SOFT POWER

V75 Series Frequency Drive User's Manual

II Version 2022.a.en

Prior to use, please read this user's manual carefully.

CAUTION:Please keep this user's manual for future reference.

SOFT POWER

V75 Series Frequency Drive

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USER’S MANUAL

English Version V2022.A.EN

TABLE OF CONTENTS

1. PRELUDE

Thank you for using V75 series frequency drive. V75 series frequency drive, independently developed by Ersan Teknoloji, is a universal vector control one that owns high quality, multiple functions and low noise.

This User's Manual offers complete introduction of installation and use of the frequency drive, setting of function parameters, fault treatment and maintenance etc. for V75 series frequency drive. Please read this manual carefully before using in order to guarantee correct installation and use of the frequency drive .

This manual is an accessory along with the machine. Please keep it properly for the future use for repair and maintenance.

1.1. Checking before use

When opening the box, please carefully check and confirm：

If the product inside together with the quality certificate user's manual and warranty card;

Please check the "Model" column on the side of the machine, and re-confirm if the product and your order are consistent;

If there's any damage, scratch or dirt (damages caused during transportation are not within the company's warranty)

If there's any damage, product missing or some other questions, please contact the dealer you purchased the product or the sales department immediately.

Note: Do not install the frequency converter if you find the product is damaged or component missing, otherwise it may cause death or safety incident.

2. SAFETY REQUIREMENT AND CAUTIONS

2.1. Warning signs and meanings

This manual has used the following signs which means there is an important parts of security. While observing against the rules, there is a danger of injury even death or machine system damage.

Danger

Danger: Wrong operation may cause serious injury or death

Warning

Wrong operation may cause death or large safety incident

Caution

Caution: Wrong operation may cause slight injury or damage to equipment.

Please read the user's manual carefully before installation, only professionally trained persons can be allowed to operate the equipment. " Professional trained persons " means the workers must be familiar with installation, wiring, running and maintenance .The operator must follow all the safety instructions to operate the machine.

If any physical injury or death or damage to the devices for ignoring to the safety precautions in the manual, our company will not be responsible for any damages and we are not legally bound in any manner.

Caution

Do not install the frequency converter if you find the product is damaged or component missing, otherwise it may cause death or safety incident

2.2. Safety operation

2.2.1 Mechanical installation

Danger

Please install the frequency converter on metal or fire-retardant material in case of fire. Please keep the frequency converter away from combustible materials.

Do not install the frequency converter in the environment of explosive gas.

Caution

Please hold the bottom of the frequency converter when installing and transport to prevent the machine from falling.

The installation platform must be strong enough to hold the frequency converter in case the machine falling and lead to damage

Please install the frequency converter in the safe place with less vibration, avoid direct sunlight, no water splashing.

When installing two or more frequency converters in one cabinet, please ensure all the machines get good heat dissipation.

Take measures to avoid screws, cables and other conductive matters fall into the frequency converter during maintenance and component replacement.

2.2.2 Electric installation

Danger

Only professional electrical engineer was allowed to install the machine, otherwise there is a risk of electric shock. There must be a circuit breaker between the frequency converter and input power, otherwise it may cause fire.

Before wiring, make sure the frequency converter is power-off, and all the indicator are completely extinguished, otherwise there is a risk of electric shock.

The PE terminal must be properly grounded in case of the risk of electric shock.

Caution

According to the power level of the frequency converter, please select the appropriate power cable for it, otherwise an accident may occur.

Don't connect the input power to the out terminals (U, V, W) of the frequency converter, otherwise it will cause damage to the drive system.

When connecting the output terminals (U, V, W), pay attention to the rotation direction of the motor.

Please make sure the connection and wiring meets the EMC requirement and the safety standards of the local area, otherwise an accident may occur.

Do not connect the braking resistor between the DC bus (+) and (-) terminals, otherwise it may cause fire.

Except control terminal T1A - T1B - T1C and T2A - T2B - T2C, all other terminals are forbidden to connect to the AC 220V signal. Otherwise it will cause damage to the frequency converter.

2.2.3 Precautions before power- on

Danger

Do not carry out any voltage-endurance test as all the products have past the test before leaving the factory.

Do not touch the driver and circuits with wet hands before and after power-on. Otherwise there is a risk of electric shock.

All covers must be installed and closed before powering on, otherwise there is a risk of electric shock. Do not open the protective cover after power-on in case the risk of electric shock.

Do not touch any input and output terminals of the frequency converters after power-on, otherwise there is a

danger of electric shock.

Caution

Before powering on, please confirm if the input voltage is consistent with the frequency converter's rated voltage, whether the wiring of the power input terminal(R,S,T) and output terminals(U,V,W) are correct, checking if there is shot circuit for drive circuit.

The wiring of all accessories (like DC reactor, Braking resistor) must follow the instruction of this manual, otherwise it may cause an accident.

Do not change the parameters reserved by the manufacturer, otherwise it may cause damage to the equipment.

2.2.4 Running

Danger

Do not touch the cooling fan and discharge resistance to test the temperature when the machine is running, otherwise it may cause burn.

Only professional technician was allowed to detect frequency converter's signals during operation, otherwise it may cause personal injury or equipment damage.

Caution

During operation, metal or other debris should be prevented from falling into the equipment, otherwise the equipment may be damaged.

Do not use the contactor to start or stop the drive system of the frequency converter, otherwise it may cause equipment damage.

2.2.5 Maintenance and replacement of components

Danger

Only qualified electricians are allowed to perform the maintenance and must do the job according to the maintenance instruction.

The input power of the frequency converter must be cut off before maintenance. After at 10 minutes of discharge, the maintenance work can be carried out.

When plugged and unplugged the devices, make sure the power is off.

Take measures to avoid screws, cables and other conductive materials to fall into the frequency converter during maintenance and component replacement.

Caution

Do not touch the components on the PCB board directly, static electricity is easy to damage the frequency converter.

After finish the work of repair, all the screws must be tightened.

When replacing the fan, pay attention to the rotation direction of the fan.

After replacing the control board, some parameter must be setting before the machine start again, otherwise there is damage to the equipment.

2.2.6 Scrap disposition

Caution

There are heavy metals in the frequency converter. Treat it as industrial effluent.

When the life cycle ends, the product should enter the recycling system. Dispose of it separately at an appropriate collection point instead of placing it in the normal dirt stream.

3. TYPE AND SPECIFICATIONS

3.1. Nameplate

Figure 3.1 Nameplate example

3.2. Type description of frequency drive

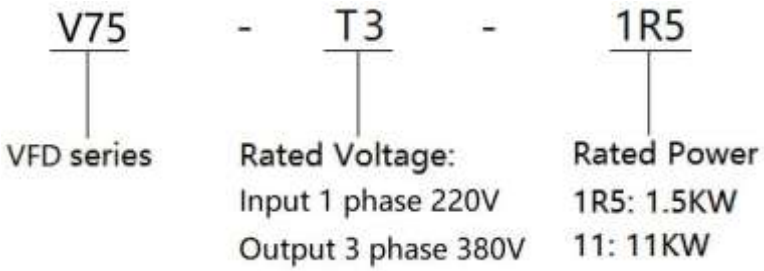


Figure 3.2 Type description of frequency drive

3.3. Type of frequency drive

Table 3.1 Type of V75 series frequency drive

VFD model	Rated output current (A)	Rated power (kW)
V75-S3-0R7	2.6	0.75
V75-S3-1R5	4.1	1.5
V75-S3-2R2	5.5	2.2
V75-S3-3	6.9	3
V75-S3-4	9.5	4
V75-S3-5R5	12.6	5.5
V75-S3-7R5	18.5	7.5
V75-S3-11	25	11

Notes: All above models are standard equipped with built-in brake unit.

3.4. Appearance &Dimensions

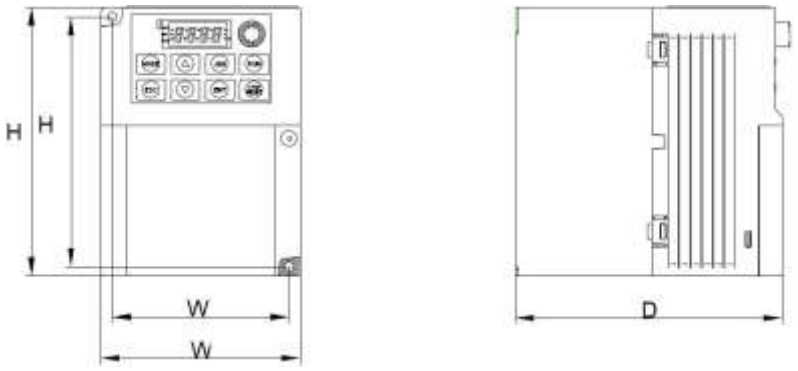


Figure 3.3 Appearance Size (0.75kW to 4kW)

Table 3.2 Appearance & Installation size (0.75kW to 4kW)

Model	Outline Dimension（mm）			Installation Dimension（mm）		
	H	W	D	H1	W1	Aperture
V75-S3-0R7G/1R5P	145	107	144	135	95	Φ5
V75-S3-1R5G/2R2P	200	138	134	188	124	Φ5
V75-S3-2R2G/4RP	200	138	134	188	124	Φ5
V75-S3-3G/4P	232	153	164	220	139	Φ5
V75-S3-4RG/5R5P	232	153	164	220	139	Φ5

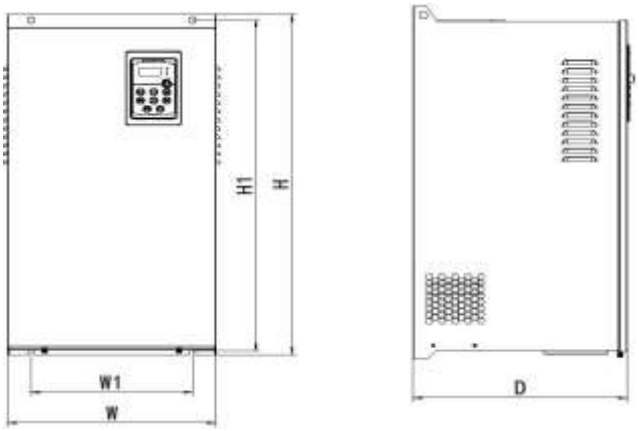


Figure 3.4 Appearance Size (5.5KW-11KW)

Table 3.3 Appearance & Installation size (5.5KW-11KW)

Model	Outline Dimension（mm）			Installation Dimension（mm）		
	H	W	D	H1	W1	Aperture
V75-S3-5R5G/7R5P	335	200	195	321	140	Φ9
V75-S3-7R5G/11P	335	200	195	321	140	Φ9
V75-S3-11G/15P	335	200	195	321	140	Φ9

3.5. Technical specifications

Table 3.4 Technical Parameters of V75 Series frequency drive

Item		Instruction
Power Input	Input voltage	S3（1 phase 220V）：Single phase AC voltage，200~240V
	Rated Frequency	50/60Hz ± 5%
Power output	output voltage	0-480VAC,3Phase
	Rated input current	According to each model, see standard spec.2.3
	Overload	150% Rated output current.60s，200% Rated output current 2s
Control Function	Control Mode	V/f control for constant torque, V/f control for quadratic load, vector control without PG (open loop control),Energy-saving
	Setting method of Frequency command	External terminal (including Logic multi-speed, analog input, UP/DOWN given), keyboard, serial communication
	Setting method of run command	External terminal, keyboard panel or serial communication
	Frequency set precision	Keyboard、UP/DOWN given：0.1Hz
		Analog given, serial communication：10bit（0.05Hz/50Hz)
	Low frequency torque	No PG V/f Control：150%Rated torque/3Hz
		No PG Vector control：150% rated torque/0.5Hz
	Speed control range	No PGV/f control：1：40
		No PG Vector control：1：200
	Speed control precision	No PGV/f control：±2%
		No PG Vector control：±0.2%
	Acc / Dec time	0-3200.0s
	switching frequency	1.5kHz ~ 12kHz,according to junction temperature automatically reduce the switching frequency
Built-in control power supply	Output Voltage	10VDC±5%（1ways），24VDC±5%（1ways）
	Max load	10V：Max current 10mA，For reference potentiometer 24V：Max current 100mA，for logic input
Analog input	Number	2 ways：AI1、AI2
	Type	DC voltage or DC current
	Maximum input range	AI1：0-5VDC，or 0-10VDC，or 0/4-20mADC AI2：0-10VDC，or PTC probe input receivable
Analog output	Number	2ways，,AO1，A02
	Type	DC voltage or DC current
	Maximum input range	0-10VDC，or 0/4-20mADC
	Function selection	Output frequency, output current, speed given, serial communication, etc.
Logic input	Number	0.75KW -4KW: 8 ways：LI1 to LI6、AI1、AI2 5.5-11KW 10 ways：LI1 to LI8、AI1、AI2 Notes： AI1、AI2 can be used as logic input port (positive logic or negative logic)
	Type	Positive Logistic （Source） Or Negative Logistic（Sink）

Item		Instruction
	Input voltage	0-24VDC
	Function Selection	FWD,REV, running, fault reset,multi-speed,etc.
Logic output	number	2ways pulse signal output（LO-CLO）、relay output 1way or 2 ways.
	pulse signal output	OC, output frequency、current output、and other function
	relay output	T1A is normally open,T1B is normally closed, T1C is common terminal T2A is normally open,T2B is normally closed, T2C is common terminal Probe capacity：T1A-T1C / T2A-T2C: 5A@250VAC，5A@30VDC T1B-T1C / T2B-T2C: 3A@250VAC，3A@30VDC Function choose: Fault, alarm, set frequency reach,etc.
communication interface	Hardware protocol	RS-485
	Software protocol	Modbus
Structure	Protection Level	IP20
	Cool method	Forced Air cooling
Environment	Installation site	Indoor
	Work temperature	-10～40ºC
	Storage temperature	-20～60ºC
	Humidity	Below 95RH%（No moisture condensation）
	Altitude	1000m and below

4.Basic Wiring Diagram

4.1 Basic Wiring Diagram

Please refer to Figure 4.1 for wiring of the frequency drive. Make only wiring of the main circuit to start the motor when the frequency drive is operated with keyboard panel.

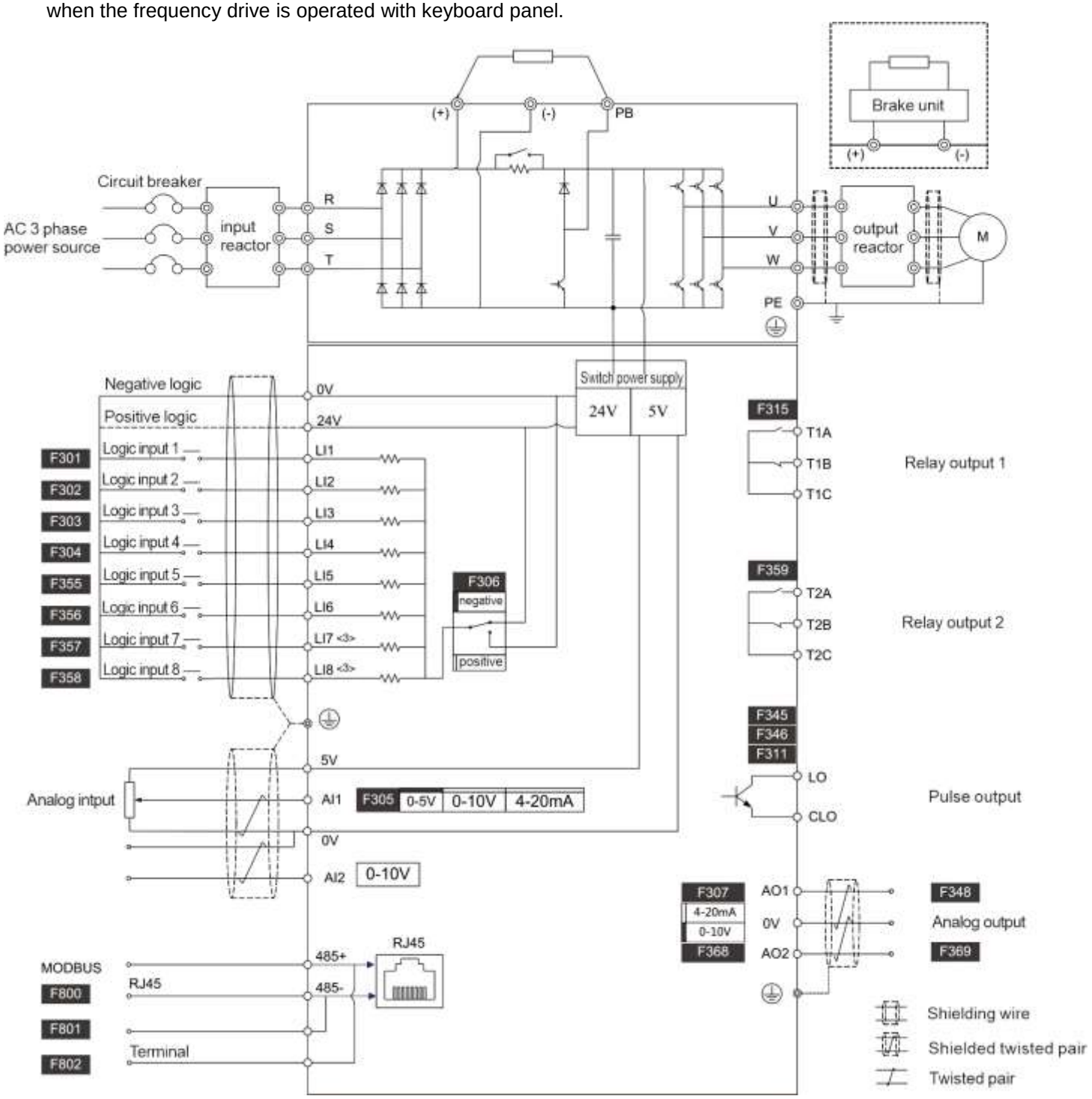


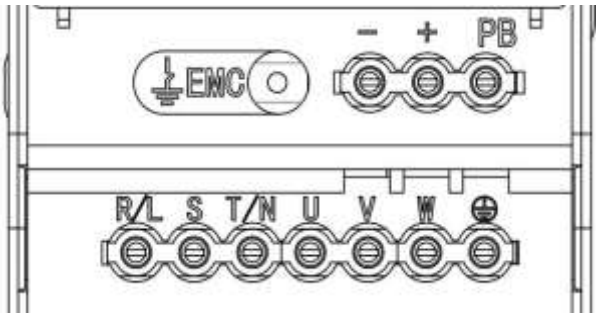
Figure 4.1 Basic wiring diagram of the frequency drive

<1> Single phase 220V AC power supply connects terminals R and T, or terminals S and T.

