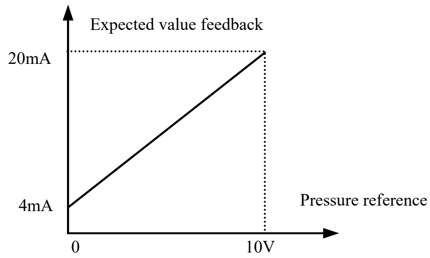


Fig. 7-37 Reference and expected feedback value

After the system control mode is confirmed, follow the procedure below to set the closed-loop parameters :

⑴ Determine the closed-loop reference and feedback channels **[F11.01]**, **[F11.02]**.

⑵ The relationship between the closed loop reference and feedback should be defined for closed-loop control (the group **[F06])**.

⑶ Set up the closed-loop frequency presetting function **[F11.19, F11.20]**.

⑷ Adjust the proportion gain, integral gain, differential gain, sampling period, and cycle and error limit **[F11.07～F11.11]**.

F11.00	Closed loop control function	Range: 0, 1	0

0: PID closed-loop functiondisabled.

1: PID closed-loop functiondisabled.

F11.01	Reference channel choose	Range: 0～7	0

0: Digital provision.

1: AI1 simulation provision.

2: AI2 simulation provision.

3: AI3 simulation provision(extension).

5: Pulse provision.

6: Communication provision(communication address: 1D00). Please refer to the chapter of Modbus communication.

7: Reserved.

Note

Except the above provision channels, Multi-Closed-loopprovision is available, Connecting different terminal to choose different provision value which with a highest priority.

F11.02	Feedback channel selection	Range: 0～9	0

0: AI1 analog input.

1: AI2 analog input.

2: AI3 simulation provision(extension).

4: AI1+AI2.

5: AI1-AI2.
6: Min{AI1, AI2}.
7: Max{AI1, AI2}.
8: Pulse input.
9: Communication feedback (address is 1DOC, 4000 stands for 10.00V).

F11.03	**Provision channel filter time**	**Range: 0.00～50.00s**	**0.00s**
F11.04	**Feedback channel filter time**	**Range: 0.00～50.00s**	**0.00s**
F11.05	**PID output filter time**	**Range: 0.00～50.00s**	**0.00s**

The external reference signal and feedback signal are often superimposed with a certain amount of interference. Filter the channel by setting the filtering time of **[F11.03]** and **[F11.04]**. The longer the filtering time, The longer the filter time, the stronger the anti-interference ability, but the slower the response; the shorter the filter time, the faster the response, but the weaker the anti-interference ability.

The PID output filter time is the filter time for the closed-loop output frequency or torque . The bigger the output filter time, the slower the output response.

F11.06	**Provision digital setting**	**Range: 0.00～10.00V**	**1.00V**

This function can realize digital setting of reference via keypad.

Note

When the PID function is valid, setting F18.14 as 1, can adjust pressure reference by press otherwise keys are invalid for adjusting reference in monitoring mode.

F11.07	**Proportional gain Kp**	**Range: 0.00～100.00**	**0.50**
F11.08	**Integral gain Ki**	**Range: 0.01～10.00**	**0.25**
F11.09	**Differential gain Kd**	**Range: 0.00～10.00**	**0.00**
F11.10	**Sampling cycle T**	**Range: 0.01～1.00s**	**0.10s**

The bigger of the proportional gain Kp, the faster the response, but oscillation may easily occur.

If only proportional gain Kp is used in regulation, the offset cannot be eliminated completely.To eliminate the offset, please use the integral gain Ki to form a PI control system. The bigger Ki is, the faster response, but oscillation may easily occur if Ki is big enough.

The sampling cycle T refers to the sampling cycle of feedback value. The PID regulator calculates once in each sampling cycle. The bigger the sampling cycle is, the slower the response.

F11.11	**Deviation limit**	**Range: 0.0～20.0%**	**2.0%**

If define the Max. deviation of the outputfrom reference, as shown in Fig. 7-38, the PID adjuster stops operation when the feedback value within this range. Setting this parameter correctly will improve the moderation of the the accuracy and stability of the system.

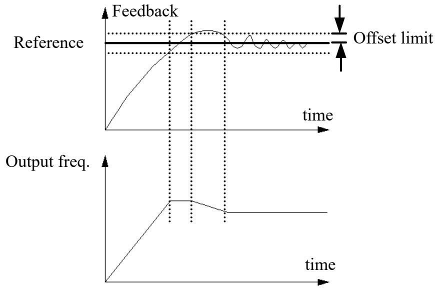


Figure 7-38 Offset limit

Note

Offset limit is the percentage refer to the value of reference.

F11.12	PID differential amplitude limiting	Range: 0.00～100.00%	0.10%

In the PID regulator, the differential effect is relatively sensitive and can easily cause system oscillation. For this reason, the PID differential effect is generally limited to a smallrange. **[F11.12]** is used Set the range of PID differential output.

F11.13	Closed-loopregulation characteristics	Range: 0, 1	0

0: Positive effect. When the provision increases, select while requiring speed of motorincrease.

1: Negative effect. When the provision increases,select while requiring speed of motordecrease.

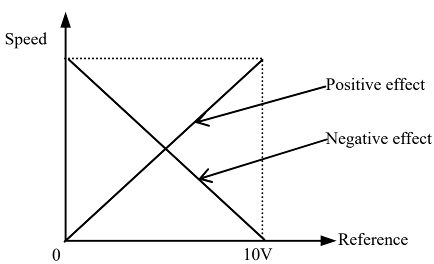


Fig. 7-39 Closed-loopcharacteristic

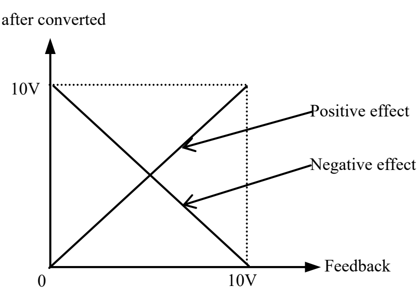


Fig. 7-40 Feedbackcharacteristic

F11.14	Feedback channel positive-negative characteristics	Range: 0, 1	0

0: Positive characteristics. The relationship between reference and feedback is positive.

1: Negative characteristics. The relationship between reference and feedback is negative.

This parameter is used to change the feedback characteristics of the feedback signal. After input into inverter through the feedback channel, the feedback pressure will compare with the reference after regulated by the positive and negative characteristic regulation, as shown in Fig.7-40.

F11.15	**PID regulation upper limit freq.**	**Range: 0.00Hz～upper limit freq.**	**50.00Hz**
F11.16	**PID regulation lower limit freq.**	**Range: 0.00Hz～upper limit freq.**	**0.00Hz**

Users can set up parameters**[F11.15]**,**[F11.16]** to define the output lower limit and upper limit frequency of the PID regulator.

F11.17	**Integral regulation selection**	**Range: 0, 1**	**0**

0: Stop integral regulatingwhen the comparison value of the referenceand feedback reaches the range of threshold for integral separation.

1: Keep integral regulating even thought the comparison value of the referenceand feedback reaches the range of threshold for integral separation.

Adjusting this parameter can avoid integral saturation and improve the response of the system.

F11.18	**PID threshold of the integral separation**	**Range: 0.0～100.0%**	**100.0%**

PID integral separated function, there is no integral regulation just proportion regulating during closed-loop control when the comparison value that between reference and feedback is bigger than this threshold. When the comparison is smaller than this threshold, the integral regulation will be active, and can adjust the speed of system by adjusting this parameter.

F11.19	**Preset Closed loop freq.**	**Range: 0.00Hz～upper limit freq.**	**0.00Hz**
F11.20	**Holding time Closed-loop preset freq.**	**Range: 0.0～6000.0s**	**0.0s**

This function code can make the closed-loop adjuster into the stable stage quickly.

When the closed-loop function start, the output frequency will ramp up to the preset closed-loop frequency [F11.19]within theAcc time, and keep running the time that set in [F11.20] then start the closed loop operating. As shown in Fig.7-41.

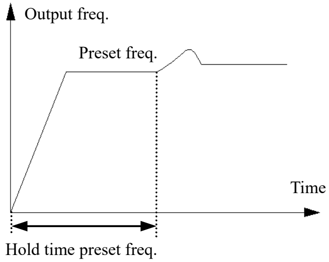


Fig. 7-41 Preset closed-loop operating

Note

Preset closed-loop function is not needed, just set the preset freq. and holding time to 0.

F11.21	**Closed-loop output reversion selection**	**Range: 0～2**	**2**

0: The inverter will run with the low frequency when the closed-loop output value is negative.

1: The inverter will reverse running when the value of the closed-loop output is negative be opposite of the initial direction).

2: Determined by running command. The motor running direction is determined by the command direction.

Note

The comparison value can be displayed in the PID monitor parameter, it's positive when the reference bigger than the feedback value,and negative when reference smaller than the feedback value.

F11.22	**Closed-loop output reversion frequency upper limit**	**Range: 0.00Hz～upper limit freq.**	**50.00Hz**

The PID regulator is a kind of bipolar. By setting **[F11.21]**,**[F11.22],** can choose whether the inverter reverse run in some degree frequency or not.

F11.23	**Multiple closed-loop provision 1**	**Range: 0.00～10.00V**	**0.00V**
F11.24	**Multiple closed-loop provision 2**	**Range: 0.00～10.00V**	**0.00V**
F11.25	**Multiple closed-loop provision 3**	**Range: 0.00～10.00V**	**0.00V**
F11.26	**Multiple closed-loop provision 4**	**Range: 0.00～10.00V**	**0.00V**
F11.27	**Multiple closed-loop provision 5**	**Range: 0.00～10.00V**	**0.00V**
F11.28	**Multiple closed-loop provision 6**	**Range: 0.00～10.00V**	**0.00V**
F11.29	**Multiple closed-loop provision 7**	**Range: 0.00～10.00V**	**0.00V**

Among the closed-loop reference channel, besides the 7 channels defined by**[F11.01]**, the closed-loop reference can alsobe defined in **[F11.23～F11.29]**. The priority of multi-closed-loop reference control is higher than the reference channel defined by**[F11.01]**.

Multi-closed-loop reference 1~7 can be selected by external terminals. Please refer to the terminal functions19~21 of introduction to **[F08.18~F08.25]** . When the function of constant water supply is valid, the reference of constant water supply is decided by the multi-closed-loop reference which selected by the external terminals.

Computational formula: constant pressure reference =[F12.06]× multi-closed-loop reference / 10.00V. By using this function can realize different times with a different constant water pressure.

F11.30 ~ F11.36	**Reserved**		

7.13 Constant pressure water supply function parameter group F12

F12.00	Constant pressure water supply mode selection	Range: 0～5	0

0: No constant pressure water supply.

1: Single pump constant pressure water supply mode.

2～4: Reserved.

5: Select inverter Y1 and Y2 as the double-pump timing alternate constant pressure water supply mode. When **[F12.00=5]**, **[F09.00=37]**, **[F09.01=38]**, realize the timing alternate constant pressure water supply control between two pumps,only one motor is running at any time, the time of timing alternate is defined by **[F12.10]**. When **[F12.10=0]**, no alternate control, when **[F12.10=1]**, switch the running water pump while starting.

When modify **[F12.00]** from 0 towater supply mode is valid, C-04 and C-05 automatically relate constant pressure water supply setting pressure and feedback pressure (including the display of halting and running).

When **[F12.00]** is set from 0 to 5, **[F09.00]** automatically associates to 37, **[F09.01]** automatically associates to 37 38, to facilitate customer operation.

Note

(1) The function of group **[F11]** will be effective automatically when the constant pressure water supply function is enabled.

(2) Except for the related parameters in group **[F11]** and **[F12]** for closed-loop, the function of Yi should be enabled**[F09][i.e. F09.00=37, F09.01=38]** for the inverter works in one-drive-two-pump function.

(3) Output terminal Y2/DO should be set to Y2.

(4) When one inverter drives one pump, with constant pressure water supply, the parameter **[F09.00~F09.01]**(Y1～Y2) can't be set 37～38.

F12.01	Target pressure setting	Range: 0.000～the range of long-distance manometer	0.200Mpa

This parameter defined the target pressure of the water supply system.

The channel of the pressure reference and feedback channels are defined by **[F11.01]** and **[F11.02]**.

F12.02	Sleep frequency threshold	Range: 0.00Hz～upper limit freq.	30.00Hz
F12.03	Revival pressure threshold	Range: 0.000～the range of long-distance manometer	0.150Mpa

Sleep frequency threshold function. To save energy and protect the motor, when the water feedback pressure within the offset limit **[F11.11]**, and the operating frequency is under in the sleep frequency **[F12.02],** after a sleep delay time **[F12.04]**, the system will enter a sleep mode and the operating frequency will drop to 0.00Hz.

When the sleep frequency threshold function is to be realized, **[F01.13]** should be set to 3, and**[F12.04]**is bigger than 0.

Revival function. When the system is in sleep mode, if the feedback water supply pressure keep less than**[F12.03]**(the revival pressure) a delay time**[F12.05]**, the system will revival from sleep mode.

F12.04	Sleep delay time	Range: 0.0～6000.0s	0.0s

This parameter is the delay time that from the feedback pressure meets the sleep conditions to the system enter in sleep mode. Within the sleep delay time, if the feedback pressure does not meet the sleep conditions, the system will not enter into sleep mode.

Sleep function is invalid when [F12.04=0].

F12.05	Wake-up delay time	Range: 0.0～6000.0s	0.0s

When the system is in the sleep state, if the feedback pressure of the system is less than the force threshold of the wake-up mode defined by **[F12.11]**, the system will exit the sleep state after this delay time.

F12.06	The range of long-distance manometer	Range: 0.001～9.999Mpa	1.000Mpa

This parameter defines the range value of the connected pressure gauge. This value corresponds to the maximum value when the connected pressure gauge is converted into a voltage or current signal.

F12.07 ～ F12.09	Reserved		

F12.10	Automatic switching time interval	Range: 0000～65535 minutes	0

By setting this parameter can avoid the rust of motor when it's not work long time. The inverter will switch the work status of the working pump and static pump automatically and smartly under the switch interval.

The automatic switch function is disabled when set the parameter as 0000. The system will switch one time when each restart of system as this parameter is 0001. If the value of this parameter is bigger than 0002, the system will switch automatically according the switch interval.

F12.11	Revival mode selection	Range: 0, 1	0
F12.12	Revival pressure coefficient	Range: 0.01～0.99	0.75

When**[F12.11=0]**, the revival pressure of the constant pressure supply is the value of **[F12.03]**,

When**[F12.11=1]**, the revival pressure is the calculating of **[F12.12*F12.01]**.

F12.13	Reserved		

F12.14	**Water shortage protection mode**	**Range: 0～2**	**0**
F12.15	**Water shortage protection current**	**Range:10%～150%**	**80%**
F12.16	**Revival time after water shortage protection**	**Range: 0～3000min**	**60min**
F12.17	**Water shortage protection judgment time**	**Range: 1.0～100.0s**	**5.0s**

When **[F12.14=1]**, the judgment of water shortage is determined by the multi-function terminal X signal, function 70: water shortage signal input, function 71: water signal input, when a water shortage fault is detected Afterwards, if water input (Function No. 71) is detected after the time defined by **[F12.16]**, it will automatically reset and start running again.

When **[F12.14=2]**, whether there is water shortage is judged by whether the PID adjusted output frequency reaches the upper limit of PID output frequency after the inverter is running**[F11.15]**, and after **[F12.17]** After time judgment, if the output current of the frequency converter is less than the current value defined by F12.15*motor rated current **[F15.03]**, the frequency converter reports E-42 water shortage fault, then delay **[F12.16]** time, automatically reset and run again. If fault reset is pressed during the fault, the inverter needs to give running instructions again. When an E-42 fault occurs, the automatic fault reset function defined by **[F19.01]** and **[F19.02]** is invalid.

F12.18	**Select the threshold of sleep freq.**	**Range: 0, 1**	**1**

0: F12.02 Set frequency.

1: F11.16 or F12.02 Set frequency value.

When [F12.18=0] , during the pressure holding stage, the output frequency slowly decreases to the set sleep frequency [F12.02] , will be enter the sleep state after the set sleep delay time [F12.04] . When [F12.18=1] , during the pressure holding stage, the output frequency slowly decreases to the set PID lower limit frequency [F11.16] or [F12.02] , will be enter the sleep state after the set sleep delay time [F12.04] . This function canensure enter the sleep mode in case of interference from pressure collection parts or slight pressure fluctuations in the system during the pressure holding stage.

7.14 Traverse,Fixed-length control Function Parameters Group: F13

F13.00	**Traverse, function enabled**	**Range: 0, 1**	**0**

0: Invalid.
1: Valid.

F13.01	**Traverse operation mode**	**Range: Unit digit: 0, 1** **Tensdigit: 0, 1** **Hundreds digit: 0, 1** **Thousands digit: 0, 1**	**0000**

Units digit: Start mode 1st.

0: Auto start. The drive operates at the preset frequency of traverse for a certain time thereafter enter traverse mode automatically.

1: Terminal manual mode. Choosing the multi-function terminal Xi (Xi =Xi~X5, AI1, AI2) as 56 function, when the terminal is enabled, the drive will enter traverse mode. The drive will exist traverse operation and operate at the preset traverse frequency when it's disabled.

Tens digit: Traverse amplitude mode choosing.

0: Variable swing. Amplitude AW changes with the central frequency, and the change rate relato to the definition of **[F13.02]**

1: Fixed swing. Traverse operation amplitude AW is determined by upper limit frequency and**[F13.02]**.

Note: The traverse central frequency is set by the main frequency.

Hundreds digit: Restart mode.

0: Restart at the initial state.

1: Restart at the memorized state before stopping.

Thousands digit: Traverse state saving when power off. This function is effective when the start mode is Restarting from the reserved memory state and saving operating state when power off.

0: Not save.

1: Save.

Note

When in variable amplitude mode, the channel of central frequency is confirmed by**[F01.06]**. During the traverse freq. operation, the acceleration and deceleration time are controlled by traverse freq. circle **[F13.04]** when adjusting the central frequnecy.

F13.02	**Traverse frequency swing value**	**Range: 0.0～50.0%**	**10.0%**

Variableamplitude: AW = the central frequency ×**[F13.02]**

Fixed amplitude: AW = upper limit frequency ×**[F13.02]**

Note

The traverse operating freq. is restricted by the upper and lower limit of frequency. Incorrectly setting the frequency will lead to abnormal of traverse operation.

F13.03	Sudden-jump frequency	Range: 0.0～50.0%	2.0%

As shown in Fig. 7-42, if this parameter is set to 0, it is the jump frequency.

F13.04	Traverse cycle	Range: 0.1～999.9s	10.0s

Define the time of a complete cycle of the traverse operation rising and falling process.

F13.05	Triangular wave rising time	Range:0.0～98.0% (Traverse cycle)	50.0%

Definition traverse rising time = **[F13.04]** × **[F13.05]** (s), the traverse falling time = **[F13.04]** × (1-**[F13.05]**)(s). Please refer to Fig. 7-42.

F13.06	Preset frequency of traverse	Range: 0.00～400.00Hz	0.00Hz

[F13.06] defines the operating frequency of the inverter before entering traverse operation.

F13.07	Traverse preset frequency waiting time	Range: 0.0～6000.0s	0.0s

F13.07 defines the operating time of Preset frequency before entering Traverse operation when auto-start mode is enabled. If manual start mode is available, F13.07 is disabled. Please refer to Fig.7-42 as below.

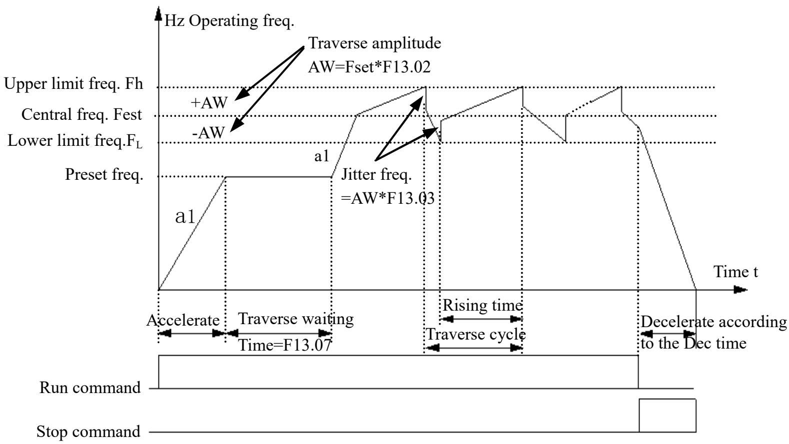


Fig. 7-42 Traverse operation

F13.08	**Setup length**	**Range: 0～65535 (m/cm/mm)**	**0**
F13.09	**PulseNo. of axis per circle**	**Range: 1～10000**	**1**
F13.10	**Axis perimeter**	**Range: 0.01～655.35cm**	**10.00cm**
F13.11	**Percentage of remaining length**	**Range: 0.00%～100.00%**	**0.00%**
F13.12	**Length correction coefficient**	**Range: 0.001～10.000**	**1.000**

Set length, actual length and Numbers of pulses per cycle are used for fixed length control. The Actual length is calculated by the number of pulses collected by terminal Xi (i=1~5, AI1, AI2), set the Xi function code to 62 and length signal output.

Actual length=(Actual number of pulses x F13.10 x F13.12)/ F13.09, When the actual record length (F00.02=39) > set length (F13.08), after the time defined by F13.07, The "reach length" signal can be output via Yi and the relay output terminal for 0.5 seconds.

When remaining length ratio<F13.11, The drive will run at the frequency defined by F13.06 until the length is reached. With this function, the overshoot of the stop can be prevented to increase the accuracy of the fixed length control. When this parameter equals 0.00%, this function is invalid. (This function is valid only when the current frequency is the primary auxiliary).

Note

(1) When F00.02=39, Actual length can be monitored by C-01in running state.Count length function is available both V/F control mode and Vector Control mode.
(2) Using X5 port as a fixed length count input, the maximum input value is 1K .Using X1~X4 port as a fixed length count input, the maximum input value is50Hz.

F13.13	**Record length when the length is reached**	**Range: Units digit: reserved** **Tens digit: 0～2** **Hundreds digit: 0～2** **Thousands digit: 0～2**	**0000**

Units place: Reserved.

Tens digit: Set the length unit.
0: Meter (m).
1: Centimeter (cm).
2: Millimeter (mm).

Hundreds digit: Actions when the length is reached.
0: Continue running.
1: Stop according to the stop mode.
2: Loop fixed length control.

Thousands digit: Software reset length. (Could be cleared to 0 by communication)
0: No operation.
1: The current length is cleared.
2: The current length and total length are both cleared.

[F13.13] tens digit determines the unit of length in **[F13.08]**, 0=m, 1=cm, 2=mm. According to the process requirements to select different units can increase the accuracy of fixed-length control.

[F13.13] Hundreds digit determine the action of the drive when reach the length.0=Continue running, 1 = Shut down according to stopping mode, 2 =Loop length control. When 2 is selected, the frequency will run for 0 frequency and continue for the next fixed time after the time defined by **[F13.04]**. This function is effective only when the frequency is the main auxiliary reference, for example jogging, PLC, process PID.This function is only available when the reference of a higher priority is invalid.

[F13.13]Thousands digit: The upper computer can change the current length and the cumulative length by changing thousands digit of **[F13.13]**. Note that **[F13.13]**can't be wrongly modified the other bits, such as F13.13 units, tens, hundreds were 1,1,0, then**[F13.13]**should be set to0x1110 or 0x2110.When the multi-function input terminal No.63 is valid, both the current length and the accumulated length are cleared.

F13.14	**Record length at shutdown**	**Range: Units digit: 0, 1** **Tens digit: 0, 1** **Hundreds digit: 0, 1**	**011**

Units digit: Stops the current length.

0: Automatically cleared.

The current record length is automatically cleared at shutdown.

1: Length is maintained.

The current record length remains unchanged during shutdown.

Tens digit: power-down length memory setting.

0: Not stored.

1: Stored.

The tens digit controls the current length of the power-down storage feature, but the cumulative length of the power-down will be stored.

Hundreds digit: Length calculation at shutdown.

0: The length is not calculated .

1: Calculate the length.

When the hundreds digit is 1, the length calculation module will automatically calculate the length according to the external pulses when the inverter is shutdown.

7.15 Vector Control Parameter Group: F14

F14.00	**Speed/torque/position control selection**	**Range: 0～6**	**0**

0: Speedcontrol.

1: Torque control.

2: Position control.

3: Torque mode←→Speed mode. Select the control mode in conjunction with the function of terminal 65.

4: Speedmode←→Position mode. Select the control mode in conjunction with the function of terminal 65.

5: Torque mode←→Position mode. Select the control mode in conjunction with the function of terminal 65.

6: Torque mode←→Speed←→Position mixed mode. Select the control mode in conjunction with the functions of terminals 65 and 66.

F14.01	**Speedloop high speed proportional gain**	**Range: 1～100**	**20**
F14.02	**Speedloop high speed integration time**	**Range: 0.01～10.00s**	**1.00s**
F14.03	**Speedloop low speed proportional gain**	**Range: 1～100**	**30**
F14.04	**Speedloop low speed integral time**	**Range: 0.01～10.00s**	**0.50s**
F14.05	**Speedloop parameter switching frequency 1**	**Range: 0.00Hz～F14.06**	**5.00Hz**
F14.06	**Speedloop parameter switching frequency 2**	**Range: F14.05～upper limit frequency**	**10.00Hz**

The speed response characteristics under vector control can be improved by adjusting the gain and integral time of the speed loop at high speed and low speed. Increasing the proportional gain and reducing the integration time can speed up the dynamic response of the speed loop. However, if the proportional gain is too large or the integration time is too small, the system may oscillate. The recommended adjustment method is:

If the factory parameters cannot meet the requirements, fine-tune the parameters based on the factory values. First increase the proportional gain to ensure that the system does not oscillate; then reduce the integration time so that the system has faster response characteristics and less overshoot.

Under open-loop vector, the speed loop gain is determined by the above parameters. In closed-loop vector mode, **[F16.34=2]**, the gain of the speed loop is determined by the above parameters. But when**[F16.34]**is equal to 0 or 1, the speed loop gain is jointly controlled by **[F16.20～F16.30, F16.35, F14.60～F14.64]** It is determined that at this time **[F16.24]** load inertia ratio has a great influence on the speed loop gain.

F14.07	**Maximum output voltage coefficient**	**Range: 100～120%**	**105**

Appropriately increasing this parameter can improve the ability to output motor torque under field weakening, but the larger this value is, the harmonics of the output current will increase.

F14.08	**Reserved**		
F14.09	**Reserved**		

F14.10	**Asynchronous motor excitation adjustment proportional gain**	**Range: 0～60000**	**2000**
F14.11	**Asynchronous motor excitation adjustment integral gain**	**Range: 0～60000**	**1300**
F14.12	**Asynchronous motor torque adjustment proportional gain**	**Range: 0～60000**	**2000**
F14.13	**Asynchronous motor torque adjustment integral gain**	**Range: 0～60000**	**1300**

The above are the PI regulator parameters of the current loop under the SVC of the asynchronous motor and the closed-loop vector. Increasing the current loop gain can speed up the dynamic response of the system torque; reducing the gain can enhance the stability of the system. Generally this parameter does not need to be changed. After the motor performs self-learning, this current loop gain parameter will automatically be optimized and updated.

F14.14	**Asynchronous motor without speed vector slip gain**	**Range: 50%～200%**	**100%**

For asynchronous motor speed sensorless vector control**[F00.24=1]**, this parameter is used to adjust the speed stability accuracy of the asynchronous motor: When the motor is loaded and the speed is low, increase this parameter, otherwise decrease it.

F14.15	**Reserved**		

F14.16	**Asynchronous motor speed feedback filter time (valid under SVC)**	**Range: 0.001～0.100s**	**0.015s**

Under the open-loop vector of an asynchronous motor, if the speed fluctuates greatly, this parameter can be increased appropriately to reduce the speed fluctuation, but adjusting the size may cause the system to become unstable. Generally this parameter does not need to be adjusted.

F14.17	**Asynchronous motor flux braking coefficient**	**Range: 100～300%**	**100.0%**

This function is effective in open-loop or closed-loop vector conditions of asynchronous motor. The inverter can quickly decelerate the motor by increasing the magnetic flux when the motor decelerates and stops. The electric energy generated during the braking process is mainly consumed in the form of heat energy inside the motor. Therefore, frequent use of magnetic flux braking will cause the temperature inside the motor to rise. Please be careful not to allow the motor temperature to exceed the maximum allowable value. If a run command is input during flux braking, the flux braking will be canceled and the inverter will accelerate to the set frequency again. When using a braking resistor, disable flux braking. When this parameter is 100%, magnetic flux braking is invalid.

F14.18	**Reserved**		

F14.19	**Motor-driven torque current limit value**	**Range: 0.0～250.0%**	**150.0%**
F14.20	**Braking torque current limit value**	**Range: 0.0～250.0%**	**150.0%**

The positive torque and negative torque limit values determine the range of the speed loop output torque. When the application needs quick acceleration and deceleration, this parameter can be appropriately increased to meet specific needs. However, setting it too high can easily cause over-current and other phenomena.

In addition, the torque limit of the speed loop is also affected by factors such as the excitation current, field weakening state, overload state of the frequency converter, and the maximum current output capability of the frequency converter.

F14.21	**Torque reference and limit channel selection**	**Range: Units digit: 0～8** **Tens digit: 0～8** **Hundreds digit: 0～8**	**000**

Units digit: Torque provision channel selection.

0: Digital setting (determined by **[F14.23]**).

1: AI1 analog provision. (0～10V corresponds to 0～200.0% motor rated torque current)

2: AI2 analog provision. (0～10V or 0～20mA corresponds to 0～200.0% motor rated torque current)

3: Terminal UP/DOWN adjusting.

4: Communication provision (communication address: 1D01). (0~10000 corresponds to 0~200.0% motor rated torque current)

5: Operate the keyboard knob to set. The maximum position of the keyboard knob corresponds to 200.0% of the motor's rated torque current.

6: AI3 analog setting (extension).

7: High-speed pulse provision. (The X5 terminal needs to select the corresponding function)

8: Terminal pulse width provision. (The X5 terminal needs to select the corresponding function)

The corresponding torque setting range from the minimum value to the maximum value set by the above channels is: 0.0～**[F14.23]** Motor rated torque current.

Tens digit: Electric torque limit channel selection.

0: Digital setting (determined by**[F14.19]**).

1: AI1 analog setting

2: AI2 analog setting

3: Terminal UP/DOWN adjustment setting.

4: Reserved.

5: Operate the keyboard knob to set.

6: AI3 analog setting (extension).

7: High-speed pulse setting. (The X5 terminal needs to select the corresponding function)

8: Terminal pulse width setting. (The X5 terminal needs to select the corresponding function)

Note: The maximum value of 1~8 channel scorresponds to **[F14.19]**.

Hundreds digit: Braking torque limit channel selection.

0: Digital setting (determined by **[F14.20]**).

1: AI1 analog setting.

2: AI2 analog settings.

3: Terminal UP/DOWN adjustment setting.
4: Reserved.
5: Operate the keyboard knob to set.
6: AI3 analog setting (extension).
7: High-speed pulse setting. (The X5 terminal needs to select the corresponding function)
8: Terminal pulse width setting. (The X5 terminal needs to select the corresponding function)
Note: The maximum value of 1~8 channelscorresponds to **[F14.20]**.

When the torque limit value is modified by communication, the torque channel needs to be set to digital setting (tens or hundreds digits are both 0). Torque limitation can be performed by directly modifying **[F14.19]** or **[F14.20]** by communication. The shutdown and power-down storage function are affected by **[F01.03]** and **[F01.05]** **w**hen terminal UP/DOWN is adjusted. If stop is not restored and power-down is saved, **[F01.03=3]**, and **[F01.05=00]** need to be set.

F14.22	**Torque polarity setting**	**Range: 0000～0102**	**0000**

Units digit: Polarity of torque provision
0: Positive.
1: Negative.
2: Determined by the running command. The torque direction is determined by the running command direction.

Note: Under torque control, the torque provision direction can also be dynamically switched through the multi-function key.

Tens: Reserved.

Hundreds digit: [F14.30] compensation is weakened when the motor locked rotor.
0: Invalid
1:Valid. This function can prevent belt slippage caused by low-frequency compensation, **[F14.30]** set too large or the torque set too large and the motor locked rotor.

Thousands: Reserved

F14.23	**Torque digital setting value**	**Range: 0.0～200.0%**	**0.0%**

When the Unite digit of**[F14.21]**= 0, the torque size is determined by**[F14.23]**. When set to 100.0%, it corresponds to the rated torque current of the motor. When the motor is under a weakenfield state, the actual output torque will generally become smaller. When numbers are given, the torque value can be modified directly through the up and down keys on the keyboard.

F14.24	**Forward speed limit channel selection in torque control**	**Range: 0～8**	**0**

0: Digital setting.
1: AI1 analog provision.
2: AI2 analog provision.
3: Terminal UP/DOWN adjusting.
4: Communication provision (Communication address: 1D0A).
5: Operate the keyboard knob to set.
6: AI3 analog setting (extension).
7: High-speed pulse setting. (Please choose the related function of X5)

8: Terminal pulse width setting. (Pleasechoose the related function of X5)

When positive torque provided, if the provision positive torque is bigger than the load torque, the motor speed will continue to rotate forward to the motor operating frequency determined by the positive speed limit channel**[F14.24]**to prevent the motor from too fast. The acceleration and deceleration time of the limited frequency is determined by the second acceleration and deceleration time **[F04.16]**, **[F04.17]**.

F14.25	**Reverse frequency limit channel selection in torque control**	**Range: 0～8**	**0**

0: Digital setting.
1: AI1 analog provision.
2: AI2 analog provision.
3: Terminal UP/DOWN adjusting.
4: Communication provision (Communication address: 1D0B).
5: Operate the keyboard knob to set.
6: AI3 analog setting (extension).
7: High-speed pulse setting. (Please choose the related function of X5)
8: Terminal pulse width setting. (Please choose the related function of X5)

When a negative torque is provided, if the provision negative torque is bigger than the load torque, the motor speed will continue to reverse to the motor operating frequency determined by the reverse speed limit channel**[F14.25]**to prevent the motor from Too fast. The acceleration and deceleration time of the limited frequency is determined by the second acceleration and deceleration time **[F04.16]**,**[F04.17]**.