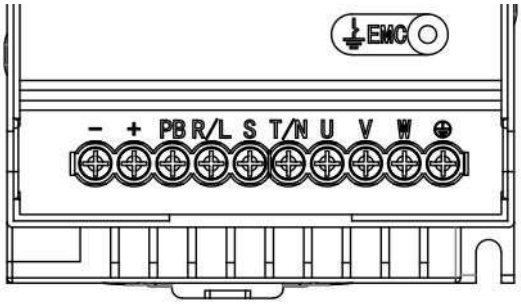
<2> 0.75-4kw VFD has no (-) terminal.

<3> The 0.75-4kw VFD has no LI7 and LI8 terminals.

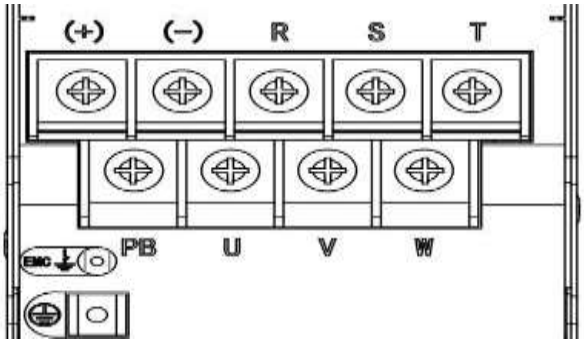
4.2 Main Circuit Terminals



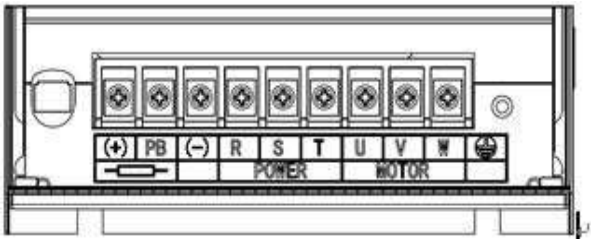
（a）Main Circuit Terminal（0.75KW）



（b）Main Circuit Terminal（1.5-2.2KW）



(a) Main Circuit Terminal（3-4kW）



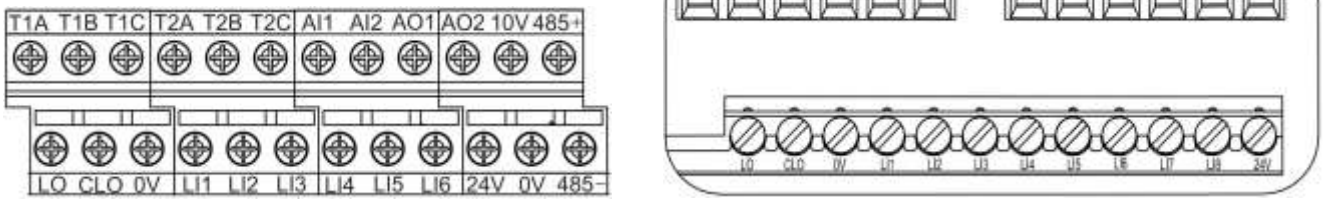
（d）Main Circuit Terminal（5.5-11kW）

Figure 4.2 Diagram of main Circuit Terminals

Table 4.1 Function of Main Circuit Terminals

Symbol	Function
R(L1)、S(L1)、T(L2)	Input of VFD，Terminal for Connection 1 phase AC Power source, 220V,50Hz /60Hz Single phase 220V AC power supply connects terminals R and T, or terminals S and T.
U/T1、V/T2、W/T3	Output of VFD，Terminal for connection to three phase induction motor
+、-	DC bus terminal, connect to braking unit etc “+” is the positive terminal of DC bus, “-” is the negative terminal
PA/+、PB +、PB	Connection of braking resistor，connection to braking resistor PA/+、+ ——positive terminal of DC power input
P0、+	DC Reactor terminal, connect DC reactor
⏚	Terminal for grounding : grounding resistance is 4Ω or below.

4.3 Control Terminals



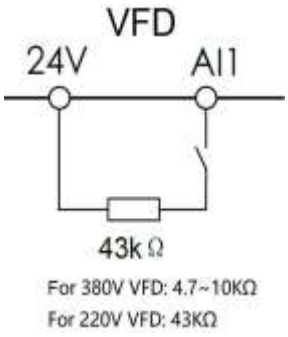
（a）Control terminal（4 kW and below） （b）Control terminal（5.5kW and above）

Figure 4.3 Diagram of control Terminals

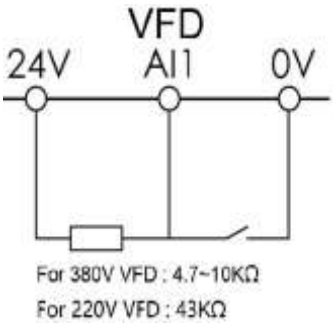
Table 4.2 Description of Control Terminals Function

Symbol	Item	Function
0V	Common terminal of the control circuit	
5V/10V	5V/10V output voltage	Commonly used as working voltage of the external potentiometer Maximum current:10mA. accuracy:±5%
24V	24V output voltage	Commonly used as working voltage of the logic input terminal, Maximum current:100mA accuracy:±20%
AI1	Voltage/current analog input Or programmable logic input	Voltage/current analog input: accuracy:10 bit Analog voltage input:0 ~ +5 V or 0 ~ +10 V ,input Reactance 30K,Analog current input: Max 20mA,input Reactance 250Ω.
		By changing parameter setting, the AI1 can also be used as a programmable logic input terminal. If that, a resistor（4.7kΩ~10kΩ，1/2W）must be added between 24V and AI1; At the same time, set AI1 to 10V analog voltage input.
AI2	Voltage Analog input Or programmable logic input	Voltage analogy input: Accuracy:10 bit Maximum range: 0 ~ +10 V, input Reactance 30K,
		By changing parameter setting, the AI2 can also be used as a programmable logic input terminal. If that, a resistor（4.7kΩ~10kΩ，1/2W）must be added between 24V and AI2
LI1 ~ LI8	programmable logic input	+24 V Power supply
		Positive Logic(source): port voltage< 5 V, input invalid (OFF), port voltage > 11V, input valid (ON); Negative Logic (sink): port voltage > 16V , input invalid (OFF);
		Logic input connection diagram refers to Figure 4.4.
AO1 AO2	Voltage/Current analog output	Analog voltage output: 0 ~ +10 V ,Min load reactance is 470Ω Analog current output: x ~ 20 mA，Max load reactance is 700Ω
LO	Pulse output collector	Maximum current:100mA Maximum voltage:30V
CLO	Pulse output emitter	

Symbol	Item	Function
T1A	Relay 1-Normally open terminal	Maximum switching capacity: T1A-T1C: 5A @ 250VAC,5A @ 30VDC T1B-T1C: 3A @ 250VAC,3A @ 30VDC
T1B	Relay 1-Normally close terminal	
T1C	Relay 1-Common	
T2A	Relay 1-Normally open terminal	Maximum switching capacity: T2A-T2C: 5A @ 250VAC,5A @ 30VDC T2B-T2C: 3A @ 250VAC,3A @ 30VDC
T2B	Relay 1-Normally close terminal	
T2C	Relay 1-Common terminal	
485+/485-	RS485 communication port	Theforth feet (A+) is positive port of RS485 differential signal, the fifth feet (B-) is the negative port of RS485 difference signal.
SW700	RS485 Reactance marching	SW700 is only for 18.5KW and above VFD. SW700 total has 3 switch, from left to right is as below: SW700-1:ON-connect 'RS485+'signal's pull-up resistance; SW700-2:ON-connect 'RS485-'signal's pull down resistance; SW700-3:ON-connect 'RS485+,-'signal's matched resistance;

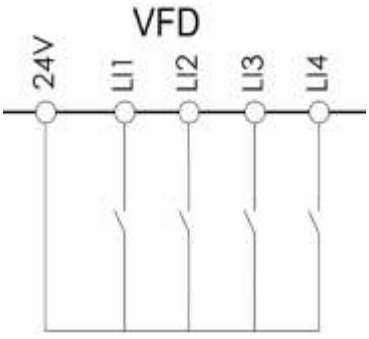


(a) Positive Logic – source

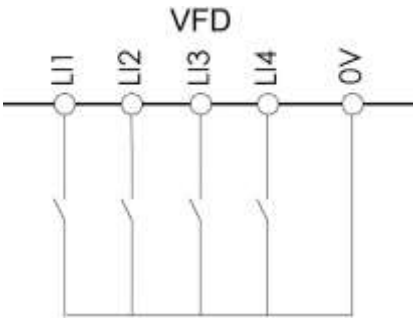


(b) negative logic– sink

Figure3.1: AI1 Wiring diagram when AI1is logic input terminal



(a) positive logic – source



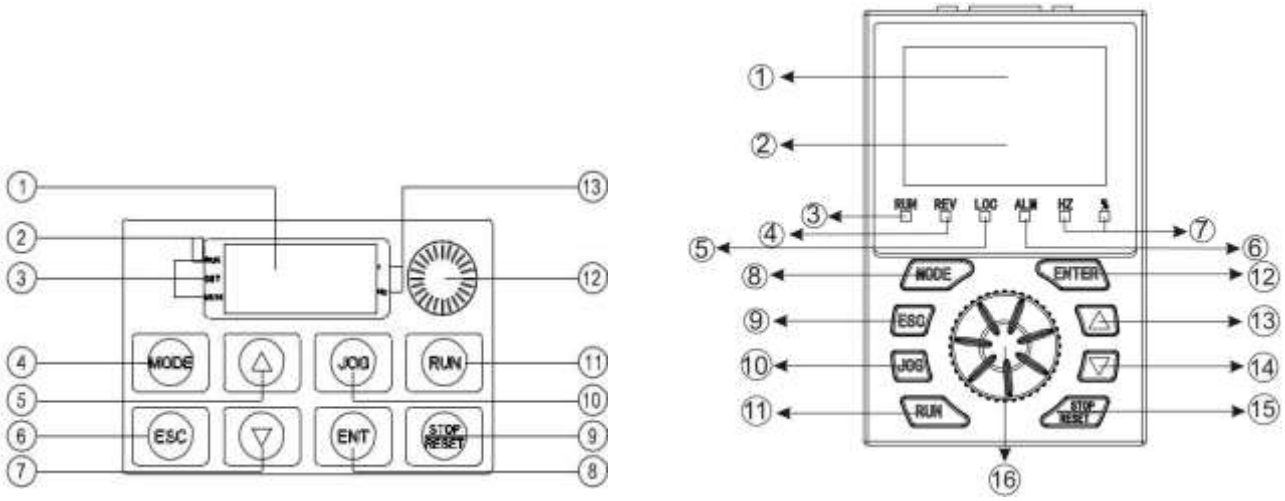
(b) negative logic– sink

Figure 4.4 Logic input terminal wiring diagram

5. BASIC OPERATION AND TRIAL RUNNING

5.1. Appearance of keyboard panel

User of this series frequency drive can perform different operations through keyboard panel, including run/stop, display of different data, parameter value setting, fault display and reset etc. The following is description of the keyboard panel.



(a) Appearance of keyboard panel (0.75KW-4KW) (b)Appearance of keyboard panel (5.5KW-11KW)

Figure 5.1 Appearance of keyboard panel

Table 5.1 Description and function of each part of the keyboard panel

NO	Designation	Sign	Functional performance
1	Display area 1	——	LED digital display for showing function parameters and set values, etc.
2	Display area 2	——	LED digital display for monitoring values.
3	Running status indicator	RUN	On：The operation command and frequency setting are valid, and the output of the VFD is normal； Flash：The running command is valid, but the frequency setting is invalid. The VFD has no output； Off：Currently no running command, no output of the VFD, in standby
4	Reverse status indicator light	REV	On：Reverse Off：Forward
5	Local status indicator	LOC	On：Local Off：Remote
6	Failure status indicator	ALM	On：Failure Off：No failure
7	Unit light	%	The current display data is a percentage.
		Hz	The unit of data currently displayed is Hz.
8	Mode	MODE	Select the operating mode of the VFD or go back to mode from the sub-menu.
9	Esc	ESC	Exits the current state and returns to the previous state.
10	Jog reset	JOG	Default is shortcut menu 3. See parameter F7 00 for Settings.
11	Run	RUN	Turn on VFD output.
12	Enter	ENTER	Enter mode, view parameters, or confirm set values.
13	Up	▲	Add parameter number and parameter setting value.
14	Down	▼	Reduce parameter number and parameter setting value.

NO	Designation	Sign	Functional performance
15	Stop/reset	STOP/ RESET	Stop the output of the converter and change to the reset button when fault is detected.
16	Speed control knob	——	Adjust the speed.

5.2. Basic operation of panel

5.2.1. Running model selection

V75 frequency drive include four running models: Powering-on default mode, Parameter setting mode, Status monitoring mode and Parameter verifying mode. Any mode can be realized by the MODE Key, showed as Figure 5.2.

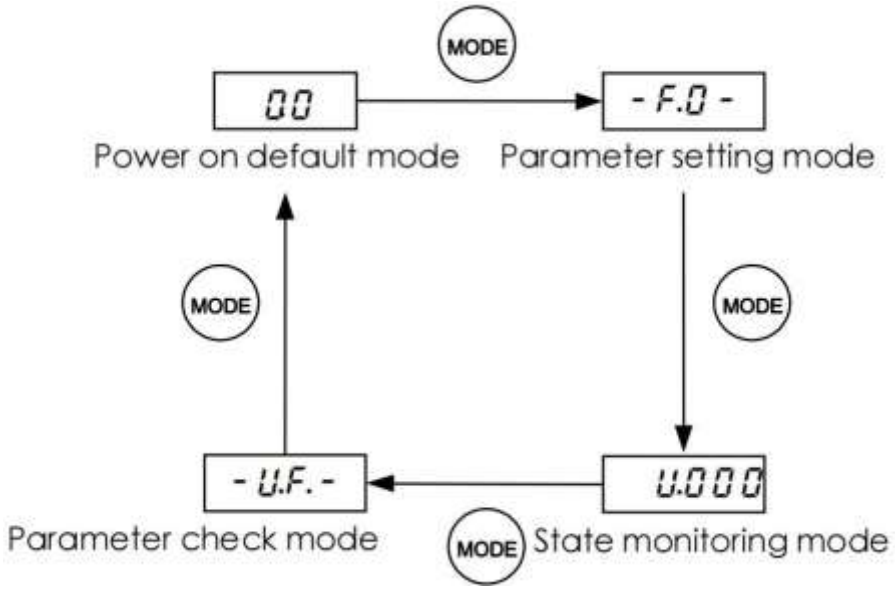


Figure 5.2 Structure of frequency drive Mode switch

<1>: when *f5.18*=1, show parameter setting mode

5.2.2. Powering-on default mode

The display data is the current output frequency under Powering-on default mode, so directly use ▲or▼ key to modify the digital frequency setting, then press the ENT key to save the modified data and return Powering-on default mode, or press the ESC key to give up the modification and return the Powering-on default mode. As showed as Figure 5.3.