F14.26	**Forward speed limit in torque control mode**	**Range: 0.00Hz～upper limit frequency**	**50.00Hz**
F14.27	**Reverse speed limit in torque control mode**	**Range: 0.00Hz～upper limit frequency**	**50.00Hz**

[F14.24=0], **[F14.25=0]**, the speed limit values corresponding to the forward and reverse torque are determined by F14.26 and F14.27 respectively.

F14.28	**Set torque acceleration time**	**Range: 0.000～60.000s**	**0.100s**
F14.29	**Set torque deceleration time**	**Range: 0.000～60.000s**	**0.100s**

Through the torque given channel, the external torque command is processed through acceleration and deceleration to form the final given torque command. Properly setting the torque acceleration and deceleration time can prevent the sudden change of the torque command from causing motor jitter.

F14.30	**Torque compensation**	**Range: -100.0～100.0%**	**0.0%**

[F14.30]Determine the torque compensation polarity and compensation value. Normally, the torque compensation needs to be adjusted when the torque loss due to the mechanical loss of the motor is large, generally no need to set this value. When the setting value is 100%, it corresponds to the rated torque current of the motor. When the provision torque is less than 1.1% of the rated torque, the torque compensation value defined by**[F14.30]**is invalid.

F14.31	**Torque compensation cutoff frequency**	**Range: 0.00Hz～upper limit frequency**	**20.00Hz**

When the inverter output frequency exceeds the frequency defined by**[F14.31]**, the torque compensation value defined by**[F14.30]**is 0. The actual compensation torque decreases linearly between the inverter output frequency from 0Hz to the frequency defined by**[F14.31]**.

F14.32	**Positive torque gain regulation coefficient**	**Range: 50.0～150.0%**	**100.0%**
F14.33	**Reverse torque gain regulation coefficient**	**Range: 50.0～150.0%**	**100.0%**

When positive torque is provided, if the actual output torque does not match the provision torque, **[F14.32]** can be adjusted to make the provision torque consistent with the actual output torque.

When negative torque is provided, if the actual output torque does not match the provision torque, **[F14.33]** can be adjusted to make the given torque consistent with the actual output torque.

F14.34	**Enable automatic adjustment of asynchronous motor weak magnetic torque**	**Range:** 0、1	0

0: invalid.

1: valid. In asynchronous motor torque mode with weak magnetic speed regulation, the torque current is automatically adjusted to output the setting torque.

F14.36	**Synchronous motor excitation adjustment proportional gain**	**Range: 0～60000**	**2000**
F14.37	**Synchronous motor excitation adjustment integral gain**	**Range: 0～60000**	**1300**
F14.38	**Synchronous motor torque adjustment proportional gain**	**Range: 0～60000**	**2000**
F14.39	**Synchronous motor torque adjustment integral gain**	**Range: 0～60000**	**1300**

The above are the PI regulator parameters of the current loop under the synchronous motor SVC and closed-loop vector. Increasing the current loop gain can speed up the dynamic response of the system torque; reducing the gain can enhance the stability of the system. Generally this parameter does not need to be changed. After the motor performs self-learning, this current loop gain parameter will automatically be optimized and updated.

F14.40	**Synchronous motor flux braking coefficient**	**Range: 0～150%**	**0%**

This function is effective in open-loop or closed-loop vector synchronous motor. The inverter can quickly decelerate the motor by increasing the magnetic flux when the motor decelerates and stops. The electric energy generated during the braking process is mainly consumed in the form of heat energy inside the motor. Therefore, frequent use of magnetic flux braking will cause the temperature inside the motor to rise. Please be careful not to allow the motor temperature to exceed the maximum allowable value. If a run command is input during flux braking, the flux braking will be canceled and the inverter will accelerate to the set frequency again. When using a braking resistor, disable flux braking. When this parameter is 0%, magnetic flux braking is invalid.

F14.41	**Synchronous motor field weakening control method**	**Range: 0, 1**	**1**

0: No magnetic weakening. Always maintain a low excitation given current. After entering field weakening, the command speed will deviate from the actual motor speed.

1: Automatic adjustment. After entering field weakening, the driver automatically calculates the field weakening current to ensure that the output speed is consistent with the command speed. However, after the motor enters deep field weakening, the output speed may still deviate from the command speed.

F14.42	**Synchronous motor field weakening gain**	**Range: 0～50**	**5**

When the field weakening mode is automatic adjustment,**[F14.41=1]**is used to set the speed of adjusting the field weakening current. **[F14.42]**The larger the value, the faster the field weakening current is adjusted, which can quickly approach the required minimum field weakening current and improve the dynamic response of the motor. If it is too large, it will easily cause oscillation.

F14.43	**Synchronous motor generator torque upper limit effective enable**	**Range: 0, 1**	**5**

0:Invalid. During synchronous motor vector control, the**[F14.20]**parameter settings are invalid at this time.

1:Valid. When separate control of power generation (braking) torque is required, **[F14.43]** needs to be set to 1, and the appropriate **[F14.20]** parameters need to be set.

F14.44	**Synchronous motor output voltage upper limit margin**	**Range: 0～50%**	**5**

This parameter defines the voltage margin for the synchronous motor to enter field weakening control, and generally does not need to be adjusted.

F14.45	**Synchronous motor SVC initial position detection current**	**Range: 20%～180%**	**80%**

This value defines the current size during the magnetic pole positioning process of the synchronous motor. The larger this value is, the more accurate the magnetic pole positioning will be, but the greater the current noise may be during the positioning process.

F14.46	**Synchronous motor SVC initial position angle detection**	**Range: 0～2**	**0**

0: Detection. It is tested every time from shutdown to startup to ensure smooth startup.

1: No detection. If magnetic pole detection is not started, the motor may reverse to a certain angle at the moment of start.

2: Detect once after power on. When starting up for the first time after power-on, a magnetic pole detection is performed.

F14.47	**Synchronous motor salient pole rate adjustment gain**	**Range: 50～500**	**100**

This parameter is used in the synchronous motor vector control mode, after the maximum torque current ratio control is started [F14.48=1] , by appropriately adjusting this parameter, the maximum torque current ratio control effect can be optimized.

F14.48	**Synchronous motor maximum torque current ratio control**	**Range: 0, 1**	**0**

0: Invalid.

1:Valid. When combined with **[F14.47]**, the synchronous motor can exert its best efficiency. This function is effective for synchronous motors with large salient pole rates, and for surface-mounted synchronous motors. The motor doesn't work well.

F14.49	**Current loop KP during synchronous motor tuning**	**Range: 1～100**	**6**
F14.50	**Current loop KI during synchronous motor tuning**	**Range: 1～100**	**6**

The above two parameters define the gain coefficient of the current loop during the rotation identification stage of the synchronous machine. If the motor loses synchronization during the motor rotation identification, this parameter can be increased appropriately.

F14.51	**Synchronous motor SVC speed filter level**	**Range: 10～1000**	**100**

If the motor oscillates during speed control of the synchronous motor, this parameter can be increased appropriately. However, if this parameter is too large, the speed response will be slower, which may also cause system oscillation.

F14.52	**Synchronous motor SVC speed estimation proportional gain**	**Range: 5～200**	**40**
F14.53	**Synchronous motor SVC speed estimation integral gain**	**Range: 5～200**	**30**

The above two parameters are the speed estimation related gains under the control of the synchronous motor SVC, and generally do not need to be adjusted.

F14.54	**Synchronous motor SVC low speed excitation current**	**Range: 0～80%**	**30%**

This parameter defines the excitation current of the low-speed section of the synchronous motor under SVC control. Appropriately increasing this value can improve the load capacity and speed accuracy of the low-speed section. However, the larger the value, the greater the current in the low-speed section and the higher the motor temperature rise may be.

F14.55	**Synchronous motor SVC low speed carrier frequency**	**Range: 0.8K～F04.09**	**1.5K**

Used to set the operating carrier of the low-speed section in the SVC control mode of the synchronous motor. Properly reducing the carrier wave in the low-speed section can improve the speed accuracy and load capacity of the low-speed section.

F14.56	**Synchronous motor SVC initial position detection minimum current**	**Range: 20%～80%**	**50%**

This value defines the minimum current during the magnetic pole positioning process of the synchronous motor. If this value is too small, the magnetic pole position detection accuracy will be reduced when starting.

F14.57	**Synchronous machine SVC online tuning enablement (synchronous motor debugging-free mode)**	**Range: 0～2**	**0**

0: Off.

1: Tuning before powering on and running for the first time. Under open-loop vector control, a motor parameter self-learning operation is automatically performed before first operation after power-on. After self-learning, it automatically runs according to user instructions.

2: Tune once before each run. Under open-loop vector control, the motor parameters are automatically identified before each operation. It is suitable for synchronous motors whose motor parameters change greatly with temperature changes. Starting the identification process will take a certain amount of time (about 1 second), which is not suitable for situations where quick response to startup commands is required.

F14.58	**Synchronous motor SVC online back electromotive force identification**	**Range: 0, 1**	**0**

0: Off.

1: On. Under the open-loop vector control of the synchronous motor, the driver automatically calculates the back electromotive force coefficient after it is turned on. The rotation self-learning of the synchronous motor can be eliminated. This function can be enabled when the **[F15.15]** parameters cannot be obtained accurately.

F14.59	**SVC initial position compensation angle**	**Range: 0～360.0°**	**0.0°**

Under the open-loop vector control of the synchronous motor, during the starting process, if there is a reversal phenomenon at the moment of starting after magnetic pole detection and positioning, this parameter can be used to make certain compensation for the results of the magnetic pole positioning to improve the stability of the starting moment.

F14.60	**Second gain mode setting**	**Range: 0, 1**	**0**
F14.61	**Second speed loop gain**	**Range: 0.1～1000.0**	**30.0**
F14.62	**Second speed loop integration time**	**Range: 0.36～512.00ms**	**26.53ms**
F14.63	**Second position loop gain**	**Range: 0.0～1570.0**	**48.0**
F14.64	**Second torque command filter time constant**	**Range: 0.00～30.00ms**	**0.66ms**

In closed-loop vector control mode, when**[F16.34=0 or 1]**, the above parameters are valid. When**[F14.60=0]**, the position loop and speed loop gains are determined by**[F16.20～F16.23]**. When**[F14.60=1]**, the position loop and speed loop gains are from**[F16.20～F16.23]**,**[F14.61～F14.64]**are jointly determined. At this time, when the motor speed is greater than**[F14.06]**, the gain is determined by**[F16.20～F16.23]**. When the motor speed is less than [When**[F14.05]**, the gain is determined by**[F14.61～F14.64]**. You can set high and low speed gains to meet the needs of different occasions.

F14.65 ~ F14.69	**Reserved**		

7.16 Motor parameter group: F15

F15.00	**Motor type**	**Range: 0, 1**	**0**
F15.01	**Motor rated power**	**Range: 0.1～6553.5KW**	**Depend on Type**
F15.02	**Motor rated voltage**	**Range: 1～800V**	**Depend on Type**
F15.03	**Motor rated current**	**Range: 0.01～655.35A (motor power＜7.5KW)**	**Depend on Type**
		Range: 0.1～6553.5A (motor power ≥7.5KW)	
F15.04	**Motor rated frequency**	**Range: 0.00～upper limit freq.**	**Depend on Type**
F15.05	**Motor rated speed**	**Range: 0～32000r/min**	**Depend on Type**
F15.06	**Number of motor pole pairs**	**Range: 1～100**	**2**

0: Asynchronous motor.

1: Synchronous motor.

Regardless of whether V/F control, closed-loop vector control or open-loop vector control is used, whether it is a synchronous motor or an asynchronous motor, the above parameters need to be set according to the nameplate data of the motor actually driven by the inverter, otherwise it may not operate normally. In order to obtain better control performance, the motor parameters need to be tuned. Before parameter tuning, the above motor rated parameters also need to be correctly set, otherwise the tuning results may be wrong. Among them, the**[F15.06]**parameter system will automatically calculate according to the motor nameplate, without manual input. You can use this parameter to verify the correctness of the nameplate parameter input.

F15.07	**Asynchronous motor stator resistance**	**Range: 0.001～65.535Ω (motor power＜7.5KW)**	**Depend on Type**
		Range: 0.0001～6.5535Ω (motor power ≥7.5KW)	
F15.08	**Asynchronous motor rotor resistance**	**Range: 0.001～65.535Ω (motor power＜7.5KW)**	**Depend on Type**
		Range: 0.0001～6.5535Ω (motor power≥7.5KW)	
F15.09	**Asynchronous motor leakage inductance**	**Range: 0.01～655.35 mH (motor power＜7.5KW)**	**Depend on Type**
		Range: 0.001～65.535 mH (motor power ≥7.5KW)	
F15.10	**Asynchronous motor mutual inductance**	**Range: 0.1～6553.5 mH (motor power＜7.5KW)**	**Depend on Type**
		Range: 0.01～655.35mH (motor power ≥7.5KW)	
F15.11	**Asynchronous motor no-load current**	**Range: 0.01～655.35A (motor power＜7.5KW)**	**Depend on Type**
		Range: 0.1～6553.5A (motor power ≥7.5KW)	

[F15.07～F15.11] are the parameters of the asynchronous motor. These parameters are generally not found on the motor nameplate and need to be obtained through automatic tuning of the inverter. In order to obtain better control performance, it is necessary to perform rotation tuning after the motor is off-axis. When the axis cannot be detached, you can choose static tuning or static full tuning; or modify **[F15.01]**motor power parameters, the inverter will **[F15.02～F15.11]** The parameters are set to the default standard motor parameters; or the motor parameters are manually entered.

F15.12	**Synchronous motor stator resistance**	**Range: 0.001～65.535Ω (motor power＜7.5KW)**	**Depend on Type**
		Range: 0.0001～6.5535Ω (motor power ≥7.5KW)	
F15.13	**Synchronous motor D-axis inductor**	**Range: 0.01～655.35mH (motor power＜7.5KW)**	**Depend on Type**
		Range:0.001～65.535mH (motor power ≥7.5KW)	
F15.14	**Synchronous motor Q-axis inductor**	**Range: 0.01～655.35 mH (motor power＜7.5KW)**	**Depend on Type**
		Range:0.001～65.535 mH(motor power ≥7.5KW)	
F15.15	**Synchronous motor back electromotive force**	**Range: 0.0～6553.5V**	**Depend on Type**

[F15.12～F15.15]are the parameters of the synchronous motor. These parameters are generally not found on the motor nameplate and need to be obtained through inverter auto-tuning. In order to obtain better control performance, it is necessary to perform rotation adjustment after the motor is detached or the load is removed. In situations where the axis cannot be detached, it can be rotated and statically adjusted.

F15.16	**Motor moment of inertia Jm**	**Range:0.01～655.35 Kg.cm2**(motor power below 7.5KW)	**Depend on Type**
		Range: 0.1～6553.5 Kg.cm2(motor power 7.5KW and above)	
		Range:1～65535 Kg.cm2(motor power 75KW and above)	

The above parameters are the inertia parameters of the motor. Under the closed-loop vector **[F00.24=2]**, when **[F16.34=0 or 1]**, the correct input is first required **[F15.16]** The inertia of the motor, and then the load inertia self-learning **[F15.19=20]** can exert the best control performance of the system. The inertia parameter of the motor can be obtained from the nameplate of the motor. If it is not marked, it can be obtained from the motor manufacturer.

F15.17	**Motor torque coefficient Kt**	**Range: 0.01～655.35 Nm/Arms**	**Depend on Type**

When the system adopts closed-loop vector control and**[F16.34=0 or 1]**, this parameter needs to be obtained accurately. This parameter will be automatically calculated when inputting the rated parameters of the motor. At the same time, the user can Enter this parameter manually. Note that if this parameter is inaccurate, it will affect the accuracy of the identification results of the load inertia.

F15.18	**Reserved**		

F15.19	Motor parameter auto-tuning selection	Range: 00～20	00

0: No action.

1: Static self-tuning of asynchronous motors.

When the motor cannot be disconnected from the load or the process of disconnecting from the load is cumbersome, static auto-tuning can be selected. Before auto-tuning, correctly enter the motor nameplate parameters**[F15.00～F15.06]**, set**[F15.19]**to 1, press [ENTER 3 DATA] , and then return to the monitoring window button press [4 RUN] , it self-tuning starts, and the keyboard displays “tune”.

After the auto-tuning is completed, the inverter automatically exits and sets the stator resistance, rotor resistance and motor leakage inductance **[F15.07～F15.09]**, current loop gain parameters**[F14.10～F14.13]** to store.

The no-load current and mutual inductance of the motor cannot be set. The user can input the corresponding valuesbased on the data provided by the motor manufacturer or the data in the motor test report; if there is no corresponding data, there is no need to input it. Just use the factory value. However, it may affect the control performance of the motor.

During the tuning process, if an abnormality occurs, the user can press the key [6 STOP RESET] to end parameter auto-tuning.

2: No-load self-tuning of asynchronous motor rotation.

If the load of the motor is less than 30% of the rated load or the load it carries is not a large inertia load, you can choose to perform rotational auto-tuning. However, please try to disconnect the load and keep the motor in a static and no-load state, otherwise the set parameters may be incorrect. After the motor wires are connected, if the motor runs in the wrong direction during rotation adjustment (which is not good for the equipment or the load is larger when running in the current direction), you can set the hundreds digit of**[F01.16]**to 1. Perform reverse rotation tuning. After tuning, you need to manually restore the original settings of**[F01.16]**.

Before auto-tuning, correctly enter the motor nameplate parameters [F15.00~F15.06], set [F15.19] to 2, press the key [ENTER 3 DATA] , and then return to Press the key [4 RUN] in the monitoring window to start self-tuning. At this time, the keyboard displays "tune". After the auto-tuning is completed, the inverter automatically exits and sets the stator resistance, rotor resistance, motor leakage inductance, motor mutual inductance, no-load current, and current loop gain parameters **[F14.10～F14.13]** for storage. If it is closed-loop vector control, the encoder direction parameters **[F16.01]** parameters can also be correctly identified.

During the tuning process, if an abnormality occurs, the user can press the key [6 STOP RESET] to end parameter auto-tuning.

3: The asynchronous motor is fully tuned at rest.

If the motor cannot come off the axis and the control performance cannot meet the requirements after static tuning, you can use the static full tuning method. After correctly inputting **[F15.00～F15.06]**, set **[F15.19=3]** and then press the run key to enter full static tuning.

11: Synchronous motor static self-tuning

When the synchronous motor cannot be disconnected from the load shaft or the process of disconnecting from the load is cumbersome, static auto-tuning can be selected. Before auto-tuning, after correctly inputting the motor nameplate parameters**[F15.00～F15.06]**, set**[F15.19]**to 11, then return to the monitoring interface and press Run Press the key to start auto-tuning, and the keyboard will display “tune”. After the auto-tuning is completed, the inverter automatically exits and adjusts**[F15.12～F15.15]**current loop gain parameters**[F14.36～F14.39]**and other parameters. If it is closed-loop vector control, parameters such as **[F16.01]**, **[F16.03]**, **[F16.04]** will be automatically obtained and stored. During the tuning process, if an abnormality occurs, the user can press the Stop key to end parameter auto-tuning.

12: Synchronous motor rotation self-tuning.

If the load of the synchronous motor is less than 30% of the rated load or the load inertia is large but the load is not heavy, you can choose to perform rotational auto-tuning. However, try to disconnect the load and keep the motor in a static and no-load state, otherwise the setting parameters may be incorrect. Before auto-tuning, after correctly inputting the motor nameplate parameters**[F15.00～F15.06]**, set**[F15.19]**to 12, then return to the monitoring interface and press Run Press the key to start auto-tuning, and the keyboard will display "tune". After the auto-tuning is completed, the frequency converter will automatically exit and set parameters such as**[F15.12～F15.15]**, current loop gain parameters**[F14.36～F14.39]**and other parameters. . If it is closed-loop vector control, parameters such as**[F16.01]**,**[F16.03]**,**[F16.04]**will be automatically obtained and stored. During the tuning process, if an abnormality occurs, the user can press the Stop key to end parameter auto-tuning.

20: Load inertia identification.

When using closed-loop vector control**[F00.24=2]**and**[F16.34=0 or 1]**, load inertia identification is required. Before identification, you need to set **[F00.19]** to the correct encoder expansion card, and set the correct encoder parameters **[F16.00]** and **[F16. 02]**, before load inertia identification, it is necessary to perform rotational or static auto-tuning according to the motor type and then perform load inertia identification operation.

After setting**[F15.19=20]**, after entering the monitoring interface, press the run key to start load inertia identification. At this time, the keyboard displays the currently identified load inertia ratio. Wait for the identification result to be basically stable (at least 10 seconds Above), you can press the UP key to store the load inertia displayed on the keyboard into **[F16.24]**(load inertia ratio). If an abnormality occurs, the user can press the Stop key to end parameter auto-tuning.

When identifying the load inertia, you can also cooperate with the **[F16.36～F16.39]**parameters to improve the flexibility and accuracy of the load inertia identification. By observing the**[F16.40]**parameters, you can pre-judge the number of revolutions of the motor during the inertia identification process. If the number of running revolutions is too large, you can appropriately adjust**[F16.37]**or**[F16.38]**parameters to prevent damage to the device during the identification process.

Note

In inertia identification, in order to ensure accurate identification, it is necessary to ensure that F01.12=0 and F02.20=0.

F15.20	**Communication expansion card software version**	**-**	**-**

The software versionof some communication expansion cards can be check through [F15.20] .

F15.21	**Reserved**		
F15.22	**Reserved**		

7.17 Encoder and Position Control Parameters: F16

F16.00	**Encoder line number**	**Range: 1～10000**	**1024**

The number of lines of the currently connected motor encoder. This setting value should be consistent with the actual encoder value. Otherwise, it may cause a deviation between the monitored speed and the actual motor speed. When the absolute position of the resolver is used for speed feedback**[i.e. F00.19=2]**, there is no need to set this parameter.

F16.01	**Encoder speed measurement direction is reversed**	**Range: 0, 1**	**0**

0: Forward.

1: Reverse.

This parameter is valid for both resolver and ABZ signals. This parameter is automatically updated after asynchronous motor rotation self-learning or synchronous motor static or rotation self-learning. When obtaining this parameter through self-learning, it needs to be set in advance **[F00.19]**, **[F00.24=2]**, **[F15.00～F15.06]**, **[F16.00]**, **[F16.02]** and other parameters.

F16.02	**Number of pole pairs of rotating transformer**	**Range: 1～32**	**1**

When **[F00.19=2]**, when using a resolver for speed and position feedback, this parameter needs to be set correctly. When selecting a resolver (resolver) model, the number of pole pairs of the motor is required to be an integer multiple of the number of resolver pole pairs.

F16.03	**Encoder mounting angle**	**Range: 0.0～359.9°**	**0.0°**

When the system drives a synchronous motor and adopts closed-loop vector control, it is necessary to accurately obtain the encoder installation angle, otherwise the motor may run away. This parameter is valid for both ABZ and rotary transformers. This parameter can be obtained through self-learning. For specific operations of self-learning, please refer to the introduction of**[F15.19]**parameters.

F16.04	**UVW encoder UVW phase sequence**	**Range: 0, 1**	**0**

0: Forward.

1: Reverse.

When the system drives a synchronous motor and adopts closed-loop vector control, and **[F00.19=1]** (ABZ UVW encoder), the UVW encoder signal line needs to be connected as required, and the correct UVW phase must be set at the same time. sequence. This parameter can be obtained through self-learning. For specific operations of self-learning, please refer to the introduction of **[F15.19]** parameters.

F16.05 ～ F16.07	**Reserved**		

F16.08	**Location command source**	**Range: 0, 1**	**0**

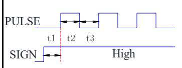
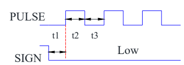
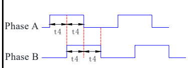
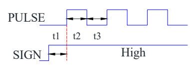
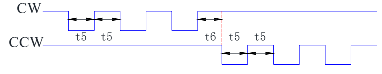
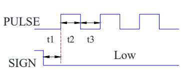
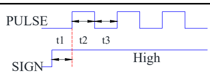
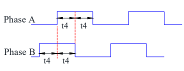
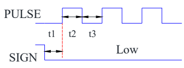
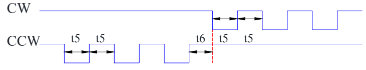
In position control mode, it is used to select the position command source.

Set value	Instruction source	How to obtain instructions
0	Pulse command	The host computer or other pulse generating device generates position pulse instructions through hardware. Terminal input to servo drive. Note that you need to select the correct PG expansion card to have hardware pulse input terminals.
1	Multi-segment position command given	The operation mode of the multi-segment position function is set by the **[Group F16]** parameters. Multi-segment position commands are triggered by 76 functions of the X terminal. (Note: The electronic gear ratio is invalid at this time)

Among them, the pulse command belongs to the external position command, and the multi-segment position command belongs to the internal position command.

F16.09	Pulse command form	Range: 0～2	0
F16.10	**Command pulse inversion**	**Range: 0, 1**	**0**

The maximum frequency and minimum time width of the position pulse command corresponding to different input terminals:

F16.10 Command pulse inversion	F16.09 Command form setting	Pulse form	Signal	Forward rotation pulse diagram	Reverse pulse diagram
0	0	pulse+direction	PULSE SIGN		
	1	A phase + B phase quadrature pulse 4 times frequency	PULSE (Phase A) SIGN (B phase)	Phase A leads phase B by 90° 	Phase B leads phase A by 90° 
	2	CW+CCW	PULSE(CW) SIGN(CCW)		
1	0	pulse+direction	PULSE SIGN		
	1	A phase + B phase quadrature pulse 4 times frequency	PULSE (Phase A) SIGN (B phase)	Phase B leads phase A by 90° 	Phase A leads phase B by 90° 
	2	CW+CCW	PULSE(CW) SIGN(CCW)		

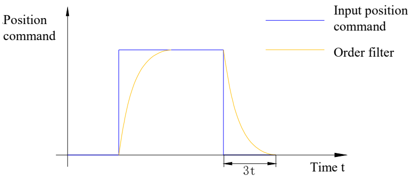
Input terminal (PULSE, SIGN)	Maximum frequency	Minimum time width/us					
		t_1	t_2	t_3	t_4	t_5	t_6
Differential input	500kpps	1	1	1	2	1	1
Collector input	200kpps	2.5	2.5	2.5	5	2.5	2.5

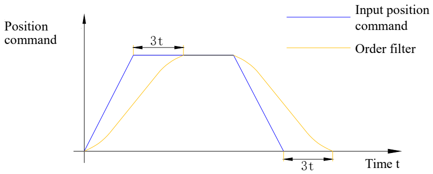
The rise and fall times of the position pulse command should be less than 0.1us.

F16.11	**Position first-order low-pass filter time**	**Range: 0～1000.0ms**	**0.0ms**

Set the first-order low-pass filter time constant of the position command (encoder unit).

Regarding the position command P as a rectangular wave and a trapezoidal wave, the position command after first-order low-pass filtering is as follows:





This function has no effect on the displacement amount (total number of position instructions).

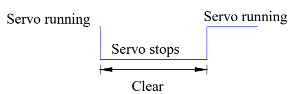
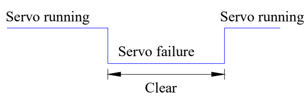
If the setting value is too large, the response delay will increase. The filter time constant should be set according to the actual situation.

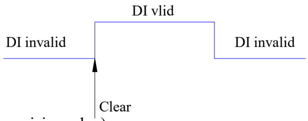
F16.12	**Electronic gear ratio 1 (numerator)**	**Range: 1～32767**	**1**
F16.13	**Electronic gear ratio 1 (denominator)**	**Range: 1～32767**	**1**

During position control, the external input pulse can be proportionally amplified or reduced by setting the electronic gear ratio. The actual walking position or speed of the motor can be changed without changing the pulse command of the host computer.

F16.14	**Position error clearing action selection**	**Range: 0～2**	**0**

Set the conditions for clearing position deviation. Position deviation = (position command - position feedback) (encoder unit)

Set value	Clear conditions	Remark
0	Clearing position deviations when the drive is stopped or malfunctions	
1	Clearing position deviations when the drive is stopped or malfunctions	

<table>
<tr><td>2</td><td>The drive stops or the position deviation is cleared through the ClrPosErr signal of the X input</td><td>One X terminal should be set to DI function 86 (clear position deviation),
It is recommended to select fast terminal X5 for this X terminal, and it is recommended that the logic be set to be valid for edge changes.


(valid on rising edge)</td></tr>
</table>

If the absolute value of the position deviation is greater than **F16.41: Excessive position deviation threshold]**, E-49 (excessive position deviation) will occur.

F16.15	Positioning completion output conditions	Range: 0～3	0

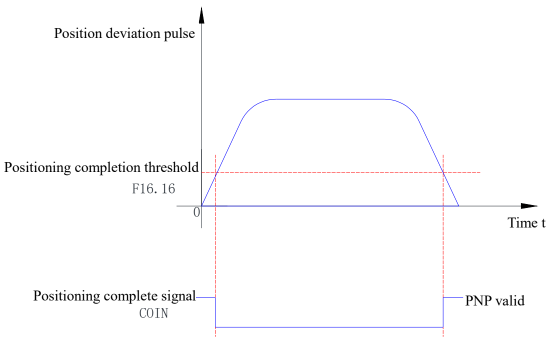
In position control mode, when the driver is running and the absolute value of the position deviation is within the **[F16.16: Positioning completion threshold]** setting value, the Y terminal of the driver can output the positioning completion (Function No. 54) signal. The output conditions of the positioning completion signal can be set through **[F16.16]**.

Set value	Output conditions
0	Output when the absolute value of position deviation is less than **[F16.16]**
1	Output when the absolute value of the position deviation is less than **[F16.16]** and the filtered position command is 0
2	Output when the absolute value of the position deviation is less than **[F16.16]** and the position command before filtering is 0
3	When the absolute value of the position deviation is less than **[F16.16]** and the position command before filtering is 0, it is output and remains valid for at least the time set by **[F16.17]**.

F16.16	Positioning completion threshold	Range: 1～65535 (encoder unit)	4

Set the threshold for the absolute value of the position deviation when the driver outputs the positioning completion signal (COIN).

Positioning completion signal: Y function 54 (FunOUT.54: COIN, positioning completion signal).



The positioning completion signal is only valid when the driver is in position control mode and running.

F16.17	Positioning completion window time	Range: 0～30000ms	1ms

The time when the positioning deviation is less than the positioning completion threshold needs to be greater than the set window time before the positioning completion signal can output a valid status.

F16.18	Positioning completion holding time	Range: 0～30000ms	0ms

[F16.15=3] When the positioning completion (COIN) signal is valid, the positioning completion (COIN) signal is set to an invalid state during the retention time. If the position command is not 0, the positioning completion (COIN) signal is set to an invalid state. If the setting value is 0 means that after the signal is output, it is in a valid state until the next instruction arrives.

F16.19	Positioning close to threshold	Range: 1～65535	100

Set the threshold of the absolute value of the position deviation when the driver Yi outputs the positioning proximity signal (Yi function 55).

Positioning proximity signal: Yi function 55 (FunOUT.55: NEAR, positioning proximity signal).

F16.20	First speed loop gain	Range: 0.1～1000.0	25.0

Set the proportional gain of the speed loop. This parameter determines the response of the speed loop. The larger the parameter is, the faster the speed loop will respond. However, setting it too high may cause vibration, so you need to pay attention. In position mode, if you want to increase the position loop gain, you need to increase the speed loop gain at the same time. The speed loop gain is in Hz only if the load inertia is accurate.

Note: This parameter is valid under **[F00.24=2]** and **[F16.34=0 or 1]**.

F16.21	First speed loop integration time	Range: 0.36～512.0ms	31.83ms

Set the integration time constant of the speed loop. The smaller the value set, the stronger the integral effect, and the deviation value at stop will approach 0 faster.

Note: This parameter is valid under **[F00.24=2]** and **[F16.34=0 or 1]**.

F16.22	First position loop gain	Range: 0.0～1570.0	40.0

Set the proportional gain of the position loop.

This parameter determines the responsiveness of the position loop. Setting a larger position loop gain can shorten the positioning time. However, setting it too large may cause vibration, so you need to pay attention.

F16.23	First torque command filter time	Range: 0.00～30.00ms	0.79ms

Set the torque command filter time constant.

By performing low-pass filtering on the torque command, the torque command can be made smoother and vibration can be reduced.

If the filter time constant setting value is too large, the responsiveness will be reduced. Please confirm the responsiveness while setting!

Note: This parameter is valid under **[F00.24=2]** and **[F16.34=0 or 1]**.

F16.24	Load inertia ratio	Range: 0.00～200.00	0.00

Sets the mechanical load inertia ratio relative to the motor's own moment of inertia.

$$\text{Load transmission inertia ratio} = \frac{\text{Moment of inertia of mechanical load}}{\text{Motor's own moment of inertia}}$$

[F16.24=0] means the motor has no load; **[F16.24=1.00]** means the mechanical load inertia is equal to the motor's own rotational inertia. Using the inertia identification function, the drive can automatically calculate and update the **[F16.24]** parameter values.

Note

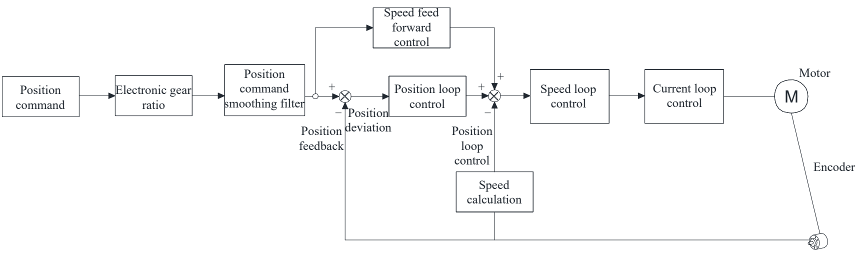
[F16.24] When the parameter value is equal to the actual inertia ratio, the value of the speed loop gain **[F16.20]** can represent the maximum following frequency of the actual speed loop.

Note: This parameter is valid under **[F00.24=2]** and **[F16.34=0 or 1]**.

F16.25	Speedfeed forward control selection	Range: 0, 1	0

Set the source of the speed loop feedforward signal.

In position control mode, speed feedforward control can be used to improve position command response speed.



Set value	Velocity feedforward source	Remark
0	Internal speed feed forward	Use the speed information corresponding to the command position (encoder unit) as the speed loop feedforward source.
1	reserve	

The parameters of speed feedforward control include **[F16.26: Speed feedforward filter time constant]** and **[F16.27: Speed feedforward gain]**.

F16.26	Speedfeedforward filter time constant	Range: 0.00～64.00ms	1.00ms

Sets the filter time constant for velocity feedforward.

F16.27	Speed feed forward gain	Range: 0.0～100.0%	0.0%

In position control mode, the speed feedforward signal is multiplied by **[F16.27]**, and the result is called speed feedforward and is used as part of the speed command.

Increasing this parameter can improve the position command response and reduce the position deviation at fixed speed.

When adjusting, first, set **[F16.26]** to a fixed value; then, gradually increase the **[F16.27]** setting value from 0 until a certain setting value is reached. At a fixed value, speed feedforward achieves results.

When adjusting, you should repeatedly adjust **[F16.26]** and **[F16.27]** to find a well-balanced setting.

Note

For speed feedforward function enablement and speed feedforward signal selection, please refer to **[F16.25: Speed feedforward control selection]**.

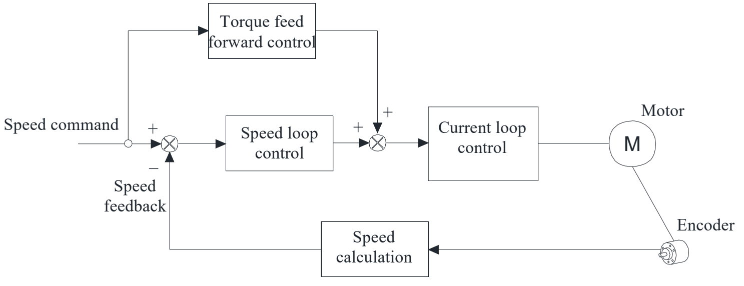
F16.28	Torque feedforward control selection	Range: 0, 1	1

Set whether to enable the internal torque feedforward function in non-torque control mode.

Using the torque feedforward function can improve the torque command response speed and reduce the position deviation during fixed acceleration and deceleration.

Set Value	Torque feedforward Control selection	Remark
0	None	-
1	Internal torque feed forward	The source of the torque feedforward signal is the speed command: In position mode, the output from the position controller. In speed mode, the speed command is given by the user.

Torque feedforward function parameters include torque feedforward gain **[F16.30]** and torque feedforward filter time constant **[F16.29]**.



This parameter is valid under**[F00.24=2]**and**[F16.34=0 or 1]**.

F16.29	Torque feedforward filter time	Range: 0.00～64.00ms	1.00ms

Sets the filter time constant for torque feedforward.

This parameter is valid under **[F00.24=2]** and **[F16.34=0 or 1]**.

F16.30	Torque feedforward gain	Range: 0.0～200.0%	0.0%

In non-torque control mode, the torque feedforward signal is multiplied by**[F17.30]**. The result is called torque feedforward and is used as part of the torque command.

Increasing this parameter can improve the responsiveness to changing speed commands.

Increasing this parameter can improve the position command response and reduce the position deviation at fixed speed.

When adjusting the torque feedforward parameters, first keep**[F16.29: Torque feedforward filter time constant]**as the default value, and gradually increase**[F16.30]**to increase The function of large torque feedforward; when speed overshoot occurs, keep **[F16.30]** unchanged and increase **[F16.29]**. When adjusting, you should repeatedly adjust **[F16.29]** and **[F16.30]** to find a well-balanced setting.

Note

Please refer to **[F16.28: Torque feedforward control selection]** for torque feedforward function enable and torque feedforward signal selection.

This parameter is valid under**[F00.24=2]**and**[F16.34=0 or 1]**.

F16.31	Position error deviation limit	Range: 0～65535	4

During position control, the stability of the motor at zero speed can be improved by adjusting this parameter.

F16.32	Rigidity test running laps	Range: 1～100	2

With**[F16.33]**rigid test action selection, customers can set the number of motor running circles for the test action according to the actual situation.

F16.33	Rigidity test auxiliary parameters	Range: 0～6	0

After selecting the debugging action suitable for the system requirements, press the ENTER key and the interface will automatically display **[F16.35]** rigidity level parameters. After pressing the RUN key, the system rigidity debugging will be started. The rigidity level can be adjusted in real time through UP and DOWN. , at the same time **[F16.35]**parameters are saved in real time. During the debugging process, you can press the STOP key to stop running at any time, and press the RUN key to start debugging again. During debugging, the user can observe whether the load motion trajectory meets the user's rigidity requirements. When the requirements are met, the user can press the ENTER key or ESC to exit debugging. Position command acceleration and deceleration and speed and waiting time multiplexing **[F16.37]**, **[F16.38]**, **[F16.39]** parameters, can Set the number of revolutions of the motor through **[F16.33]**.

Set value	Function
0	No action
1	Reserved
2	Reserved
3	Number of rotations: **[F16.33]**rotation, direction of rotation: forward → reverse
4	Number of rotations: **[F16.33]**rotation, direction of rotation: reverse → forward

5	Number of rotations: **[F16.33]**rotation, direction of rotation: forward → forward
6	Number of rotations: **[F16.33]**rotation, direction of rotation: reverse → reverse

This parameter is valid under **[F00.24=2]** and **[F16.34=1]**.

F16.34	Closed-loop PI self-adjusting mode selection	Range: 0～2	2

0: Manually adjust parameter 1.

1: Parameter self-adjusting mode, using the rigidity table to automatically adjust the gain parameters.

2: Manually adjust parameter 2. (Determined by**[F14]**group PI parameters and**[F16]**group position related PI)

When 0 or 1 is selected, in order to achieve good performance, the carrier frequency needs to be appropriately increased. It is recommended that the minimum is 4Khz and the maximum is 8KHz. If the system has high requirements for dynamic response, it is recommended to use an inverter with one gear higher power than the motor. At the same time, in order to obtain better control performance, the system needs to accurately obtain the system inertia parameters. The user can obtain the system inertia parameters through load inertia identification after accurately inputting **[F15.16]**(motor inertia). **[F16.34=0 or 1]**, the speed loop gain is from **[F16.20～F16.24]**, **[F16.28～F16.30]**, **[F16.35]**, **[F14.61～F14.64]** etc. are confirmed. When **[F16.34=2]**, the speed loop gain is determined by**[F14.01～F14.06]**.

F16.35	Rigidity level selection	Range: 0～31	12

Set the rigidity of the servo system. The higher the rigidity level, the stronger the gain and the faster the response. However, excessive rigidity will cause vibration. Level 0 is the weakest and level 31 is the strongest.

This parameter is valid under **[F00.24=2]** and **[F16.34=1]**.

F16.36	Offline inertia identification mode selection	Range: 0～2	0

Set the mode of offline inertia identification. The offline inertia identification function can be enabled through function code [F15.19].

Set value	Offline inertia identification mode	Remark
0	Forward and reverse mode	Suitable for situations where the motor can rotate forward and reverse.
1	Forward rotation mode	Suitable for situations where the motor can only rotate forward.
2	Reverse mode	Suitable for situations where the motor can only rotate in reverse direction.

Before performing offline inertia identification, first confirm the following:

(1) The movable stroke of the motor should meet three requirements.

① There is a movable stroke of more than 1 turn in the forward and reverse directions between the mechanical limit switches.

Before performing offline inertia identification, please make sure that a limit switch has been installed on the machine, and ensure that the motor has a movable stroke of more than 1 circle in the forward and reverse directions to prevent overtravel during the inertia identification process and cause an accident!

② Meet the requirements of **[F16.40]**(the number of motor rotations required to complete a single inertia identification).

View the current maximum speed of inertia identification **[F16.37]**, the time to accelerate to the maximum speed during inertia identification **[F16.38]**, and the number of motor rotations required to complete inertia identification **[F16.40]**, ensure that the operable stroke of the motor at this stop position is greater than the **[F16.40]**setting value, otherwise it should be appropriately reduced **[F16.37]**or**[F16.38]**set the value until this requirement is met.

③ According to the restriction of the mechanical running direction, the offline inertia identification mode **[F16.36]** can be selected to realize forward and reverse rotation identification, forward rotation identification and reverse rotation identification.

⑵ Estimate the load inertia ratio **[F16.24]** value and enter the correct motor inertia **[F15.16]**.

If **[F16.24]** is the default value (0.00) and the actual load inertia ratio is greater than 30.00, the motor may move slowly causing identification failure. In this case, the following two measures can be taken:

① Preset **[F16.24]** to a larger initial value.

It is recommended that the preset value be 5.00 times as the starting value and gradually increase until the panel display value is updated during the recognition process.

② Appropriately increase the driver rigidity level **[F16.35]** so that the actual motor speed can reach the maximum speed of inertia identification **[F16.37]**.

Note

⑴ To use the inertia identification function, in order to accurately calculate the load inertia ratio, the following conditions must be met:

① The actual maximum motor speed is higher than 150rpm;

② When the actual motor accelerates and decelerates, the acceleration is above 3000rpm/s;

③ The load torque is relatively stable and cannot change drastically;

④ The actual load inertia ratio does not exceed 200 times;

⑵ If the actual load inertia ratio is large and the driver gain is low, it will cause the motor to move slowly and fail to meet the motor's maximum speed and acceleration requirements. In this case, the speed loop gain can be increased and the inertia identification can be performed again.

⑶ If vibration occurs during the identification process, the inertia identification should be stopped immediately and the gain should be reduced.

⑷ In addition, when the backlash of the transmission mechanism is large, the inertia identification may fail.

F16.37	**Inertiaidentification maximum speed**	**Range: 50～6000rpm**	**500rpm**

Set the maximum allowed motor speed command in offline inertia identification mode.

The greater the speed during inertia identification, the more accurate the identification result will be. Usually, the default value can be kept.

F16.38	**Acceleration and deceleration time during inertia identification**	**Range: 2～20000ms**	**125ms**

Set the time for the motor to accelerate from 0rpm to 1000rpm under offline inertia identification.

F16.39	**Waiting time after completion of single inertia identification**	**Range: 20～10000ms**	**1000ms**

When using the offline inertia identification function, set the time interval between two consecutive speed commands. Extending this time will help improve the identification accuracy.

F16.40	**Completed single inertia identification of motor revolutions**	**Range: 0.00～655.35 turns**	**-**

Displays the number of revolutions required by the motor for a single offline inertia identification function.

Note

When using the offline inertia identification function, be sure to ensure that the operable stroke of the motor at this stop position is greater than the F16.40 setting value. Otherwise, the F16.37 or F16.38 setting value should be appropriately reduced until this requirement is met.

F16.41	**Excessive position deviation fault threshold**	**Range: 1～65535 (this function is invalid when 65535)**	**10000**

Set the excessive position deviation fault threshold in position control mode.

When the position deviation is greater than this threshold, the inverter will generate E-49 (excessive position deviation fault).

F16.42	**Pulse signal filtering**	**Range: Units digit: 0～3 Tens digit: 0~3 Hundreds digit: 0～3 Thousands digit: 0, 1**	**1223**

Units digit: command pulse input pin filter constant.

0: No filtering.

1: Filter level 1.

2: Filter level 2.

3: Filter level 3.

When there is peak interference at the command pulse input terminal, this parameter can be set to suppress it to prevent interference signals from entering the inverter and causing motor malfunction or inaccurate positioning. The larger this value is, the stronger the filtering is.

Tens digit: Quadrature encoder input pin filter constant.

0: No filtering.

1: Filter level 1.

2: Filter level 2.

3: Filter level 3.

The input port of the quadrature encoder is a digital input port. When there is peak interference in the external input signal, this parameter can be set to filter out the peak interference to prevent interference signals from entering the inverter and causing motor malfunction or inaccurate positioning. The larger this value is, the stronger the filtering is.

Hundreds digit: Z signal filtering strength.
0: Filter strength 1.
1: Filter strength 2.
2: Filter strength 3.
3: Filter strength 4.

When there is peak interference in the Z signal, this parameter can be set to filter out the peak interference to prevent interference signals from entering the inverter and causing motor malfunction or inaccurate positioning. The larger this value is, the stronger the filtering is.

Thousands digit: Z signal correction enabled.
0: No correction.
1: Correction.

F16.43	**Soft limit setting**	**Range: 0～2**	**0**

0: Disable software limit.
1: Reserved.
2: Enable soft limit after returning to zero point.

F16.44	**Maximum value of soft limit**	**Range: -2147483648～2147483647**	**2147483647**
F16.46	**Minimum value of soft limit**	**Range: -2147483648～2147483647**	**-2147483648**

Soft limit setting:

[F16.43=0] When, the software limit function is not enabled.

[F16.43=2] When the inverter is powered on and before returning to the origin, the software limit function is not enabled. After return to origin, when the absolute position counter **[F17.73]** is greater than**[F16.44]**, AL.54 occurs, and a forward overtravel stop is executed; when the absolute position counter **[F17.73]** is less than **[F16.46]** AL.55 occurs, and negative overtravel shutdown is performed.

Comparison of the advantages and disadvantages of traditional hardware limit and software limit functions:

Traditional hardware limit function		Soft limit function	
1	Can only be limited to linear motion and single-turn rotation.	1	Can be used not only in linear motion, but also in rotation mode
2	Requires external mechanical limit switch installation	2	No hardware wiring is required to prevent abnormal operation caused by poor line contact
3	Unable to determine abnormal mechanical slippage	3	Internal position comparison to prevent mechanical slippage and abnormal movement
4	When the power is cut off, the machine moves out of the limit position and cannot judge or alarm.		

F16.48	**Reserved**		

F16.49	Origin return enable control	Range: 0～2	0

Set the origin return mode and starting signal source.

0: Turn off origin return.

1: Input the HomingStart signal through the X terminal (the 85th function of the X terminal) to enable the origin return function.

2: Return to origin immediately.

F16.50	Return to origin mode	Range: 0～5	0

0: Return to zero in forward direction, deceleration point and origin are motor Z signal

1: Reverse zero return, the deceleration point and origin are the motor Z signal

2: Return to zero in the forward direction, the deceleration point and origin are the origin switches

3: Reverse zero return, the deceleration point and origin are the origin switches

4: Return to zero in forward direction, the deceleration point is the origin switch, and the origin is the motor Z signal

5: Reverse zero return, the deceleration point is the origin switch, and the origin is the motor Z signal

Set the default motor rotation, deceleration point, and origin when returning to zero.

Set value	Origin return mode		
	Return to zero direction	Deceleration point	Origin
0	forward	Z signal	Z signal
1	reverse	Z signal	Z signal
2	forward	Origin switch	Origin switch
3	reverse	Origin switch	Origin switch
4	forward	Origin switch	Z signal
5	reverse	Origin switch	Z signal

Note

⑴ When using the origin return function, the low-pass filter function is invalid.

⑵ To use the return-to-origin function, you need to set the mechanical limit switch in advance. If you use the stop-to-zero method and use mechanical offset, please set the offset within the stroke range to ensure that it will not cause damage during the return-to-origin process. mechanical.

Take the following situation as an example to illustrate the origin return:

Return to zero in the forward direction, the deceleration point and origin are the motor Z signal**[F16.50＝0]**;

Return to zero in the forward direction, the deceleration point and origin are the origin switch**[F16.50＝2]**;

Return to zero in the forward direction, the deceleration point is the origin switch, and the origin is the motor Z signal **[F16.50＝4]**;

For other zero return methods, only the initial zero return method is opposite to the above.

a) Origin return: forward zero return, deceleration point and origin are motor Z signal**[F16.50=0]**.

> **Note**
>
> In the origin return method**[F16.50=0 or 1]**, which uses the Z signal as the deceleration point and origin, after returning to zero, the actual stop position of the motor may not be on the rising edge of the same side of the Z signal. The stop position There is a deviation of ±1 pulse (encoder unit).

① When the motor starts to move, the Z signal is invalid (0: invalid, 1: valid), and the forward overtravel switch is not triggered during the whole process.

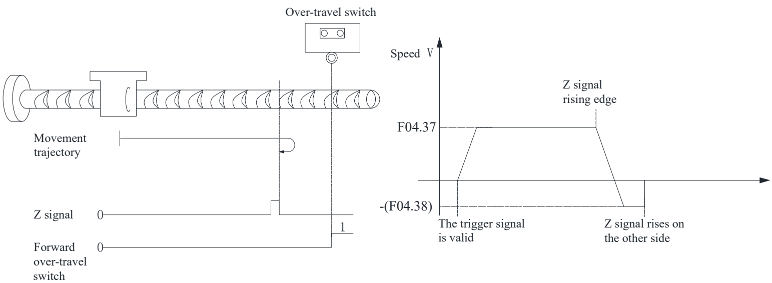


Fig.7-43 Mode 0 origin return motor operating curve ① and speed description

The motor first searches for the Z signal in the forward direction at high speed according to the**[F16.51]**setting value. After encountering the rising edge of the Z signal, it decelerates and reverses according to the **[F16.53]** setting value. direction, accelerate to **[-F16.52]**, during reverse acceleration or reverse constant speed operation, stop immediately when encountering the rising edge of the Z signal on the other side of the motor.

② The Z signal is valid when the motor starts to move, and the forward over-travel switch is not triggered during the whole process.

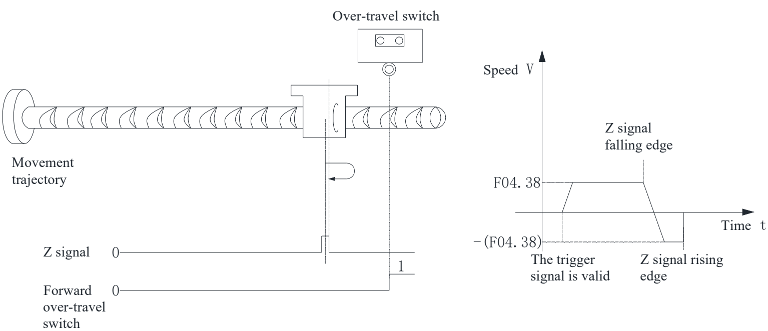


Fig.7-44 Mode 0 origin return motor operating curve ② and speed description

The motor directly searches for the Z signal falling edge in the low speed forward direction at the **[F16.52]** setting value. When encountering the Z signal falling edge, it reverses the direction and starts with **[-F16.52]** Continue to search for the rising edge of the Z signal at low speed. During reverse acceleration or reverse constant speed operation, the machine will stop immediately when encountering the rising edge of the Z signal.

③ The Z signal is invalid when the motor starts to move, and the forward overtravel switch is valid when triggered during the process.

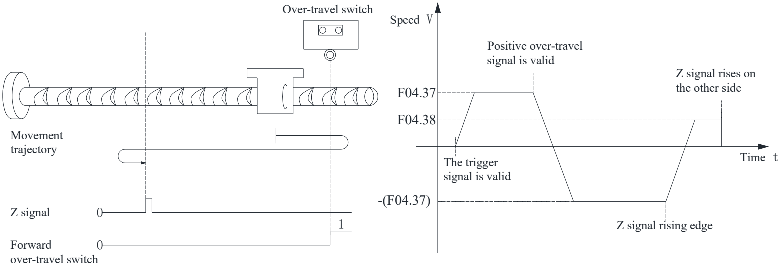


Fig.7-45 Mode 0 origin return motor operating curve ③ and speed description

The motor first searches for the Z signal in the forward direction at high speed using the**[F16.51]**set value. After encountering the forward overtravel switch, it immediately returns to zero in the reverse direction to **[-F16.51]** Search the Z signal at high speed in the reverse direction until it encounters the rising edge of the Z signal. According to the **[F16.53]** setting value, it gradually decelerates and reverses (that is, returns to the forward direction), and the motor moves in the direction of **[F16. 52]**Search for the rising edge on the other side of the Z signal at low speed in the forward direction. During forward acceleration or forward constant speed operation, the machine will stop immediately when encountering the rising edge on the other side of the Z signal.
b) Origin return: forward zero return, the deceleration point and origin are the origin switch **[F16.50＝2]**.

① When the motor starts to move, the origin switch (deceleration point) signal is invalid (0: invalid; 1: valid), and the forward overtravel switch is not triggered during the whole process.

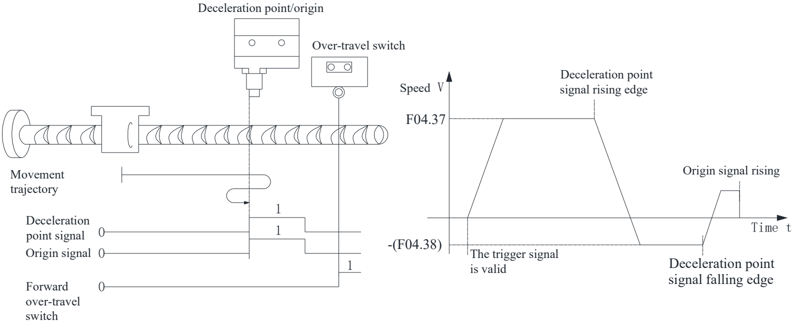


Fig. 7-46 Mode 2 origin return motor operating curve ① and speed description

The motor first searches for the deceleration point signal in the forward direction at high speed using the [F16.51] setting value until it encounters the rising edge of the deceleration point signal, and then gradually After decelerating to [-F16.52], the motor searches for the falling edge of the deceleration point signal in the reverse direction at the low speed set by [-F16.52], and encounters the falling edge of the deceleration point signal. then reverse direction, and continue to search for the rising edge of the origin signal at low speed at [F16.52]. During forward acceleration or forward constant speed operation, it will stop immediately when encountering the rising edge of the origin signal.

② When the motor starts to move, the origin switch (deceleration point) signal is valid, and the forward overtravel switch is not triggered during the whole process.

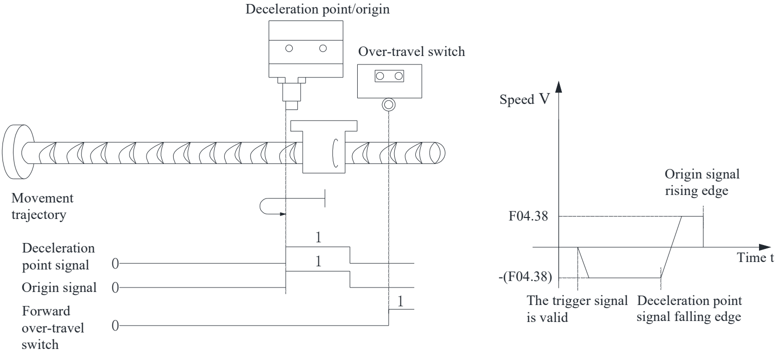


Fig. 7-47 Mode 2 origin return motor operating curve ② and speed description

The servo motor directly searches for the falling edge of the deceleration point signal at low speed at the set value of **[-F16.52]**. When encountering the falling edge of the deceleration point signal, it reverses (i.e. forward) and starts with **[F16.52]** Continue to search for the rising edge of the origin signal at low speed. During forward acceleration or forward constant speed operation, it will stop immediately when encountering the rising edge of the origin signal.

③ When the motor starts to move, the origin switch (deceleration point) signal is invalid, and the forward overtravel switch is activated during the process.

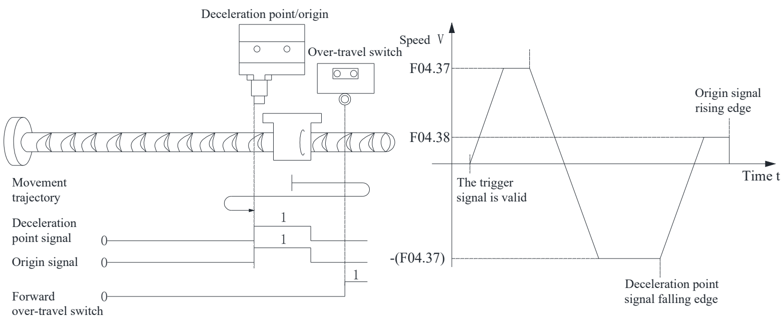


Fig.7-48 Mode 2 origin return motor operating curve ③ and speed description

The motor first searches for the deceleration point signal in the forward direction at high speed using the **[F16.51]**setting value. After encountering the forward overtravel switch, it immediately reverses to [**-F16.51**] Reverse high-speed search for the falling edge of the deceleration point signal. After encountering the falling edge of the deceleration point signal, decelerate in the reverse direction (that is, return to the forward direction) according to the **[F16.53]** setting value, and the motor will move in the direction of [**F16.52**] Search for the rising edge of the origin signal at low speed in the forward direction. During forward acceleration or forward constant speed operation, it will stop immediately when encountering the rising edge of the origin signal.

c) Return to origin: forward return to zero, the deceleration point is the origin switch, the origin is the motor Z signal **[F16.50=4]**

① When the motor starts to move, the origin switch signal is invalid (0: invalid; 1: valid), and the forward overtravel switch is not triggered during the whole process.

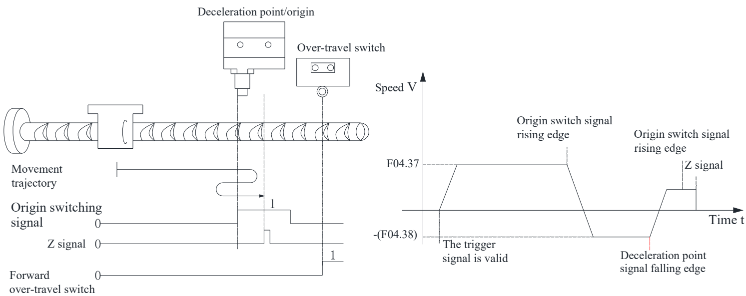


Fig. 7-49 Mode 4 origin return motor operating curve ① and speed description

The servo motor first searches for the origin switch signal at high speed in the forward direction with the **[F16.51]** setting value. After encountering the rising edge of the origin switch signal, it sets according to **[F16.53]** Gradually decelerate and reverse direction, the servo motor searches for the falling edge of the origin switch signal in the low speed reverse direction set by **[-F16.52]**. When encountering the falling edge of the origin switch signal, it decelerates and reverses (i.e. returns to the forward direction). And use **[F16.52]** to search for the rising edge of the origin switch signal at low speed in the forward direction. After encountering the rising edge of the origin switch signal, it will continue to run, and then it will stop immediately when it encounters the motor Z signal for the first time.

③ The origin switch signal is valid when the motor starts to move, and the forward overtravel switch is not triggered during the whole process.

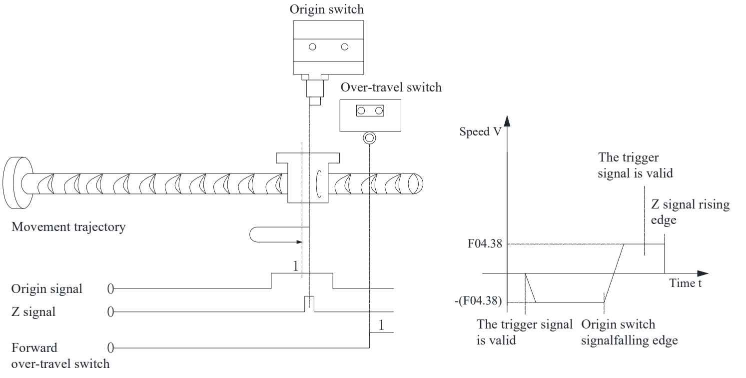


Fig. 7-50 Mode 4 origin return motor operating curve ② and speed description

The motor directly searches for the falling edge of the origin switch signal at a low speed in the reverse direction at the [-**F16.52**] setting value. After encountering the falling edge of the origin switch signal, it decelerates in the reverse direction (i.e. forward) and starts with [**F16.52**] Low-speed forward search for the rising edge of the origin switch signal. After encountering the rising edge of the origin switch signal, continue running at [**F16.52**] forward and low speed. After encountering the rising edge of the origin switch signal for the first time, Stop immediately when the Z signal rises.

③ When the motor starts to move, the origin switch signal is invalid, and the forward overtravel switch is activated during the process.

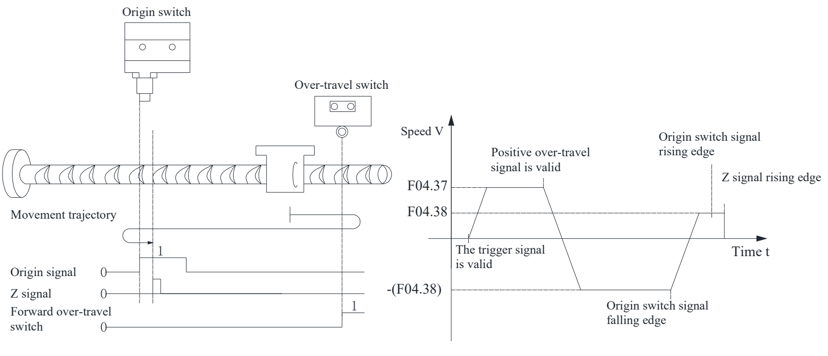


Fig. 7-51 Mode 4 origin return motor operating curve ③ and speed description

The motor first searches for the origin switch in the forward direction at high speed using the **[F16.51]** setting value. After encountering the forward overtravel switch, it immediately returns to zero in the reverse direction to **[-F16.51]** Search for the deceleration point at high speed in the reverse direction until it encounters the falling edge of the origin switch signal. After gradually decelerating in the reverse direction (that is, returning to the forward direction) according to the**[F16.53]**setting value, the motor starts with **[F16.52]** Low-speed forward search for the rising edge of the origin switch signal. After encountering the rising edge of the origin switch signal, it will continue to run. After that, it will stop immediately when it encounters the motor Z signal for the first time.

F16.51	**High-speed search for origin switch signal frequency**	**Range: 0～upper limit frequency**	**5.00**

Set the motor speed when searching for the deceleration point signal when returning to the origin.

If the speed setting value is too low, the search time for the origin switch signal will be too long, and fault E-51 will occur (timeout fault when returning to the origin).

F16.52	**Low speed search origin switch signal frequency**	**Range: 0～upper limit frequency**	**0.50**

When setting the origin return, motor speed when searching for the origin signal.

If the motor is already near the origin switch when the origin return is triggered, after enabling it, the motor will immediately search for the origin at the low speed set by **[F16.52]**.

[F16.52] Do not set the parameters too large to avoid mechanical impact during shutdown.

F16.53	**Acceleration and deceleration time when searching for origin**	**Range: 0～65535ms**	**1000ms**

Set the speed change time of the motor from 0 to 1000rpm evenly when returning to the origin.

Therefore, during the origin return operation, the actual acceleration time t of the motor is:

$$t=\frac{60*F16.51}{F15.06*1000}*F16.53$$

F16.54	**Limit the time to find the origin**	**Range: 0～65535ms**	**10000ms**

Set the maximum search origin time.

[F16.54] If the setting is too small or the origin is not found within the limited time, the inverter will cause fault E-51 (origin return to zero timeout).

F16.55	**Mechanical origin offset**	**Range: -1073741824～1073741824**	**0**

Set the motor absolute position **[F17.73]** value after return to origin.

When returning to zero, the positional relationship between the mechanical origin and the mechanical zero point is determined according to the settings of **[F16.56]**.

F16.57	**Mechanical origin offset setting**	**Range: 0, 1**	**0**

Set the offset relationship between the mechanical origin and the mechanical zero point when returning to zero.

Set value	Mechanical origin offset	Remark
0	**[F16.55]** is the coordinate after return to origin	The mechanical origin and mechanical zero do not coincide. After the origin return is completed, the motor stops at the mechanical origin, and the mechanical origin coordinates are forced to **[F16.55]**.
1	**[F16.55]** is the relative offset from the origin after the origin return	The mechanical origin coincides with the mechanical zero point. After the motor locates the mechanical origin, it continues to move the displacement set by **[F16.55]** and then stops.

After the origin return is completed, the current absolute position of the motor **[F17.73]** is consistent with **[F16.55]**.

F16.58	Accurate stop positioning enable selection	Range: 0, 1	0

0: Off.

1: Enabled.

[F16.58=1], it needs to cooperate with terminal function 79: spindle level control enablement to realize the spindle accurate stop function.

Except when the jog operation command is valid, it will switch to the precise stop mode as long as the spindle accurate stop command is valid. There are 3 modes of operation:

Method 1: If the motor speed is lower than 1Hz and the accurate stop zero point has been found, the spindle servo presses **[F16.61]**(accurate stop directional running direction) setting to perform position planning operation and stop to the set accurate stop position. , the spindle movement position will not exceed 1 turn.

Method 2: If the motor speed is lower than 1Hz and the accurate stop zero point is not found, accelerate in the direction of **[F16.60]**(accurate stop positioning setting) or accelerate to **[F16.62]**, after finding the spindle zero point, position planning is performed based on the distance between the current position and the accurate stop position, and finally the system stops at the set accurate stop position.

If operation modes 1 and 2 are not met, run according to mode 3:

Method 3: Decelerate or accelerate the motor speed to **[F16.62]**(accurate stop orientation frequency) according to the current running direction. After finding the spindle zero point, perform position planning based on the distance between the current position and the accurate stop position. , and finally stops at the set accurate stopping position.

F16.59	Accurate stop zero input selection	Range: 0, 1	0

Set the source of the zero signal for the spindle accurate stop function.

Set value	Spindle stops exactly at zero point	Remark
0	Encoder Z phase signal	Resolver encoders do not support this option
1	X terminal zero switch signal	Terminal function 84 needs to be set: zero switch, it is recommended to use high-speed terminal X5

F16.60	Accurate stop positioning settings	Range: Units digit: 0, 1 Tens digit: 0, 1 Hundreds, thousands digit: reserved	0000

Units position: The running direction when the zero stop is found for the first time.

0: Current running direction.

1: Set direction (tens setting).

Tens digit: The running setting direction when the zero stop point is found for the first time.
0: Positive.
1: Negative.
Set the running direction of the zero point in the spindle accurate stop mode when the motor running frequency is lower than 1Hz.

Hundreds and thousands digit: reserved.