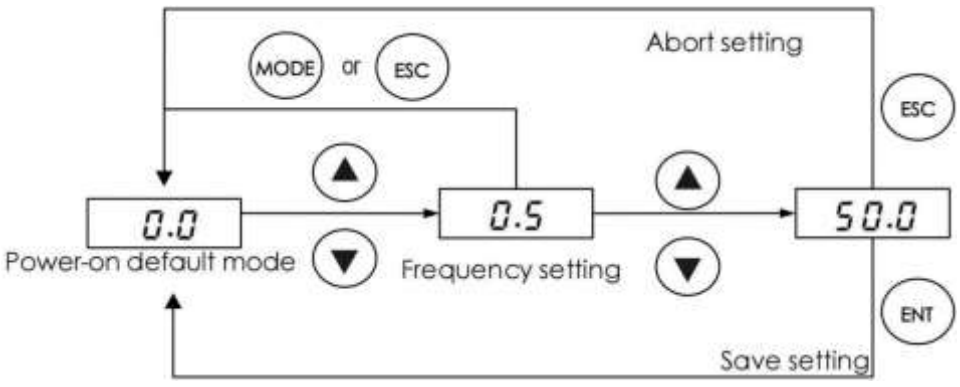


Figure 5.3 Powering-on default mode Navigation

Here the display data type can be set freely under the Powering-on default mode, showed in the parameter *f*510.

5.2.3. Parameter setting Mode

There are 10 groups function parameters from *f*0 group to *f*9 group, each group includes different numbers function parameter. The Parameter setting value can be modified by ▲or ▼key and ENT key, or give up the modification by ESC key, as showed as Figure 5.4

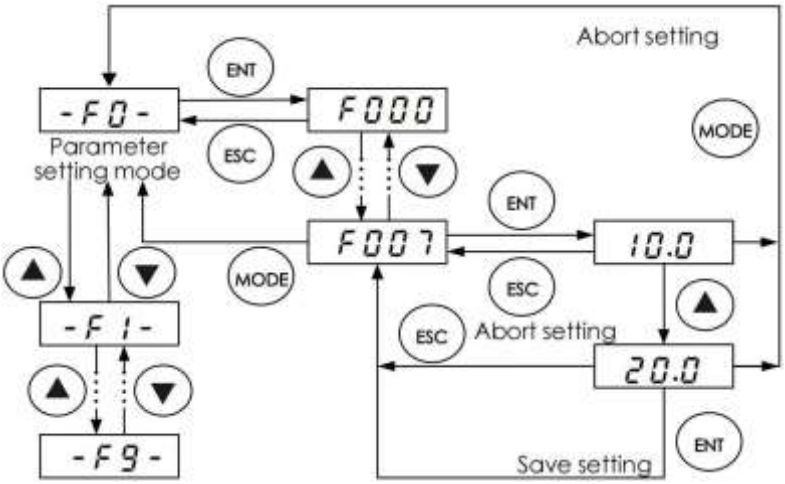


Figure 5.4 Parameter Setting Mode navigation

5.2.4. Status monitoring mode

The status monitoring mode can be used to monitor the current running status of frequency drive , or check the fault record, the operation shows as the Figure 5.5

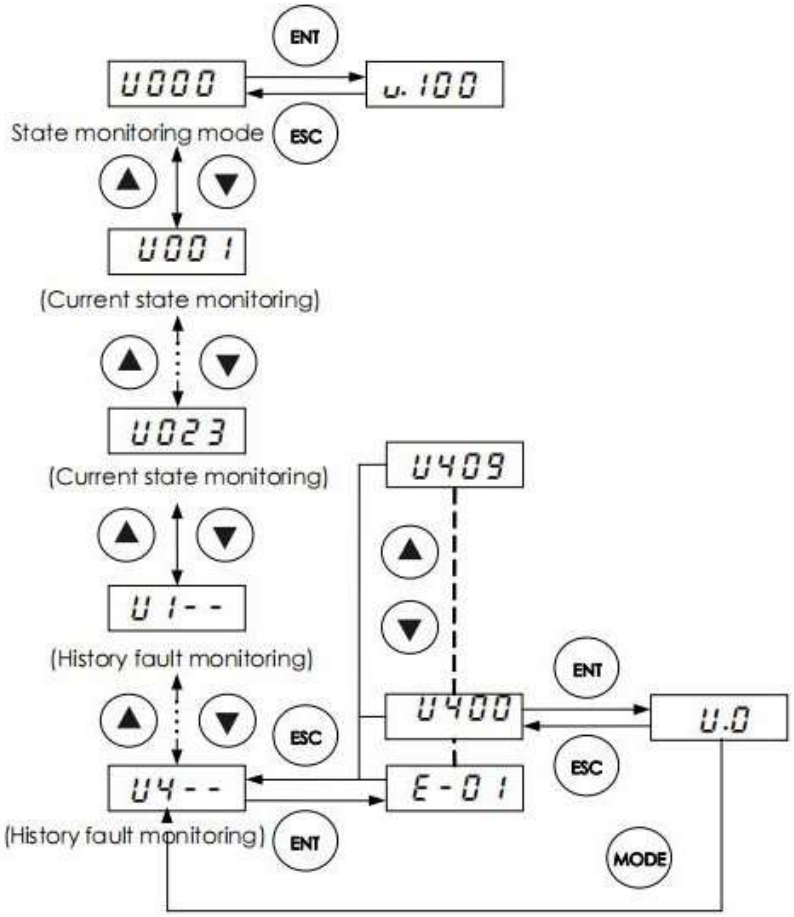


Figure 5.5 State monitoring mode navigation

Here: Monitoring parameter only can be used to check, cannot be modified or set.

5.2.5. Parameter verifying mode

When *f518*=1, use MODE key to switch to parameter calibration mode. Under this mode, we can see all different parameters from the default value. The setup method for these parameters is the same to other parameter setup way. Please see figure 5.6.

Remarks: no other display only "*–uF–*" when pressing the ENT key without change to any parameter

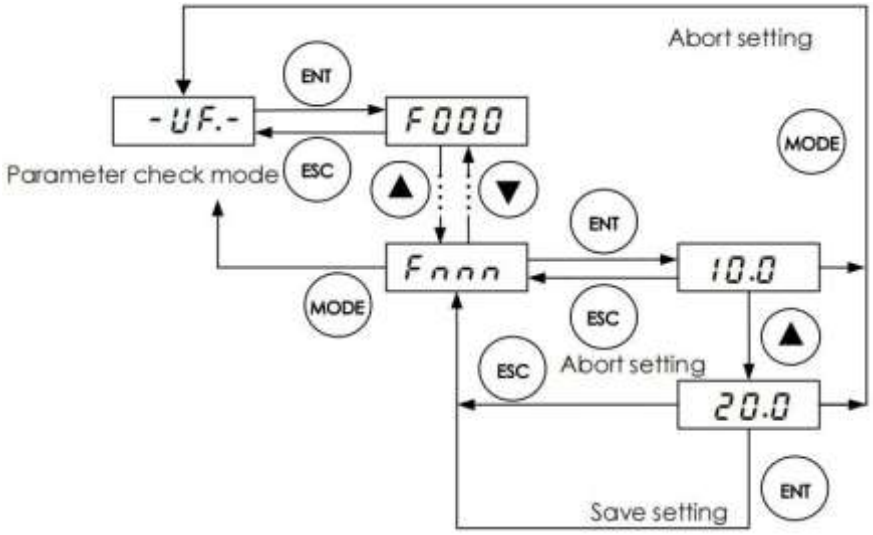


Figure 5.6 Parameter verifying mode navigation

5.2.6. JOG

Under the powering-on mode, when *f700*=1, press the Jog key then enter the Jog state. Jog represents forward jog and –jog represents reverse jog. Switch between forward/reverse jog can be realized through UP/DOWN keys on the keyboard panel.

5.3. Power on and confirmation of display status

Before switching on the frequency drive, please do confirm the following items.

Table 5.2 Items to be confirmed prior to switching on the frequency drive

Item	Instruction
Input power voltage	Please confirm if the power supply is correctly connected (1-phase, AC200V~ 240V, 50/60 Hz) Please confirm if the power supply input terminals L1/R, L2/S are properly connected. Please confirm whether the VFD and the motor are correctly grounded.
Main circuit output terminals	Please confirm the output terminals of the VFD (U, V ,W) are reliably connected with the 3-phase input terminals of the motor.
Control circuit terminals	Please confirm the control circuit terminals are reliably connected with other device. Please confirm that all control circuit terminals are in the state OFF (The VFD does not run when powered on).
State of load	Please confirm the condition of the motor load (namely the status of connection with mechanical system).

After the frequency drive is switched on, the keyboard panel enters into Powering-on mode. The displayed value type at Powering-on mode is determined by the setting value of parameter *f610*.

5.4. Running

5.4.1. Local control mode

V75 provide two control modes: local and remote. The mode is set with parameter *f601*.

At local control mode, both the command source and frequency setting source of the VFD are set through the keyboard panel:

(1)Command source is given through RUN and STOP keys in order to run or stop the motor.

(2)Frequency is given by ▲ and ▼ keys.

(3) Motor rotation direction: ENTER+▲——Setting motor rotation as Forward；

ENTER+▼——Setting motor rotation as Reverse（confirm the setting of *f522*）；

Parameter *f522* is used to limit the ability of the motor to rotate only in a single direction。

(4) Fault reset: When fault occurred, press STOP key，if show as *A- 00*，Press STOP key again，finish fault reset function, Please see parameter *f600*。

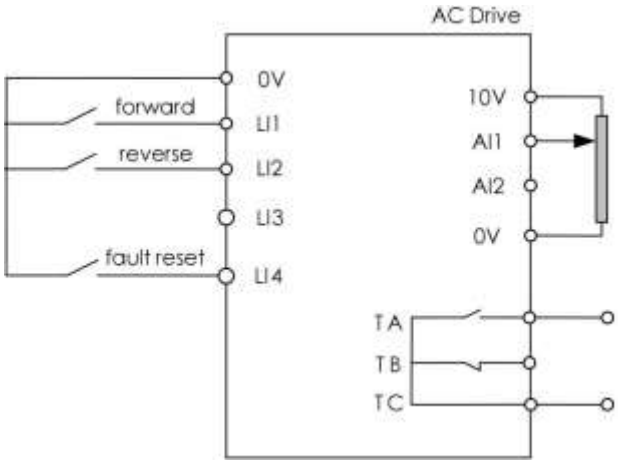
5.4.2. Remote control mode

Under remote control mode, the command source and frequency setting source of the VFD are set through parameters *f002* and *f003* respectively. The command source and frequency setting source can be combined in any way. As show as Parameter *f002*, *f003*.

Below is the main two ways of remote control mode wiring and setting:

（1）2 wires control (including (decelerating stop , free stop) （2）3-wire control（decelerating stop）

（1） Remote mode example 1: 2-wire control



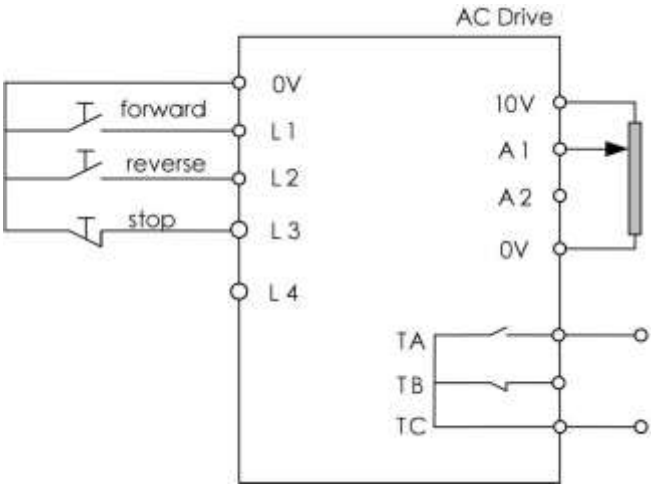
Wiring I： 2 wires control wiring figure

Table 5.3 2-wire control parameter setting （Negative logic）

Code	Parameter	Setting value (Decelerating stop)	Setting Value (Free stop)
f002	Running Command Selection	0	0
f003	Frequency Command Selection	1	1
f300	AI1 Input function（Analog or logic selection)	0	0
f301	LI1 Logic input function	2	2
f302	LI2 Logic input function	3	3
f304	LI4 Logic input function	10	10
f305	Analog input mode setting	0	0
f306	Logic input type selection	1	1
f309	Forcing valid input function	1	1

F310	Forcing valid input function 2	0	0
F522	Motor reverse forbid	0	0
F523	Motor stop type	0	2

（2） **Remote mode example 2: 3-wire control (Negative Logic)**



Wiring II： 3-wires control (negative logic) wiring figure

Table 5.4 3-wire control parameter setting （Negative logic）

Code	Parameter	Setting value (Decelerating stop)	Setting Value (Free stop)
F002	Running Command Selection	0	0
F003	Frequency Command Selection	1	1
F300	AI1 Input function（Analog or logic selection)	0	0
F301	LI1 Logic input function	2	2
F302	LI2 Logic input function	3	3
F303	LI3Logic input function	30	30
F305	Analog input mode setting	0	0
F306	Logic input type selection	1	1
F309	Forcing valid input function	1	1
F310	Forcing valid input function 2	0	0
F522	Motor reverse forbid	0	0
F523	Motor stop type	0	3

6. DETAILED PARAMETER DESCRIPTION

6.1.Basic parameter group

NO.	Parameter Name	Setting Range	Default
f000	Operation frequency of keypad	f009~f008	0.0

When power on, the frequency drive displays the operation frequency (when operation stopped, "0.0" is displayed, see f610. Then press the ▲ key or the ▼ key to change the operation frequency (even during operation).

Press ▲ move the frequency up. Press ▼ move the frequency down, Press the ENT key to save the operation frequency f000, and the set frequency are displayed alternately.

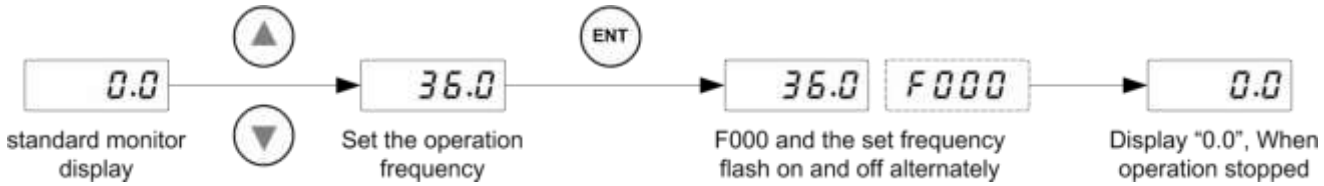


Figure 6.1 Procedure of setting f000

Note1: when set f003=3, f000 is effective as the frequency command.

Note2: Pressing the ▲key or the ▼ key will change the operation frequency even during operation.

NO.	Parameter Name	Setting Range	Default
f001	V/F control mode selection	0~3	0

0: V/F constant. When one single frequency drive is required to drive more than one motor, please select V/f control mode if motor automatic tuning can not be correctly performed or there is no other access to acquire parameters of controlled motor. To increase the torque further, increase the setting value of the manual torque boost.

1: Variable torque. This is appropriate for load characteristics of such things as fans, pumps and blowers in which the torque in relation to load rotation speed is proportional to its square.

2: Sensor-less vector control. Using sensor-less vector control with a standard motor will provide the highest torque at the low speed ranges.

Provides large starting torque.

Effective when stable operation is required to move smoothly up from the low speeds.

Effective in elimination of load fluctuations caused by motor slippage.

3: Energy saving mode. Energy can be saved in all speed areas by detecting load current and flowing the optimum current that fits the load.

Note: To use vector control and automatic energy saving, motor constant setting (motor tuning) is required.

NO.	Parameter Name	Setting Range	Default
f002	Command mode selection 1	0~2	1

0: Terminal board. ON and OFF of an external signal Runs and stops operation.

1: Keypad. Press the <RUN> and <STOP> keys on the keypad to start and stop.

2: Serial communication. Run and stop through serial communication.

Note: When under local control (f601=0), f002 setting is ignored, Keypad is always effective.

NO.	Parameter Name	Setting Range	Default
f003	Frequency setting mode selection 1	0~8	3

0: Built-in potentiometer.

1: AI1 input. Frequency command is set by means of a signal from an external input device (AI1 terminal: 0-5V, 0-

10Vdc or 4-20mAdc).

2: AI2 input. An external signal (AI2 terminal: 0-10Vdc) is used to specify a frequency command.

3: Keypad (f000). Press the <▲> key or the <▼> key on either the keypad or the expansion panel (optional) to set frequency.

4: Serial communication. Frequency command is set by commands from an external control unit.

5: UP/DOWN setting from external contact. Terminals are used to specify an up/down frequency command. 6: AI1+AI2.

7: PID setting of keypad.

8: Simple PLC running option

Note 1: When under local control(f601=0), f003 setting is ignored, and f000 is always effective.