F16.61	**Accurate stop and directional running direction**	**Range: 0～2**	**0**

0: Based on the principle of shortest positioning distance, the running direction is automatically selected.
1: Orient in the forward direction.
2: Orient in the reverse direction.
Set the positioning operation direction after the zero point is found in the spindle accurate stop mode when the motor running frequency is lower than 1Hz.

F16.62	**Accurate stop directional frequency**	**Range: 0.01～upper limit frequency**	**5.00Hz**

Set the maximum operating frequency of the motor during zero-finding and directional operation in the spindle accurate stop mode.

F16.63	**Accurate stop directional acceleration and deceleration time**	**Range: 0～65535ms**	**3000ms**

Set the speed change time for the motor to uniformly change speed from 0 to 1000rpm when the spindle stops accurately.

F16.64	**Spindle position index 1**	**Range: 0.0°～359.9°**	**0.0°**
F16.65	**Spindle position index 2**	**Range: 0.0°～359.9°**	**45.0°**
F16.66	**Spindle position index 3**	**Range: 0.0°～359.9°**	**90.0°**
F16.67	**Spindle position index 4**	**Range: 0.0°～359.9°**	**135.0°**
F16.68	**Spindle position index 5**	**Range: 0.0°～359.9°**	**180.0°**
F16.69	**Spindle position index 6**	**Range: 0.0°～359.9°**	**225.0°**
F16.70	**Spindle position index 7**	**Range: 0.0°～359.9°**	**270.0°**
F16.71	**Spindle position index 8**	**Range: 0.0°～359.9°**	**315.0°**

In the spindle accurate stop mode, the spindle positioning position selection can be flexibly switched through external terminals, see **[F08.18～F08.25]** terminal functions 80～82.

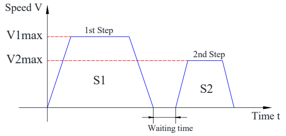
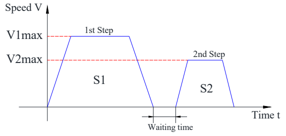
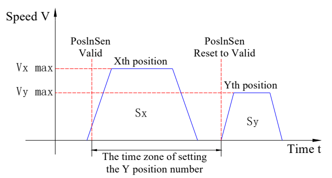
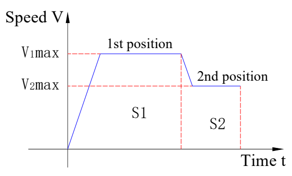
F16.72	**Main shaft transmission ratio numerator (main shaft side gear)**	**Range: 1～32767**	**1**
F16.73	**Main shaft transmission ratio denominator (motor side gear)**	**Range: 1～32767**	**1**

When selecting the X terminal zero switch signal **[F16.57=1]** for the accurate stop zero point input, it is recommended to use the high-speed DI port input, and it needs to be set according to the mechanical transmission ratio:**[F16.72]** Main shaft transmission ratio numerator (main shaft side gear), **[F16.73]** Main shaft transmission ratio denominator (motor side gear).

Example: The encoder is installed on the motor side, the photoelectric switch signal is connected to the main shaft externally, and the transmission ratio between the motor and the main shaft is 10:1, **[F16.57 =1]**, **[F16.72 =10]**, **[F16.73 =1]**.

F16.74	Multi-position operation mode	Range: 0～3	1

In position control mode,**[F16.08=1: The main position command source is multi-segment position command]**, set the multi-segment position operation mode.

Set value	Operation mode	Remark	Run waveform
0	Stop at the end of a single run	Stop after one round of operation; Segmentnumber automatically increases and switches; Waiting time can be set between segments; Multi-segment position enable is level effective;	V1max, V2max: the maximum operating speed of the 1st and 2nd stages; S1, S2: Displacement of the 1st and 2nd segments; 
1	Loop operation	Cycle operation, the starting segment number after the first round is 1; Segment number automatically increases and switches; Waiting time can be set between segments; Multi-segment position enable is level effective;	
2	X terminal switching operation	The segment number is logically determined by the DI terminal; The interval between segments is determined by the host computer instruction delay time; Multi-segment position enable is valid for rising edge trigger; After the segment number is updated, the multi-segment position enable needs to be triggered again;	
3	Run sequentially	It can run for one round and then stop; it can run cyclically, and the starting segment number after the first round is F16.76; Segment number automatic increment function There is no waiting time between segments; Multi-segment position enable is level valid;	

When using the multi-segment position function, one X port function 76 (multi-segment position enable) must be set. For the setting method, please refer to **[Group F08: Switch input function parameter group]**.

After each segment of displacement command operation is completed, the positioning completion (COIN) is valid. If you want to judge whether a certain segment has ended, please use terminal output function 54 (positioning completion). For the setting method, please refer to **[Group F09: Switch value , Analog output function parameter group]**.

When the X terminal switches the operating mode, if the multi-segment position enable is turned off during a certain segment of operation, the unsent displacement instructions of this segment will be abandoned and the machine will stop. After the shutdown is completed, the positioning completion (COIN) will be valid. Re-open the multi-segment position enable, and the running segment number is determined by the settings of **[F16.77]**.

F16.75	**Number of end segments of displacement command**	**Range: 1～4**	**1**

Set the total number of segments for position instructions. Different displacements, running speeds, and acceleration times can be set for different segments.

When **[F16.74≠2]**, the multi-segment segment number automatically increases and switches, and the switching sequence is: 1, 2,..., **[F16.75]**.

F16.76	**Sequential operation starting section selection**	**Range: 0～4**	**0**

When using the multi-segment position sequential operation mode**[F16.74=3]**, set whether to cycle and the starting segment number after the first round during cycle operation.

Set value	Sequential operation starting section selection	Illustrate
0	No loop	Only run for 1 round **[F16.75]** The number of segments set, the motor will stop after running and the motor will be in a locked state.
1	1～4	Cycle operation, the starting segment number after the first round is the **[F16.76]** setting value. **[F16.76]** should be less than or equal to **[F16.75]**.

Note: [F16.76] set value is greater than **[F16.75]**, **[F16.76]** will be forced to 0.

F16.77	**Multi-segment run settings**	**Range: Units digit: 0, 1** **Tens digit: 0, 1** **Hundreds digit: 0, 1** **Thousands digit: reserved**	**0x0100**

Units digit: displacement command type selection.

0: Relative displacement command.

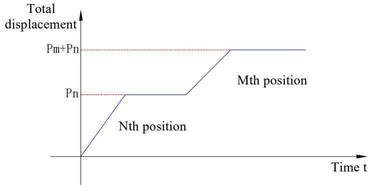
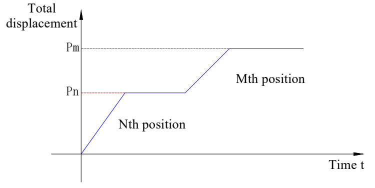
1: Absolute displacement command.

Relative displacement is the position increment of the target position relative to the current position of the motor; absolute displacement is the position increment of the target position relative to the motor origin.

Note

When setting the absolute displacement command, the origin return operation must be performed first, otherwise the system cannot determine the absolute position and the motor will not be able to run.

For example: the moving displacement of the nth segment is Pn (Pn>0), and the moving displacement of the mth segment is Pm (Pm>0). Assuming Pm>Pn, the comparison is as follows:

Set value	Displacement instruction type	Remark
0	Relative displacement command	Actual movement displacement of segment m: Pm 
1	Absolute displacement command	Actual movement displacement of segment m: Pm-Pn 

When the actual moving displacement is negative, the motor rotates in the opposite direction.

Tens digit: time unit.

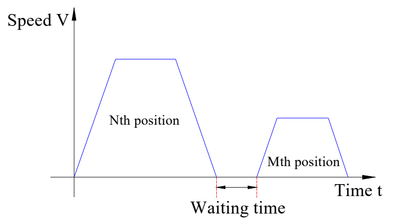
0: ms

1:s

When running using the multi-segment position function, set the unit of acceleration and deceleration time and waiting time.

Acceleration and deceleration time: the time for the motor to change speed from 0rpm to 1000rpm;

Waiting time: The time interval from the end of this instruction to the start of the next instruction.

Set value	Waiting time unit	Remark
0	ms	
1	s	

[16.74=3] In (sequential mode) mode, there is no waiting time between segments.

[F16.74=2] In (X terminal switching operation) mode, the interval time between segments is only determined by the host computer command delay time.

Hundreds digit: residual processing method after pause(valid in the other three modes except X terminal switching operation mode)

0: Continue running the unfinished segment.

1: Restart operation from segment 1.

A pause occurs when running using the multi-segment position function. When resuming multi-segment position operation, set the starting segment number.

Suspension will occur in the following two situations:

① During multi-position operation, the inverter control mode switches to other control modes;

② The internal multi-segment position enable signal terminal changes from valid to invalid.

Thousands digit: reserved.

F16.78	**Multi-segment operation interrupt deceleration time**	**Range: 0～65535ms**	**1000ms**

Set the time for the motor to uniformly change speed from 0rpm to 1000rpm when a pause or interruption occurs during the operation of the multi-position position function.

F16.79	**Movement displacement of segment 1**	**Range: -1073741824～1073741824**	**0**

Movement displacement of the first segment of multi-segment position (command unit).

F16.81	**The maximum operating freq. of the first stage displacement**	**Range: 0.01～upper limit freq.**	**5.00Hz**

The maximum operating frequency of the first segment of the multi-segment position.

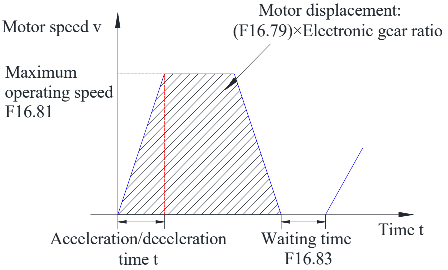
The maximum operating frequency refers to the uniform operating frequency of the motor when it is not in the process of acceleration and deceleration. If **[F16.79]**is too small, the actual frequency of the motor will be less than **[F16.81]**.

F16.82	**The first displacement acceleration and deceleration time**	**Range: 0～65535ms**	**1000ms**

The time for the motor in the first stage of the multi-position position to change speed uniformly from 0rpm to 1000rpm.

F16.83	**Waiting time after the first displacement is completed**	**Range: 0～65535ms/s**	**100ms/s**

After the first displacement of multi-segment position is completed, the waiting time before running the next displacement.



F16.84	**2nd segment movement displacement**	**Range: -1073741824～1073741824**	**0**

F16.86	**Maximum operating frequency of the 2nd stage displacement**	**Range: 0.01～upper limit freq.**	**5.00Hz**

F16.87	**2nd segment displacement acceleration and deceleration time**	**Range: 0～65535ms**	**1000ms**

F16.88	**Waiting time after completion of the second segment of displacement**	**Range: 0～65535ms/s**	**100ms/s**

F16.89	**3rd segment movement displacement**	**Range: -1073741824～1073741824**	**0**

F16.91	**The maximum operating freq. of the third stage displacement**	**Range: 0.01～upper limit freq.**	**5.00Hz**

F16.92	**The third segment displacement acceleration and deceleration time**	**Range: 0～65535ms**	**1000ms**

F16.93	**Waiting time after completion of the third segment of displacement**	**Range: 0～65535ms/s**	**100ms/s**

F16.94	**Section 4 Movement displacement**	**Range: -1073741824～1073741824**	**0**

F16.96	**The maximum operating freq. of the 4th stage displacement**	**Range: 0.01～upper limit freq.**	**5.00Hz**

F16.97	**The 4th segment displacement acceleration and deceleration time**	**Range: 0～65535ms**	**1000ms**

F16.98	**Waiting time after the 4th segment of displacement is completed**	**Range: 0～65535ms/s**	**100ms/s**

7.18 Monitoring parameter group: F17

F17.00 ～ F17.90	**Monitoring parameters**	**See C-xx definition (F00.01) for details**	**-**

The**[F17]**group is the monitoring parameter group,**[F17.00～F17.90]**respectively corresponds to the index number of the monitoring parameter group. For the specific correspondence, please refer to**[F00. 01]**Definition. Users can read the parameters corresponding to the**[F17]**group through communication to obtain the required monitoring data.

7.19 Enhanced Control Function Parameter Group: F18

F18.00	**Operation panel control frequency bundling**	**Range: 0～15**	**0**

F18.00 can bundling operation panel with frequency reference channels, to achieve synchronous switching.

0: No bundling.

1: Keyboard digital provision.

2: AI1 analog provision.

3: AI2 analog provision.

4: Terminal UP/DOWN adjustment setting.

5: Communication provision (Modbus and Field bus used a same storage registers).

6: Operate the keyboard knob to set.

7: AI3 analog setting(extension).

8: High-speed pulse provision (X5 terminal needs to select the corresponding function).

9: Terminal pulse width provision (X5 terminal needs to select the corresponding function).

10: Terminal encoder provision (determined by X1, X2).

11～15: Reserved.

Different running command channels can be bundled with the same frequency given channel. After the bundling function is set, the priority of the bundled frequency given channel is the highest, but it is only given as the main frequency bundled.

F18.01	**Terminal control frequency bundling**	**Range: 0～15**	**0**
F18.02	**Communication control frequency bundling**	**Range: 0～15**	**0**

Refer to the description of **[F18.00]**.

F18.03	**Digital frequency integral function selection**	**Range: Units digit: 0, 1** **Tens digit: 0, 1** **Hundreds digit: 0～2** **Thousands digit: 0, 1**	**0000**

Units digit: keyboard UP/DOWN integration control.

0: Integral function enabled.

1: Integral function disabled.

Tens digit: Terminal UP/DOWN integral control.

0: Integral function enabled.

1: Integral function disabled.

This function is used in conjunction with multi-function terminal functions 16 and 17.

Hundreds digit: Keyboard shuttle knob is enabled (the shuttle keyboard is valid).

0: The shuttle knob is valid in the monitoring interface.

1: The shuttle knob is invalid in the monitoring interface.

2: In the monitoring interface, the UP DW and shuttle knob adjustments are invalid.

Thousands place: keyboard adjustment of frequency classic mode selection.

0: Invalid.

1: Valid, the adjustment range is determined by [F18.05].

F18.04	**Keyboard UP/DOWN integral rate**	**Range: 0.01～50.00Hz**	**0.10Hz**

When the keyboard UP/DW integration function is valid, if the frequency is continuously adjusted in the same direction, the integration effect will be occur. The integration rate is set by parameters **[F18.04]**.

This function is suitable for the occasions that need to adjust the frequency quickly.

F18.05	**Keyboard no integral single step's size setup**	**Range: 0.01～10.00Hz**	**0.01Hz**

When the keyboard UP/DW integration function is invalid, the rate of adjusting frequency is fixed by the value of [F18.05].

F18.06	**Terminal UP/DOWN integral rate**	**Range: 0.01～50.00Hz**	**0.20Hz**
F18.07	**Terminal without integral single step's size setup**	**Range: 0.01～10.00Hz**	**0.10Hz**

For the functions of parameters **[F18.06]**, **[F18.07]**, please refer to **[F18.04]**, **[F18.05].**

F18.08	**Droop control declinefrequency**	**Range: 0.0～100.0%**	**0.0%**

When several drivers drive one load, the function can make the drives share the load equally. When the load of one drive is heavier, the drive will reduce its output frequency to shed part of the load. This function is suitable for the share of several motors which with a common load. The value of **[F18.08]** is the maximum reduced frequency when the inverter reaches the rated power.

F18.09	**Setupaccumulate power-on time**	**Range: 0～65535 hours**	**0**
F18.10	**Setupaccumulate running time**	**Range: 0～65535 hours**	**0**

When the actual accumulate operation time reach to the set accumulated operation time**[F18.10]**, the inverter will output an indication signal, please refer to the description of **[F09.00～F09.03]**.

[F18.09] defines the expectedaccumulated time of power on from Ex factory.

Note

Power-on time and the accumulated runtime can be checked by monitoring parameters group C .

F18.11	**Timing run function enabled**	**Range: 0, 1**	**0**

0: Invalid.

1: Valid.

F18.12	**Timing run stop time**	**Range: 0.1～6500.0Min**	**2.0Min**

When **[F18.11]** timing operation function selection is valid, the driver will starts the timer with inverter start.

The drive will stop automatically, and the multi-function Yi (set Yi as the 33 function) will output an indication signal when reach to the set stop time.

Note

The timer of inverter start from 0 every times, the user can monitor the current running time through the **[Group F17]** parameters.

F18.13	Current run arrival time	Range: 0.0～6500.0Min	1.0Min

When the running time of this startup reaches this time, the multi-function digital Yi of the frequency converter outputs the "Running Time Arrival" indication signal (if the Yi function is set to 34).

F18.14	Keyboard UP/DOWN selection under monitor mode	Range: 0～6	0

0: Keyboard frequency provision frequency adjusting.
1: PID digital reference value adjusting.
2: Reserved.
3: Torque provision adjustment.
4～6: Reserved.

When the parameters**[F18.14]**are set to 1, the UP/DW keys can only be used to adjust the digital given amount of the closed-loop PID in the keyboard monitoring mode. When the parameter is 0, the UP/DW keys on the keyboard are used to adjust the given frequency, and are not affected by the monitoring mode at this time.

F18.15	Reserved		

F18.16	Advanced control functions	Range: Units, tens digit: reserved Hundreds digit: 0, 1 Thousands digit: 0, 1	0000

When the hundreds digit of **[F18.16]** is 1, the fast traverse function below the lower limit frequency is enabled. When a hook phenomenon occurs when driving a lifting load, this function can be turned on and the **[F01.12]** parameters can be appropriately increased to effectively solve this problem.

When the thousand bit of**[F18.16]**is 1, in the non-speed torque control mode, the given torque is less than 1.1% and the motor speed is less than 2Hz, the PWM will be blocked, and the motor is in free state. This function is valid when **[F00.24=1]**.

F18.17	Cooling fan control selection	Range: Units digit: 0~2 Tens digit: 0, 1	10

Units digit: Fan control mode.
0: Smart fan.
1: Inverter is running all the time after power on.
2: No running for fan, but it start automatically when the temperature is higher than 75 degrees.

Tens digit: Speed regulation fan control mode.
0: Smart PWM speed regulation.
1: Run at highest speed.

Under the smart control, after stop the inverter, if the detected temperature is lower than 35 degrees, the fan will stop running after 20 seconds.

F18.18	Reserved		

F18.19	Low-order of total power consumption	Range: 0～9999	0

F18.20	**High-order of total power consumption**	**Range: 0～65535**	**0**
F18.21	**Correction factor of power consumption calculation**	**Range: 50.0%～200.0%**	**100.0%**

[F18.19] and **[F18.20]** show the total amount of power consumed by the load and the inverter. Similarly, C-x can be set to 59 and 60 to monitor the amount of power consumed by the keyboard. Where **[F18.20]** parameter minimum unit represents 10000KWH. For example, F18.19=1000, F18.20=4, the total power consumption = 4×10000+1000=41000KWH.

Users can also set **[F18.19]** and **[F18.20]** to 0 to restart the calculation of power consumption; if the calculated power consumption are not correct, the **[F18.21]** parameters can be adjusted, so that the calculated power consumption correspond to actual consumption.

F18.22	**OC internal account**	**Range: 0～65535**	**-**
F18.23	**OC recording current**	**Range: 0.0～6553.5**	**-**

This parameter is used to monitor the internal information when the hardware OC is triggered and used for inverter fault analysis.

F18.24	**Output phase loss current detection coefficient**	**Range:** 0～500	200
F18.25	**Output phase loss detection level**	**Range:** 3～10	6

The smaller setting values of **[F18.24]** and **[F18.25]** are, the more sensitive of the output phase loss detection is.

F18.26 ～ F18.29	**Reserved**		

7.20 Protective Relevant Function Parameter Group: F19

F19.00	**Power off restart waiting time**	**Range: 0.0～20.0s (0 means disabled this feature)**	**0.0s**

When the power is off, then power-on, whether this inverter will start automaticallyafter a waiting time.

When **[F19.00]** set to 0.0s, after the power off then power-on, inverter will not start automatic. When **[F19.00]** is not 0.0S, after the power off then power-on again, if all is ready, the inverter will not automatically with the start mode defined by **[F02.00],** after waiting time defined by **[F19.00]**.

Note Conditions for repower-on after power-off, it should be in the running state before power-off; there is no fault and running signal is maintained when power-on again;there's no other factors which affect normal starting.

F19.01	**Fault self-recovery times**	**Range: 0～10 (0 means no automatic reset function)**	**0**
F19.02	**Failure self-recovery interval time**	**Range: 0.5～50.0s**	**5.0s**

During the operation of the inverter, due to load fluctuations, it may occasionally malfunction and stop output. At this time, in order not to interrupt the operation of the equipment, the fault self-recovery function of the inverter can be used. During the self-recovery process, the frequency converter resumes operation in the speed check and restart mode. Within the set times,If the frequency converter cannot successfully resume operation, it will fail to protect and stop. output. When the number of fault self-recovery times is set to zero, the self-recovery function is turned off.

(1) When using the fault self-recovery function, it must be premised that the equipment is allowed and the inverter has no substantial fault.

(2) The self-recovery function is invalid for fault protection caused by power-on terminal protection, clock failure, overload and overheating, output short circuit, and short circuit to ground.

F19.03	**Motor overload protection action selection**	**Range: 0～2**	**2**

This parameter specifies the protective action mode of the motor when overload occurs.

0: Alarm, continue running. Only an alarm prompt, no motor overload protection feature (use with caution). At this time, the inverter has no overload protection for the load motor;

1: Alarm, shut down according to shutdown mode.

2: Failure, free stop. When overload occurs, the inverter blocks the output and the motor coasts to a stop.

F19.04	**Motor overload protection coefficient**	**Range: 10.0～2000.0%**	**100.0%**

In order to implement effective overload protection for motors with different types of loads, ensure that the F15.03 (motor rated current) parameter is set according to the motor nameplate.

You can adjust **[F19.04]**to adjust the motor overload time, as shown in Figure 7-52. When the motor output current is equal to 150% of the motor's rated current, motor overload protection will be reported after the time determined by 4min*F19.04. If **[F19.04=120.0%]**, the overload time is

4min *120.0%=4.8min. The minimum time for motor overload is 5 seconds.

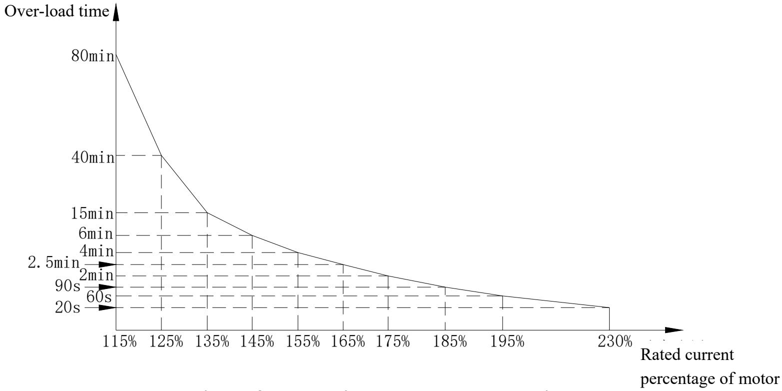


Fig. 7-52 Electronic thermal relay protection

This adjustable value can based on the user's setting. In the same conditions, if AC motor is overloaded and need the fast protection, then decrease **[F19.04],** or else increase.

F19.05	**Inverter overload pre-alarm detection selection**	**Range: 0, 1**	**0**

0: Detection all the time. During the operation of the inverter, overload detection always works.

1: Enable only constant speed detection. Overload detection only works when the inverter is running at constant speed.

F19.06	**Inverter overload pre-alarm detection level**	**Range: 20～180% (Inverter rated current)**	**130%**
F19.07	**Inverter overload pre-alarm delay time**	**Range: 0.0～20.0s**	**5.0s**

If output current higher parameters **[F19.06]**, the set electrical level will go through delay time of **[F19.07]**, open collector outputs a valid signal (see Fig. 7-53 and parameters list **[F09.00～F09.03]**).

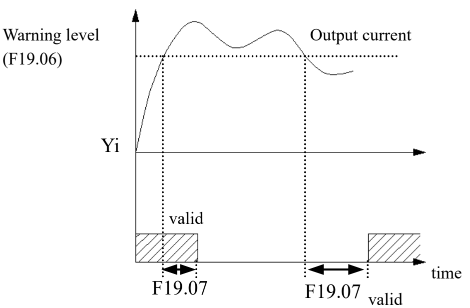


Fig. 7-53 Overload alarm

F19.08	**Motor underloadalarm detection level**	**Range: 0.0～120.0% (Motor rated current)**	**50.0%**
F19.09	**Motor underload alarm detection time**	**Range: 0.1～60.0s**	**2.0s**

When the inverter output current is lower than underload pre-alarm detection level **[F19.08]** (definite the value, comparing to the motor rated current), and the last timewill over motor underload pre-alarm detection level time **[F19. 09]**, then Yi will output underload pre-alarm signal.

F19.10	**Motor underload alarm detection action**	**Range: Units digit: 0～2 Tens digit: 0～2**	**00**

Units digit: detection selection.

0: No detection.

1: The operation has been detected all the time. This detection is valid during the operation the running process of the inverter.

2: Detected in constant speed mode only. This detection is valid during the constant speed mode only.

Tens digit: action selection.

0: When it's in alram, continue running. inverter will only alarm, when detecting motor is underload pre-alarm, .

1: Alarm, Stop according to stop mode.

2: Fault, free stop. The inverter will detect motor is underload pre-alarm, and it will lock PWM output, the motor will stop with free rotation.

F19.11	**Input and output phase loss, short circuit detection action**	**Range: Units digit: 0, 1 Tens digit: 0, 1 Hundreds digit: 0, 1 Thousands digit: 0, 1**	**1111**

Units digit: Input phase failure protect.

0: No detection.

1: Fault, free stop. When inverter detect that the input is lack one phase, alarm in input lacked, alarm, and free stop.

Tens digit: Output phase failure protect.

0: No detection.

1: Fault, free stop. When inverter detect that theoutput is lack one phase, alarm in input lacked, alarm, and free stop.

Hundreds digit: Power-on will detect short circuit protection .

0: No detection.

1: Fault, free stop. When inverter is power-on, the output to earth is short-circuiting.At this moment, the fault of short-circuiting to earth while power-on is alarmed,the inverter free stops.

Thousands digit: The detection to earth short circuit protection in the running mode

0: No detection.

1: Fault, free stop. When inverter is power-on, the output is short-circuitingduring the running process.At this time, the fault of short-circuiting to earth while running is alarmed, the inverter free stops.

F19.12	Overvoltage stall gain	Range: 0～100	30

Under vector control (including closed-loop vector and open-loop vector), if an overvoltage fault occurs during rapid deceleration, the overvoltage speed gain can be appropriately increased. The greater the gain, the stronger the overvoltage suppression capability. Without overvoltage, the smaller the gain, the better. If the braking unit is turned on, this parameter can be appropriately reduced.

F19.13	Overvoltage stall protection voltage	Range: 100～150%	Depend on the Type

During deceleration,the motor’s decelerate rate may be lower than that of drive’s output frequencydue to the load inertia. At this time, the motor will feed electric energy back to the drive, resulting in the voltage rise on the drive’s DC bus. If no measures taken, the drive will trip due to the overvoltage.

During the deceleration, the drive detects the bus voltage and compares it with the overvoltage point at stall defined by**[F19.13].** Ifthe bus voltage exceeds the stall overvoltage point, the output frequency of the inverter will stop decreasing.When the bus voltage become lower than the point, then run slowly, as shown in Fig. 7-54.

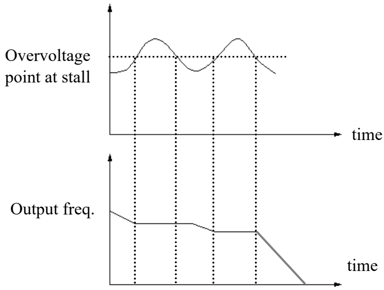


Fig. 7-54 Over-voltage at stall

F19.14	Motor over-temperature protection selection	Range: 0～4	0

0: Invalid

1～3: Reserved

4: Protection with PT100

[F19.14]defines the type of external detection components for motor temperature protection. When set to 0, motor temperature detection is invalid. When using the temperature detection function, one port of the PT sensor is connected to the 10V terminal and the other port is connected to AI2 (AI2 is set to the current position) to achieve motor temperature sampling. When the motor temperature is detected to exceed the temperature defined by [F19.15] , the inverter will be E-48 fault. When the temperature is higher than [F19.16] and lower than the temperature defined by [F19.15] , the inverter will be A-48 alarm. If the displayed motor temperature (monitoring value [F17.68]) is inconsistent with the actual temperature,can be adjusted through [F19.49] .

F19.15	Motor overheat protection threshold	Range: 0～200	110
F19.16	Motor overheating warning threshold	Range: 0～200	90

The above parameters define the protection point and alarm point when using temperature probe for motor protection.

F19.48	Fault detection time of motor temperature detection element	Range: 0.1～50.0s	2.0s

When the temperature detection element is detected disconnected time is higher than set by [F19.48] ,the inverter will alarm and display A-58.

F19.49	Temperature probe calibration	Range: 0～99	0

After the probe type [F19.14] be set , the probe needs to be calibrated. Enter the current actual temperature in [F19.49] to automatically calculate the motor temperature detection calibration coefficient and store it in the internal parameters.

F19.17	Rapid current-limitingcoefficient	Range: 0, 1	1

0: Invalid.

1: Enabled. After enabling the fast current limiting function, the over-current fault of the frequency converter can be minimized and the uninterrupted operation of the frequency converter can be ensured. If the inverter continues to be in the rapid current limiting state for a long time, the inverter may report an E-45 (wave-by-wave current limiting fault) fault to further protect the inverter.

F19.18	Motor runsection selection when instant power off	Range: 0～2	0

0: Forbidden.

1: Bus voltage constant control. If the input voltage fluctuates during operation, the inverter maintains a constant bus voltage by controlling the output frequency, and returns to normal operation after the power supply is normal.

2: Deceleration and stop. After input voltage fluctuation occurs during operation, the inverter performs deceleration and stop operation.

F19.19	Instantaneous power outage voltage recovery voltage	Range: 80～100% (rated bus voltage)	85%
F19.20	Voltage rebound estimate time when instant power off	Range: 0.0～100.0s	0.5s
F19.21	Action estimate voltage when instant power off	Range: 60～100% (rated bus voltage)	80%
F19.22	Instant stop and non-stop gain Kp	Range: 0～100	40
F19.45	Instantaneous stop integral coefficient Ki	Range: 0～100	30
F19.46	Instant stop and non-stop action deceleration time	Range: 0～300.0s	20.0s

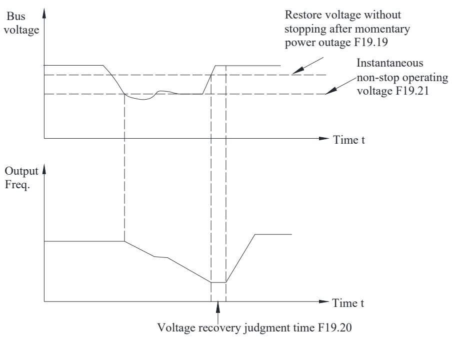


Fig. 7-55 Schematic diagram of instantaneous power outage

This function means that when there is a momentary power outage or a sudden voltage drop, the inverter reduces the output speed and uses the load feedback energy to compensate for the drop in the DC bus voltage of the inverter to maintain the continued operation of the inverter. See Figure 7-55 for a schematic diagram of instantaneous power outage.

If **[F19.18=1]**, when there is a momentary power failure or the voltage is suddenly lower than the value defined by **[F19.21]** (based on the rated bus voltage), the inverter will It will automatically reduce the output speed. When the bus voltage returns to normal, the inverter will accelerate to the set frequency and run normally. Determine whether the bus voltage has recovered to the bus voltage defined by **[F19.19]**, and the speed returns to normal after the duration exceeds the **[F19.20]** setting time. By adjusting the **[F19.22]** and **[F19.45]** gain parameters, the responsiveness to bus voltage control can be improved.

If **[F19.18=2]**, when a power supply abnormality is detected, the inverter will continue to decelerate to 0 according to the deceleration time defined by **[F19.46]** and then stop. It needs to be set Appropriate deceleration time to prevent undervoltage fault during deceleration, causing the motor to stop freely.

F19.23	**Terminal external device fault action selection**	**Range: 0～2**	**2**

0: Alarm, continue running. When inverterchecked that terminal of the external is no alarm, stop in stopping mode enabled, it will alarm, then run continue**.** Under this mode, the inverter will do nothing with terminal of the external in no alarm, stop in stopping mode, so please cautiously use.

1: Alarm, stop according to the stop mode. When inverter detects terminal external fault is valid, an alarm will appear and it will stop in stop mode**.**

2: Failure, free stop. hen inverter detects terminal external fault is valid, alarm for external device fault, and free stop**.**

F19.24	**Power-on terminal protection selection**	**Range: 0, 1**	**0**

0: Invalid.

1: Valid.

When setting power-off and then restart function is valid, this function is invalid. When the running command channel is a terminal command, and the powered on and detection run the command is valid, It will get terminal protection with faults. This function is only valid for the terminal forward and reverse functions.

F19.25	**Provide loss detection value**	**Range: 0～100%**	**0%**
F19.26	**Provide loss detection time**	**Range: 0.0～500.0s**	**0.5s**

When setting PID given value is continuously less than the value defined by**[F19.25]**(based on the maximum given value), and the duration exceeds the detection limit defined by**[F19.26]**, the PID given is lost, and the inverter will run based on **[F19.31]** units digit. The diagram of PID loss detectionis shown in Fig. 7-56.

F19.27	**Feedback lost detection value**	**Range: 0～100%**	**12%**
F19.28	**Feedback loss detection time**	**Range: 0.0～500.0s**	**0.5s**

When the feedback value of PIDis lower than **[F19.27]**definite(setting the input as base), and the constant timeis over than the time of **[F19.28]**definition detection, then PID setting will lost, and the inverter will run based on the tens digit setting of**[F19.31]**. The PID loss detection diagram is shown in Fig. 7-56.

F19.29	**Deviation magnitude abnormal detection time**	**Range: 0～100%**	**50%**
F19.30	**Deviation magnitude abnormal detection time**	**Range: 0.0～500.0s**	**0.5s**

When the PID error is continuously greater than the value defined by **[F19.29]**(based on 10V), and the duration exceeds the detection time defined by **[F19.30]**, If the PID error amount is abnormal, the inverter will operate according to the settings of **[F19.31]** hundreds digit. The PID error detection diagram is shown in Figure 7-56.

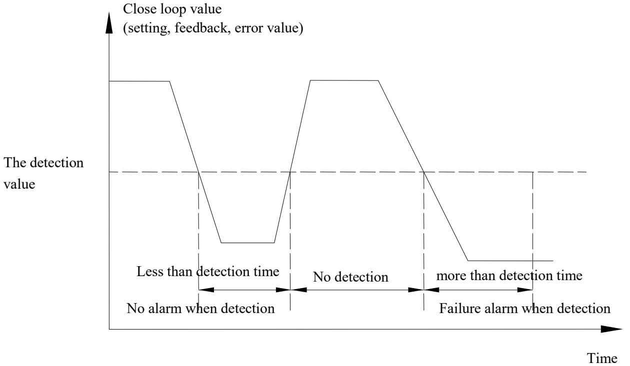


Fig. 7-56 Closed-loop detection timing diagram

F19.31	**Protection action selection 1**	**Range: Units digit: 0～3** **Tens digit: 0～3** **Hundreds digit: 0～3**	**000**

This parameter definite the internal PID controls the action selection of the setting loss and the fault Error amount. It is set as 0 or 1, inverter will have no response, and with no protection selection, users should set this parameter basing on the actual applications.

Units digit: Setting PID loss motion detection.

0: No detection.

1: Alarm, continue running.

2: Alarm, stop according to stop mode.

3: Failure, free stop.

Tens digit: PID feedback for loss motion detection.

0: No detection.

1: Alarm, continue running.

2: Alarm, stop according to stop mode.

3: Failure, free stop.

Hundreds digit: The amount of error fault for PID detection operation

0: No detection.

1: Alarm, continue running.

2: Alarm, stop according to stop mode.

3: Fault, free stop**.**

F19.32	**Protection action selection 2**	**Range: Units digit: 0～2** **Tens digit: 0～2** **Hundreds digit: 0, 1** **Thousands digit: 0, 1**	**1000**

This parameter defines the communication fault, E^2PROM fault, contactor fault and lack-voltage fault when it's no alarm, stop in stopping mode for the action selection of inverter.When it is set as 0, during the fault situation, inverter will only alarm. And with no protection selection, users should set this parameter basing on the actual applications.

Units digit: Communication fault action, including communication reply and fault.

0: Alarm, continue running.

1: Alarm, stop according to stop mode.

2: Failure, free stop.

Tens digit: E^2PROM fault action selection.

0: Alarm, continue running.

1: Alarm, stop according to stop mode.

2: Failure, free stop.

Hundreds digit: Inverter overload selection.

0: Fault, free stop.

1: Use with derating. When the frequency converter detects an imminent overload, the frequency converter actively reduces the output torque to prevent the frequency converter from reporting an overload fault. At this time, the output speed of the frequency converter may decrease. After the overload condition is eliminated, the output torque of the frequency converter will automatically recover to ensure that the output speed returns to normal.

Thousands digit: Runninglack-voltage fault display action selection.

0: No detection.

1: Fault, free stop.

F19.33	**Protection action selection 3**	**Range: Units digit: 0, 1** **Tens digit: 0, 1** **Hundreds digit: 0, 1** **Thousands digit: 0, 1**	**0111**

Units digit: UVW encoder UVW signal error enable.

0: Invalid.

1: Fault, free stop. When a fault is detected, E-44 fault is reported.

Tens digit: synchronous machine initial position angle identification fault enable.

0: invalid

1: Free stop. When a fault is detected, E-47 is reported.

Hundreds digit: Synchronous machine load tuning failure.

0: Invalid.

1: Free stop.

Thousands digit: Output phase loss detection is enabled at startup.

0: Invalid.

1: Valid. During the startup process, first check whether the output is missing phase. When the output is missing phase, E-13 will be reported, and**[F00.61=1]**.

F19.34	**Protection action selection 4**	**Range: Units digit:0, 1** **Tens digit: 0, 1** **Hundreds digit , Thousands digit: Reserved**	**0011**

This parameterdefines the action type of the inverter in the case of frequency division output communication failure and frequency division output over-speed failure. If it is set to 0, the inverter will not take any protection action in abnormal situations. Please make reasonable settings according to the actual working conditions.

Units digit : Frequency division output expansion card CAN communication fault detection action .

0: Do not detect.

1: Fault, free stop.

Tens digit : Frequency division output over-speed fault detection action.

0: Do not detect.

1: Fault, free stop.

Hundreds of digits , Thousands of digits: Reserved .

F19.35	**Fault indication and fault lock during the period of recovery**	**Range: Units digit: 0, 1** **Tens digit: 0, 1**	**00**

Units digit: During automatic reset of fault display selection .

0: action. During automatic reset, the fault indication signal of the Yi and relay are updated with the refresh of the internal fault status.

1: No action. During automatic reset, Yi and Relay display signal no action.

Tens digit: Lock function selection to realize display before power -off.

0: Disabled.

1: Enabled. When this function is valid, if the inverter shows the fault before the last time power down, then the inverter will display the fault last time fault status,make sure that user will know about the inverter potential faults.

F19.36	**Continuous run freq. selection when alarm**	**Range: 0～3**	**0**

This parameter defines the run frequency when the user selects "Alarm, continue running"for the inverter failure.

0: Running at the current setting frequency.

1: Running at the upper limiting frequency.

2: Running at the lower limitfrequency.

3: Running at the faultalternate frequency.

F19.37	**Abnormal standby freq.**	**Range: 0.00Hz～upper limit freq.**	**10.00Hz**

This parameter defines the alternativerunning frequency when inverter fault, user can use it along with parameters**[F19.36]**.

F19.38	**Disconnection testing time of Encoder**	**Range: 0.0～8.0s (no detection at 0)**	**0.0s**

When the inverter runs withthe closed-loop vector mode, the detection starts when the running frequency is higher than 1Hz. When the encoder A and B phase signals continue for the time set by**[F19.38]**and there is no feedback, Report E-37 fault and free stop. When set to 0, there is no detection. When set to 8.0, it is hardware detection mode. Only some encoder cards have hardware disconnection detection mode.

F19.39	**Overspeed (OS) detection value**	**Range: 0.0～120.0% (relative to the upper limit frequency)**	**120.0%**
F19.40	**Overspeed (OS) detection time**	**Range: 0.00～20.00s (no detection when it is 0)**	**0.00s**

Under the open-loop or the closed-loop vector mode, when it is detected that the motor speed is higher than the value set by**[F19.39]**and the continues time of **[F19.40]'s** setting value, the inverter alarm fault of E-38 and freely stop. No detection when**[F19.40]**is set to 0, but still detected when**[F19.39]**is set to 0.

F19.41	**Speeddeviation excessive (DEV) detection value**	**Range: 0.0～50.0% (relative to upper limit freq.)**	**10.0%**
F19.42	**Speeddeviation excessive (DEV) detection time**	**Range: 0.00～20.00s (No detection when it is 0)**	**0.00s**

Under the open-loop or the closed-loop vector running mode, when it is detected that the difference of motor rotational speed and setting rotational speed equals the setting valuee of **[F19.41] ,** and after thecontinues time of **[F19.42]'s** setting value, the inverter alrams fault of E-39 and freely stop. No detection when **[F19.42]** is set to 0, but still detected when **[F19.41]** is set to 0.

F19.43	**Reserved**		
F19.44	**Fan start temperature**	**Range: 0～100℃**	**75℃**

When inverter temperature is higher than the temperature set by**[F19.44]**, the fan start. When inverter temperature is lower than (F19.44-10) °C, the fan is turned off.

F19.50	**Reserved**		

7.21 Internal Virtual Input Output Node Parameter Group: F20

F20.00	**Virtual input VDI1 function selection**	**Range: 0～90**	**0**
F20.01	**Virtual input VDI2 function selection**	**Range: 0～90**	**0**
F20.02	**Virtual input VDI3 function selection**	**Range: 0～90**	**0**
F20.03	**Virtual input VDI4 function selection**	**Range: 0～90**	**0**
F20.04	**Virtual input VDI5 function selection**	**Range: 0～90**	**0**

VDI1～VDI5 have thesame functionsas Xi terminal on the control board and can be used for digital input. For more details, see description of **[F08.18~F08.25]**. The realization of the function set by internal virtual terminal must be based on the available terminal function.

F20.05	**Virtual output VDO1 function selection**	**Range: 0～60**	**0**
F20.06	**Virtual output VDO2 function selection**	**Range: 0～60**	**0**
F20.07	**Virtual output VDO3 function selection**	**Range: 0～60**	**0**
F20.08	**Virtual output VDO4 function selection**	**Range: 0～60**	**0**
F20.09	**Virtual output VDO5 function selection**	**Range: 0～60**	**0**

VDO functionsare similar to the Yi function on the control board.The VDO can be used together with VDIx to implement some simple logiccontrol.

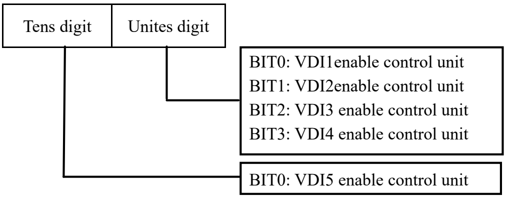
If VDO function is set to non-0, the function settings and use of VDOx are the same as the output of parameter of Yi.Please refer todescription in group **[F09]**.

F20.10	**Virtual output VDO1 open delay time**	**Range: 0.00～600.00s**	**0.00s**
F20.11	**Virtual output VDO2 opendelay time**	**Range: 0.00～600.00s**	**0.00s**
F20.12	**Virtual output VDO3 open delay time**	**Range: 0.00～600.00s**	**0.00s**
F20.13	**Virtual output VDO4 opendelay time**	**Range: 0.00～600.00s**	**0.00s**
F20.14	**Virtual output VDO5 opendelay time**	**Range: 0.00～600.00s**	**0.00s**
F20.15	**Virtual output VDO1 close delay time**	**Range: 0.00～600.00s**	**0.00s**
F20.16	**Virtual output VDO2 close delay time**	**Range: 0.00～600.00s**	**0.00s**
F20.17	**Virtual output VDO3 close delay time**	**Range: 0.00～600.00s**	**0.00s**
F20.18	**Virtual output VDO4 close delay time**	**Range: 0.00～600.00s**	**0.00s**
F20.19	**Virtual output VDO5 close delay time**	**Range: 0.00～600.00s**	**0.00s**

[F20.10～F20.19] define the time of open up and shutdown terminal VDO1～VDO5 definite is the delay time of internal level from open up to shut down.

F20.20	Virtual input VDI enable control	Range: 00～FF	00

Parameter **[F20.20]** is to control VDI1～VDI5 are enabled. **[F20.20]** BIT0～BIT4 correspond to the enable unite VDI1～VDI5, 0 stands for disabled, 1 stands for enabled. The relations are as follows:



F20.21	Virtual input VDI status digital setup	Range: 00～FF	00

Virtual input terminal VDI state is determined by the VDI **[F20.21]** definite virtual input VDI state digital and virtual output terminal VDO state. Therelationship between then is logical OR.

Parameter **[F20.21]** BIT0~BIT4 is according to the state, 0 stands for disable state, and 1 stands for enabled state.

F20.22	Virtual input and output connection relationships	Range: 00～FF	00

Bit0: The connection of VDI1 and VDO1
0: Positive logic.
1: Negative logic.
Bit1: The connection of VDI2 and VDO2
0: Positive logic.
1: Negative logic.
Bit2: The connection of VDI3 and VDO3
0: Positive logic.
1: Negative logic.
Bit3: The connection of VDI4 and VDO4
0: Positive logic.
1: Negative logic.
Bit4: The connection of VDI5 and VDO5
0: Positive logic.
1: Negative logic.

Parameter**[F20.22]**defines the logical relationship between virtual input and output terminals. Bit0~Bit4 correspond to the logical relationship settings of VDI1~VDI5 and VDO1~VDO5 , 0 stands for positive logic, 1 stands for negative logic.

Note

Parameter **[F20.21]** definition VDI state, the digital setting willbe not affected by parameter **[F20.22]**.

7.22 Frequency division output dedicated parameter group: F21

F21.19	Frequency division output CAN communication enable	Range:0,1	0

When using the frequency division output function, you need to set [F21.19] to 1 first.

Note : When [F21.19] = 1, [F05.00] is forced to remain at 0 to avoid conflicts between other CAN communications and frequency division outputs due to misoperation.

F21.20	Pulse outputsource selection	Range:0～2	0

When the frequency division output is valid, set the output source of the pulse output port.

The signal width of the A/B phase pulse is determined by the motor speed, and the signal width of the Z phase pulse is half of the signal width of the A/B phase pulse. The output polarity of the Z phase signal is set by [F21.22: Z pulse output polarity selection] .

Settings	Frequency division pulse output source selection	Explanation
0	Encoder frequency division output	The pulse output signal comes from the motor encoder. When the motor rotates, the encoder feedback signal is divided and output according to the setting value of [F21.21]. When the host computer is used as closed-loop feedback, it is recommended to use the encoder frequency division output method.
1	Pulse command synchronous output	The pulse output signal comes from the external pulse commandinput. When multi-axis control pulse synchronous tracking is performed, it is recommended to use the pulse command synchronous output method.
2	Frequency division and synchronous output disabled	The output of the frequency division output expansion card is prohibited, and the pulse output terminal has no output.

Pulse output hardware terminal:

Signal name	Output format	Output Port	Maximum pulse frequency
A phase signal	Differential output	PAO+、PAO-	5Mpps
	Open collector output	OA, GND	5Mpps
B phase signal	Differential output	PBO+、PBO-	5Mpps
	Open collector output	OB, GND	5Mpps
Z phase signal	Differential output	PZO+、PZO-	5Mpps
	Open collector output	OZ, GND	5Mpps

F21.21	Encoder frequency division pulse number	Range:1～40000	500

By setting [F21.21], The frequency inverter divides and multiplies the number of pulses feedback from the encoder according to the set value, and then outputs it through the frequency division output expansion card port.The [F21.21] set value corresponds to the PAO/PBO output per revolution(before 4 times the frequency), the frequency division ratio = [F21.21]:[F16.00].

Pulse output resolution: Pulse output resolution for 1 revolution of the motor = [F21.21]×4.

Note

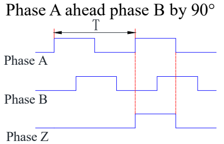
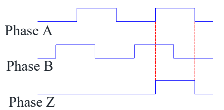
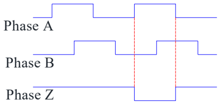
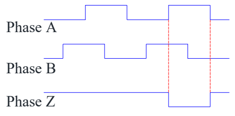
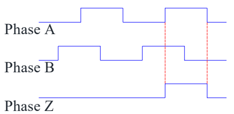
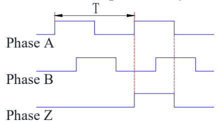
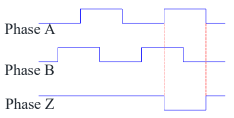
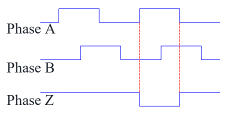
(1) If the number of motor encoderis 2500,[F16.00] = 2500, [F21.21] is set to 2500, the frequency division ratio = 1:1.

(2) When [F21.20]=1, the pulse command synchronous output is fixedly divided and multiplied by 2500 lines,the frequency division ratio=[F21.21]:2500.

F21.22	**Z pulse output polarity selection**	**Range:0,1**	**1**

By setting [F21.22], the Zphase pulse output polarity of the frequency division output can be selected.

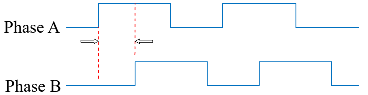
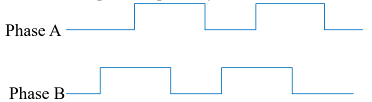
Note: If needs the accuracy of the Z signal frequency division output is high, it is recommended to use the effective changing edge of the Z signal output.

F21.23 (Output pulse phase)	**F21.22 (Z pulse output polarity)**	**Forward, pulse output diagram**	**Reverse, pulse output diagram**
0	0	Phase A ahead phase B by 90° 	Phase B ahead phase A by 90° 
	1	Phase A ahead phase B by 90° 	Phase B ahead phase A by 90° 
1	0	Phase B ahead phase A by 90° 	Phase A ahead phase B by 90° 
	1	Phase B ahead phase A by 90° 	Phase A ahead phase B by 90° 

Set value	**Z pulse output polarity selection**	**Illustrate**
0	Positive polarity output (Z pulse is high level)	The effective changing edge is the falling edge
1	Negative polarity output (Z pulse is low level)	The effective changing edge is the rising edge

F21.23	Frequency division pulse output phase selection	Range:0,1	0

When setting to use the pulse output function, under the motor rotation direction remains unchanged, by setting [F21.23], the frequency division pulse output PAO/PBO phase relationship can be selected.

Set value	Output pulse phase	Note
0	A ahead B	In the encoder frequency division output pulse, the phase A pulse is ahead of the phase Bby 90° . 
1	A behind B	In the encoder frequency division output pulse, thephase A pulse behind the phase B pulse by 90°. 

F21.24	Frequency division pulse output limiting coefficient	Range:0～20.000	2.800

By setting [F21.24], the pulse frequency of the frequency division output can be limited ,to avoid exceeding the hardware output limit of the frequency division output expansion card.

Note

⑴ Freq. division output limit freq. f_{DIV_MAX}=[F21.24]×500000×([F16.00]/[F21.21])pps，Limit motor speedn_{DIV_MAX}=f_{DIV_MAX}×60/[F16.00]rpm.

⑵ For example, the encoder line speed[F16.00]=2500，[F21.21]=2500，i.e. freq. division ratio=1:1，If [F21.24] is set to 2.800, the frequency division output frequency is limited tof_{DIV_MAX}=2.8×500000×2500/2500=1.4Mpps, Motorspeed limitn_{DIV_MAX}=1400000×60/2500=33600rpm.

7.23 Reserved parameter group: F22

F22.00 ～ F22.40	**Reserved**		

7.24 Reserved parameter group: F23

F23.00 ～ F23.40	**Reserved**		

7.25 Lifting Special Parameter Group: F24

F24.00	**Rising brake release frequency**	**Range: 0.0～10.00Hz**	**0.00Hz**
F24.01	**Delay of rising brake release frequency**	**Range: 0.01～10.00s**	**0.40s**
F24.02	**The brake release current value when rising (percentage of motor rated current)**	**Range: 0～200.0%**	**50.0%**
F24.03	**The brake release time when rising**	**Range: 0～10.00s**	**0.20s**
F24.04	**The brake release frequency when falling**	**Range: 0.60～10.00Hz**	**1.00Hz**
F24.05	**Delay of brake release frequency when falling**	**Range: 0.01～10.00s**	**1.00s**
F24.06	**The brake release current value when falling**	**Range: 0～200.0%**	**20.0%**
F24.07	**The brake release action time when falling**	**Range: 0～10.00s**	**0.4s**
F24.08	**The stopbrake frequency when rising**	**Range: 0.60～10.00Hz**	**1.00Hz**
F24.09	**The stop brake delay when rising**	**Range: 0～10.00s**	**0.40s**
F24.10	**The stop brake action time when rising**	**Range: 0～10.00s**	**0.10s**
F24.11	**The stop brake frequency when falling**	**Range: 0.60～10.00Hz**	**1.00Hz**
F24.12	**The stop brake delay when falling**	**Range: 0～10.00s**	**0.50s**
F24.13	**The stop brake action time when falling**	**Range: 0～10.00s**	**0.50s**

To use the lifting brake function, you first need to configure the corresponding digital output port to 52 (you can skip this step when not using the inverter output port to control the brake), and then set **[F24.00]** is set to a non-zero value, and the startup mode **[F02.00]** is set to 0, and the deceleration mode is **[F02.11]** needs to be set to 0. When the lifting brake function is not used, **[F24.00]** must be set to 0.00.

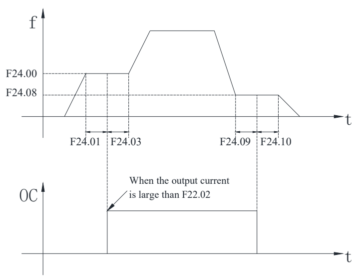


Fig. 7-57 The release process when rising

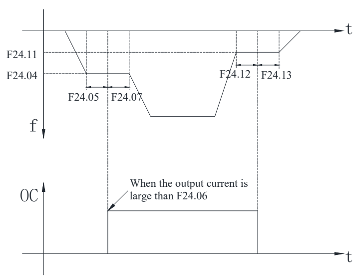


Fig. 7-58 The release process when falling

Rising brake release process: given the rising command, the inverter outputs the rising brake release frequency **[F24.00]**, maintains this frequency for a certain period of time **[F24.01]**, and judges the output when the current reaches the rising brake release current value **[F24.02]**, the output port will output the brake release signal. After the delay time is reached, the inverter will continue to output this frequency **[F24.00]**for a certain period of time **[F24.03]**.

Rising brake process: A stop command is given when rising, the output frequency drops to the rising stopping brake frequency **[F24.08]**according to the set deceleration slope, and this frequency is maintained with a delay of a certain time **[F24. 09]**, the output port will output the brake signal, and the inverter will continue to output this frequency**[F24.08]**for a certain period of time**[F24.10]**.

Descending brake release process: given the descending command, the frequency converter outputs the descending brake release frequency **[F24.04]**, maintains this frequency for a certain period of time **[F24.05]**, and judges the output When the current reaches the falling brake release current value **[F24.06]**, the output port will output the brake release signal. After the delay time is reached, the inverter will continue to output this frequency **[F24.04]**for a certain period of time **[F24.07]**.

Lowering brake process: A stop command is given when descending, and the output frequency drops to the descending shutdown brake frequency **[F24.11]**according to the set deceleration slope, and maintains this frequency for a certain period of time **[F24 .12]**, the output port will output the brake signal, and the inverter will continue to output this frequency**[F24.11]**for a certain period of time**[F24.13]**.

F24.14	**Reserved**		
F24.15	**Reserved**		

7.26 User Definition Display Parameter Group: F25

F25.00	**User function code 1**	**Range: F00.00～F25.xx**	**25.00**
F25.01	**User function code 2**	**Range: F00.00～F25.xx**	**25.00**
F25.02	**User function code 3**	**Range: F00.00～F25.xx**	**25.00**
F25.03	**User function code 4**	**Range: F00.00～F25.xx**	**25.00**
F25.04	**User function code 5**	**Range: F00.00～F25.xx**	**25.00**
F25.05	**User function code 6**	**Range: F00.00～F25.xx**	**25.00**
F25.06	**User function code 7**	**Range: F00.00～F25.xx**	**25.00**
F25.07	**User function code 8**	**Range: F00.00～F25.xx**	**25.00**
F25.08	**User function code 9**	**Range: F00.00～F25.xx**	**25.00**
F25.09	**User function code 10**	**Range: F00.00～F25.xx**	**25.00**
F25.10	**User function code 11**	**Range: F00.00～F25.xx**	**25.00**
F25.11	**User function code 12**	**Range: F00.00～F25.xx**	**25.00**
F25.12	**User function code 13**	**Range: F00.00～F25.xx**	**25.00**
F25.13	**User function code 14**	**Range: F00.00～F25.xx**	**25.00**
F25.14	**User function code 15**	**Range: F00.00～F25.xx**	**25.00**
F25.15	**User function code 16**	**Range: F00.00～F25.xx**	**25.00**
F25.16	**User function code 17**	**Range: F00.00～F25.xx**	**25.00**
F25.17	**User function code 18**	**Range: F00.00～F25.xx**	**25.00**
F25.18	**User function code 19**	**Range: F00.00～F25.xx**	**25.00**
F25.19	**User function code 20**	**Range: F00.00～F25.xx**	**25.00**
F25.20	**User function code 21**	**Range: F00.00～F25.xx**	**25.00**
F25.21	**User function code 22**	**Range: F00.00～F25.xx**	**25.00**
F25.22	**User function code 23**	**Range: F00.00～F25.xx**	**25.00**
F25.23	**User function code 24**	**Range: F00.00～F25.xx**	**25.00**
F25.24	**User function code 25**	**Range: F00.00～F25.xx**	**25.00**
F25.25	**User function code 26**	**Range: F00.00～F25.xx**	**25.00**
F25.26	**User function code 27**	**Range: F00.00～F25.xx**	**25.00**
F25.27	**User function code 28**	**Range: F00.00～F25.xx**	**25.00**
F25.28	**User function code 29**	**Range: F00.00～F25.xx**	**25.00**
F25.29	**User function code 30**	**Range: F00.00～F25.xx**	**25.00**

This parameters is the user-defined parameter. User can choose the at most 30 from F0 to F30 that are reflect into **[F25]**, in order to check and alter more convenient.

Use **[F25.00]** to set the first function code parameter that the user intends to display, and then use **[F25.01]** to set the second function code parameter that the user intends to display. By analogy, up to 30 user-customized parameters can be set. After the setting is completed, set**[F00.00]**to 3 (user menu mode) and press the ENTER 3 DATA buttonto confirm. If the user wants to exit the customized parameter display mode, he can change the **[F00.00]** parameter value to a value other than 3, and then press the ENTER 3 DATA key to confirm.

For example: the user intends to set three customized parameters: [F02.01], [F03.02] and [F04.00]. You can follow the following steps to set the user customized parameters:

⑴ Use [F25.00] to set the first function code parameter 02.01, and press the ENTER 3 DATA key to confirm;

⑵ Use [F25.01] to set the second function code parameter 03.02, and press the key to ENTER 3 DATA confirm;

⑶ Use [F25.02] to set the third function code parameter 04.00, and press the ENTER 3 DATA key to confirm.

⑷ Set **[F00.00]** to 3 (user menu mode) and press the ENTER 3 DATA key to confirm.

After the setting is completed, if the **[F00.00]** function code parameter values are not changed, when entering the function code display state, the operation panel will only display **[F00.00]**, **[F02.01]**, **[F03.02]** and **[F04.00]** four function code parameters. If you do not want to display user-defined parameters, just Just set **[F00.00]** to the desired display mode.

Note

⑴ xx represents the function code number.
⑵ F25.xx means not mapping.

Note

When the set function code parameters are not within the user specified range of S2000, setting customer parameter customization will not achieve the goal.

7.27 Fault Record Function Parameter Group: F26

F26.00	**The last fault record**	**Range: 0～53**	**0**
F26.01	**The last two fault records**	**Range: 0～53**	**0**
F26.02	**The last three fault records**	**Range: 0～53**	**0**
F26.03	**The last four fault records**	**Range: 0～53**	**0**

0: No fault.

Higher than 0: There is a fault.

[F26.00～F26.03] defines the times previous four codes of fault and two times previous fault for the voltage, current terminal and ect of inverter, users based on fault code and refer to fault functions& fault handle process, then getting the result for different types of fault and reasons.

F26.04	**Setup freq. at the last one fault**	**Range: 0.00Hz～upper limit freq.**	**0.00Hz**
F26.05	**Output freq. at the last one fault**	**Range: 0.00Hz～upper limit freq.**	**0.00Hz**
F26.06	**Output current at the last one fault**	**Range: 0.0～6553.5A**	**0.0A**
F26.07	**DC bus voltage at the last one fault**	**Range: 0.0～6553.5V**	**0.0V**
F26.08	**Module temperature at the last one fault**	**Range: 0～125℃**	**0℃**
F26.09	**Input terminal status at the last one fault**		**0**
F26.10	**Accumulated running time at the last one fault**	**Range: 0～65535min**	**0min**
F26.11	**Setup frequency at the last two one fault**	**Range: 0.00Hz～upper limit freq.**	**0.00Hz**
F26.12	**Output frequency at the last two one fault**	**Range: 0.00Hz～upper limit freq.**	**0.00Hz**
F26.13	**Output current at the last two one fault**	**Range: 0.0～6553.5A**	**0.0A**
F26.14	**DC bus voltage at the last two one fault**	**Range: 0.0～6553.5V**	**0.0V**
F26.15	**Module temperature at the last two one fault**	**Range: 0～125℃**	**0℃**
F26.16	**Input terminal status at the last two one fault**		**0**
F26.17	**Accumulated running time at the last two one fault**	**Range: 0～65535min**	**0min**

[F26.04～F26.17]record the running state of fault for the first and second time before,when input terminal state at fault, the terminal state is the whole terminal state after the time delay, including the standard input terminal state and expanded input terminal state. When virtual terminal communicationis set as the terminal panel point, the standard input terminal state is determined by the actual physical input terminal and virtual terminal communication.Please refer to the details of the input terminal state:

Bit0: X1 (standard input terminal 1). 1: valid; 0: invalid
Bit1: X2 (standard input terminal 2). 1: valid; 0: invalid
Bit2: X3 (standard input terminal 3). 1: valid; 0: invalid
Bit3: X4 (standard input terminal 4). 1: valid; 0: invalid
Bit4: AI1 (standard input terminal 5). 1: valid; 0: invalid
Bit5: AI2 (standard input terminal 6). 1: valid; 0: invalid
Bit6: Reserved
Bit7: X5 (standard input terminal 8). 1: valid; 0: invalid
Bit8: Reserved
Bit9: Reserved
Bit10: Reserved
Bit11: Reserved
Bit12: Reserved
BIT13: Reserved

7.28 Password and Manufacturer Function Parameter Group: F27

F27.00	**User password**	**Range: 00000～65535**	**00000**

User password setting function is used for prevent unauthorized persons from checking and modifying functional parameters.

When the user password function is not required, the function code can be set to 00000.

When the user password function is required, input a 5-digitnone-zero figure, and press ENTER 3 DATA to confirm, the password is effective at once.

Password change:

Press the ESC 1 MENU and input the primary password,select [F27.00] (F27.00=00000 at themoment), then input new password, and press ENTER 3 DATA to confirm.The password is effective at once

Cancel password:

Press ESC 1 MENU into the state of verification,and enter the original correct5-digit password,into the state of parameter editing,then select [F27.00] (F27.00=00000 at themoment), and directly press ENTER 3 DATA to confirm,password can be canceled.

Note

Please memorize the password. Seeking advice from manufacturer in case it is lost.

F27.01	**Manufacturer password**	**Range: 00000～65535**	**00000**

Factory setting function, the user cannot modify.

8 Fault countermeasures and exception handling

8.1 Fault phenomena and countermeasures

The types of faults or alarms that may occur in the S2000 series are shown in Table 8-1. Fault types are divided into two types: faults and alarms. For example, E-XX is displayed when the frequency converter fails, and A-XX is displayed when the corresponding alarm occurs. Once a fault occurs in the inverter, the fault type is stored in the F26 fault record parameter group. When an alarm occurs, the alarm status is displayed until the alarm source is removed, and the alarm status is not recorded in the F26 parameter group. Some reserved fault codes are prepared for future intelligent self-diagnosis functions. When the inverter fails, the user should first check according to the instructions in this table and record the fault phenomenon in detail. If technical service is needed, please contact the company's technical engineering department or our local agents.