Note 2: In the case when there is no valid frequency command (e.g., frequency command is under starting frequency setting f503), the motor does not run even if the frequency drive receives the run command. At this time the RUN led on the keypad blinks.

Note 3: When f003 = 7, use f830 or f916 as the main PID setting.

NO.	Parameter Name	Setting Range	Default
f004	Command mode selection 2	0~2	0

Setting method is the same as f002.

Note: Switching operation between f002and f004 can be set input terminal function 67 (or 68) beforehand to an input contact terminal. When switching the terminal operation mode to panel operation mode:

If f502 = 1, the motor will keep the running status before switch operation.

If f502 = 0, the motor stops regardless the running status before the switch operation.

NO.	Parameter Name	Setting Range	Default
f005	Frequency setting mode selection 2	0~8	2

Setting method is the same as f003.

Note: About switching between f003 and f005 operation, see f006.

NO.	Parameter Name	Setting Range	Default
f006	Frequency priority selection	0~3	0

0: Switch between f003 and f005

When f006 =0, switch between two frequency /PID given source f003 or f005 with a logical input; 1: Switch is disabled.

When f006=1, the switch is disabled.

At this point, if f021 =0, take f003 as the frequency /PID given channel; otherwise, determine the frequency /PID given source according to the setting of f021

2: Switch between f003 and f021 selected frequency /PID source When f021 =0, frequency /PID given source is determined by f003.

When f021≠0, switch between f003 and the given source of f021 selected frequency /PID with a logical input.

3: Switch between f005 and f021 selected frequency /PID source When f021 =0, frequency /PID given source is determined by f003.

When f021≠0, switch between f005 and the given source of f021's selected frequency /PID with a logical input.

Note: To use this feature, a logical input must be defined as function 20, given the frequency /PID source switch When the defined logic input is OFF, the frequency /PID given source is determined by f003

When the defined logical input is ON, the frequency converter determines the frequency /PID given source by f005 or f021.

NO.	Parameter Name	Setting Range	Default
F007	Maximum frequency	30.0 ~ 400.0 Hz	50.0
F008	Upper limit frequency	0.5 Hz ~F007	50.0
F009	Lower limit frequency	0.0 Hz ~F008	0.0

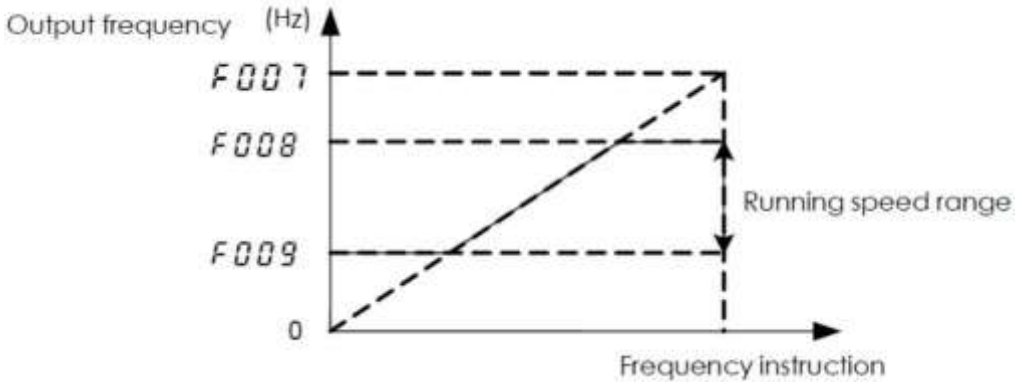


Figure 6.2 Relation of *f*007, F008, F009 and running speed

F007 sets the range of frequencies output by the frequency drive (maximum output values). This frequency is used as the reference for acceleration/deceleration time.

F008 and F009 set the upper and lower limit frequency that determines motor rotation speed range.

Figure 6.2 Relation of *f*007, F008, F009 and running speed

Note1:Set F007, F008 , F009 carefully. The motor output frequency is affected not only by these three parameters, but also by start frequency, DC braking initial frequency and skip frequency.

Note 2: The following condition must be true when setting up these parameters: *f* 009≤ F008 ≤ F007.

NO.	Parameter Name	Setting Range	Default
F010	Acceleration time 1	0.0 ~ 3200 s	varies by model
F011	Deceleration time 1	0.0 ~ 3200 s	varies by model

F010 sets the time that it takes for the frequency drive output frequency to go from 0Hz to maximum frequency F007.

f 011 programs the time that it takes for the frequency drive output frequency to got from maximum frequency F007to 0Hz.

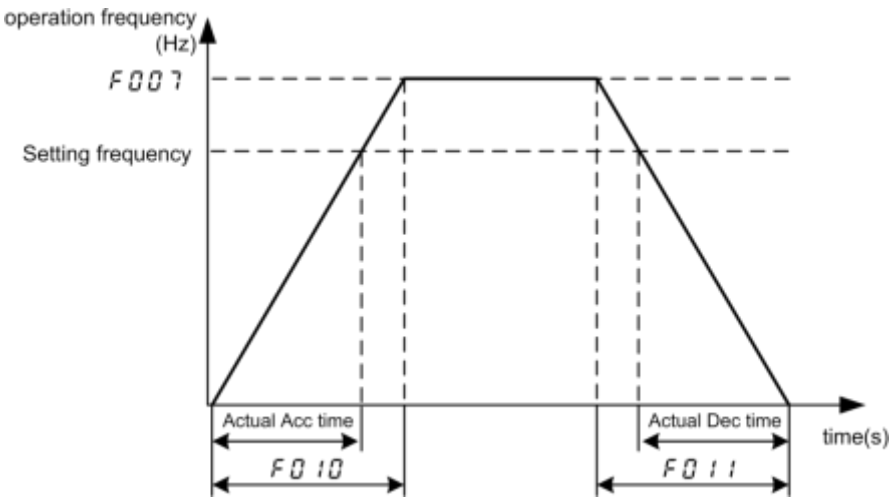


Figure 6.3 Definition of acceleration/deceleration time

When the acceleration/deceleration time is set at 0.0 seconds, the frequency drive speed increases or reduces within 0.1 seconds.

If the programmed value is shorter than the optimum acceleration/deceleration time determined by load conditions, overcurrent stall or overvoltage stall function may make the acceleration/deceleration time longer than the programmed time. If an even shorter acceleration/deceleration time is settled, there may be an over current trip or overvoltage trip for frequency drive protection.

Note: See **f518**, **f520**, **f519** and **f521**.

NO.	Parameter Name	Setting Range	Default
f012	PWM carrier frequency	1.5 ~ 12.0 kHz	varies by model

Increase of the switching frequency may reduce the magnetic noise of the motor. However, enhancement of switching frequency will increase heat dissipation. In the event of increase of switching frequency, the capacity of the frequency drive may require corresponding derating. Normally it is unnecessary to change the parameter because we have done the reasonable setup when ex-factory.

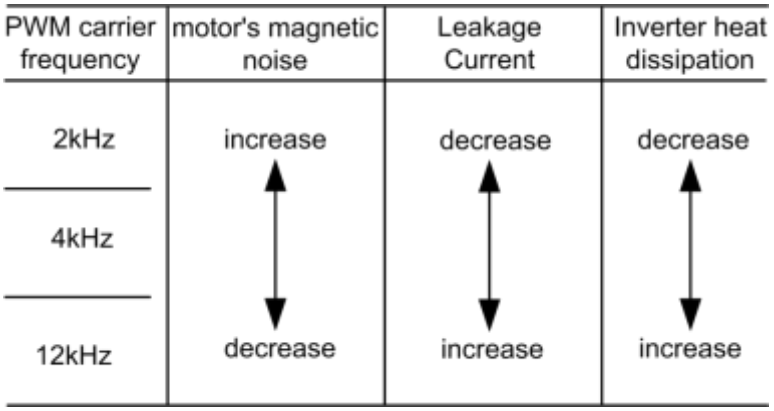


Figure 6.4 Impact on frequency drive performance by changing carrier frequency

Table 6.1 default carrier frequency value of different model capacity

Model	Max. of **f3** （kHz）	Min. of **f3** （kHz）	default of **f3** （kHz）
0.4 ~ 11 kW	12.0	1.5	4.0
15 ~ 30 kW	8.0	1.5	4.0
37 ~ 500 kW	4.0	1.5	4.0

Note: Although the electromagnetic noise level is reduced, the motor acoustic noise may be increased.

NO.	Parameter Name	Setting Range	Default
f013	Carrier frequency control mode selection	0~1	1

0: Carrier frequency not reduced automatically 1: Carrier frequency reduced automatically.

Reduction of rated current will be required if the PWM carrier frequency is set high.

When the PWM carrier frequency is set high, selecting “Carrier frequency not reduced automatically” may causes the frequency drive to be tripped (overheat) more easily than selecting “Carrier frequency reduced automatically “.

Switching frequency level will be automatically controlled in case of overheat trip in the frequency drive. If the frequency drive detects upcoming overheat fault, it will lower the switching frequency to reduce the heat dissipation from the drive. With the temperature tending to normal, the switching frequency will return to the level selected by **f012**.

NO.	Parameter Name	Setting Range	Default
f014	Random PWM mode	0~1	0

0: Disable.

1: Enable. The random mode reduces motor electromagnetic noise by changing the PWM pattern.

NO.	Parameter Name	Setting Range	Default
f015	Automatic acceleration/deceleration	0~2	0

0: Disabled (manual).

1: Automatic (at acceleration & deceleration) 2: Automatic (only at acceleration)

Adjusts the acceleration/deceleration time automatically within the range of 1/8 to 8 times as long as the time set with the (f010 or f011), depending on the current rating of the frequency drive.

When automatically setting acceleration/deceleration time, always change the acceleration /deceleration time so that it conforms to the load. The acceleration/deceleration time changes constantly with load fluctuations. For frequency drive that requires a fixed acceleration/deceleration time, use the manual settings (f010 and f011), and set f015 = 0.

Setting acceleration/deceleration time (f010 and f011) in conformance with mean load allows optimum setting that conforms to further changes in load.

Use this parameter after actually connecting the motor.

When the frequency drive is used with a load that fluctuates considerably, it may fail to adjust the acceleration or deceleration time in time, and therefore may be tripped.

Note: Manual acceleration and deceleration time may still be restrained by motor current amplitude limit (See f107) and over-voltage fault protection (See f415) and over-voltage fault operation level. function (See f416).

NO.	Parameter Name	Setting Range	Default
f016	Factory reserved		

NO.	Parameter Name	Setting Range	Default
f017	Parameter setting macro function	0~19	0

0: Default value.

1: 2-wire control (Negative logic mode, ramp stop).

2: 3-wire control (Negative logic mode, ramp stop).

3: External input UP/DOWN setting (Negative logic mode, slowdown stop).

4 ~ 16: Factory reserved

17: PID sleep & Wake Control (f003 =7 f910 =0.1s f911 =75.0% f915 =5.0s f919 =38.0Hz)

18: PID basic control (f002 =1 f003=7 f367=1 f523=2 f900 =1 f917=100 f918=20)

19: Factory reserved

Note 1: All the setup is available only under remote control mode (f601=1) or it cannot recover to the default value even you setup *f017*=0. After setting f601=1, *f017* will recover to 0. If we request 2-wire control mode, we just set *f017*=1 and confirm the frequency drive is under remote control mode.

Note 2: Negative logic means the common point of all input terminal is connected to “0V” terminal on frequency drive, while positive logic mode connected to “24V” terminal, see f306.

Note 3: 1ST LED Display on the left is the value for *f017* last setting

NO.	Parameter Name	Setting Range	Default
f018	Factory reserved		
f020	Factory reserved		

NO.	Parameter Name	Setting Range	Default
f021	Primary and secondary frequencies /PID are given	0 ~ 4	0

0: Single channel given

When f006 =0, switch between two frequency /PID given source f003or f005 with a logical input; When f006 ≠0, frequency /PID given source is determined by f003.

1: f003+f005

When f006 =0/1, take the sum of frequency /PID given by f003 and f005 as the final given, and its value is limited by upper and lower limits.

When f006=2, switch between f003 and (f003+ f005) with a logical input; When f006=3, switch between f005 and (f003+f005) with a logical input.

2: f003-f005

When f006 =0/1, the difference between the frequency /PID given by f003 and f005 is taken as the final given value, and its value is limited by the upper and lower limits.

When f00 =2, switch between f 03 and (f003-f005) with a logical input; When f006=3, switch between f 05 and (f003-f00) with a logical input. 3: MAX (f003, f005)

When f006 =0/1, the maximum value of frequency /PID given by f003 and f005 is taken as the final given value, which is limited by upper and lower limits.

When f006=2, switch between f003 and MAX (f003, f005) with a logical input; When f006=3, switch between f005 and MAX (f003, f005) with a logical input. 4: MIN (f003, f005)

When f006 =0/1, the minimum value of frequency /PID given by f003 and f005 is taken as the final given value, which is limited by upper and lower limits.

When f006=2, switch between f003 and MIN (f003, f005) with a logical input; When f006=3, switch between f005 and MIN (f003, f005) with a logical input.

NO.	f 1	f	Final frequency setting
1	0	0	Switch between f003 and f005 with logical input
2	0	1/2/3	f003
3	1/2/3/4	0/1	f021 The selected given source
4	1/2/3/4	2	Switch between f003 and the given source selected by f021 with logical input
5	1/2/3/4	3	Switch between f005 and the given source selected by f021 with logical input

Example 1: When f003+ f005 operation and f005=3/7, press ▲▼ button to adjust the frequency /PID of

f003 channel, and can increase or decrease.

• The set remains unchanged when the machine stops; When the power is off, it is not saved. After the power is on, it is the original set of f003 channel. Set to:

Frequency given: f900 =0, f003 = any, f005 =3, f021 =1, f024 =1 or 4.

PID given: f900 ≠0, f003= any, f005 =7, f021 =1, f024=1 or 4.

• When the machine stops or power is switched off, the set is not saved, and the original set of f 003 channel is restored. Set to:

Frequency given: f900 =0, f003 = any, f005 =3, f021 =1, f024 =2 or 5.

PID given: f900 ≠0, f003= any, f005 =7, f021 =1, f024 =2 or 5.

Example 2: when f003± f005 is calculated and f005=5, the frequency /PID of f003 channel can be adjusted directly through UP/DOWN function, and can be increased or decreased. (Applicable to both frequency setting and PID setting)

• The set remains unchanged when the machine stops;

Set as: f003= any, f005 =5, f021 =1 or 2, f023 =25, f303 =23, f304 =24, f323 =25;

It is suggested to set f324 =4 to decide whether to save after power off.

• Do not save when shutdown and power down, restore to the original f 003 channel.

Set to: f003= any, f005 =5, f021 =1 or 2,f023 =25, f303 =23, f304 =24, f323 =25 (must be

f323= *f023* based on *f324* =6), *f324* =4, *f310* =75.

NO.	Parameter Name	Setting Range	Default
f022	*f005* frequency given coefficient	0.0~ 100.0%	100.0 %
f023	*f005* frequency bias given	0.0Hz~400.0Hz	0.0Hz

When *f021* =1 (*f003*+ *f005*) or 2 (*f003*-*f005*) and *f005* =0 (keyboard panel potentiometer), or 1 (AI1), or 2 (AI2), or 5 (UP/DOWN), *f022*、*f023* are used to adjust the given amount of *f005*.

Example 1: Processing with a given frequency

The final frequency of *f005* channel is given = (the original frequency of *f005* channel is given - *f023*) * *f022*.

Example 2: processing given by PID (note: consider the original *f005* as a given frequency here)

The final frequency PID given for *f005* channel = *f022* **f917* * (the original frequency given for *f005* channel - *f023*)/*f007*.

Note: The final frequency /PID given for *f005* channel may be positive or negative.

NO.	Parameter Name	Setting Range	Default
f024	Lower limit selection and *f005*= 3/7 setting	0~ 5	0

f024 contains two features:

Function 1: Select the lower limit value of panel potentiometer/*f000* /UP_DOWN;

Function 2: When selecting *f021* =1(*f003* + *f005*) and *f005* =3 (given frequency) or 7(PID given), press ▲▼ button to adjust the treatment method of given frequency

f024	Panel potentiometer/*f000*/UP_DOWN given lower limit selection	When *f021* =1 (*f003*+ *f005*) and *f005* = 3/7,press ▲▼ button to adjust a given treatment
0	（1) Frequency given: *f009* (2）PID given:*f917* * *f009* / *f007*	Press button ▲▼ to adjust the value of *f000*and use *f000* as the given source of *f005*
1		Press button ▲▼ to adjust *f003* channel on the given basis, give keep the same when stop; When the power is off, it is not saved. After the power is on, it is the original set of *f003* channel.
2		Press button ▲▼ to adjust *f003* channel on the given basis, don't save the given when stop and power off, restore to the original given of *f003* channel.
3	0.0Hz	Press button ▲▼ to adjust the value of *f000*and use *f000* as the given source of *f005*
4		Press button ▲▼ to adjust *f003* channel on the given basis, give keep the same when stop; When the power is off, it is not saved. After the power is on, it is the original set of *f003* channel.
5		Press button ▲▼ to adjust *f003* channel on the given basis, don't save the given when stop and power off, restore to the original given of *f003* channel.