Table8-1 Fault alarm content and countermeasures

Fault code	Fault type	Possible cause of failure	Countermeasures
E-01	Overcurrent during inverter acceleration	Acceleration time is too short	Extend acceleration time
		The V/F curve is inappropriate	Adjust V/F curve settings, adjust manual torque boost amount or change to automatic torque boost
		Restart a rotating motor	Set to speed check and restart function
		Grid voltage is low	Check input power
		Inverter power is too small	Choose an inverter with a large power level
		Under vector control, the output phase is missing	Check whether the motor wiring is intact
E-02	Overcurrent during inverter deceleration	Deceleration time too short	Extend deceleration time
		There is potential energy load or large inertia load	Increase the braking power of external energy-consuming braking components
		Inverter power is too small	Choose an inverter with a large power level
E-03	Overcurrent in the inverter at constant speed	Load mutation or abnormality	Check load or reduce load mutation
		Acceleration and deceleration time setting is too short	Properly extend the acceleration and deceleration time
		Grid voltage is low	Check input power
		Inverter power is too small	Choose an inverter with a large power level
E-04	Overvoltage during inverter acceleration	Abnormal input voltage	Check input power
		Acceleration time set too short	Properly extend the acceleration time
		Restart a rotating motor	Set to speed check and restart function
E-05	Overvoltage during inverter deceleration	Deceleration time too short	Extend deceleration time
		There is potential energy load or large inertia load	Increase the braking power of external energy-consuming braking components
E-06	Frequency converter constant speed medium overvoltage	Abnormal input voltage	Check input power
		Acceleration and deceleration time setting is too short	Properly extend the acceleration and deceleration time
		Abnormal changes in input voltage	Install input reactor
		Load inertia is large	Use energy-consuming braking components
E-07	Overvoltage when the inverter is shut down	Abnormal input voltage	Check input power or call for service
E-08	Undervoltage during operation	Input voltage is too low	Check site input voltage
E-09	Frequency converter	Acceleration time is too short	Extend time to speed up

	overload protection	DC braking amount is too large	Reduce DC braking current and extend braking time
		The V/F curve is inappropriate	Adjust V/F curve and torque boost amount
		Restart a rotating motor	Set to speed check and restart function
		Grid voltage is too low	Check grid voltage
		Load is too large	Choose a more powerful inverter
E-10 (A-10)	Motor overload protection	The V/F curve is inappropriate	Adjust V/F curve and torque boost amount
		Grid voltage is too low	Check grid voltage
		General motor operates at low speed and large load for a long time	Long-term low-speed operation, variable frequency motor can be selected
		The motor overload protection coefficient is set incorrectly	Correctly set the motor overload protection coefficient
		The motor is stalled or the load suddenly changes too much	Check load
E-11 (A-11)	Motor underload protection	The operating current of the frequency converter is less than the underload threshold	Confirm whether parameters F19.08 and F19.09 are set appropriately
		load off motor	Confirm whether the motor load is disconnected
E-12	Input phase loss	Three-phase input power supply abnormality	Check whether the three-phase input power cord is disconnected or has poor contact.
		Abnormal power board	Seeking services from manufacturers or
		Main control board abnormality	Seeking services from manufacturers or agents
E-13	Output phase loss	The lead wire from the inverter to the motor is abnormal.	Check motor leads
		The three-phase output of the inverter is unbalanced when the motor is running.	Check whether the three-phase windings of the motor are balanced
		Abnormal power board	Seeking services from manufacturers or agents
		Main control board abnormality	Seeking services from manufacturers or agents
E-14	Inverter module protection	Inverter instantaneous overcurrent	See Overcurrent Countermeasures
		The three output phases have a phase-to-phase short circuit or a short circuit to ground.	Rewiring
		The air duct is blocked or the fan is damaged	Clean the air duct or replace the fan
		Ambient temperature is too high	Lower ambient temperature
		Control board connections or plug-ins are loose	Check and reconnect
		Abnormal current waveform caused by output phase loss and other reasons	Check wiring
		The auxiliary power supply is damaged and the driving voltage is under voltage.	Seeking services from manufacturers or agents
		Control board abnormality	Seeking services from manufacturers or agents
E-15	Short circuit to ground during operation	Motor short circuit to ground	Replace cable or motor
		The Hall device is damaged or the Hall line is defective or the current detection circuit is abnormal.	Seeking services from manufacturers or agents

E-16	Short circuit to ground after power on	Motor short circuit to ground	Replace cable or motor
		The inverter power supply and motor wires are connected reversely	Replace cables and motor wiring
		Hall device is damaged or Hall line is defective	Seeking services from manufacturers or agents
E-17 (A-17)	Inverter overheating	The A-17 alarm continues to be reported for more than 30 minutes.	Clean air ducts or improve ventilation conditions
		Air duct blocked	Clean air ducts or improve ventilation conditions
		Ambient temperature is too high	Improve ventilation conditions and reduce carrier frequency
		Fan damaged	Replace fan
E-18 (A-18)	External device failure	External fault emergency stop terminal is closed	Disconnect the external fault terminal after handling the external fault
E-19	Current detection circuit Fault	Control board connections or plug-ins are loose	Check and reconnect
		Auxiliary power supply damaged	Seeking services from manufacturers or agents
		Hall device damaged	Seeking services from manufacturers or agents
		Amplification circuit abnormality	Seeking services from manufacturers or agents
E-20	External interference failure	The protection interrupt of the CPU board is triggered, but one of the actual overcurrent, overvoltage, and short circuit signals is not detected	Press the "STOP/RESET" button to reset or add a power filter to the power input side
E-21	Internal interference fault	Serious internal interference	Power off and restart. If the fault persists, seek service from the manufacturer or agent.
E-22 (A-22)	PID given is lost	The PID given loss threshold setting is unreasonable	Reset related parameters
		External given line disconnection	Check external given wiring
		Main control board abnormality	Seeking services from manufacturers or agents
E-23 (A-23)	PID feedback lost	PID feedback loss threshold setting is unreasonable	Reset related parameters
		Feedback signal disconnected	Check external feedback signal wiring
		Main control board abnormality	Seeking services from manufacturers or agents
E-24 (A-24)	PID error amount is abnormal	PID error amount abnormal detection threshold setting is unreasonable	Reset related parameters
		Main control board abnormality	Seeking services from manufacturers or agents
E-25	Start terminal protection	Terminal commands are valid when powering on	Check external input terminal status
E-26 (A-26)	Communication fail	Improper baud rate setting	Set the baud rate appropriately
		Serial port communication error	Press the "STOP/RESET" button to reset and seek service
		Improper setting of fault alarm parameters	Modify the settings of F05.04 and F05.05
		The host computer is not working	Check whether the host computer is working and whether the wiring is correct
E-27	Reserved		

E-28	Frequency division output expansion card CAN communication fault (active detected when frequency division output is valid and F19.34 ones digit = 1)	1.Expansion card abnormality 2. Set F21.19 to 1 during self-learning	1. Get services from manufacturers or agents 2. Set F21.19 to 0 then starting self-learning again.
E-29	Frequency division pulse output is over-speed (active detected when frequency division output is valid and F19.34 tens digit = 1)	The output pulse frequency of the frequency division output expansion card is higher than the limit value set by F21.24	(1) When F21.20=0, reduce F21.21 (number of encoder frequency division pulses) so that within the entire speed range required by the machine, the output pulse frequency is less than the upper frequency limit set by F21.24. (2) When F21.20=1, reduce the input pulse frequency to within the upper frequency limit allowed by F21.24 setting. At this time, if the electronic gear ratio is not modified, the motor speed will decrease. If the input pulse frequency already high but does not exceed the allowable frequency upper limit, anti-interference measures should be taken (use twisted pair shielded wires for pulse input wiring, and set the pin filter parameter F16.42 or F16.11) to prevent interference pulses Superimposed on the real pulse command, causing fault alarm.
E-30 (A-30)	E^2PROM read and write error	An error occurred while reading and writing control parameters.	Press the "STOP/RESET" button to reset and seek service from the manufacturer or agent.
E-31	Temperature detection disconnection	Temperature sensor failure	Seeking services from manufacturers or agents
		Temperature detection circuit abnormality	Seeking services from manufacturers or agents
E-32	Auto-tuning failure	Motor parameters are not set according to the nameplate	Correctly set relevant parameters according to the motor nameplate
		Abnormal current during tuning process	Choose an inverter that matches the motor
		Motor wiring is wrong	Check the three-phase wiring of the motor
E-33 (A-33)	Contactor abnormality	Abnormal power board	Seeking services from manufacturers or agents
		Contactor abnormality	Replace contactor
E-34	On-site failure 1	For in-factory debugging	
E-35	On-site failure 2	For in-factory debugging	
E-36 (A-36)	Bus capacitor overheated	Poor heat dissipation environment of the inverter	Improve the heat dissipation environment of the frequency converter
		Inverter capacity is too small	Choose an inverter that matches the motor
		Bus capacitor cooling fan is damaged	Replace the bus capacitor cooling fan
E-37	Encoder disconnection	Encoder damage or poor wiring	Check wiring or encoder
E-38	Over speed protection	Acceleration time is too short	Extend acceleration time
		Inverter power is too small	Choose an inverter with a large power level
		The motor overspeed detection parameters F19.39 and F19.40 are set unreasonably.	Set parameters appropriately according to actual conditions

E-39	Excessive speed deviation protection	Acceleration and deceleration time is too short	Extend acceleration and deceleration time
		Inverter power is too small	Choose an inverter with a large power level
		The speed deviation is too large and the detection parameters F19.41 and F19.42 are improperly set.	Set parameters appropriately according to actual conditions
E-40	Reserved		
E-41	Analog channel disconnected	The physical quantity detected by AI1 or AI2 is not within the reasonable range, or the circuit contact of AI1 or AI2 is poor.	Properly control the physical quantity measured by AI1 or AI2, and check the wiring of AI1 or AI2.
E-42	Water shortage failure	Water shortage signal detected in constant pressure water supply mode	Detect whether there is water shortage in the water source
E-43	Reserved		
E-44	UVW encoder failure	Encoder UVW signal abnormality	Check whether the wiring is correct
			Replace encoder
E-45	Wave-by-wave current limiting fault	When F19.17 is set to 1 and a long-term overcurrent is detected	The acceleration and deceleration time is too short, increase the acceleration and deceleration time appropriately;
			The load is too heavy, increase the frequency converter selection by one gear.
E-46	Reserved		
E-47	Synchronous machine initial position detection failure	Unable to detect magnetic pole position properly	The motor wiring is abnormal, check the wiring
			Inverter and motor power do not match
E-48 A-48	Motor overheating	When F19.14 is not 0, the detected motor temperature is greater than F19.15 and F19.16	Check the motor temperature and cool down the motor
			Check whether the parameters are set appropriately and whether the signal is abnormal.
E-49	Excessive position deviation fault	In position mode, when the position deviation is greater than F16.41, this fault will be reported.	Set parameters appropriately according to actual conditions
E-50	Origin return to zero exception	When the origin returns to zero, the forward and reverse overtravel signals are triggered.	Check whether the overtravel signal is reasonable
E-51	Origin return timeout	Origin return time is too long	Properly set F16.51 and F16.54
E-52	Encoder failure	Encoder signal abnormality	Check whether the encoder wiring is normal
			Check whether F00.19 is set correctly
			Replace encoder
E-53	Synchronous motor does not self-tuning under vector control	The motor parameters of the synchronous motor under vector control have not self-tuning.	After correctly setting F15.00~F15.06 according to the motor nameplate, select the corresponding auto-tuning method (F15.19) according to the motor to auto-tune the motor parameters.
A-51	Alarm for mutual exclusion of primary and secondary given frequency channels	Parameter setting error	F01.00 and F01.03 cannot be set to the same channel (except 9: terminal encoder reference)
A-53	Operation limit warning	The time limit for running is up	Please contact the upper level supplier
A-54	Forward overtravel	Terminal input or software limit	Properly set F16.43 and F16.44

		maximum value overtravel	Check whether the input terminal has No. 74 function in effect
A-55	Negative overtravel	Terminal input or software limit minimum value overtravel	Properly set F16.43 and F16.46 Check whether the input terminal has No. 75 function in effect
A-58	Motor temperature detection element is disconnected	When F19.14≠0, AI2 (switched to the current position) no input and the motor temperature detection element disconnected.	Check whether the wiring is correct or not ,whether the motor temperature detection component is connected to 10V at one port and the AI2 terminal at the other port.
LOCH1.	Keyboard key lock	Operation keyboard press keyboard lock	Press key ESC 1 MENU for more than 5 seconds to unlock the keyboard

Note

(1) When E-14/E-15/E-16 fault is reported, the inverter must be powered off before it can be reset.

(2) When an overcurrent fault or a short-circuit fault to ground occurs during operation, the inverter needs to be delayed for 2 seconds before it can be reset.

(3) When an E-09 fault is reported, the reset time for models with a power of 75KW and above is 10s; for models with a power of 55KW and below, the reset time is 4s.

8.2 Fault record search

This series of inverters records the most recent 4 fault codes and the operating parameters of the inverter at the time of the last 2 faults. Searching this information can help find the cause of the fault.

All fault information is saved in the F26 group parameters. Please refer to the keyboard operation method to enter the F26 group parameters to search for information.

Function code	Content	Function code	Content
F26.00	Previous fault record	F26.09	Input terminal status at the time of previous fault
F26.01	Previous two fault records	F26.10	Running time at the time of previous failure
F26.02	Records of the first three failures	F26.11	The setting freq. for the first two faults
F26.03	The first four fault records	F26.12	Output freq. during the first two faults
F26.04	The set freq. at the time of the previous fault	F26.13	Output current during the first two faults
F26.05	Output frequency at the time of previous fault	F26.14	DC bus voltage during the first two faults
F26.06	Output current at the previous fault	F26.15	Module temperature during the first two faults
F26.07	DC bus voltage at the time of the previous fault	F26.16	Input terminal status during the first two faults
F26.08	Module temperature at the time of previous failure	F26.17	Running time during the first two failures

8.3 Fault reset

(1) Before resetting, the cause of the fault must be thoroughly identified and eliminated, otherwise the inverter may be permanently damaged.
(2) If it cannot be reset or the fault occurs again after reset, the cause should be checked. continuous reset will damage the inverter.
(3) When overload and overheating protection is activated, reset should be delayed for 5 minutes.
(4) When E-14 fault occurs, pressing the reset button has no effect. You need to power off, check the motor wiring, and restart the inverter.
(5) When the E-16 fault is reported after powering on, please do not run it directly after resetting. You need to check whether the input and output lines are connected reversely.

When the inverter fails, to restore normal operation, you can choose any of the following operations:
(1) Set any terminal among X1~X5 as external RESET input, close and then disconnect with COM terminal.
(2) When the fault code is displayed, press the 6 STOP/RESET key after confirming that it can be reset.
(3) Communication reset. Please refer to the communication attachment instructions.
(4) Cut off the power supply.

8.4 Alarm reset

When an alarm occurs, the alarm source represented by this alarm code must be eliminated in order to return to normal. Otherwise, the alarm cannot be eliminated and cannot be reset by the reset key.

9 Maintenance

9.1 Routine maintenance

When you use this 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 will affect it, which may cause failure of the inverter. To avoid this, it is recommended to perform routine inspections and maintenance.

Table 9-1 Daily inspection and maintenance items

Period		**Inspection item**
Daily	**Periodic**	
√		Daily cleaning: (1) Inverter should be maintained in a clean state (2) Clean up the dust on the surface of inverter, prevent the dust into the inverter internal (especially metal dust). (3) Clean up the oil stain of cooling fan
	√	Check the air duct, and regularly clean.
	√	Check whether the screws is loose
	√	Check whether the inverter is corrode
√		Whether inverter installation environment changes
√		Whether the inverter cooling fan is working properly
√		Whether the inverter is overheating
√		When running whether voice of motor abnormal change.
√		Whether occur abnormal vibration when motor running
	√	Check wiring terminals have arc trace
	√	The main circuit insulation test

Recommend to inspect with following instrument:

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

9.2 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 wearing bearing, 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.

9.3 Repair guarantee

(1) We provide the free maintenance within warranty time if any failure or damage under normal usage, the warranty time can be seen in the warranty card, we will charge some when exceed warranty time.

(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.

9.4 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 low quality of electrolyte capacitance, so must assure that it's electrified for one time within 1 year and electrification time is not shorter than 1 hour and input voltage must be increased to rated value gradually by voltage regulator of 250w, meanwhile the inverter should be cut off from the motor.

Appendix A Modbus communication protocol

A.1 Data communication structure

A.1.1 RTU frame format:

Frame header	3.5 character time pause
Slave address	Slave address: 0～247
Communication command code	03H: Read slave parameters 06H: Write slave parameters 10H: Write multiple parameters
Data content DATA	Information content in the data package: Parameter address (16bit); The number of parameters or the number of bytes of parameter values; Parameter value (16bit).
Data content DATA	
…	
…	
CRC check value low byte	16bit unsigned check value
CRC check value high byte	
End of frame	3.5 character time pause

A.2 Data communication address allocation

A.2.1 Function code F00~F26 group communication address

The communication addresses of F00.00～F26.17 are 0000H～1A11H, and the starting address of group F26 fault record parameters is 1A00H. For example, the communication address of function code F3.21 is 0315H, 03H is the hexadecimal form of group number 3, and 15H is the hexadecimal form of group number 21.

A.2.2 Control commands, status words, monitoring and internal hidden parameter communication addresses

Variable name	Contact address	Read and write properties	Meaning of command data or response value
Operation command words	1E00H	Read and write	1: Reserved
			2: Jog stop command
			3: Forward jogging operation
			4: Reverse jog operation
			5: Run
			6: Shutdown
			7: Forward running
			8: Reverse operation
			9: Fault reset
			10: Reserved
Serial port value setting (frequency given)	1E01H	Read and write	When F01.02 hundred digit = 0:5000 represents 50.00Hz When F01.02 hundred digit = 1: 10000 represents F01.11
Inverter status	1E02H	Read only	BIT0: Bus voltage established BIT1: Ordinary running commands are valid BIT2: The jog operation command is valid BIT3: Running BIT4: The current running direction is reverse BIT5: The direction of operation command is reverse BIT6: decelerating and braking BIT7: Accelerating BIT8: Decelerating

			BIT9: Alarm BIT10: Failure BIT11: Current limit BIT12: Fault self-recovery in progress BIT13: Self-tuning BIT14: free stop state BIT15: Speed tracking starts
Alarm code	1E03H	Read only	0: No alarm 1～50: Indicates the current alarm code
C-00	1C00H	Read only	Monitoring parameters 1
C-01	1C01H	Read only	Monitoring parameters 2
C-02	1C02H	Read only	Monitoring parameters 3
C-03	1C03H	Read only	Monitoring parameters 4
C-04	1C04H	Read only	Monitoring parameters 5
C-05	1C05H	Read only	Monitoring parameters 6
PID communication given value	1D00H	Read and write	Range: 0～1000 (1000 represents 10.00V)
Torque communication given value	1D01H	Read and write	Range: 0～2000 (2000 represents 200.0% rated motor torque)
Communication AO given value	1D02H	Read and write	Range: 0～4000 (4000 represents 10.00V or 20.00mA)
Communication DO given value	1D06H	Read and write	Range: 0～4000 (4000 represents 10.00V or 20.00mA)
Communication output terminal given value	1D08H	Read and write	BIT0：Y1 BIT1：Y2 BIT2: reserved BIT3: Reserved BIT4：RLY1
Positive torque limit frequency	1D0AH	Read and write	Range: 0～60000 (60000 represents 600.00Hz)
Reverse torque limit frequency	1D0BH	Read and write	Range: 0～60000 (60000 represents 600.00Hz)
PID feedback voltage	1D0CH	Read and write	Range: 0～4000 (4000 represents 10.00V)

A.3 Handling of communication errors

The communication error response packet will be (host command code + 80H) as the command code, and comes with a 1-byte error code.

The communication error response packet format is as follows:

ADR	01H
CMD	83H/86H/90H
Communication error code	01H～06H (see the table below for meaning)
CRC check value low byte	Need to calculate
CRC check value high byte	Need to calculate

The meaning of the response error code value is as follows:

Communication error code value	Communication error type	priority	Communication error code value	Communication error type	priority
0x01	CRC check error	1	**0x05**	Parameters are not allowed to be changed	5
0x02	The command code is illegal	2	**0x06**	The number of read registers is illegal	6
0x03	The accessed register address is illegal	3	**0x07**	The number of write registers is illegal	7
0x04	The value written to the register is illegal	4	**0x08**	Data frame format is incorrect	8

A.4 Data Frame Example

A.4.1 RTU format example

Data field	Slave machine address	Command code	Register address high byte	Register address low byte	Data high byte	Data low byte	CRC low position	CRC high position	Function Description
Command frame	01	06	1E	00	00	05	4F	E1	#1 inverter operation
Reply frame	01	06	1E	00	00	05	4F	E1	
Command frame	01	06	1E	00	00	06	0F	E0	#1 inverter shuts down
Reply frame	01	06	1E	00	00	06	0F	E0	
Command frame	01	06	01	11	00	64	D9	D8	#1 Setting F01.17=100
Reply frame	01	06	01	11	00	64	D9	D8	
Command frame	01	03	1E	02	00	01	twenty three	E2	Read the status of #1 inverter
Reply frame	01	03	02 (Number of response bytes)		00	01	79	84	

Example of reading multiple consecutive addresses (up to 10):

Command frame:01 03 00 06 00 08 A4 0D

Response frame:01 03 10 00 09 00 02 00 06 00 30 00 0E 00 14 00 09 00 00 6F 55

Description: Read F00.06～F00.13 (8), the number of response bytes is 16 (0x10), F00.06=09, F00.07=02, F00.08=06, F00.09=48, F00 .10=14, F00.11=20, F00.12=09, F00.13=0, "6F 55" is CRC check.

Example of writing multiple consecutive addresses (up to 10):

Command frame:01 10 00 02 00 05 0A 00 01 00 02 00 03 00 04 00 05 E9 A8

Response frame:01 10 00 02 00 05 A1 CA

Instructions: Write F00.02~F00.06 (5 pieces), F00.02=01, F00.03=02, F00.04=03, F00.05=04, F00.06=05.

Appendix B Free port communication protocol

B.1 Overview

In our S2000 series frequency converter, users are provided with a universal RS485/RS232 communication interface. This communication interface can communicate with host computer equipment (such as PC, PLC controller, etc.) with corresponding interfaces to achieve centralized monitoring of the frequency converter (such as setting frequency converter parameters, controlling frequency converter operation, reading frequency converter The working status of the device), and can also be connected to our company's corresponding series of remote control keyboards to meet various user requirements.

This communication protocol is an interface normative document designed to realize the above functions. Users are requested to read it carefully and follow the programming to achieve remote and networked control of the frequency converter.

B.2 Agreement content and description

B.2.1 Networking method of communication network

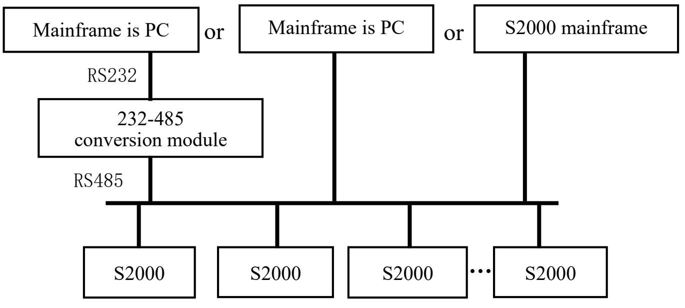


Fig. B-1 Schematic diagram of networking mode

B.2.2 Communication methods

Currently, the S2000 frequency converter can be used as a master or slave in the RS485 network. If the frequency converter is used as a slave machine, the host computer can be completed through a PC, PLC or human interface. If it is used as a host machine, the master-slave control of the frequency converter can be realized. The specific communication methods are as follows:

(1) PC or PLC is the host machine, the frequency converter is the slave machine, and the master-slave machine communicates point-to-point.

(2) When the master sends a command using the broadcast address, the slave does not respond.

(3) The user can set the local address, baud rate, data format, etc. of the inverter through the slave keyboard.

(4) The slave reports the current fault information in the latest response frame to the master poll.

(5) S2000 provides an RS485 interface.

B.2.3 Transmission method

Asynchronous serial, half-duplex transmission mode. Default format and transmission rate: 8-N-1, 9600bps. For specific parameter settings, see the description of the F05 group function code.

(Note: The definition of this parameter is valid in free port communication mode, and other parameters are consistent with the original instructions.)

F05.00	Protocol selection	0: Modbus protocol 1: Reserved 2: Profibus protocol (extended valid) 3: CanLink protocol (extended valid) 4: CANopen protocol/EtherCAT protocol (extended valid) 5: Free Agreement 1 6: Free Agreement 2	1	0	×
F05.01	Baud rate configuration	Units digit: free protocol and Modbus baud rate selection 0:300BPS 1:600BPS 2: 1200BPS 3: 2400BPS 4:4800BPS 5:9600BPS 6: 19200BPS 7: 38400BPS 8:57600BPS 9:115200BPS	1	005	×
F05.02	Data Format	Units digit: free protocol and Modbus protocol data format 0: 1-8-1 format, no parity, RTU 1:1-8-1 format, even parity, RTU 2: 1-8-1 format, odd parity, RTU 3: 1-7-1 format, no parity, ASCII 4: 1-7-1 format, even parity, ASCII 5: 1-7-1 format, odd parity, ASCII	1	0000	×
F05.03	Local address	0～247, 0 is the main station address	1	1	×

B.2.4 Data command frame format

Host command frame format																		
Send order	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Frame header	slave address	slave address	host command	host command	Auxiliary index	Auxiliary index	command index	command index	Setting data	Setting data	Setting data	Setting data	Checksum	Checksum	Checksum	Checksum	end of frame
Definition	Head	Address		Command area		Index area				Set data area				Check area				Tail
Send byte	1	2		2		4				4				4				1

Slave response frame format																		
Send order	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Frame header	slave address	slave address	Slave response	Slave response	Fault index	Fault index	command index	command index	Operating data	Operating data	Operating data	Operating data	Checksum	Checksum	Checksum	Checksum	end of frame
Definition	Head	Address		Response area		Index area				Run data area				Check area				Tail
send byte	1	2		2		4				4				4				1

Figure B-2 Schematic diagram of command/response frame format

Remark:

(1) In some command/data frame formats, the "setting data area" and "running data area" may not exist, and are marked as "none" in the protocol command list.

(2) The valid character sets in the protocol are:～, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F And hexadecimal number 0DH, lowercase ASCII letters a, b, c, d, e, f are illegal.

(3) The valid command frame length is 14 or 18 bytes.

B.2.5 Explanation and explanation of format

(1) Frame header

is the character "～" (that is, hexadecimal 7E). Single byte.

(2) Slave address

Data meaning: The local address of the slave. Double Byte. ASCII format. The inverter is factory set to 01.

(3) Host command/slave response

Data meaning: command sent by the host, response from the slave to the command. Double Byte. ASCII format.

Response code function classification:

1> Class: Command code = "10", the host requests the slave to feedback the current preparation status and control enablement status.

Table B-1 Response frame response area command code meaning

Response code ASCII	Meaning		
	Preparation state of auxiliary device	Control from mainframe is allowed	To set frequency is allowed
10	Haven'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		

2> Category: Command code = "11" ~ "15", five function commands sent by the host to the slave, see the protocol command list for details.

Table B-2 Meaning of response code in command index area of response frame

Response code ASCII	The meaning of response code	Illustrate
00	Slave communication and control are normal; function code parameter changes are valid; password is correct.	
20	(1) Frame check error. (2) The data in the "command area" exceeds the limit. (3) The data in the "index area" exceeds the limit. (4) Frame length error/non-ASCII bytes exist except the frame header and frame trailer.	When this response code is reported, the data in the "command area", "index area" and "running data" areas are not reported.
30	(1) Slave machine control is invalid. (2) Function code parameter changes are invalid. (3) The data in the "setting/operation data" area exceeds the limit. (4) The password is wrong.	Whether this response code is reported depends on the current setting status of the slave machine. When reporting, the data in the "command area", "index area" and "running data" areas are reported according to the protocol requirements.

(4) Auxiliary index/command index/fault index

Data meaning: including auxiliary index byte and command index byte.

For the host, the auxiliary index and command index are used to cooperate with the host commands to implement specific functions.

For the slave machine, the auxiliary index and command index are used to report the fault status code from the slave machine. The command index is reported directly without modification.

Data type: hexadecimal, 4 bytes. ASCII format.

The command index occupies the lower two bytes, and the data range is: "00" ~ "FF".

The auxiliary index occupies the upper two bytes, and the data range is: "00" ~ "FF".

The fault status of the slave occupies the "auxiliary index" byte, see Table B-3.

Table B-3 Free port 1 fault type description

Error code (10 hex)	Describe	Error code (10 hex)	Describe
1	Overcurrent during inverter acceleration	19	Current detection circuit failure
2	Overcurrent during inverter deceleration	20	External interference failure
3	Overcurrent in the inverter at constant speed	twenty one	internal interference fault
4	Overvoltage during inverter acceleration	twenty two	PID given is lost
5	Overvoltage during inverter deceleration	twenty three	PID feedback lost
6	Frequency converter constant speed medium overvoltage	twenty four	PID error amount is abnormal
7	Overvoltage when the inverter is shut down	25	Start terminal protection
8	Undervoltage during operation	26	RS485 communication failure
9	Frequency converter overload protection	27	reserved
10	Motor overload protection	28	reserved
11	Motor underload protection	29	reserved
12	Input phase loss	30	E^2PROM read and write error
13	Output phase loss	31	Temperature detection disconnection
14	Inverter module protection	32	Auto-tuning failure
15	Short circuit to ground during operation	33	Contactor abnormality
16	Short circuit to ground after power on	34	On-site failure 1

17	Inverter overheating		
18	External device failure		

Free port 2 fault type description

Error code (10 hex)	Describe	Error code (10 hex)	Describe
1	Acceleration operation overcurrent	13	Inverter module protection
2	Overcurrent during deceleration operation	14	External device failure
3	Constant speed running overcurrent	15	Current detection circuit failure
4	Acceleration operation overvoltage	16	RS485 communication failure
5	Overvoltage during deceleration operation	17	Reserved
6	Constant speed operation overvoltage	18	Reserved
7	Control power supply overvoltage	19	Undervoltage
8	Frequency converter overload	20	System interference
9	Motor overload	twenty one	Reserve
10	Inverter overheating	twenty two	Reserve
11	Reserved	twenty three	E^2PROM read and write error
12	Reserved		

(5) Checksum

Data meaning: frame check, four bytes, ASCII.

Calculation method: The cumulative sum of the ASCII code values of all bytes from "slave address" to "running data".

(6) End of frame

Hexadecimal 0D, single byte.

B.2.6 Protocol command list

The following description omits the frame header 7E and frame tail 0D, address, checksum, and ASCII character format.

Table B-4 Freeport 1 protocol command list

name		Host Order 10 base	Auxiliary Index 16 base	Order Index 16 base	Operating data setting range 16 base	The host sends the instance, e.g. PC controls the inverter operation(Clanguage string format, slave address is set to01)	Number of runs data accuracy	illustrate
Query slave status		10	00	00	none	~010A00000192\r	1	
Read slave parameters	Main setting freq.	11	00	00	none	~010B00000193\r	0.01Hz	
	Auxiliary setting frequency	11	00	01	none	~010B00010194\r	0.01Hz	
	Set frequency	11	00	02	none	~010B00020195\r	0.01Hz	
	Output frequency	11	00	03	none	~010B00030196\r	0.01Hz	
	Output current	11	00	04	none	~010B00040197\r	0.1A	
	The output voltage	11	00	05	none	~010B00050198\r	1V	
	DC bus voltage	11	00	06	none	~010B00060199\r	0.1V	
	Load motor speed	11	00	07	none	~010B0007019A\r	1to/minutes	
	Load motor line speed	11	00	08	none	~010B0008019B\r	none	
	Inverter emperature	11	00	09	none	~010B0009019C\r	1degree	

	Elapsed running time this time	11	00	0A	none	~010B000A01A4\r	0.1minutes	
	Current cumulative running time	11	00	0B	none	~010B000B01A5\r	1hour	
	Current cumulative power-on time	11	00	0C	none	~010B000C01A6\r	1hour	
	Inverter status	11	00	0D	none	~010B000D01A7\r	none	
	Input terminal status	11	00	0E	none	~010B000E01A8\r	none	
	InputOutput terminal statusStatus	11	00	0F	none	~010B000F01A9\r	none	
	Extended output terminal status	11	00	10	none	~010B00100194\r	none	
	Extended input terminal status	11	00	11	none	~010B00110195\r	none	
	Communication virtual input terminal status	11	00	12	none	~010B00120196\r	none	
	Internal virtual input node status	11	00	13	none	~010B00130197\r	none	
	Analog inputAI1	11	00	14	none	~010B00140198\r	none	
	Analog inputAI2	11	00	15	none	~010B00150199\r	none	
	Extended analog input EAI1	11	00	16	none	~010B0016019A\r	none	
	Extended analog input EAI2	11	00	17	none	~010B0017019B\r	none	
	Simulation AO1 Output	11	00	18	none	~010B0018019C\r	none	
	Simulation AO2 Output	11	00	19	none	~010B0019019D\r	none	
	Extended Simulation EAO1 Output	11	00	1A	none	~010B001A01A5\r	none	
	Extended Simulation EAO2 Output	11	00	1B	none	~010B001B01A6\r	none	
	External pulse input frequency	11	00	1C	none	~010B001C01A7\r	1Hz	
	reserve							
	Process PID Reference	11	00	1E	none	~010B001E01A9\r	0.01V	
	Process PID Feedback	11	00	1F	none	~010B001F02AA\r	0.01V	
	Process PID Error	11	00	20	none	~010B00200195\r	0.01V	
	Process PID Output	11	00	twenty one	none	~010B00210196\r	0.01Hz	
	Simple PLC current segment number	11	00	twenty two	none	~010B00220197\r	none	
	Current segment number of external multi-speed	11	00	twenty three	none	~010B00230198\r	none	
	Constant pressure water supply given pressure	11	00	twenty four	none	~010B00240199\r	0.001Mpa	

	Constant pressure water supply feedback pressure	11	00	25	none	~010B0025019A\r	0.001Mpa	
	Constant pressure water supply relay status	11	00	26	none	~010B0026019B\r	none	
	current length	11	00	27	none	~010B0027019C\r	none	
	cumulative length	11	00	28	none	~010B0028019D\r	none	
	Current internal count value	11	00	29	none	~010B0029019E\r	none	
	Current internal timing value	11	00	2A	none	~010B002A01A6\r	none	
	Run command to set channel	11	00	2B	none	~010B002B01A7\r	none	
	Main frequency given channel	11	00	2C	none	~010B002C01A8\r	none	
	Auxiliary frequency given channel	11	00	2D	none	~010B002D01A9\r	none	
	Inverter rated current	11	00	2E	none	~010B002E01AA\r	0.1A	
	Inverter rated voltage	11	00	2F	none	~010B002F01AB\r	1V	
	Inverter rated power	11	00	30	none	~010B00300196\r	0.1KW	
	reserve							
	reserve							
	Frequency after acceleration and deceleration	11	00	33	none	~010B00330199\r	0.01Hz	
	Motor rotor frequency	11	00	34	none	~010B0034019A\r	0.01Hz	
	Current given torque	11	00	35	none	~010B0035019B\r	0.1%	
	Current output torque	11	00	36	none	~010B0036019C\r	0.1%	
	Current torque current	11	00	37	none	~010B0037019D\r	0.1A	
	Current flux current	11	00	38	none	~010B0038019E\r	0.1A	
Operation control and regulation functions	Run command from slave	12	00	00	none	~010C00000194\r	none	
	Set the current operation of the slave machine line frequency given	12	00	01	0Hz～Upper limit frequency	~010C00010FA0027C\r	0.01Hz	Set frequency =40.00Hz
	Slave running with running Frequency given	12	00	02	0Hz～Upper limit frequency	~010C00020FA0027D\r	0.01Hz	Run from machine Set freq. =40.00Hz
	Slave machine runs forward	12	00	03	none	~010C00030197\r	none	
	Slave machine reverse operation	12	00	04	none	~010C00040198\r	none	
	Slave machine forward running belt Running frequency given	12	00	05	0Hz～Upper limit frequency	~010C00050FA00280\r	0.01Hz	Forward turn on set frequency =40.00Hz

	Slave machine reverse running belt Running frequency given	12	00	06	0Hz～Upper limit frequency	~010C00060FA00281\r	0.01Hz	Reverse boot set frequency =40.00Hz
	Slave machine shuts down	12	00	07	None	~010C0007019B\r	None	
	Slave machine jog operation	12	00	08	None	~010C0008019C\r	None	
	Slave machine forward rotation jogging operation	12	00	09	None	~010C0009019D\r	None	
	Slave machine reverse jog operation	12	00	0A	None	~010C000A01A5\r	None	
	The slave machine stops running	12	00	0B	None	~010C000B01A6\r	None	
	Slave fault reset	12	00	0C	None	~010C000C01A7\r	None	
Software version Query command	Query slave software version This number	15	00	00	None	~010F00000197\r	1	

Freeport 2 protocol command list

Name		Host Command10 Base	Auxiliary Index 16 base	Order Index 16 base	Operating data setting range 16 base	The host sends the instance, e.g. PCcontrols the inverter operation (Clanguage string format, slave address is set to01)	Number of runs data accuracy	illustrate
Query slave status		10	00	00	None	~010A00000192\r	1	
Operation control and regulation functions	Run command from slave	12	00	00	None	~010C00000194\r	None	
	Set the current operation of the slave machine line frequency given	12	00	01	0Hz～Upper limit frequency	~010C00010FA0027C\r	0.01Hz	
	Slave running with running Frequency given	12	00	02	0Hz～Upper limit frequency	~010C00020FA0027D\r	0.01Hz	
	Slave machine runs forward	12	00	03	None	~010C00030197\r	None	
	Slave machine reverse operation	12	00	04	None	~010C00040198\r	None	
	Slave machine forward running belt Running frequency given	12	00	05	0Hz～Upper limit frequency	~010C00050FA00280\r	0.01Hz	
	Slave machine reverse running belt Running freq. given	12	00	06	0Hz～Upper limit frequency	~010C00060FA00281\r	0.01Hz	
	Slave machine shuts down	12	00	07	None	~010C0007019B\r	None	

	Slave machine jog operation	12	00	08	None	~010C0008019C\r	None	
	Slave machine forward rotation jogging operation	12	00	09	None	~010C0009019D\r	None	
	Slave machine reverse jog peration	12	00	0A	None	~010C000A01A5\r	None	
	The slave machine stops running	12	00	0B	None	~010C000B01A6\r	None	
	Slave fault reset	12	00	0C	None	~010C000C01A7\r	None	
Software version Query command	Query slave software version This number	15	00	00	None	~010F00000197\r	1	

Table B-5 Read slave function code parameters

Function definition	Set slave function code parameters: all function code parameters except user password and manufacturer password						
Meaning	Frame header	Address	Order	Command index	Operating data	Checksum	End of frame
Host command	7EH	ADDR	13	See remarks	4	BCC	0DH
Number of bytes	1	2	2	4	0	4	1
Slave response	7EH	ADDR	06	See remarks	Function code parameters	BCC	0DH
Number of bytes	1	2	2	4	4	4	1
Remark	Command index = composed of the function code group number and the hexadecimal code of the function code number. For example: To set the parameters of the F0.05 function code, command index = 0005; to set the parameters of the F2.11 function code, the command index = 020B; To set the parameters of the F2.15 function code, command index = 020F; To set the parameters of the F2.13 function code, command index = 020D.						

Correspondence between decimal and hexadecimal values of function code group number names

Function code group number	Decimal	Hexadecimal	Function code group number	Decimal	Hexadecimal
F00	0	00H	F0E	14	0EH
F01	1	01H	F0F	15	0FH
F02	2	02H	F10	16	10H
F03	3	03H	F11	17	11H
F04	4	04H	F12	18	12H
F05	5	05H	F13	19	13H
F06	6	06H	F14	20	14H
F07	7	07H	F15	Twenty one	15H
F08	8	08H	F16	Twenty two	16H
F09	9	09H	F17	Twenty three	17H
F0A	10	0AH	F18	Twenty four	18H

	F0B	11	0BH	F19	25	19H
	F0C	12	0CH	F1A	26	1AH
	F0D	13	0DH	F1B	27	1BH
Valid data	0～FFFF (i.e. 0～65535)					

Before setting the parameters of the user function code, the "user password" must be entered correctly.

Table B-6 Set slave function code parameters

Function definition	Set slave function code parameters: all function code parameters except user password and manufacturer password					
Meaning	Frame header	Address	Order	Command index	Operating data	Checksum	End of frame
Host command	7EH	ADDR	14	See remarks	4	BCC	0DH
Number of bytes	1	2	2	4	4	4	1
Slave response	7EH	ADDR	06	See remarks	Function code parameters	BCC	0DH
Number of bytes	1	2	2	4	4	4	1
Remark	Command index = composed of the function code group number and the hexadecimal code of the function code number. For example: To set the parameters of the F00.05 function code, command index = 0005; to set the parameters of the F02.11 function code, the command index = 020B; To set the parameters of the F02.15 function code, command index = 020F; To set the parameters of the F02.13 function code, command index = 020D.						
	Correspondence between decimal and hexadecimal values of function code group number names						
	Function code group number	Decimal	Hexadecimal	Function code group number	Decimal	Hexadecimal	
	F00	0	00H	F0E	14	0EH	
	F01	1	01H	F0F	15	0FH	
	F02	2	02H	F10	16	10H	
	F03	3	03H	F11	17	11H	
	F04	4	04H	F12	18	12H	
	F05	5	05H	F13	19	13H	
	F06	6	06H	F14	20	14H	
	F07	7	07H	F15	twenty one	15H	
	F08	8	08H	F16	twenty two	16H	
	F09	9	09H	F17	twenty three	17H	
	F0A	10	0AH	F18	twenty four	18H	
	F0B	11	0BH	F19	25	19H	
	F0C	12	0CH	F1A	26	1AH	
	F0D	13	0DH	F1B	27	1BH	
valid data	0～FFFF (i.e. 0～65535)						

Appendix C Keyboard

C.1 Keyboard selection:

Serial number	Model	Illustrate	Remark
1	S-LED15	Native LED single display keyboard	Standard configuration for power 37KW and below
2	S-LED16	Local LED dual display keyboard (with parameter copy function)	Standard configuration for power 45KW and above
3	S-LED15-D	Native LED single display analog potentiometer keyboard	Power options for 37KW and below
4	S-LED16-D	LED dual display digital potentiometer keyboard (With parameter copy function)	The power of 37KW and below is optional and can be used as an external keyboard. Power options of 45KW and above can be used as local or external keyboards.

Currently, our company has two keyboards available for customers to choose from: S-LED15-D and S-LE16-D. The appearance and installation dimensions of these two keyboards are the same as the standard keyboards S-LED15 and S-LED16 respectively. The specific dimensions are Please refer to the outline dimensions of the operation keyboard and keyboard installation box in Chapter 2.

Note

(1) S-LED16 and S-LED16-D keyboards have parameter copy function.

(2) When S-LED16-D keyboard is selected for power of 37KW and below, it can only be used as an external keyboard.

(3) When using the parameter copy function, it can be operated through the F00.27 parameter.

C.2 S-LED15-D Keyboard:

C.2.1 Keyboard layout

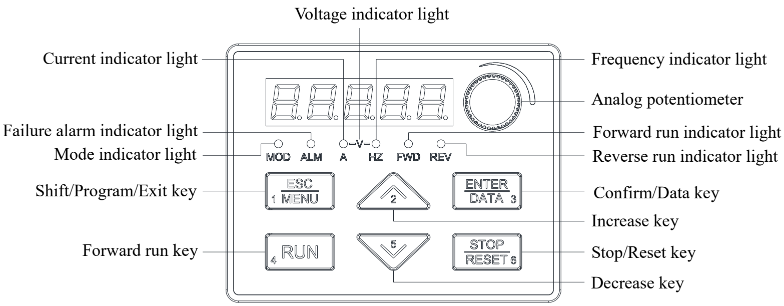


Fig. C-1 S-LED15-D operation keyboard layout diagram

C.2.2 Description of keyboard functions, LED digital tubes and indicator lights

S-LED15-D keyboard consists of a five-digit digital tube display, 6 buttons, an analog potentiometer and six indicator lights.

Analog potentiometer: used for frequency given; when F01.00=5, the analog potentiometer is set for frequency given.

For the function definitions of the 6 keys on the operation keyboard, and the description of the LED digital tube and indicator lights, please refer to the S-LED15 keyboard function description in Chapter 5.

C. 3 S-LED16-D Keyboard:

C. 3. 1 Keyboard layout

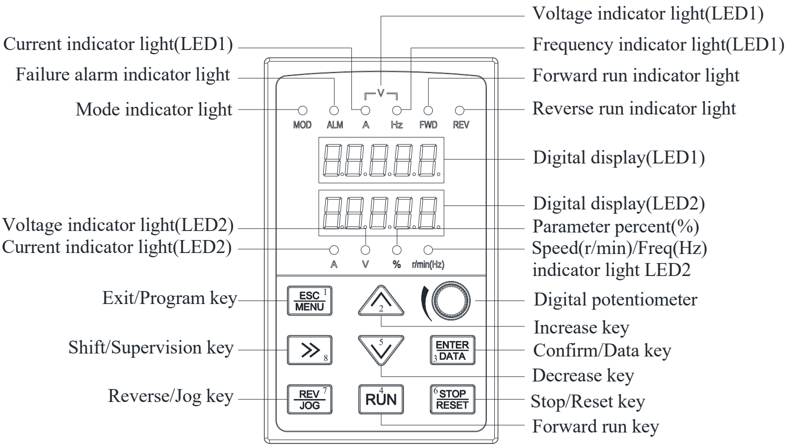


Fig. C-2 S-LED16-D operation keyboard layout diagram

C.3.2 Description of keyboard functions, LED digital tubes and indicator lights

S-LED16-D keyboard consists of two five-digit digital tube displays, 8 buttons, a digital potentiometer and ten indicator lights.

Digital potentiometer: It has the same function as the increment and decrement keys on the keyboard. Turn left to decrease and right to increase.

For the function definitions of the 8 keys on the operation keyboard, LED digital tubes and indicator lights, please refer to the S-LED16 keyboard function description in Chapter 5.

Appendix D Communication expansion card

D.1 Expansion card selection:

Currently, our company offers the following communication expansion cards for customers to choose from.

Serial number	Model	Illustrate	Remark
1	S-PRO5	PROFIBUS-DP expansion card	Optional
2	S-CAN5	CANopen expansion card	Optional
3	S-CAT3	EtherCAT expansion card (applicable to 3.7KW and above power)	Optional
4	S-PN03	ProfiNet expansion card (applicable to 3.7KW and above power)	Optional
5	S-FD01	Frequency division output expansion card(applicable to 3.7KW and above power)	Optional

D.2 PROFIBUS-DP expansion card

D.2.1 Introduction to PROFIBUS

(1) PROFIBUS (abbreviation for PROcess FIeld Bus) is a process field bus. It is an international, open field bus standard that does not depend on equipment manufacturers. It is supported by many control equipment manufacturers and has strong compatibility. It is widely used in manufacturing automation, process industry automation and other automation fields such as buildings, transportation, and electric power.

(2) PROFIBUS can realize data exchange between various types of automation components. Various automation equipment can exchange information through the same interface, but the transmission rates of various equipment are different, so PROFIBUS must provide various transmission rate options. It consists of three compatible parts: PROFIBUS-DP (distributed peripheral), PROFIBUS-PA, and PROFIBUS-FMS.

(3) PROFIBUS (RS485) The first layer realizes symmetrical data transmission. The wires of a bus segment are shielded twisted pair cables, and there is a terminal resistor at both ends of the segment. The transmission method is based on half-duplex, asynchronous, and gapless synchronization for data exchange. The physical layer supports Fiber Channel, data frame 11, and transmission rate: 9.6Kbit/sec-12Mbit/sec. The bus length ranges from 100 to 1200 meters.

(4) Communication between the controller and PC at the same level (token passing program) ensures that you get enough opportunities to handle your own communication tasks at a certain time. Complex PLCs and PCs must communicate with simple distributed I/O quickly and with as little protocol overhead as possible (master-slave program).

D.2.2 PROFIBUS-DP appearance and terminal definition description

Fig. D-1 PROFIBUS-DP overall dimensions

Table D-1 Terminal function description

Terminal number	Name	Describe	Remark
J4	Board level docking socket	During installation, connect this plug to J4 on the A main control board or to J3 on the B main control board.	
J3	Communication terminal block	DP bus terminal block	

(1) J3 plug pin definition:

Foot position	Terminal label	Describe
1	PE	Earth
2	PG	Isolated 5V power ground
3	B-	Data line B
4	A+	Data line A
5	PP5V	Isolated 5V power supply

D.3 CANopen expansion card

D.3.1 Introduction to CANopen

CANopen is a high-level communication protocol built on the Controller Area Network (Controller Area Network, CAN), including communication sub-protocol and device sub-protocol. It is often used in embedded systems and is also commonly used in industrial control. A field bus.

CANopen implements the network layer and above protocols of the OSI model. The CANopen standard includes an addressing scheme and several small communication sub-protocols.

D.3.2 Equipment model

The communication unit handles the communication protocols required to communicate with other modules on the network, and the startup and reset of the device are controlled by a state machine. The states of the state machine include: Initialization, Pre-operational, Operational, and Stopped.

D.3.3 Object dictionary

Object Dictionary (OD: Object Dictionary) is an ordered group of objects; each object is addressed with a 16-bit index value. In order to allow access to a single element in the data structure, an 8-bit sub-index is also defined.

D.3.4 Communication

(1) Communication objects: management messages, service data objects (SDO), process data objects (PDO), predefined messages or special function objects.
(2) Communication model: master/slave model, client/server model, producer/consumer model.

D.3.5 Agreement

(1) NMT protocol (network management, network management): The protocol defines state change commands of the state machine (such as starting or stopping the device), detecting

remote device bootup and fault conditions.

(2) Heartbeat protocol: used to monitor nodes in the network and confirm their normal operation.

(3) SDO protocol:is used to transmit large low-priority data between devices, typically used to configure devices on theCANopennetwork.

(4) PDO protocol:is used to transmit 8 bytes or less data, and there are no other protocol presets (meaning that the data content has been predefined).

D.3.6 CANopen appearance and terminal definition description

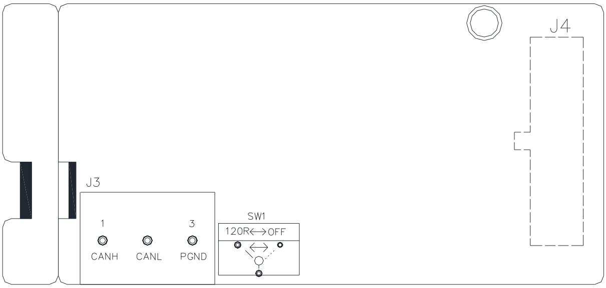


Fig. D-2 CANopen dimensions

Table D-2 Terminal function description

Terminal number	Name	Describe	Remark
J4	Board level docking socket	During installation, connect this plug to J4 on the A main control board or to J3 on the B main control board.	
J3	Communication terminal block	Communication equipment connected to the CAN bus by the customer	
SW1	Terminal resistor access port	Short-circuit SW1, then the terminal resistor is connected to the bus	

(1) J3 pin definition

Foot position	Terminal label	Describe
1	CANH	CAN positive input
2	CANL	CAN negative input
3	PGND	Power ground

D.4 EtherCAT expansion card

D.4.1 Introduction to EtherCAT

S-CAT3 is specially developed to provide EtherCAT communication function for S2000 frequency converter. It supports CoE (SDO PDO) service, full-duplex 100Mbps, and realizes the function of reading, writing and monitoring parameters of S2000 frequency converter.

D.4.2 Appearance and terminal definition description

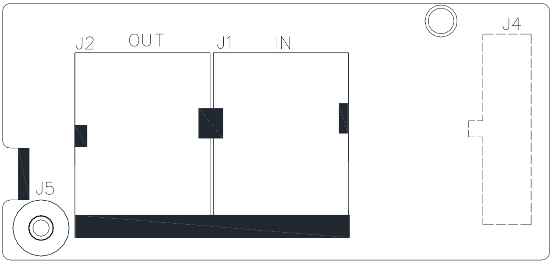


Fig. D-3 Appearance drawing

Table D-3 Terminal function description

Terminal number	Name	Describe	Remark
J4	Board level docking socket	During installation, connect this plug to J4 on the A main control board or to J3 on the B main control board.	
J1	Network port IN	Communication input port	
J2	Network port OUT	Communication output port	

D.5 ProfiNet expansion card

D.5.1 Introduction to Profinet

The S-PN03 communication card is a ProfiNet communication card specially developed by our company for the S2000 universal frequency converter. It complies with the internationally accepted ProfiNet Ethernet standard.

D.5.2 Appearance and terminal definition description

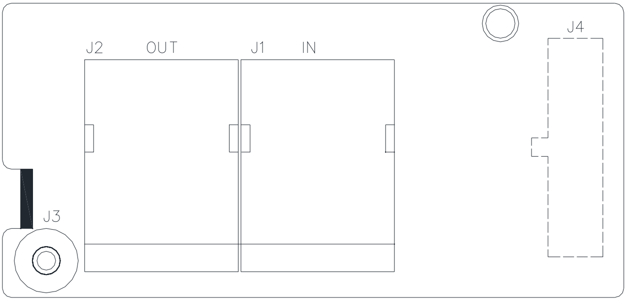


Fig. D-4 Appearance drawing

Table D-4 Terminal function description

Terminal number	Name	Describe	Remark
J4	Board level docking socket	During installation, connect this plug to J4 on the A main control board or to J3 on the B main control board.	
J1	Network port IN	Communication input port	
J2	Network port OUT	Communication output port	
J3	PE terminal	Earth terminal block	

D.6 Frequency division output expansion card

D.6.1 Introduction to frequency division output expansion card

S-FD01 expansion card is a frequency division output communication card and developed by our company for S2000 series frequency inverter.

D.6.2 Appearance and terminal definition instructions

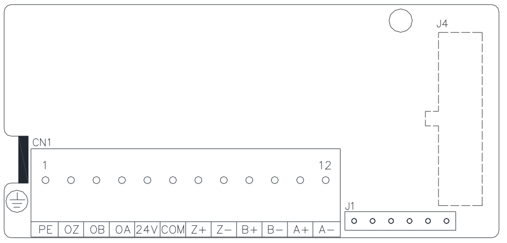


Fig. D-5 Outline drawing

Table D-5 Terminal function description

Terminal number	Name	Description	Mark
CN1	Frequency division output terminal	The port connected by the customer to the device that receives the pulse	
J4	Board level docking interface	During installation, connect this interface to the communication expansion bayonet of the main control board.	

(1) CN1 pin definition

Pin position	Terminal label	Definition	Pin position	Terminal label	Definition
1	PE	Ground	7	Z+	Z signal differential frequency division output positive
2	OZ	Z signal collector frequency division output	8	Z−	Z signal differential frequency division output negative
3	OB	B signal collector frequency division output	9	B+	B signal differential frequency division output positive
4	OA	A signal collector frequency division output	10	B−	B signal differential frequency division output negative
5	24V	External power supply 24V input port	11	A+	A signal differential frequency division output positive
6	COM	External COM connection port	12	A−	A signal differential frequency division output negative

(2) Technical specifications

Name	Technical specifications	Mark
Output frequency range (after 4 times frequency)	Differential output: 0Hz ~ 20MHz; collector output: 0Hz ~ 250KHz.	
Frequency division coefficient	Arbitrary division and frequency doubling	

Output interface type	Support 5V differential output	
Output interface type	Supports 24V collector wiring mode, with a maximum pull-down current of 20mA.	

⑶ **Wiring guide**

① Collector frequency division output wiring: Connect the OA, OB, and OZ of the output terminals to the OA, OB, and OZ terminals of the receiving device respectively with output cables; 24V and COM can be connected to the 24V and COM terminals of the control board or external terminals using cables.

② Differential frequency division output wiring: Connect the A+, A-, B+, B-, Z+, Z-and PE output terminals to the A+, A-, B+, B-, Z+, Z- ,COM of the receiving device using output cables.

Note: If necessary, connect the shield-layer of the frequency division output cable wiring to the PEof the frequency division signal receiving device.

Appendix E Universal encoder expansion card

E.1 Encoder expansion card selection:

The universal encoder expansion card (PG card) is used as an optional accessory and is a must for closed-loop vector control of the inverter.

No.	Model	Illustrate	Remark
1	S-PG09	OC/open collector expansion card (ABZ) (applicable to all series)	Optional
2	S-PG10	Differential PG expansion card (ABZ+UVW) (applicable to all series)	Optional
3	S-PG11	Differential PG expansion card (ABZ+command pulse) (applicable to all series)	Optional
4	S-PG13	Resolver PG expansion card (SPI communication) (applicable to power of 3.7KW and above)	Optional

E.2 S-PG09 appearance and terminal definition description

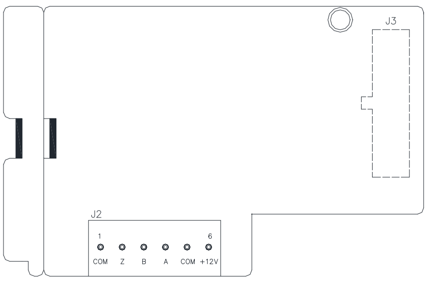


Fig. E-1 S-PG09 overall dimensions

Table E-1 Terminal function description

Terminal number	Name	Describe	Remark
J3	Board level docking socket	During installation, connect this plug to J4 on the main control board	
J2	User interface	Use with encoder	

(1) **J2 terminal definition**

Foot position	Terminal label	Describe
1	COM	Power ground
2	Z	Encoder output Z signal
3	B	Encoder output B signal
4	A	Encoder output A signal
5	COM	Power ground
6	12V	Provides 12V voltage to the outside world (only supplies power to the 12V encoder)

E.3 S-PG10 appearance and terminal definition description

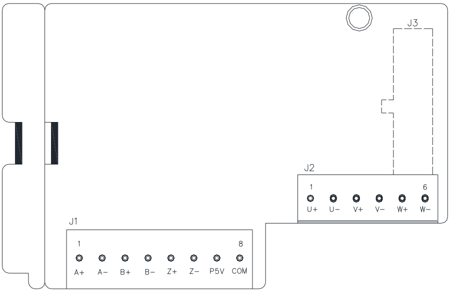


Fig. E-2 S-PG10 overall dimensions

Table E-2 Terminal function description

Terminal number	Name	Describe	Remark
J3	Board level docking socket	During installation, connect this plug to J4 on the main control board	
J1, J2	User interface	Use with encoder	

(1) **J1 terminal definition**

Foot position	Terminal label	Describe
1	A+	The encoder output A signal is positive
2	A-	Encoder output A signal negative
3	B+	The encoder output B signal is positive
4	B-	Encoder output B signal negative
5	Z+	The encoder output Z signal is positive
6	Z-	Encoder output Z signal negative
7	PP5V	Provides 5V/300mA current to the outside world
8	COM	Power ground

(2) J2 terminal definition

Foot position	Terminal label	Describe
1	U+	The encoder output U signal is positive
2	U-	Encoder output U signal negative
3	V+	The encoder output V signal is positive
4	V-	The encoder output V signal is negative
5	W+	Encoder output W signal is positive
6	W-	Encoder output W signal negative

E.4 S-PG11 appearance and terminal definition description

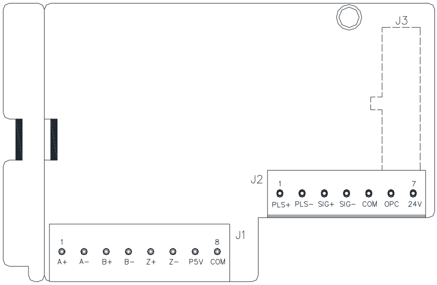


Fig.E-3 S-PG11 overall dimensions

Table E-3 Terminal function description

Terminal number	Name	Describe	Remark
J3	Board level docking socket	During installation, connect this plug to J4 on the main control board	
J1, J2	user interface	Use with encoder	

(1) J1 terminal definition

Foot position	Terminal label	Describe
1	A+	The encoder output A signal is positive
2	A-	Encoder output A signal negative
3	B+	The encoder output B signal is positive
4	B-	Encoder output B signal negative
5	Z+	The encoder output Z signal is positive
6	Z-	Encoder output Z signal negative
7	PP5V	Provides 5V/300mA current to the outside world
8	COM	Power ground

(2) J2 terminal definition

Foot position	Terminal label	Describe
1	PLS+	Position pulse command signal positive
2	PLS-	Position pulse command signal negative
3	SIG+	Position direction command signal positive
4	SIG-	Position direction command signal negative
5	COM	Power ground
6	OPC	Default is shorted to P24V
7	24V	Provides 24V voltage to the outside world (only supplies power to the 24V encoder)

E.5 S-PG13 appearance and terminal definition description

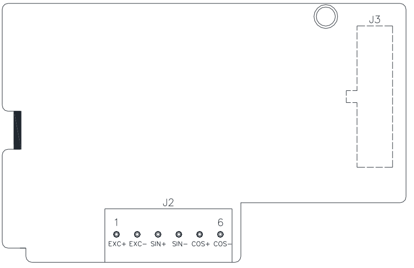


Fig. E-4 S-PG13 overall dimensions

Table E-4 Terminal function description

Terminal number	Name	Describe	Remark
J3	Board level docking socket	During installation, connect this plug to J4 on the main control board	
J2	User interface	Use with encoder	

(1) J2 terminal definition

Foot position	Terminal label	Describe
1	EXC+	Resolver excitation positive
2	EXC-	Resolver excitation negative
3	SIN+	Resolver feedback SIN positive
4	SIN-	Resolver feedback SIN negative
5	COS+	Resolver feedback COS positive
6	COS-	Resolver feedback COS negative

(2) PG card specifications:

User interface	Terminal block
Wire gauge	>22AWG
Resolution	12 bits
Excitation frequency	10kHz
VRMS	7V
VP-P	3.15±25%

Appendix F General I/O, analog expansion card

F.1 General I/O, analog expansion card Selection：

General I/O, analog expansion card, used as an optional accessory, the expansion card is installed on the control board J3.

No.	Model	Illustrate	Remark
1	S-AI2	Terminal expansion card. One relay output, one analog input, one analog output.（applicable to power of 3.7KW and above)	Optional
2	S-WS8	Two-way relay expansion card.（applicable to power of 3.7KW and above)	Optional

F.2 S-AI2 appearance and terminal definition description

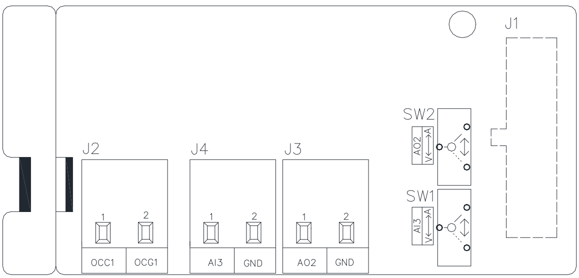


Fig. F-1 S-AI2 overall dimensions

Table F-1 Terminal function description

Terminal number	Name	Describe
J1	Board level docking socket	During installation, connect this plug to the communication expansion port on the main control board.
J2	User interface	Relay output terminals
J3	User interface	Relay output terminals
J4	User interface	Relay input terminals

（1）J2 terminal definition

Foot position	Terminal label	Describe
1	OCC1	Relay OC1 output terminal.
2	OCG1	

（2）J3 terminal definition

Foot position	Terminal label	Describe
1	AO2	Analog output channel 2 can realize 0~+10V voltage signal output and 0~20mA current signal output through the dip switch (SW2).
2	GND	Power ground

（3）J4 terminal definition

Foot position	Terminal label	Describe
1	AI3	Analog input channel 3 can realize 0~+10V voltage signal input and 0~20mA current signal input through the dip switch (SW1).
2	GND	Power ground

F.3 S-WS8 appearance and terminal definition description

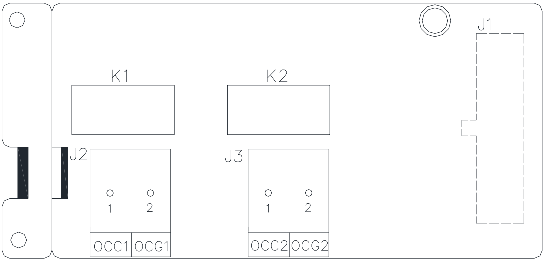


Fig.F-2 S-WS8 overall dimensions

Table F-2 Terminal function description

Terminal number	Name	Describe
J1	Board level docking socket	During installation, connect this plug to the communication expansion port on the main control board.
J2	User interface	Relay OC1 terminal block.
J3	User interface	Relay OC2 terminal block.

（1）J2 terminal definition

Foot position	Terminal label	Describe
1	OCC1	Output terminal of relay K1
2	OCG1	

（2）J3 terminal definition

Foot position	Terminal label	Describe
1	OCC2	Output terminal of relay K2
2	OCG2	

Appendix G Application Macros

G.1 Introduction to industry application macros

For the following industry applications, the functional parameters have been configured according to the usage habits of some customers. As long as the wiring is performed according to the provided wiring diagram and the corresponding application macro is selected, it can be used conveniently, reducing the workload of parameter setting.

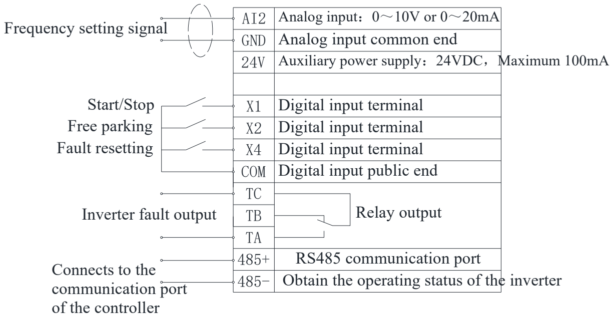
Function code	Function code name	Function code parameter description	Unit	Factory default	Attributes
F09.49	Apply macro selection	0: General model 1: Air compressor application 2: Extruder application 3: Water pump application 4: Fan application	-	0	○

G.2 Applicable occasions of application macro

Application macro	Applications
General model	It is a general-purpose inverter that operates under keyboard control. For the factory terminal configuration, see the basic operation wiring diagram in Chapter 3.
Air compressor application	The frequency converter serves as a speed regulating actuator, and the air compressor control logic is completed by the controller. The 0~20mA current signal is used as the frequency given, and the factory parameters are configured.
Extruder application	Analog given frequency, terminal control start and stop. Can be used for host and feeding motor control
Water pump application	Constant pressure water supply application including sleep and wake-up functions, which can control variable frequency pumps and dormant pumps. Digitally set target pressure, press 0～20mA pressure transmitter as pressure feedback, and configure factory parameters.
Fan application	Light-load applications including manual/automatic switching, speed tracking startup, and instantaneous stop-stop functions. When the X2 terminal is valid, it switches to manual state.