NO.	Parameter Name	Setting Range	Default
f099	Manufacturer reserve (same as f020)	-	-

6.2.Motor and its protection parameter group

NO.	Parameter Name	Setting Range	Default
f100	Auto-tuning	0~2	0

0: Auto-tuning disabled (use of internal parameters).

1: Application of individual settings of f203 (after execution: 0).

2: Auto-tuning enabled (after execution: 0).

When auto-tuning, set the following parameters at least, as specified on the nameplate of the motor:

f101~f104.

Set f100 to 2 before the start of operation. Tuning is performed at the start of the motor then.

Check to be sure that the setting of the parameter f101 and that of the parameter f102 agree with the base frequency (rated rotational speed) and base frequency voltage (rated voltage) of the motor to be operated, respectively. If not, set the parameters correctly.

When using the frequency drive to control the operation of a motor smaller in capacity by one grade or more, be sure to set the motor rated current setting parameter (f103) properly.

Vector control may not operate properly if the motor capacity differs from the applicable rated capacity of the frequency drive by more than two grades.

If current wave forms oscillate during operation, increase the speed control stability factor (f208). This is effective in suppressing oscillation.

Precautions on auto-tuning:

Conduct auto-tuning only after the motor has been connected and operation completely stopped. If auto- tuning is conducted immediately after operation stops, the presence of a residual voltage may result in abnormal tuning.

(1) Voltage is applied to the motor during tuning even though it barely rotates. During tuning, “tun1” is displayed on the keypad.

(2) Tuning is performed when the motor starts for the first time after f100 is set to 2.

Tuning is usually completed within three seconds. If it is aborted, the motor will trip with the display of E-46 and no constants will be set for that motor.

(3) High-speed motors, high-slip motors or other special motors cannot be auto-tuned.

(4) Provide cranes and hoists with sufficient circuit protection such as mechanical braking. Without sufficient circuit protection, the resulting insufficient motor torque during tuning could create a risk of machine stalling/falling.

(5) If auto-tuning is impossible or an "E-46" auto-tuning error is displayed.

(6) If the frequency drive is tripped during auto-tuning because of an output phase failure (E-42), check if the frequency drive is connected to the correctly. A check for output phase failures is made during auto-tuning, regardless of the setting of the output phase failure detection mode selection parameter (f406).

NO.	Parameter Name	Setting Range	Default
f101	Base frequency 1	25.0~400.0 Hz	50.0
f102	Base frequency voltage1	50~660V	varies by model
f103	Motor rated current	varies by model	varies by model
f104	Motor rated speed	100~15000 Pm	varies by model

Set f101 ~f104, as specified on the nameplate of the motor

Note 1: Please set according to the motor nameplate parameters. Excellent control performance of vector control requires accurate motor parameters.

Note 2: Frequency converter provides parameter self-learning function. Accurate parameter self-learning comes from the correct input of motor nameplate parameters. In order to ensure the control performance, please try to ensure the drive and the motor power match, otherwise, the drive control performance will be significantly reduced.

Note 3: When the rated power of the field frequency converter is greater than the rated power of the motor, the motor overload protection should be enabled to prevent the motor from burning out. The motor overload protection function must set the following parameters:

1) F106 or F110 is set as the rated current of the motor nameplate.
2) F401=0 or 4, set to enable overload protection of ordinary motor or forced air-cooled motor.
3) F402 sets motor overload time, which defaults to 300 seconds.

NO.	Parameter Name	Setting Range	Default
F105	Motor no-load current	10.0~100.0%	varies by model

Set the ratio of the no-load current of the motor to the rated current. Enter the value in % that is obtained by dividing the no-load current by the rated current.

NO.	Parameter Name	Setting Range	Default
F106	Motor thermal protection current setting	varies by model	varies by model

Set the motor rated current specified on the nameplate of the motor to F106. This parameter allows selection of the appropriate electronic thermal protection characteristics according to the particular rating and characteristics of the motor.

Note: If F603=1, F106 displays in amperes/volts. If F603=0, F106 displays in % term. The 100% standard value is the rated output current indicated on the nameplate.

NO.	Parameter Name	Setting Range	Default
F107	stall prevention level	varies by model	varies by model

This parameter adjusts the output frequency by activating a current stall prevention function against a current exceeding the F107 specified level.

Note 1: Do not set F107 under the rated motor no-load current. Otherwise the frequency drive will determine that it is performing motor braking and increase the frequency applied to the motor.

Note 2: If F603=1, F107 displays in amperes/volts. If F603=0, F107 displays in % term. The 100% standard value is the rated output current indicated on the nameplate.

Note 3: When frequency drive current is exceeding the F107 specified level:

- Output frequency is adjusted current exceeding the F107 specified level.
- During an OC alarm status, (that is, when there is a current flow in excess of the stall prevention level), the output frequency changes. At the same time, “---c” is displayed flashing on and off.

NO.	Parameter Name	Setting Range	Default
F108	Base frequency 2	25.0~400.0 Hz	50.0
F109	Base frequency voltage 2	50~660 V	varies by model
F110	Motor electronic-thermal protection level 2	varies by model	varies by model
F111	Stall prevention level 2	varies by model	varies by model

Setting method is the same as F101, F102, F106, F107.

Use the above parameters to switch the operation of two motors with a single frequency drive and to select motor V/F characteristics (two types) according to the particular needs or operation mode.

The F001 (V/F control mode selection) parameter is enabled only for motor1.If motor 2 is selected, V/F control will be given constant torque characteristics.

NO.	Parameter Name	Setting Range	Default
f112~f115	Factory reserved		

NO.	Parameter Name	Setting Range	Default
f120	Default setting	0~9	0

0: -

1: Standard default setting (Initialization)

2: Save user-defined parameters

3: Call user-defined parameters

4: Trip record clear

5: Cumulative operation time clear

6: Cumulative fan operation time record clear

7: Initialization of type information

8: P-type rating. (Normal duty, for variable torque load characteristic like pumps and fans).

9: G-type rating. (Heavy duty, for constant torque load characteristic).

Note1: This function will be displayed as 0 during reading on the right. This previous setting is displayed on the left. Example: 1 0. f120 cannot be set during the frequency drive operating. Always stop the frequency drive first and then program.

Note 2: Even set f120=1, f300, f333, f334, f335 , f336, f348, f349 will not be reset to their factory default settings.

Note 3: G-type and P-type: G-type refers to applications requiring constant torque output, while P-type applications with variable torque needs. The drive allows the user to select G-type or P-type ratings for the frequency drive depending on the application. Fans, pumps, and blowers should use P-type (f120 = 8), and other applications generally use G-type (f120 = 9). Differences between G-type ratings and P -type ratings for the drive include rated input and output current, overload capacity, carrier frequency, and current limit.

Duty types	Stall prevention level	overload tolerance	First digit of u000 display
G-type (heavy duty)	150%	150% rated output current for 60 s	“g” (e.g. g100)
P-type(Normal duty)	120%	120% rated output current for 60 s	“p” (e.g. p100)

Note 4:when set f120=1, the default setting is for G-type rating.

6.3.Motor control parameter group

NO.	Parameter Name	Setting Range	Default
f201	Supply voltage correction (limitation of output voltage AVR Function)	0~3	3

0: Supply voltage uncorrected, output voltage limited.

1: Supply voltage corrected, output voltage limited.

2: Supply voltage uncorrected, output voltage unlimited.

3: Supply voltage corrected, output voltage unlimited.

If f201 is set to "0" or "2", the output voltage will change in proportion to the input voltage.

Even if the base frequency voltage (f102) is set above the input voltage, the output voltage will not exceed the input voltage.

The rate of voltage to frequency can be adjusted according to the rated motor capacity. For example, setting f201 to "0" or "1" prevents the output voltage from increasing, even if the input voltage changes when operation frequency exceeds the base frequency.

When the V/F control mode selection parameter (f001) is set to any number between 2 and 3, the supply voltage is corrected regardless of the setting of f201.

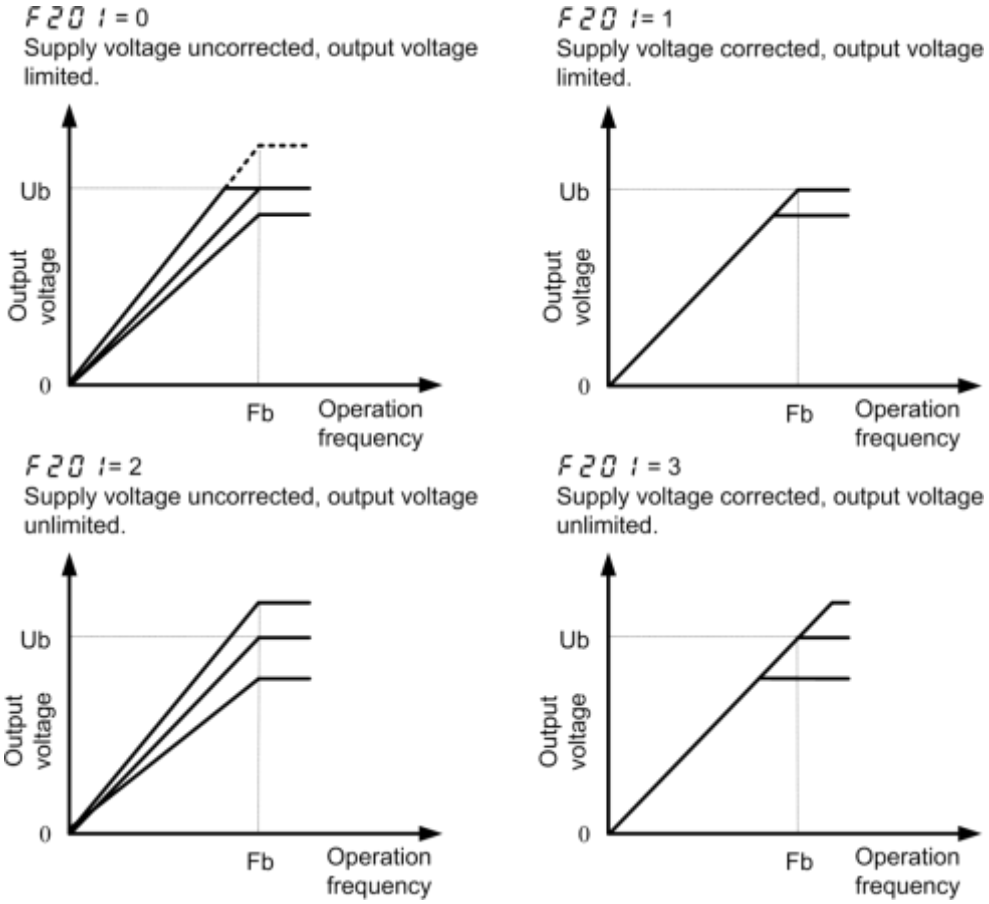


Figure 6.5 Description of voltage correct and voltage limit

NO.	Parameter Name	Setting Range	Default
f202	Voltage boost 1	0.0~30.0%	varies by model
f203	Torque boost	0.0~30.0%	varies by model

If torque is inadequate at low speeds, increase torque by raising the torque boost rate with these two parameters. Perform adjustments according to the actual operation.

f202 is effective when f001 is set to 0 (V/F constant) or 1 (square reduction).

f203 is effective when f001 is set to 2 (SVC mode).

Note: Be careful not to increase the voltage boost or torque boost rate too much because it could cause an overcurrent trip or E-45 at startup.

NO.	Parameter Name	Setting Range	Default
f204	Slip frequency gain	0~150 %	50

Set the compensation gain for the slipping of the motor. A higher slip frequency gain reduces motor slipping correspondingly.

Note1:.After setting f104, set f204 to adjust in detail.

NO.	Parameter Name	Setting Range	Default
f205	Exciting current coefficient	100~130 %	100

f205 is used to fine adjust the magnetic field increase rate in low-speed range. To increase the torque in low-speed range, specify a lager value for f205.

Note: This parameter should be adjusted only when enough torque cannot be obtained, even though auto-tuning (**f100** = 2) was made after the setting of the parameters **f204** and **f203**. Note also that adjusting this parameter may cause an increase in the no-load current in low-speed range. If the no-load current exceeds the rated current, do not adjust this parameter.

NO.	Parameter Name	Setting Range	Default
f206	Voltage boost 2	0~30 %	varies by model

Setting method is the same as *f202*.

NO.	Parameter Name	Setting Range	Default
f207	Speed control response coefficient	1~150	40
f208	Speed control stability coefficient	1~100	20

Use these two parameters to adjust the speed of response and stability to the frequency command.

How to make adjustments according to the moment of inertia of the load:

The moment of inertia of the load (including that of the motor shaft) was set at the factory on the assumption that it would be three times as large as that of the motor shaft. If this assumption does not hold, calculate the values to be entered in **f207** and **f208**, using the following equations. $F207 = 40 \times \sqrt{a/3}$, $F208 = 20 \times \sqrt{a/3}$

Where 'a' is the times by which the moment of inertia of the load is larger than that of the motor. After the above adjustments, if necessary, make fine adjustments as described below:

- To increase(reduce) the response speed: Increase (reduce) the setting of *f207*.
- If overshooting or hunting occurs: Increase the setting of *f208*.
- If reduction gears or the squeak sound: Increase the setting of *f208*.
- If an over-voltage trip occurs on completion of acceleration: Increase the setting of *f208*.

Note 1: When making the above adjustments, increase or decrease settings in steps of 10% or so while checking how things change.

Note 2: Depending on the settings of *f207* and **f208**, the frequency may exceed the upper-limit frequency if the frequency drive is set to accelerate the load in the shortest possible time.

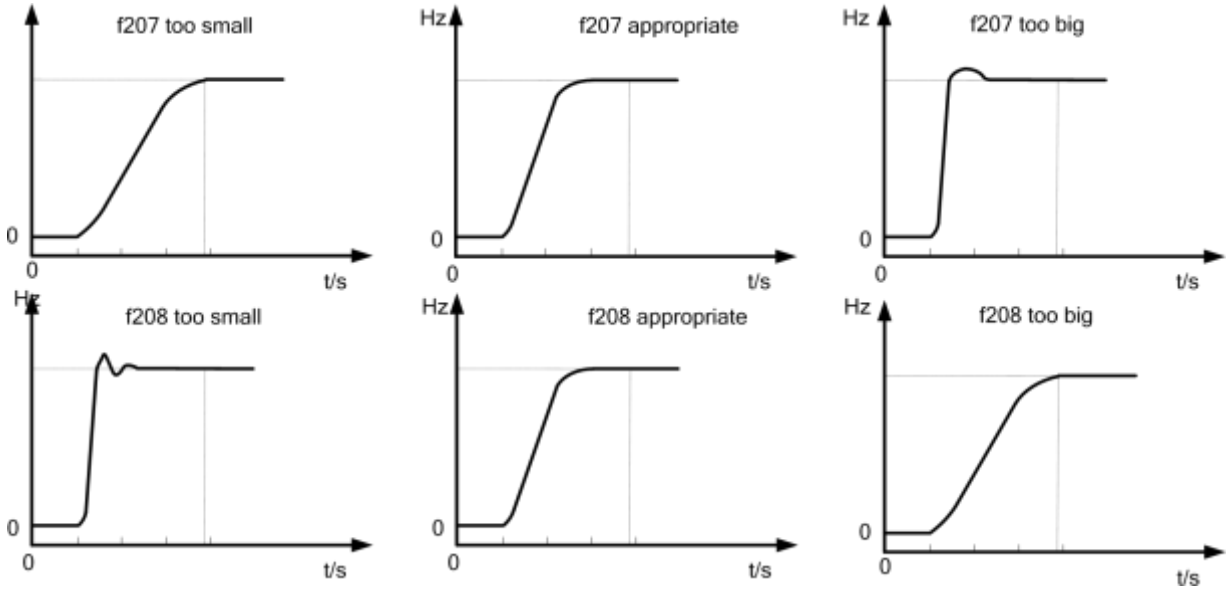


Figure 6. 6 Relationsofspeedresponse and *f207*, **f208**

NO.	Parameter Name	Setting Range	Default
f209	Stall prevention control coefficient 1	10~250%	100

Use this parameter along with **f210** adjusts characteristics in a region in which the frequency is above the base frequency (region where the field is weak). If a heavy load is applied instantaneously (or transiently), the motor may stall before the load current reaches the current set with the stall prevention level 1 parameter (**f107**). In

many cases, this kind of stall can be avoided by gradually reducing the setting of *f209*.

NO.	Parameter Name	Setting Range	Default
f210	Stall prevention control coefficient 2	50~150%	100

Using this parameter along with *f209* adjusts characteristics in a region in which the frequency is above the base frequency (region where the field is weak).

* How to make adjustments in a region (region where magnetic field is weak) above the base frequency:

A drop in supply voltage may cause fluctuations of the load current or vibration of the motor. In some cases, such phenomena can be eliminated by changing the setting of *f210* to between 80 and 90. However, this may cause an increase in load current, so that it is also necessary to adjust the setting of the electronic thermal protective level 1 parameter (*f106*) properly according to the motor capacity.

NO.	Parameter Name	Setting Range	Default
f211	Maximum voltage adjustment coefficient	90~120%	104

Specify a larger value for *f211* to secure as high an output voltage as possible in a region (region where magnetic field is weak) above the base frequency. Setting *f211* to a larger value may cause the motor to vibrate or gears to squeak. If such a phenomenon occurs, do not adjust this parameter.

NO.	Parameter Name	Setting Range	Default
f212	Waveform switching adjustment coefficient	0.1~14.0kHz	14.0

Specify a larger value for *f212* if switching from a waveform to another resulting in a considerable increase in vibration and noise in middle-speed range (region between the start frequency and the base frequency). If no improvement can be made by specifying a larger value, do not adjust this parameter.

NO.	Parameter Name	Setting Range	Default
f213- f216	Factory reserved		

NO.	Parameter Name	Setting Range	Default
f217	Multi-point profile V/F patter	0~2	0

0: factory reserved.

1: factory reserved.

2: Enable multi-point profile V/F patter.

The drive utilizes a set V/f pattern (*f217* = 2) to determine the appropriate output voltage level for each relative to the frequency reference.

NO.	Parameter Name	Setting Range	Default
f218	Point 1 output frequency（F1）	0~*f220*	10.0
f219	Point 1 output frequency voltage（V1）	0~100%	20.0
f220	Point 2 output frequency（f2）	*f218~f220*	20.0
f221	Point 2 output frequency voltage（V2）	0~100%	40.0
f222	Point 3 output frequency（f3）	*f220~f101*	30.0
f223	Point 3 output frequency voltage（V3）	0~100%	60.0

Set up the V/f pattern with *f218~f223* as shown in according to the load characteristic.

Note 1: The following condition must be true when setting up the V/f pattern: V1<V2<V3, F1<f2<f3.

Note: Too high voltage output at low speed will cause a serious motor heat dissipation problem, or stall prevention

alarm, or over current trip.

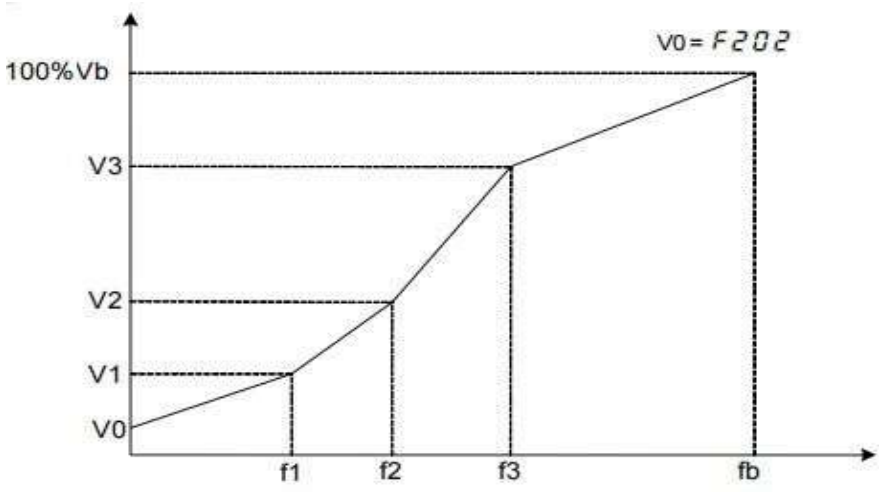


Figure 6.7 Multipoint profile V/F patter (F2 17 =2)

6.4.Process PID parameter group

NO.	Parameter Name	Setting Range	Default
F300	AI1 terminal function selection	0~2	0

0: AI1 - analog input

1: AI1 - contact input (Sink mode)

2: AI1 - contact input (Sourcemode)

This parameter allows you to choose between analog signal input and contact signal input for the AI1 terminal.

When using the AI1 terminal as analog input, be sure F305 is configured right (0~5VDC, 0~10VDC, or 0~20mA).

When using the AI1 terminal as contact input terminals in sink logic connection, be sure to insert a resistor between the 24V terminal and the VIA terminal. (Recommended resistance: 4.7kΩ~10kΩ 1/2W).

Note1: Not valid when capacity rating is at 18.5kW or above.

NO.	Parameter Name	Setting Range	Default
F301	Input terminal function for LI1	0~75	2
F302	Input terminal function for LI2	0~75	3
F303	Input terminal function for LI3	0~75	0
F304	Input terminal function for LI4	0~75	10

Use the above parameters to send signals from an external programmable controller to various control input terminals to operate and/or set the frequency drive. The desired contact input terminal functions can be selected from table 6.2.

Table 6.2 Description of input terminal function

Input terminal function NO.	Function name	Description
0	No function is assigned	Disabled
1	Standby terminal	ON: Ready for operation OFF: Coast stop (gate off)
2	Forward run command	2-wire operation ON: Forward run OFF: Slowdown stop
		3-wire operation OFF→ON: forward run.
3	Reverse run command	2-wire operation ON: Reverse run. OFF: Slowdown stop
		3-wire operation OFF→ON: Reverse run.
4	Jog run mode	ON: Jog run OFF: Jog run canceled
5	Acceleration/deceleration 2 pattern selection	ON: Acceleration/deceleration 2 OFF: Acceleration/deceleration 1 or 3
6	Preset-speed command 1	See f716- f730
7	Preset-speed command 2	
8	Preset-speed command 3	
9	Preset-speed command 4	
10	Reset command	ON: Acceptance of reset command ON → OFF: Trip reset
11	Trip stop command from external input device	OFF: No Trip ON: E-43 Trip stop according to the stop mode set by f403
13	DC braking command	OFF: No DC braking command ON: DC braking started. DC braking current level and DC braking time is set by f507 and f508 respectively.
14	PID control disabling	OFF: PID control enabled. ON: PID control disabled. The input terminal function of PID control disabling is used for switching between PID control and open-loop control. Clearance of PID integral value function can also be used.
15	Permission of parameter editing	ON: Parameter editing permitted OFF: Parameter editing prohibited (If f602 = 1)

Input terminal function NO.	Function name	Description
16	Combination of standby and reset commands	ON: Simultaneous input from standby and reset commands
17	Frequency source switching to AI1	ON: Frequency source switched to AI1 OFF: Frequency source as per f003
18	Combination of forward run and jog run	ON: Forward jog operation
19	Combination of reverse run and jog run	ON: Reverse jog operation
20	Frequency setting source switching	ON: The frequency drive follows the speed setting set by f005 (when f011= 1). OFF: The frequency drive follows the speed setting set by f003.
21	No.2 Switching of V/F setting	ON: No.2 V/F setting (f001=0, f108, f109, f110, f206) OFF: No.1 V/F setting(f001, f101, f102, f106, f202)
22	No.2 motor switching	ON: No.2 motor (f001=0, f108, f109, f110, f111, f206, f518, f519, f511) OFF: No.1 motor (f001, f010, f011, f101, f102, f106, f107, f202, f510)
23	Frequency UP signal input from external contacts	ON: Increase in frequency
24	Frequency DOWN signal input from external contacts	ON: Reduction in frequency
25	Frequency UP/DOWN cancellation signal input from external contacts	OFF→ON: Resetting of UP/DOWN frequency by means of external contacts
26	inversion of trip stop command from external device	OFF: E-43 Trip stop according to the stop mode set by f403
27	Thermal trip stop signal input from external device	ON: E-25 Trip stop
28	inversion of thermal trip stop signal input from external device	OFF: E-25 Trip stop
29	Forced switching from remote to local control	Enabled when remote control is exercised ON: Local control (setting of cmod, f002, f003 and f005) OFF: Remote control

Input terminal function NO.	Function name	Description
30	Operation holding (stop of 3-wire operation)	ON: forward /reverse run held, 3-wire operation OFF: Slowdown stop
31	Forced switching of command mode and terminal board command	ON: Terminal board operation OFF: Setting of F002
32	Display cancellation of the cumulative power amount (kWh)	ON: Monitor display cancellation of the cumulative power amount (kWh)
33	Fire-speed control see F419	ON: Fire-speed operation (preset speed operation frequency F730) OFF: Normal operation
34	Free stop command	ON: Free stop OFF: Operational readiness
35	Inversion of Reset	ON: Acceptance of reset command OFF→ ON: Trip reset
36	Forced switching of stall prevention level	ON: Enabled at the value of F111 OFF: Enabled at the value of F107
37	PID control integral value clear PID control integral value clear	ON: PID control integral value always zero OFF: PID control permitted
38	inversion of PID error signal	ON: PI error input = feedback – setting OFF: PI error input = setting – feedback
39	Forward running command + Acc&Dec curve 2	ON: Motor forward running, follow Acc&Dec curve 2 to do the ramp acceleration
40	Reverse running command + Acc&Dec curve 2	ON: Motor reverse running, follow Acc&Dec curve 2 to do the ramp acceleration
41	Forward running command + Multi-speed section 1	ON: Motor forward running and activate multi-speed section 1
42	Reverse running command + Multi-speed section 1	ON: Motor reverse running and activate multi-speed section 1
43	Forward running command + Multi-speed section 2	ON: Motor forward running and activate multi-speed section 2
44	Reverse running command + Multi-speed section 2	ON: Motor reverse running and activate multi-speed section 2

Input terminal function NO.	Function name	Description
45	Forward running command + Multi-speed section3	ON: Motor forward running and activate multi-speed section 3
46	Reverse running command + Multi-speed section 3	ON: Motor reverse running and activate multi-speed section 3
47	Forward running command + Multi-speed section 4	ON: Motor forward running and activate multi-speed section 4
48	Reverse running command + Multi-speed section 4	ON: Motor reverse running and activate multi-speed section 4
49	Multi-speed section 1 + Acc&Dec curve 2	ON: activate Acc&Dec curve 2 and multi-speed section 1 at the same time
50	Multi-speed section 2 + Acc&Dec curve 2	ON: activate Acc&Dec curve 2 and multi-speed section 2 at the same time
51	Multi-speed section 3 + Acc&Dec curve 2	ON: activate Acc&Dec curve 2 and multi-speed section 3 at the same time
52	Multi-speed section 4 + Acc&Dec curve 2	ON: activate Acc&Dec curve 2 and multi-speed section 4 at the same time
53	Forward running command+Multi-speed section 1+ Acc&Dec curve 2	ON: activate Acc&Dec curve 2, forward running command and multi-speed section 1 at the same time
54	Reverse running command+Multi-speed section 1+ Acc&Dec curve 2	ON: activate Acc&Dec curve 2, reverse running command and multi-speed section 1 at the same time
55	Forward running command+Multi-speed section 2+ Acc&Dec curve 2	ON: activate Acc&Dec curve 2, forward running command and multi-speed section 2 at the same time
56	Reverse running command+Multi-speed section 2+ Acc&Dec curve 2	ON: activate Acc&Dec curve 2, reverse running command and multi-speed section 2 at the same time
57	Forward running command+Multi-speed section 3+ Acc&Dec curve 2	ON: activate Acc&Dec curve 2, forward running command and multi-speed section 3 at the same time
58	Reverse running command+Multi-speed section 3+ Acc&Dec curve 2	ON: activate Acc&Dec curve 2, reverse running command and multi-speed section 3 at the same time
59	Forward running command+Multi-speed section 4+ Acc&Dec curve 2	ON: activate Acc&Dec curve 2, forward running command and multi-speed section 4 at the same time
60	Reverse running command+Multi-speed section 4+ Acc&Dec curve 2	ON: activate Acc&Dec curve 2, reverse running command and multi-speed section 4 at the same time
61	UP/DOWN speed clean up+ fault reset	When it is OFF to ON，clean up UP/DOWN speed input setup frequency level

Input terminal function NO.	Function name	Description
62	Running permission+ Forward running command (only 2-wire control)	ON: Activate running permission and forward running command at the same time.
63	Running permission+ reverse running command (only 2-wire control)	ON: Activate running permission and reverse running command at the same time.
64	Acc &dec curve 3	ON: Motor follows acceleration curve 3
65	Acce/Dece curve 3 + Forward running command	ON: Activate forward running and acce/dece curve 3 command at the same time.
66	Acce/Dece curve 3 + Reverse running command	ON: Activate reverse running and acce/dece curve 3 command at the same time.
67	Command source switch	OFF: command source press *f002* ON: command source press *f002*
68	Command source + frequency source switch	OFF: Command source press *f002* and frequency source press *f003* ON: Command source press *f004* and frequency source press *f005*
69	Three-wire control stop reverse	OFF: Ready for running ON: decelerate along the ramp until stop
70	Reset when simple PLC stops	OFF: Command source is *f002* ON : Command source is *f004*
71	Simple PLC hold	OFF: Invalid ON: Effective
72	Simple PLC pause	OFF: Invalid ON: Effective
73	PID control + frequency given source switch	OFF: Control disable + set *f005* for the given frequency source ON: Control disable + set *f003* for the given frequency source
74		OFF: Control disable + set *f005* for the given frequency source ON: Control disable + set *f003* for the given frequency source
75	(UP/DOWN) stop speed clearance	ON: (UP/DOWN) stop speed clear effective OFF: (UP/DOWN) stop speed clearance is invalid

Note1: AI1 and AI2 could be used as contact input terminals (see *f300*, *f308*, *f313* and *f314*).

Note 2: The difference between 2-wire control and 3-wire operation configuration lies in whether logic input function 30 (3-wire control shutdown input) is used.

NO.	Parameter Name	Setting Range	Default
F305	AI1 voltage-current input selection	0~2	0

0:0～5V voltage signal input.

1:0～10V voltage signal input.

2: 0-20mA(4-20mA) current signal input.

Note: AI2 only accept 0~10VDC voltage signal input, setting value of F305 will not change the characteristic of AI2.

NO.	Parameter Name	Setting Range	Default
F306	sink/source mode selection	0~1	1

0: Source (Positive) logic terminal mode.

1: Sink (Negative) logic terminal mode

NO.	Parameter Name	Setting Range	Default
F307	AO voltage-current output selection	0~1	1

0: Current signal output.

1: Voltage signal output.

NO.	Parameter Name	Setting Range	Default
F308	Input terminal function of AI1	0~75	0

When F300 disabled, the set value of F308 cannot be read out.

When F300 set at 1or 2, AI1 is enabled, and can be used as a contact input terminal.

NO.	Parameter Name	Setting Range	Default
F309	Always-active terminal selection 1	0~75	1
F310	Always-active terminal selection 2	0~75	0

F309 and F310 specifies an input terminal function that is always to be kept active (ON).

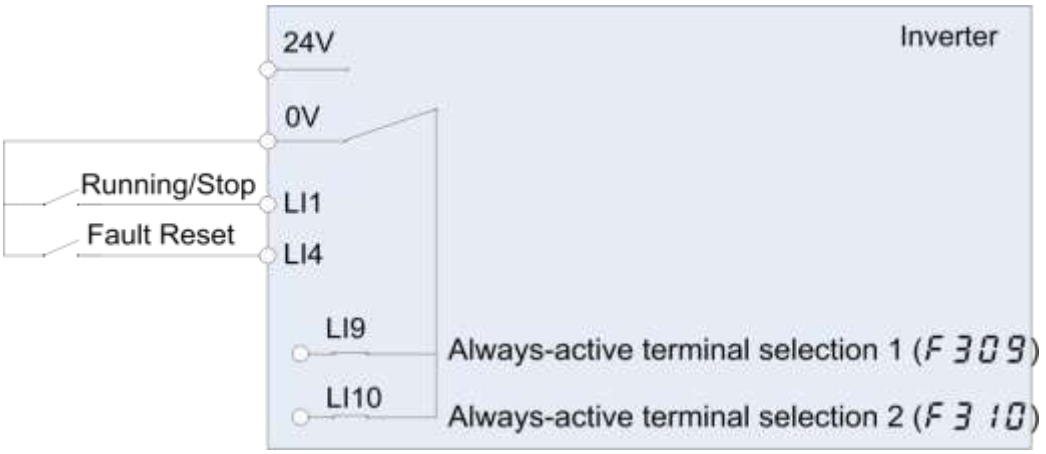


Figure 6.8 Always active terminal function

Note 1: Use F309 and F310 to assign input terminal function to LI9, LI10. LI9 and LI10 are virtual input contact terminal which are always activated. See Figure 6.8.

NO.	Parameter Name	Setting Range	Default
f311	Output terminal function A of LO-CLO	0~255	4
f312	Output terminal function B of LO-CLO	0~255	255

The set method is same as f315 .