G.3 Wiring diagram and parameter table corresponding to application macro

G.3.1 Wiring diagram corresponding to air compressor application macro



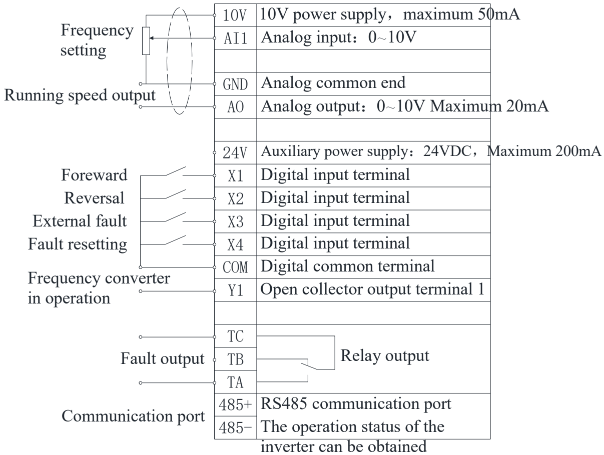
Parameter table corresponding to air compressor application macro

F09.49=1: Air compressor application, after one-click setting, the parameters are as shown in the table below:

Function code	Function code name	Function code parameter description	unit	Factory default
F00.24	Motor control mode	0: V/F control (torque control is not supported)	1	0
F01.15	Run command channel selection	0: Operation keyboard operation control	1	0
F01.00	Main frequency input channel selection	2: AI2 simulation settings	1	2
F01.17	Acceleration time 1	1～60000 (acceleration time refers to the time required to accelerate from zero frequency to upper limit frequency)	1	25.0
F01.18	Deceleration time 1	1～60000 (Deceleration time refers to the time required to decelerate from the upper limit frequency to zero frequency)	1	30.0
F01.11	Upper limit frequency	Lower limit frequency～600.00Hz	0.01Hz	50.00Hz
F01.12	Lower limit frequency	0.00Hz～upper limit frequency	0.01Hz	30.00Hz
F01.13	Lower limit frequency operation mode	0: Run at the upper limit frequency	1	0
F01.16	Running direction setting	Units digit: keyboard command forward and reverse setting (only valid for jog) 0: Forward rotation 1: Reverse Tens digit: Forward and reverse rotation prohibited (applicable to all command channels, excluding jog) 0: Can be reversed 1: Reverse operation is prohibited (when reverse operation is applied, stop according to the stop mode) 2: Forward operation is prohibited (when forward operation is applied, stop according to the stop mode) Hundreds digit: reverse the running direction (only valid for keyboard and communication channel) 0: invalid 1: valid	1	0x1010

		Thousands digit: Terminal multi-speed acceleration and deceleration time control 0:Corresponds to acceleration and deceleration 1~15 respectively. 1: Determined by F01.17 and F01.18		
F08.18	Input terminal X1 function selection	1: Forward running FWD terminal	1	1
F08.19	Input terminal X2 function selection	25: Free stop input	1	25
F06.00	Given curve selection	Units digit: AI1 curve selection 0: Curve 1 1: Curve 2 2: Curve 3 Tens digit: AI2 curve selection: same as units digit Hundreds digit: high-speed pulse curve selection: same as units digit Thousands digit: pulse width given curve selection: same digit	1	0x0010
F06.07	Curve 2 minimum given	0.0%～curve 2 inflection point given	0.1%	21.0%
F06.08	Curve 2 minimum given corresponding physical quantity	0.0～100.0%	0.1%	0.0%
F06.09	The inflection point of curve 2 is given	Curve 2 minimum reference～curve 2 maximum reference	0.1%	21.0%
F06.10	The inflection point of curve 2 is given as the corresponding physical quantity	0.0～100.0%	0.1%	0%
F06.11	Curve 2 maximum given	Curve 2 inflection point given～100.0%	0.1%	99.0%
F06.12	Curve 2 maximum given corresponding physical quantity	0.0～100.0%	0.1%	100.0%
F09.00	Open collector output terminal Y1 output setting	1: The inverter is running (RUN)	1	1
F09.04	RLY1 output setting	22: Frequency converter failure	1	twenty two
F02.00	Start operating mode	0: Start from the starting frequency	1	0
F02.11	Shutdown mode	0～2	1	0
F03.00	V/F curve setting	0: Constant torque curve	1	0
F19.04	Motor overload protection coefficient	10.0～2000.0%	0.1%	105.0%

G.3.2 Wiring diagram corresponding to extruder application macro



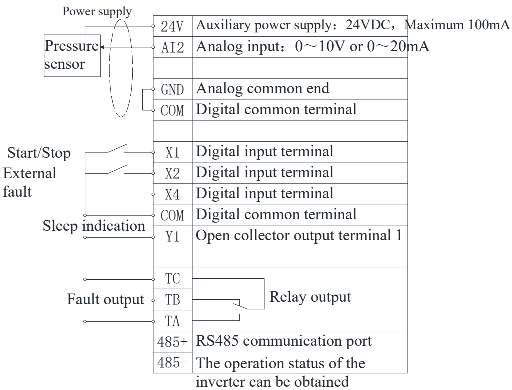
Parameter table corresponding to the extruder application macro

F09.49=2: Extruder application, after one-click setting, the parameters are as shown in the table below:

Function code	Function code name	Function code parameter description	Unit	Factory default
F01.15	Run command channel selection	1: Terminal operation command control	1	1
F01.00	Main frequency input channel selection	1: AI1 simulation setting	1	1
F01.17	Acceleration time 1	1～60000 (acceleration time refers to the time required to accelerate from zero frequency to upper limit frequency)	1	25.0
F01.18	Deceleration time 1	1～60000 (Deceleration time refers to the time required to decelerate from the upper limit frequency to zero freq.)	1	30.0
F01.11	Upper limit frequency	Lower limit frequency～600.00Hz	0.01Hz	50.00Hz
F01.12	Lower limit frequency	0.00Hz～upper limit frequency	0.01Hz	0.00Hz
F08.18	Input terminal X1 function selection	1: Forward running FWD terminal	1	1
F08.19	Input terminal X2 function selection	2: Reverse operation REV terminal	1	2
F08.20	Input terminal X3 function selection	22: External device fault input	1	twenty two
F09.00	Open collector output terminal Y1 output setting	1: The inverter is running (RUN)	1	1
F09.04	RLY1 output setting	22: Frequency converter failure	1	twenty two
F02.00	Start operating mode	0: Start from the starting frequency	1	0
F02.11	Shutdown mode	0: Deceleration to stop	1	0
F03.00	V/F curve setting	4: User-set V/F curve (determined by F03.04～F03.11	1	4

		function codes)		
F03.04	V/F frequency value 0	0.00～V/F frequency value 1	0.01Hz	0.50Hz
F03.05	V/F voltage value 0	0.00～V/F voltage value 1	0.01%	2.00%
F03.06	V/F frequency value 1	V/F frequency value 0～V/F frequency value 2	0.01Hz	2.00Hz
F03.07	V/F voltage value 1	V/F voltage value 0～V/F voltage value 2	0.01%	5.50%
F03.08	V/F frequency value 2	V/F frequency value 1～V/F frequency value 3	0.01Hz	5.00Hz
F03.09	V/F voltage value 2	V/F voltage value 1～V/F voltage value 3	0.01%	10.00%
F03.10	V/F frequency value 3	V/F frequency value 2～upper limit frequency	0.01Hz	40.00Hz
F03.11	V/F voltage value 3	V/F voltage value 2～100.00% (motor rated voltage)	0.01%	80.00%
F03.02	Torque boost	0.0～30.0%	0.1%	0.0%

G.3.3 Wiring diagram corresponding to water pump application macro



Parameter table corresponding to water pump application macro

F09.49=3; water pump application, after one-click setting, the parameters are as shown in the table below:

Function: Started process PID, instantaneous stop, normal fault retry, sleep wake-up function

Water pressure conversion relationship:

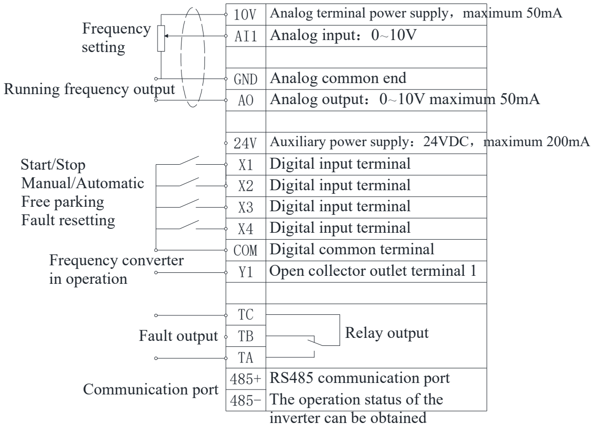
1bar (bar) = 0.1Mpa (megapascal) = 100kPa (kilopascal) ≈ 1Kg/cm² (kg/square centimeter)

Function code	Function code name	Function code parameter description	Unit	Factory default
F01.15	Run command channel selection	0: Operation keyboard operation control	1	0
F11.00	Closed loop operation control selection	1: PID closed-loop operation control is valid	1	1
F12.00	Constant pressure water supply mode selection	1: Single pump water supply mode	1	1
F01.17	Acceleration time 1	1～60000 (acceleration time refers to the time required to accelerate from zero frequency to upper limit freq.)	1	25.0
F01.18	Deceleration time 1	1～60000 (Deceleration time refers to the time required to decelerate from the upper limit freq. to zero freq.)	1	30.0
F01.11	upper limit frequency	Lower limit frequency～600.00Hz	0.01Hz	50.00Hz

F11.15	PID adjustment upper limit frequency	0.00Hz～upper limit frequency	0.01Hz	50.00Hz
F01.13	Lower limit frequency operation mode	3: Sleep, PWM is blocked during sleep	1	3
F01.16	Running direction setting	Units digit: keyboard command forward and reverse setting (only valid for jog) 0: Forward rotation 1: Reverse Tens digit: Forward and reverse rotation prohibited (applicable to all command channels, excluding jog) 0: Can be reversed 1: Reverse operation is prohibited (when reverse operation is applied, stop according to the stop mode) 2: Forward operation is prohibited (when forward operation is applied, stop according to the stop mode) Hundreds digit: reverse the running direction (only valid for keyboard and communication channel) 0: invalid 1: valid Thousands digit: Terminal multi-speed acceleration and deceleration time control 0: Corresponds to acceleration and deceleration 1～15 respectively. 1: Determined by F01.17 and F01.18	1	0x1010
F08.18	Input terminal X1 function selection	0: The control terminal is idle	1	0
F08.19	Input terminal X2 function selection	22: External device fault input	1	twenty two
F09.00	Open collector output terminal Y1 output setting	1: The inverter is running (RUN)	1	1
F09.04	RLY1 output setting	22: Frequency converter failure	1	twenty two
F02.00	Start operating mode	0: Start from the starting frequency	1	0
F02.11	shutdown mode	0: Deceleration to stop	1	0
F03.00	V/F curve setting	1: Decreasing torque curve 1 (1.2 power)	1	1
F19.01	Fault self-recovery times	0～10 (0 means no automatic reset function)	1	5
F19.02	Failure self-recovery interval	0.5～50.0s	0.1s	30.0s
F11.01	Given channel selection	0: Digital given	1	0
F12.01	Target pressure setting	0.000～Remote pressure gauge range	0.001Mpa	0.200Mpa
F11.02	Feedback channel selection	1: AI2 analog input	1	1
F12.06	Remote pressure gauge range	0.001～9.999Mpa	0.001Mpa	1.000Mpa
F12.02	sleep freq. threshold	0.00Hz～upper limit frequency	0.01Hz	30.00Hz
F12.03	Awakening pressure threshold	0.000～Remote pressure gauge range	0.001 Mpa	0.150 Mpa
F12.04	sleep delay time	0.0～6000.0s	0.1s	5.0s
F12.05	Wake-up delay time	0.0～6000.0s	0.1s	5.0s

F12.11	Wake mode selection	0: Wake up according to the pressure defined by F12.03	1	0
F00.05	C-04 displays parameter selection during runtime	36: Constant pressure water supply given pressure (0.001Mpa)	1	36
F00.06	C-05 displays parameter selection during runtime	37: Constant pressure water supply feedback pressure (0.001Mpa)	1	37
F00.11	C-04 displays parameter selection when shutting down	36: Constant pressure water supply given pressure (0.001Mpa)	1	36
F00.12	C-05 displays parameter selection when shutting down	37: Constant pressure water supply feedback pressure (0.001Mpa)	1	37

G.3.4 Wiring diagram corresponding to fan application macro



Parameter table corresponding to fan application macro

F09.49=4: Fan application, after one-click setting, the parameters are as shown in the table below:

Functions: Contains manual/automatic switching function, speed tracking start, non-stop after instantaneous stop, and normal fault retry function.

When manual: F01.01 sets the operating frequency, and the keyboard controls start and stop; when automatic: AI1 voltage sets the frequency, and the terminal controls start and stop.

Function code	Function code name	Function code parameter description	Unit	Factory default
F01.15	Run command channel selection	1: Terminal operation command control	1	1
F01.00	Main frequency input channel selection	1: AI1 simulation setting	1	1
F01.01	Main frequency digital setting	0.00Hz～upper limit frequency	0.01Hz	35.00Hz
F01.17	Acceleration time 1	1～60000 (acceleration time refers to the time required	1	25.0

		to accelerate from zero freq. to upper limit freq.)		
F01.18	Deceleration time 1	1～60000 (Deceleration time refers to the time required to decelerate from the upper limit freq. to zero freq.)	1	30.0
F01.11	Upper limit frequency	Lower limit frequency～600.00Hz	0.01Hz	50.00Hz
F01.12	Lower limit frequency	0.00Hz～upper limit frequency	0.01Hz	0.00Hz
F01.16	Running direction setting	Units digit: keyboard command forward and reverse setting (only valid for jog) 0: Forward rotation 1: Reverse Tens digit: Forward and reverse rotation prohibited (applicable to all command channels, excluding jog) 0: Can be reversed 1: Reverse operation is prohibited (when reverse operation is applied, stop according to the stop mode) 2: Forward operation is prohibited (when forward operation is applied, stop according to the stop mode) Hundreds digit: reverse the running direction (only valid for keyboard and communication channel) 0: invalid 1: valid Thousands digit: Terminal multi-speed acceleration and deceleration time control 0: Corresponds to acceleration and deceleration 1～15 respectively. 1: Determined by F01.17 and F01.18	1	0X1010
F08.18	Input terminal X1 function selection	1: Forward running FWD terminal	1	1
F08.19	Input terminal X2 function selection	49: Command to switch to panel	1	49
F08.20	Input terminal X3 function selection	25: Free stop input	1	25
F09.00	Open collector output terminal Y1 output setting	1: The inverter is running (RUN)	1	1
F02.00	Start operating mode	2: Speed tracking starts	1	2
F02.11	Shutdown mode	1: Free stop	1	1
F03.00	V/F curve setting	1: Decreasing torque curve 1 (1.2 power)	1	1
F19.01	Fault self-recovery times	0～10 (0 means no automatic reset function)	1	5
F19.02	Failure self-recovery interval	0.5～50.0s	0.1s	30.0s

Note

(1) When AI2 current signal is selected for reference/feedback, the AI2 switch on the control board must be set to the current position to correctly receive the current signal.

(2) To facilitate debugging, except for the fan application macro, the factory command sources are keyboard control. After debugging, please change to the required command source.

(3) Industry application macros cannot guarantee to meet the application needs of all users. Therefore, after selecting an application macro, you may need to fine-tune the relevant parameters.

Appendix H Lifting Special Function Instruction (customized special process)

H.1 Supplementary function parameter table

Function code	Name	Set range	Min. unit	Factory Default	Modifi -cation
F00.68	Device serial number	0～65535	0	0	*
F01.00	Main frequency input channel selection	11: Command pulse frequency setting	0	0	○
F08.18	Input terminal X1 function selection	67: Servo enable 79: Spindle positioning enable 87: Brake feedback input 88: Anti-sway disabled	1	1	×
F08.31	Special function selection	Unit digit: jogging priority level selection 0: Highest priority 1: Lowest priority Tens digit: Keyboard adjustment display settings (Under speed control mode) 0: Display set frequency 1: Display set speed Hundreds digit: Multi- speed setting mode 0: Binary input (multi-terminal combination) 1: Direct input (single terminal) Thousands digit: Frequency reduction with voltage drop 0: Invalid 1: Valid	1	1000	○
F09.00	Open-collector output terminal Y1 output setting	58: Zero servo enable output	1	0	×
F09.49	Apply Macro Selection	5: Traverse mechanism 6: Lifting mechanism (Conical Motor) 7: Lifting mechanism (winch open-loop) 8: Lifting mechanism (winch closed-loop) When switching application macros, follow this sequence: first set F00.14 to restore the factory parameters, then configure the corresponding application macro.	1	0	×
F14.00	Speed/torque/position control selection	7:Speed-Position Control Switching (CNC)	1	0	×

F21-Anti-Sway Parameter Group					
Function code	Name	Set range	Min. unit	Factory Default	Modifi -cation
F21.00	Anti-shake mode	0: Anti-sway disabled 1: Reserved 2: Normal anti-sway mode 3: Quick anti-sway mode	0	0	○
F21.01	Swing period	0～8.192 seconds The relationship between period T and rope length L: $T = 2\pi\sqrt{(L/g)}$ $L = T^2 g/(2\pi)^2$ $= 0.2485T^2$ If the swing period is default value but the rope length is not, the rope length shall prevail; otherwise, the swing period shall prevail	0	8.192s	○
F21.02	Rope length	0～16.00m	0m	16.00m	○
F21.03	Residual oscillation percentage	0～50.0%	0.1%	3.0%	○
F21.04	Low-speed positioning operation	0: Anti-sway is disabled at low speed 1: Anti-sway is disabled when the given freq.≤F21.05	0	0	○

F21.05	Low-speed positioning freq.	0～50.0Hz	0.1Hz	10.0Hz	○
F21.06	Anti-mounting detection enable	0: Invalid 1: Valid	0	0	○
F21.07	Slack rope detection enable	0: Invalid 1: Valid	0	0	○
F21.10	Balance window time	0～5s	0.01s	0.5s	○
F21.12	Bus voltage percentage for action of the frequency reduction with voltage drop	85%～99% When the bus voltage＞F21.12, no frequency reduction is applied. If the bus voltage＜F21.12, the maximum set freq. f1 is calculated as the motor rated freq. multiplied by the current bus voltage and divided by F21.12 of rated bus voltage . If the freq. setting exceeds f1, the system reduces the freq. to f1 F08.31 Thousand digit: 0: Freq. reduction with voltage drop function OFF 1: Freq. reduction with voltage drop function On	1%	90%	○
F21.13	Overload protection alarm current detection value of lifting mode	0.0～150.0% (percentage of motor rated current, 0 is not valid) When the overload protection current detection value F21.13＞0, the overload protection alarm function activates. During rise operation, if the operating frequency≥F24.01+2.00, initiate the output current detection. If the output current >= F21.13 and keeps over F21.14 (overload detection time), the overload protection warning is triggered. Lowering operation is not detected	0.1%	0	○
F21.14	Overload detection time	0.0～5.0s	0.1s	0.5s	○
F21.20	Reverse slack rope torque	0～100.0%	0.1%	5.0%	○
F21.21	Reverse light load factor	0～100.0	0.1	35.0	○
F21.22	Reverse allows load percentage	0～100.0%	0.1%	80.0%	○
F21.27	Anti-mounting torque detection upper percentage	0～150%	1%	100%	○
F21.28	Mounting quick deceleration time	0～5.0s	0.1s	1s	○
F21.29	Mounting target frequency for quick deceleration	0～50.0Hz	0.1Hz	10.0Hz	○
F21.30	Current fluctuation range during mounting balance	0～100%	0.1%	3%	○
F21.31	Current fluctuation range during mounting mutation	0～100%	0.1%	20%	○
F21.32	Smooth lifting frequency during mounting. (Anti-mounting is invalid if the freq.<F21.32.)	0～50.0Hz	0.1Hz	15.0Hz	○
F21.33	Minimum duration time for low-speed operation during mounting	0～5s	0.1s	1s	○
F21.34	Minimum torque for slack rope detection	0～150.0%	0.1%	50.0%	○
F21.35	Slack rope quick deceleration time	0～5.0s	0.1s	0.5s	○
F21.36	Target frequency for slack rope quick deceleration	0～50.00Hz	0.1Hz	3.0Hz	○
F21.37	Current fluctuation range during rope slack balance	0～100%	0.1%	3%	○
F21.38	Current fluctuation range during rope slack mutation	0～100%	0.1%	10%	○

F21.39	Slack rope stable lifting freq. (anti-mounting detection is invalid if frequency<21.39)	0.0～50.0Hz	0.1Hz	15.0Hz	○
F21.40	Minimum duration time of low-speed operation during rope slack	0～5s	0.1s	2s	○

11.2 Crane Application Macro

1. F09.49=5: Traverse mechanism

Function code	Name	Explain	Unit	Macro value
F08.31	Special function selection	Hundreds digit: Multi-speed setting mode 0: Binary input (multi-terminal combination) 1: Direct input (single terminal) Thousands digit: Frequency reduction with voltage drop 0: Invalid 1: Valid	0	0x1000
F08.18	Input terminal X1 function selection	1: Forward running FWD terminal	0	1
F08.19	Input terminal X2 function selection	2: Reverse running REV terminal	0	2
F08.20	Input terminal X3 function selection	24: External resetting input	0	24
F08.21	Input terminal X4 function selection	5:Multi-step speed control terminal 1	0	5
F08.25	Input terminal X5 function selection	6:Multi-step speed control terminal 2	0	6
F08.23	AI2 feature selection	7:Multi-step speed control terminal 3	0	7
F09.02	OC1 (extension) output settings	22:Inverter fault	0	22
F09.04	RYL1 output setting	Lifting brake control	0	52
F10.31	Multi-frequency 1	25.0Hz	0.1Hz	25.0Hz
F10.33	Multi- frequency 3	35.0Hz	0.1Hz	35.0Hz
F10.37	Multi- frequency 7	50.0Hz	0.1Hz	50.0Hz
F01.00	Main frequency input channel selection	0: Operation keyboard number setting	0	0
F01.01	Main frequency input channel selection	FWD REV Speed: 15.0Hz	0.1Hz	15.0Hz
F01.17	Acceleration time 1	5.0s	0.1s	5.0s
F01.18	Deceleration time 1	3.0s	0.1s	3.0s
F01.19	Acceleration and deceleration time control selection	Acceleration time unit: 0.1s	0	11
F01.15	Run command channel selection	Terminal operation command control	0	1
F24.00	Brake control mode selection	0:The brake is controlled by S2000	0	1
F24.01	Lifting brake release freq.	0.5Hz	0.1Hz	0.5Hz
F24.02	Delay of Lifting brake release freq.	0.03s	0.01s	0.03s
F24.03	Lifting brake Release Current (percentage of motor rated current)	0.1%	0.1%	0.1%
F24.04	Lifting brake release action time	0.03s	0.01s	0.03s
F24.05	Lowering brake release freq.	0.5Hz	0.1Hz	0.5Hz
F24.06	Delay of Lowering brake release frequency	0.03s	0.01s	0.03s
F24.07	Lowering brake release current(percentage of motor rated current)	0.1%	0.1%	0.1%

F24.08	Lowering brake release action time	0.03s	0.01s	0.03s
F24.09	Lifting shutdown and braking frequency	0.5Hz	0.1Hz	0.5Hz
F24.10	Lifting shutdown and braking delay	0.03s	0.01s	0.03s
F24.11	Lifting shutdown and braking action time	0.03s	0.01s	0.03s
F24.12	Lowering shutdown and braking frequency	0.5Hz	0.1Hz	0.5Hz
F24.13	Lowering shutdown and braking delay	0.03s	0.01s	0.03s
F24.14	Lowering shutdown and braking action time	0.03s	0.01s	0.03s
F24.16	Brake release feedback delay	0.03s	0.01s	0.03s
F24.17	Reverse start direction selection	0: The start direction is the same as the running direction.	0	0
F21.13	Overload protection alarm current detection value	0: Invalid	0	0
F21.06	Anti-mounting detection enable	0: Invalid	0	0
F21.07	Slack rope detection enable	0: Invalid	0	0
F03.00	VF constant torque curve	VF constant torque curve	0	0

2. F09.49=6: Lifting Mechanism (Conical Motor)

Function code	Name	Explain	Unit	Macro value
F08.31	Special function selection	Hundreds digit: Multi-speed setting mode 0: Binary input (multi-terminal combination) 1: Direct input (single terminal) Thousands digit: Frequency reduction with voltage drop 0: Invalid 1: Valid	0	0x1000
F08.18	Input terminal X1 function selection	1: Forward running FWD terminal	0	1
F08.19	Input terminal X2 function selection	2: Reverse running REV terminal	0	2
F08.20	Input terminal X3 function selection	24: External resetting input	0	24
F08.21	Input terminal X4 function selection	5:Multi-step speed control terminal 1	0	5
F08.25	Input terminal X5 function selection	6:Multi-step speed control terminal 2	0	6
F08.23	AI2 feature selection	7:Multi-step speed control terminal 3	0	7
F09.02	OC1 (extension) output settings	22:Inverter fault	0	22
F10.31	Multi-frequency 1	25.0Hz	0.1Hz	25.0Hz
F10.33	Multi-frequency 3	35.0Hz	0.1Hz	35.0Hz
F10.37	Multi-frequency 7	50.0Hz	0.1Hz	50.0Hz
F01.00	Main frequency input channel selection	Set the keyboard's main frequency	0	0
F01.01	Main frequency input channel selection	FWD REV Speed: 15.0Hz	0.1Hz	15.0Hz
F01.17	Acceleration time 1	3.0s	0.1s	3.0s
F01.18	Deceleration time 1	2.0s	0.1s	2.0s
F01.15	Run command channel selection	Terminal operation command control	0	1
F01.19	Acceleration and deceleration	Acceleration time unit: 0.1s	0	11

	time control selection			
F24.00	Brake function selection	0: Brake output is not controlled by S2000	0	0
F21.13	Overload protection alarm current detection value of lifting mode	0: Invalid	0	0
F21.15	Anti-mounting detection enable	0: Invalid	0	0
F21.06	Slack rope detection enable	0: Invalid	0	0
F21.07	Overload protection alarm current detection value	0: Invalid	0	0
F24.17	Reverse start direction selection	0:The start direction is the same as the running direction.	0	0
F03.00	VF constant torque curve	VF constant torque curve	0	0

3. F09.49=7: Lifting mechanism (winch open-loop)

Function code	Name	Explain	Unit	Macro value
F08.31	Special function selection	Hundreds digit: Multi-speed setting mode 0: Binary input (multi-terminal combination) 1: Direct input (single terminal) Thousands digit: Frequency reduction with voltage drop 0: Invalid 1: Valid	0	0x1000
F08.18	Input terminal X1 function selection	1: Forward running FWD terminal	0	1
F08.19	Input terminal X2 function selection	2: Reverse running REV terminal	0	2
F08.20	Input terminal X3 function selection	24: External resetting input	0	24
F08.21	Input terminal X4 function selection	5:Multi-step speed control terminal 1	0	5
F08.25	Input terminal X5 function selection	6:Multi-step speed control terminal 2	0	6
F08.23	AI2 feature selection	7:Multi-step speed control terminal 3	0	7
F09.02	OC1 (extension) output settings	22:Inverter fault	0	22
F09.04	RYL1 output setting	Lifting brake control	0	52
F10.31	Multi-frequency 1	25.0Hz	0.1Hz	25.0Hz
F10.33	Multi- frequency 3	35.0Hz	0.1Hz	35.0Hz
F10.37	Multi- frequency 7	50.0Hz	0.1Hz	50.0Hz
F01.00	Main frequency input channel selection	0: Operation keyboard number setting	0	0
F01.01	Main frequency input channel selection	FWD REV Speed: 15.0Hz	0.1Hz	15.0Hz
F01.19	Acceleration and deceleration time control selection	Acceleration time unit: 0.1s	0	11
F01.17	Acceleration time 1	3.0s	0.1s	3.0s
F01.18	Deceleration time 1	2.0s	0.1s	2.0s
F01.19	Acceleration and deceleration time control selection	Acceleration time unit: 0.1s	0	11
F01.15	Run command channel selection	Terminal operation command control	0	1
F24.00	Brake control mode selection	1:The brake is controlled by S2000	0	1
F24.01	Lifting brake release frequency	3.0Hz	0.1Hz	3.0Hz
F24.02	Delay of Lifting brake release frequency	0.30s	0.01s	0.30s
F24.03	Lifting brake release current (percentage of motor rated current)	30.0%	0.1%	30.0%
F24.04	Lifting brake release action time	0.50s	0.01s	0.50s
F24.05	Lowering brake release freq.	2.5Hz	0.1Hz	2.5Hz
F24.06	Delay of Lowering brake release frequency	0.30s	0.01s	0.30s
F24.07	Lowering brake release current(percentage of motor rated current)	30.0%	0.1%	30.0%

F24.08	Lowering brake release action time	0.50s	0.01s	0.50s
F24.09	Lifting shutdown and braking frequency	1.0Hz	0.1Hz	1.0Hz
F24.10	Delay of lifting shutdown and braking	0.10s	0.01s	0.10s
F24.11	Lifting shutdown and braking action time	0.50s	0.01s	0.50s
F24.12	Lowering shutdown and braking frequency	0.5Hz	0.1Hz	0.5Hz
F24.13	Delay of lowering shutdown and braking	0.10s	0.01s	0.10s
F24.14	Lowering shutdown and braking action time	0.50s	0.01s	0.50s
F24.16	Delay of brake release feedback	0.50s	0.01s	0.50s
F24.17	Reverse start direction selection	0: The start direction is the same as the running direction.	0	0
F21.13	Overload protection alarm current detection value of lifting mode	0: Invalid	0	0
F21.06	Anti-mounting detection enable	0: Invalid	0	0
F21.07	Slack rope detection enable	0: Invalid	0	0
F03.00	VF constant torque curve	VF constant torque curve	0	0

4. F09.49=8: Lifting Mechanism (winch closed-loop, the self-tuning of motor rotation must be completed before operation)

Function code	Name	Explain	Unit	Macro value
F08.31	Special function selection	Hundreds digit: Multi-speed setting mode 0: Binary input (multi-terminal combination) 1: Direct input (single terminal) Thousands digit: Frequency reduction with voltage drop 0: Invalid 1: Valid	0	0x1000
F08.18	Input terminal X1 function selection	1: Forward running FWD terminal	0	1
F08.19	Input terminal X2 function selection	2: Reverse running REV terminal	0	2
F08.20	Input terminal X3 function selection	24: External resetting input	0	24
F08.21	Input terminal X4 function selection	5:Multi-step speed control terminal 1	0	5
F08.25	Input terminal X5 function selection	6:Multi-step speed control terminal 2	0	6
F08.23	AI2 feature selection	7:Multi-step speed control terminal 3	0	7
F09.01	Open-collector output terminal Y2 output setting	Zero servo enable output	0	58
F09.02	OC1 (extension) output settings	22:Inverter fault	0	22
F09.04	RYL1 output setting	Lifting brake control	0	52
F10.31	Multi-frequency 1	25.0Hz	0.1Hz	25.0Hz
F10.33	Multi- frequency 3	35.0Hz	0.1Hz	35.0Hz
F10.37	Multi- frequency 7	50.0Hz	0.1Hz	50.0Hz
F01.00	Main frequency input channel selection	0: Operation keyboard number setting	0	0
F01.01	Main frequency input channel selection	FWD REV Speed: 15.0Hz	0.1Hz	15.0Hz
F01.19	Acceleration and deceleration time control selection	Acceleration time unit: 0.1s	0	11
F01.17	Acceleration time 1	3.0s	0.1s	3.0s
F01.18	Deceleration time 1	2.0s	0.1s	2.0s
F01.19	Acceleration and deceleration time control selection	Acceleration time unit: 0.1s	0	11
F01.15	Run command channel selection	Terminal operation command control	0	1
F24.00	Brake control mode selection	1:The brake is controlled by S2000	0	1
F24.01	Lifting brake release frequency	0.5Hz	0.1Hz	0.5Hz
F24.02	Delay of Lifting brake release frequency	0.30s	0.01s	0.30s

F24.03	Lifting brake release current (percentage of motor rated current)	20.0%	0.1%	20.0%
F24.04	Lifting brake release action time	0.50s	0.01s	0.50s
F24.05	Lowering brake release freq.	0.5Hz	0.1Hz	0.5Hz
F24.06	Delay of Lowering brake release frequency	0.30s	0.01s	0.30s
F24.07	Lowering brake release current(percentage of motor rated current)	20.0%	0.1%	20.0%
F24.08	Lowering brake release action time	0.50s	0.01s	0.50s
F24.09	Lifting shutdown and braking frequency	0.5Hz	0.1Hz	0.5Hz
F24.10	Delay of lifting shutdown and braking	0.10s	0.01s	0.10s
F24.11	Lifting shutdown and braking action time	0.50s	0.01s	0.50s
F24.12	Lowering shutdown and braking frequency	0.5Hz	0.1Hz	0.5Hz
F24.13	Delay of lowering shutdown and braking	0.10s	0.01s	0.10s
F24.14	Lowering shutdown and braking action time	0.50s	0.01s	0.50s
F24.16	Delay of brake release feedback	0.50s	0.01s	0.50s
F24.17	Reverse start direction selection	0: The start direction is the same as the running direction.	0	0
F24.20	Zero servo mode	2: Zero servo input remains effective (maintaining zero speed operation)	0	2
F24.21	Brake failure protection(slow descending) frequency	4.0Hz	0	4.0Hz
F24.22	Slow descending hold time	2.0s	0.1s	2.0s
F24.23	Zero servo tolerance pulse threshold	5000	0	5000
F24.24	Brake failure warning protection activation delay	0.50s	0.01s	0.50s
F24.25	Brake failure warning protection reset mode	0: Reset only for downlink operation	0	0
F24.26	Zero servo zero-speed hold time	0 ~ 60 min	1 minute	10min
F00.24	Motor control mode	2: Closed-loop vector control (FVC)	0	2
F00.19	Encoder expansion port type	0: ABZ incremental encoder card (no UVW signal)	0	0
F21.13	Overload protection alarm current detection value of lifting mode	0: Invalid	0	0
F21.06	Anti-mounting detection enable	0: Invalid	0	0
F21.07	Slack rope detection enable	0: Invalid	0	0

Appendix I Braking unit and braking resistor

I.1 Braking unit and braking resistor

During the operation of the frequency converter, if the speed of the controlled motor drops too fast or the motor load jitters too fast, its electromotive force will reversely charge the internal capacitor of the frequency converter, causing the voltage at both ends of the power module to pump up, easily causing damage to the frequency converter. . The internal control of the frequency converter will control this according to the load condition. When the customer needs the braking function, he only needs to add an external braking resistor to realize the timely release of energy. The external braking resistor is an energy consumption braking method, and all its energy will be dissipated in the power braking resistor.

S2000-2S0004B～2S0022B, S2000-4T0007B～S2000-4T0220B are equipped with a built-in braking unit as standard, and S2000-4T0300～S2000-4T3150 are equipped with an optional built-in braking unit.

When the user is in use, the inverter needs to connect an external braking resistor. Please connect the external braking resistor according to the following configuration table.

Braking unit and braking resistor configuration and external braking resistor configuration table

Inverter model	Built-in Braking unit	Built-in Braking resistor	Can be added Braking resistor	Quantity	Braking resistor power (50% braking rate)	Braking resistor power (10% braking rate)
S2000-2S0004B	Built-in	No	≥150Ω	1PCS	≥1KW	≥200W
S2000-2S0007B	Built-in	No	≥100Ω	1PCS	≥1.5KW	≥250W
S2000-2S0015B	Built-in	No	≥70Ω	1PCS	≥2KW	≥400W
S2000-2S0022B	Built-in	No	≥50Ω	1PCS	≥3KW	≥600W
S2000-4T0007B	Built-in	No	≥300Ω	1PCS	≥1KW	≥250W
S2000-4T0015B	Built-in	No	≥300Ω	1PCS	≥1KW	≥250W
S2000-4T0022B	Built-in	No	≥300Ω	1PCS	≥1KW	≥250W
S2000-4T0037B	Built-in	No	≥125Ω	1PCS	≥2KW	≥400W
S2000-4T0055B	Built-in	No	≥80Ω	1PCS	≥3.8KW	≥750W
S2000-4T0075B	Built-in	No	≥80Ω	1PCS	≥3.8KW	≥750W
S2000-4T0110B	Built-in	No	≥50Ω	1PCS	≥5KW	≥1KW
S2000-4T0150B	Built-in	No	≥40Ω	1PCS	≥7.5KW	≥1.5KW
S2000-4T0185B	Built-in	No	≥27Ω	1PCS	≥9KW	≥1.8KW
S2000-4T0220B	Built-in	No	≥22Ω	1PCS	≥11KW	≥2.2KW
S2000-4T0300	Optional	No	≥19Ω	1PCS	≥15KW	≥3KW
S2000-4T0370	Optional	No	≥16.8Ω	1PCS	≥18.5KW	≥3.7KW
S2000-4T0450	Optional	No	≥13Ω	1PCS	≥22KW	≥4.5KW
S2000-4T0550	Optional	No	≥11Ω	1PCS	≥28KW	≥5.5KW
S2000-4T0750	Optional	No	≥8Ω	1PCS	≥38KW	≥8KW
S2000-4T0900	Optional	No	≥8Ω	1PCS	≥46KW	≥9KW
S2000-4T1100	Optional	No	≥7.5Ω	2PCS	≥55KW	≥11KW
S2000-4T1320	Optional	No	≥6.8Ω	2PCS	≥66KW	≥13.5KW
S2000-4T1600	Optional	No	≥6.3Ω	2PCS	≥80KW	≥16KW
S2000-4T2000	Optional	No	≥4.5Ω	2PCS	≥100KW	≥20KW
S2000-4T2200	Optional	No	≥4.1Ω	2PCS	≥110KW	≥22KW
S2000-4T2500	Optional	No	≥3.6Ω	2PCS	≥125KW	≥25KW
S2000-4T2800	Optional	No	≥3.2Ω	2PCS	≥140KW	≥28KW
S2000-4T3150	Optional	No	≥3Ω	2PCS	≥158KW	≥32KW