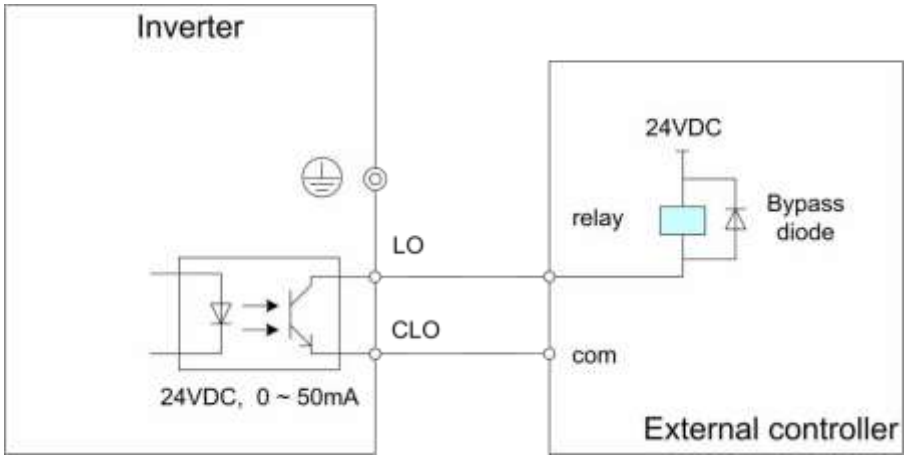


Figure 6.9 Output of LO-CLO wiring example

f312 could be used to remind of assisted status signal.

NO.	Parameter Name	Setting Range	Default
f313	AI1 terminal function selection	0	0

0: AI2 - analog input

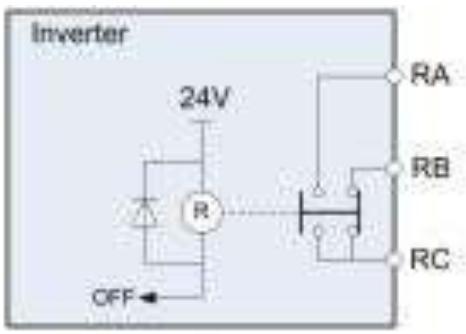
1: AI2 - contact input (Sink)

2: AI2 - contact input (Source)

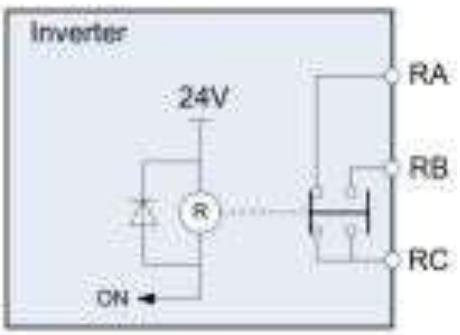
NOTE: 18.5KW include and above not support this function.

NO.	Parameter Name	Setting Range	Default

NO.	Parameter Name	Setting Range	Default
f315	Output terminal function A of T1	0~255	40
f314	Input terminal function of AI2	0~75	0



a) Relay in OFF status



b) Relay in ON status

NOTE: 18.5KW include and above not support this function.

Table 6.3 Description of output terminal function

Logic output Function Settings	Relay state	Operation
0	OFF	Output frequency ≤ lower limit frequency setting of f009
	ON	Output frequency > lower limit frequency setting of f009
2	OFF	Output frequency < upper limit frequency setting of f008
	ON	Output frequency = upper limit frequency setting of f008
4	OFF	Output frequency < setting of f337
	ON	Output frequency ≥setting of f337
6	OFF	Output frequency > (set frequency + f339), or < (set frequency - f339)
	ON	(frequency - f339) < output frequency < (set frequency + f339)
8	OFF	Output frequency >(f338+f339), or < (f338-f339)
	ON	(f338-f339)＜Output frequency＜(f338+f339)
10	OFF	Output frequency ≤ f338-f339
	ON	Output frequency ≥f338+f339
12	OFF	Frequency commanded by f003or f005 ≠AI1 value
	ON	Frequency commanded by f003or f005= AI1 value
14	OFF	Frequency commanded by f003or f005 ≠AI2 value
	ON	Frequency commanded by f003or f005= AI2 value
16	OFF	AI1 value≤f340-f341
	ON	AI1 value ≥f340+f341
18	OFF	AI2 value ≤f342-f343
	ON	AI2 value ≥f342+f343
20	OFF	Terminal other than AI2 selected as frequency command
	ON	AI2 selected as frequency command
22	OFF	Operation stopped
	ON	When operation frequency is output or during (A–07)
24	OFF	Not ready for operation
	ON	Ready for operation (Input function of standby and run are not ON)
26	OFF	forward run
	ON	reverse run
28	OFF	remote control mode
	ON	local control mode
30	OFF	No Frequency converter fault (no fault output during automatic fault reset attempt)
	ON	Frequency converter fault
32	OFF	Torque in f412 set value and time of duration ＞ f414 set time.
	ON	Torque in f412 set value and time of duration ≤ f414 set time.
34	OFF	The output current ＞ f408 +f409
	ON	The output current ≤ f408set value and time of duration＞f410 set

Logic output Function Settings	Relay state	Operation
36	OFF	When frequency drive is not significant trip
	ON	When frequency drive is significant trip
38	OFF	When frequency drive is not insignificant trip
	ON	When frequency drive is insignificant trip
40	OFF	No Frequency converter fault
	ON	Frequency converter fault (out of order during automatic fault reset attempt)
42	OFF	alarm off
	ON	alarm on
44	OFF	calculated value of motor overload level < 50%
	ON	calculated value of motor overload level ≥ 50%
46	OFF	calculated value of brake resister overload level < 50%
	ON	calculated value of brake resister overload level ≥ 50%
48	OFF	Torque current <（F412*70% - F413）
	ON	Torque current ≥ F412*70%
50	OFF	Cumulative operation time ＜F428 setting
	ON	Cumulative operation time ≥F428 setting
52	OFF	Calculation for parts replacement time is shorter than the preset time (internally preset)
	ON	Calculation for parts replacement time is equal to or longer than the preset time (internally preset)
54	OFF	PTC detected value ＜60% of protection level
	ON	PTC detected value ≥ 60% of protection level
56	OFF	Other than undervoltage detected
	ON	Undervoltage detected
58	OFF	Mechanical brake release
	ON	Mechanical brake not release
60	OFF	Motor is not in acceleration state
	ON	Motor is in acceleration state
62	OFF	Motor is not in deceleration state
	ON	Motor is in deceleration state
64	OFF	Motor is not in acceleration or deceleration state
	ON	Motor is in acceleration or deceleration state
66	OFF	Heat sink temperature still not reach alarm value
	ON	Heat sink temperature reaches alarm value
68	OFF	PLC recycle is under running
	ON	After completing one PLC recycle, then export one 0n-pulse
70	OFF	Under running at one PLC section
	ON	After completing one PLC section, then export one On-pulse

Logic output Function Settings	Relay state	Operation
72	OFF	The converter is not ready
	ON	The converter is ready to receive the running signal
74~79	OFF	Not used
	ON	Not used
80	OFF	LI1 input is invalid
	ON	LI1 input is valid
82	OFF	LI2 input is invalid
	ON	LI2 input is valid
84	OFF	PID feedback pressure equal to or below *f627* - *f628*
	ON	PID feedback pressure is equal to or higher than *f627* + *f628*
86	OFF	PID feedback pressure is equal to or below *f918*
	ON	PID feedback pressure is equal to or higher than *f918* + *f628*
88~253	OFF	Not used
	ON	Not used
254	OFF	Relay Output always OFF
255	ON	Relay Output always ON

Note 1: Inversion logic can be obtained by add 1 to the output terminal function number. Example: *f315* =3 is the inversion logic action of *f315* =2.

Note 2: Output terminal function is available for LO1-CLO1, LO2-CLO2 (*f311*, *f312*, *f373*, *f374*) and T1, T2 (*f315*, *f359*, *f360*).

Note 3: Significant trip including follows: *E-02*, *E-03*, *E-05*, *E-06*, *E-07*, *E-12*, *E-25*, *E-31*, *E-32*, *E-33*, *E-36*, *E-41*, *E-42*, *E-43*, *E-46*.

Insignificant trip including follows: *E-01*, *E-11*, *E-21*, *E-22*, *E-24*.

NO.	Parameter Name	Setting Range	Default
f316	Output terminal logic selection of LO-CLO	0~1	0

0: *f311* AND *f312*. The logical product (AND) of *f311* and *f312* will be output to LO1-CLO1.

1: *f311* OR *f312*. The logical sum (OR) of *f311* and *f312* will be output to LO1-CLO1.

NO.	Parameter Name	Setting Range	Default
f317	LO-CLO output delay	0~60.0 s	0.0

f317 specified the time of LO1-CLO1 output delay.

NO.	Parameter Name	Setting Range	Default
f318	Relay 1 closing delay time	0~60.0 s	0.0

f318 specifies the closing delay time of relay 1 normally open contact

NO.	Parameter Name	Setting Range	Default
f319	External contact input - UP response time	0.0~10.0s	0.1
f320	External contact input - UP frequency steps	0.0 Hz ~f007	0.1
f321	External contact input - DOWN response time	0.0~10.0s	0.1
f322	External contact input - DOWN frequency steps	0.0 Hz ~f007	0.1

These functions take effect when f003 or f005 is set to 5. Two input contact terminals are required to adjust the frequency command: one is used to increase the frequency command (see input terminal function 23),

and the other is used to reduce the frequency command (see input terminal function 24).

Use an input contact terminal to clear the frequency setting that accumulated by the UP/DOWN operation (see input terminal function 25).

Use f319~f322 set the frequency incremental/decremental gradient.

Frequency command incremental gradient = f320/f319 setting time

Frequency command decremental gradient = f322/f321 setting time

NO.	Parameter Name	Setting Range	Default
f323	Initial up/down frequency	0.0 Hz ~f007	0.0

To adjust the frequency starting at a specified frequency other than 0.0 Hz (default initial frequency) after turning on the frequency drive , specify the desired frequency using f323 (initial up/down frequency).

NO.	Parameter Name	Setting Range	Default
f324	Change of the initial up/down frequency	0~6	0

f324 Set	Whether f323 is saved when power is lost	f323 reset option
0	Do not save, f323 will not change every time the power is switched off or switched on.	f323 restores to f009 when reset with logical input function 25 (special reset) or 75 (stop reset).
1	Save, f323 is set to the last received frequency given when power is lost.	
2	Do not save, f323 will not change every time the power is switched off or switched on.	The f323 is restored to 0.0Hz when reset by the logical input function 25 (dedicated reset) or 75 (shutdown reset).
3	Save, f323 is set to the last received frequency given when power is lost.	
4	Do not save, f323 will not change every time the power is switched off or switched on.	f323 returns to its original value when it is reset by the logical input function 25 (dedicated reset) or 75 (shutdown reset).
5	Save, f323 is set to the last received frequency given when power is lost.	
6	Record the initial value of f323, see note for details.	

Note: If f323 needs to return to its original value (i.e. : f324 =4 or 5) when it is reset through the logical input terminal function 25 or 75, it must set f324 =6 after setting f323, or set f323 on the basis of f324 =6 to record the original value of f323, otherwise the frequency after reset may be incorrect.

Example: when given a frequency through a single channel UP/DOWN, the frequency is not saved for each shutdown and power outage, and the frequency is restored to the original given frequency of f323.

◇ Settings are: f003=5, f021 =0, f023 =25, f303 =23, f304 =24, f310 =75,

F323 =25 (F323 must be set on F324=6 and F323=F 023), F324=4.

NO.	Parameter Name	Setting Range	Default
F325	AI1 input point 1 setting	0~100%	0
F326	AI1 input point 1 frequency	0.0~400.0 Hz	0.0
F327	AI1 input point 2 setting	0~100%	100
F328	AI1 input point 2 frequency	0.0~400.0 Hz	50.0
F329	AI2 input point 1 setting	0~100%	0
F330	AI2 input point 1 frequency	0.0~400.0 Hz	0.0
F331	AI2 input point 2 setting	0~100%	50
F332	AI2 input point 2 frequency	0.0~400.0 Hz	50.0

These parameters adjust the output frequency according to the externally applied analog signal (0-5Vdc voltage, 0-10Vdc voltage, 4-20mAdc current) and the entered command for setting an external contact frequency, see figure 5.11.

Note 1: Do not set the same value to F325 and F327 (or F329 and F331), otherwise a-05 will alarmed.

Note 2: when adjust 4-20mAdc current input, set 20(%) to F325 (F327).

Note 3: analog input signal bias and slope could further adjust with the parameter between F333 and F336

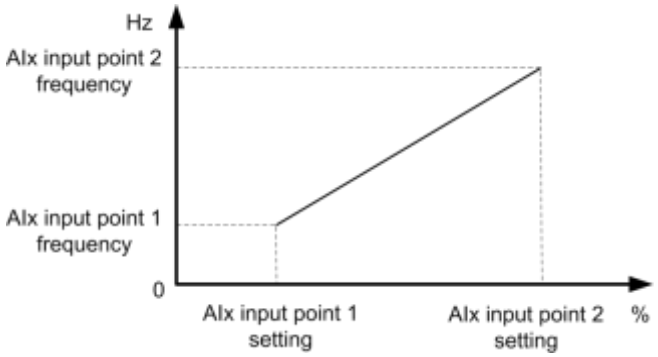


Figure 6.11 Relation between analog input and frequency setting

NO.	Parameter Name	Setting Range	Default
F333	AI1 input bias	0~255	varies by model
F334	AI1 input gain	0~255	varies by model
F335	AI2 input bias	0~255	varies by model
F336	AI2 input gain	0~255	varies by model

To fine adjust the frequency command characteristics for AI1/AI2 input, use the Parameters F333 to F336.

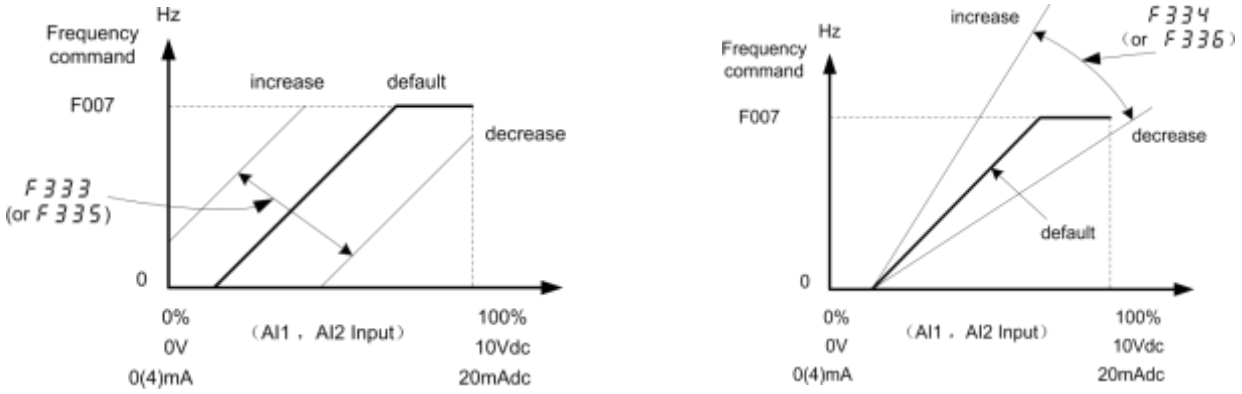


Figure 6.12 Calibration of analog input

Note 1: If you want to reduce the leeway, set F470 or F472 to a larger value. Note that specifying a too large value may cause an output frequency to be output, even though the operation frequency is 0 (zero) Hz.

Note 2: If you want to adjust the frequency drive so that it will output the maximum frequency at the maximum voltage and current input, set F471 or F473 to a smaller value. Note that specifying a too small value may cause the operation frequency not to reach the maximum frequency, even though the maximum voltage and current input are applied.

NO.	Parameter Name	Setting Range	Default
F337	Low-speed signal output frequency	0.0 Hz ~F007	0.0

When the output frequency exceeds the setting of F337, an ON signal will be generated. This signal can be used as an electromagnetic brake excitation/release signal.

This signal can also be used as an operation signal when F337 is set to 0.0Hz, because an ON signal is put out if the output frequency exceeds 0.0Hz.

If the frequency drive is so set, the signal will be put out through the open collector OUT(LO-CLO) and RELAY output terminals.

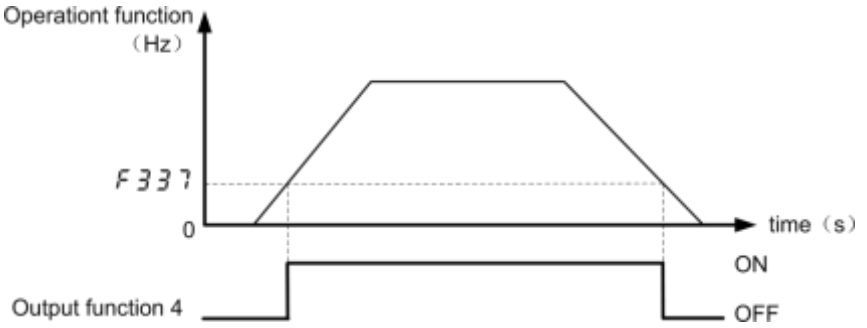


Figure 6.13 Description of Low-speed signal output frequency

NO.	Parameter Name	Setting Range	Default
F338	Speed reach detection output frequency	0.0 Hz ~F007	0.0
F339	Speed reach detection band	0.0 Hz ~F007	2.5

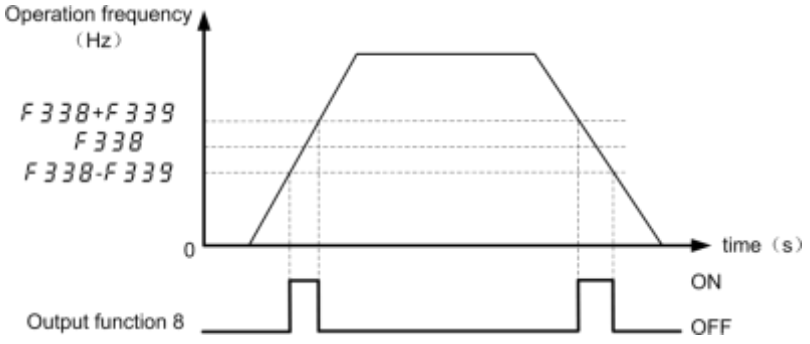


Figure 6.14 Description of Speed reach detection outputfrequency

NO.	Parameter Name	Setting Range	Default
F340	AI1 input reach detection level	0~100 %	0
F341	AI1 input reach detection band	0~20 %	3

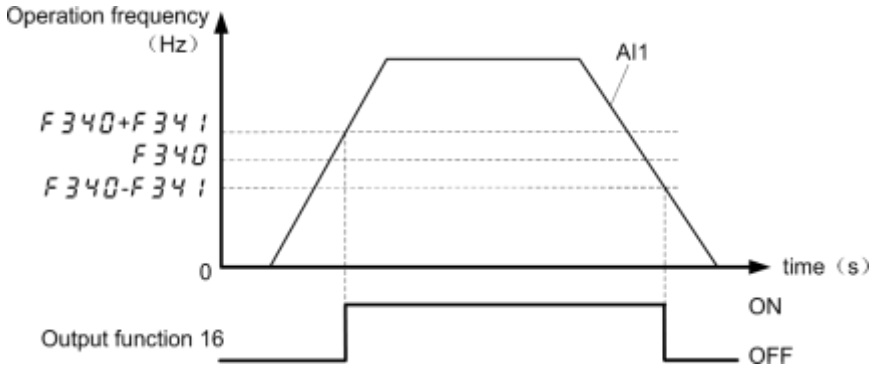


Figure 6.15 Description of AI1 input reach output

NO.	Parameter Name	Setting Range	Default
f342	AI2 input reach detection level	0~100 %	0
f343	AI2 input reach detection band	0~20 %	3

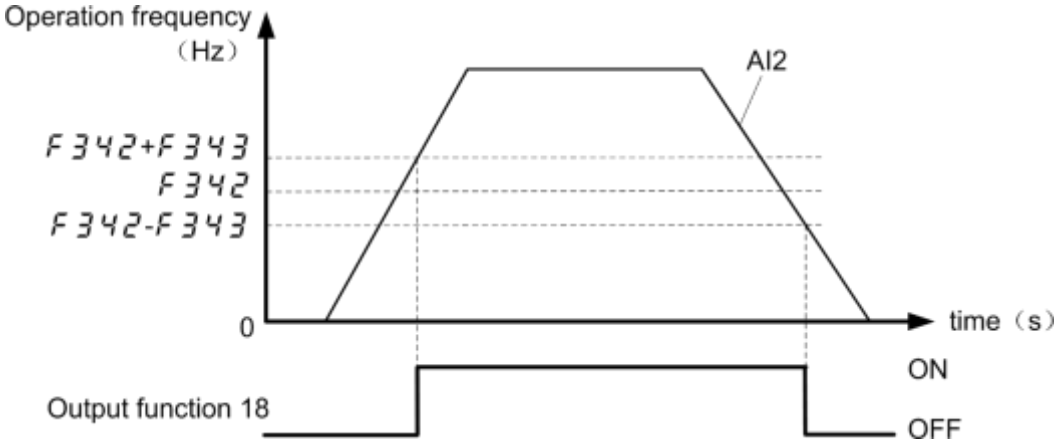


Figure 6.16 Description of AI2 input reach output

NO.	Parameter Name	Setting Range	Default
f344	Frequency command agreement detection range	0.0 Hz ~f007	2.5

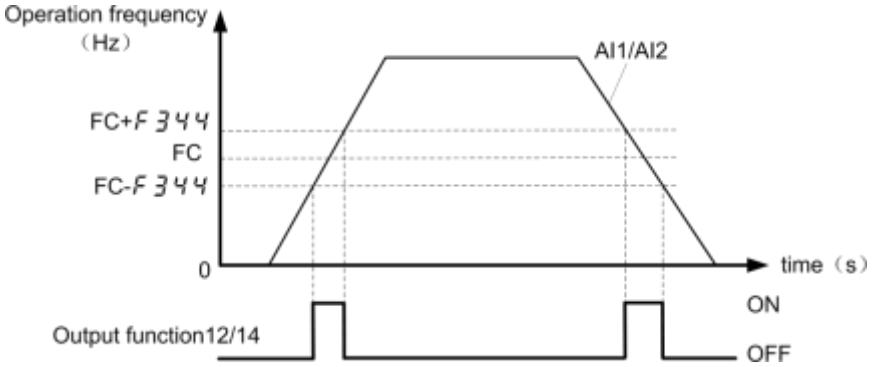


Figure 6.17 Description Frequency command agreement detectionoutput

If the frequency command value specified using f003 (or f005) almost agrees with the frequency command value from the VA and VIB terminal with an accuracy of ± f344, an ON or OFF signal will be sent out.

Note: This function can be used, for example, to send out a signal indicating whether the amount of processing and the amount of feedback agree with each other when the PID function is in use. For an explanation of the PID function.

NO.	Parameter Name	Setting Range	Default
f345	Logic output/pulse train output selection (LO-CLO)	0~1	0

0: Logic output 1: Pulse train output

NO.	Parameter Name	Setting Range	Default
f346	Pulse train output function selection (LO1 –CLO1)	0~14	0

Table6.4 Pulse train output function selection

f346	Description	Reference of max. value
0	Output frequency	f007
1	Output current	185% of frequency drive rated current
2	Set frequency (Before PID)	f007
3	Frequency setting value (After PID)	f007
4	DC voltage	150% of frequency drive rated voltage
5	Output voltage command value	150% of frequency drive rated voltage
6	Input power	185% of frequency drive capacity
7	Output power	185% of frequency drive capacity
8	AI1 Input value	5V /10V/20mA
9	AI2 Input value	10V
10	Torque	250% of motor rated torque
11	Torque current	250% of motor rated torque current
12	Motor cumulative load factor	100%
13	frequency drive cumulative load factor	100%
14	PBR (braking reactor) cumulative load factor	100%

Note : When item of f346 reach “Reference of max. value”, the number of pulse train set by f346 are sent to output terminals (LO-CLO）.

NO.	Parameter Name	Setting Range	Default
f347	Maximum numbers of pulse train	500~1600	800

Note: The ON pulse width is maintained constant. The ON pulse width is fixed at a width that causes the duty to reach 50% at the maximum pulse number set with f347. Therefore, the duty is variable. For example, the ON pulse width is approximately 0.6 ms when f347 = 800, approximately 0.5ms when f347=1000, or approximately 0.3 ms when f347 = 1600.

NO.	Parameter Name	Setting Range	Default
f348	AO1 selection	0~18	0

The signal of internal calculated value can output from the AO1 terminal. Analog voltage output signal is default. Switching to 0-20mAdc (4-20mAdc) output current can be made by setting f307 to 0.

Table 6.5 AO selection parameters

F348	Description	maximum value
0	Output frequency	Maximum frequency F007
1	Output current	185% of inverter rated current
2	Set frequency (before PID)	Maximum frequency F007
3	Frequency setting value (after PID)	Maximum frequency F007
4	DC voltage	150% of frequency drive rated voltage
5	Output voltage command value	150% of frequency drive rated voltage
6	Input power	185% of frequency drive rated voltage
7	Output power	185% of frequency drive rated voltage
8	AI1 input	（1023）
9	AI2 input	（1023）
10	Torque	250% of frequency drive rated torque
11	Torque current	250% of frequency drive rated torque current
12	Motor cumulative load factor	100%
13	Frequency drive cumulative load factor	100%
14	brake resistor cumulative load factor	100%
15	Serial communication data	——
16	F374 = 0% ~ 185% corresponds to the range of AO	——
17	F374 = 0% ~ 185% corresponds to the range of AO	——
18	F374 = 0% ~ 185% corresponds to the range of AO	——

NO.	Parameter Name	Setting Range	Default
F349	Analog output voltage scaling (AO1)	1~1280	464
F350	Inclination characteristic of analog output	0~1	1
F351	Bias of analog output	0~100%	0

The analog output characteristic can be adjusted by using the parameter F349, F350 and F351, see figure 6.18. Note: This parameter cannot be reset by F120 = 1.

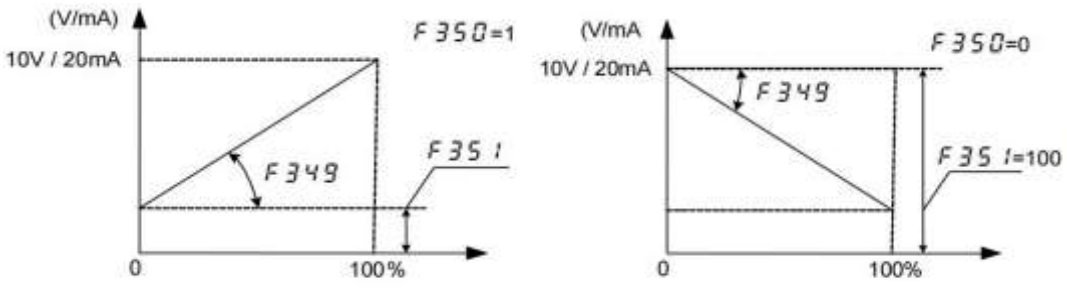


Figure 6.18 Description of F349, F350 and F351

Default output signals from AO1 terminals are analog voltage signals. Their standard setting range is from 0 to 10Vdc. Using these parameters, you can calibrate the output to 4-20mAdc or 20-4mAdc.

Note 1: To switch to 0-20mAdc (4-20mAdc) output, set f307 = 0. Note 2: Only when f348 = 16, set value of f349 displays.

Note 3: When enters f349. operation frequency is displayed (f348 = 0), then press the ▲ key or the ▼ key to adjust f349. If a meter is connected to AO1, the meter reading will change at this time (f349 will change too) but be careful because there will be no change in the frequency drive 's digital LED (monitor) indication.

NO.	Parameter Name	Setting Range	Default
f352	output frequency when AO1 = 0V	0 Hz ~f007	0.0
f353	output frequency when AO1 = 10V	0 Hz ~f007	0.0

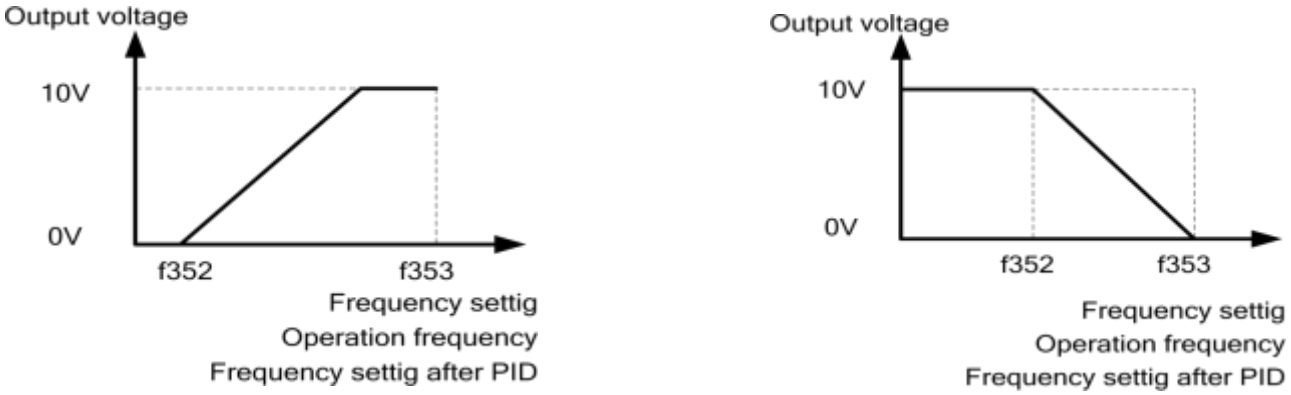


Figure 6.19 Description of f352 and f353 setting

Note: When f348 is set to 0 (or 2,3), if f352 or f353 are not set to 0 at same time, f350 and f351 will not be effective..

NO.	Parameter Name	Setting Range	Default
f354	Analog Output Voltage Bias Calibration (AO1)	0~255	126

For details of f354, see parameter f348.

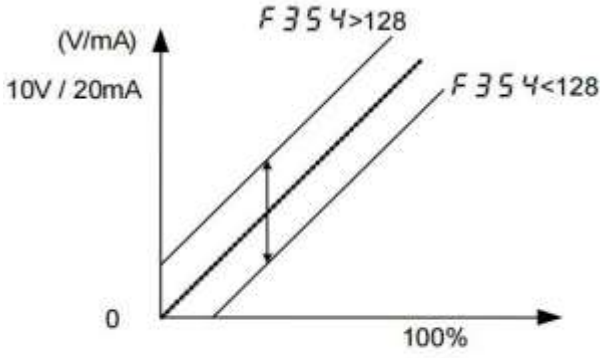


Figure 6.20 Description of F354

Note: This parameter cannot be reset by f120 = 1.

NO.	Parameter Name	Setting Range	Default
f355	Input terminal function for LI5	0~75	0
f356	Input terminal function for LI6	0~75	0
f357	Input terminal function for LI7	0~75	0
f358	Input terminal function for LI8	0~75	0

The set method is same as f301~f304.

Note1: Only valid when capacity rating is at 18.5kW or above.

NO.	Parameter Name	Setting Range	Default
f359	Main functions of Relay 2	0~255	0
f360	Relay 2 auxiliary functions	0~255	0
f361	Relay 2 main and secondary functional logic relationship	0~1	0
f362	Relay 2 closing delay time	0~60.0s	0.0

The set method is same as f315 .

NO.	Parameter Name	Setting Range	Default
f363	Input terminal active mode	00~FF	00

This parameter is 8-bit binary-hexadecimal display (0x00~0xFF), and corresponds from right to left to the setting bits for LI1~LI8, with the setting options for each:

0: Input terminal function active when input terminal is OFF.

1: Input terminal function inactive when input terminal is ON.

NO.	Parameter Name	Setting Range	Default
f364	Input terminal filter time	0~200	0

A unit of filtering time constant 1 corresponds to2ms.

NO.	Parameter Name	Setting Range	Default
f365	Output terminal function B of T1	0~ 69	0

The set method is same as f315 .

NO.	Parameter Name	Setting Range	Default
f366	Output terminal logic selection of T1	0~1	0

The set method is same as f316.

0： With, f315 and f316 must satisfy the request at the same time, then relay one acts. 1

： Or.f315 or 316 either satisfy the request, then relay one acts.

NO.	Parameter Name	Setting Range	Default
f367	Terminal run detection selection at power on	0~1	0

0：Disable, when power on frequency drive will not supply to the motor even if the input terminal (to which forward/reverse run function is assigned) is ON, Only open the input terminal and re-close it will start the motor.

1：Enable. when power on frequency drive will supply to the motor on the detection of the forward/reverse run terminal is ON.

NO.	Parameter Name	Setting Range	Default
f368	AO2 voltage-current output selection	0~1	0

0: Current signal output.

1: Voltage signal output.

NO.	Parameter Name	Setting Range	Default
f369	AO2 selection	0~16	0
f370	Analog output current scaling (AO2)	1~1280	375
f371	Inclination characteristic of analog output	0~1	1
f372	Bias of analog output	0~100%	0

The Settings of f369, f371 and f372 are shown in the corresponding parameters of AO1, f348, f350 and f351.

For detailed description of f370, see parameter f348. Note: Parameter f370 cannot be reset by f120 = 1.

NO.	Parameter Name	Setting Range	Default
f373	Analog Output current Bias Calibration (AO2)	0~255	107
f374	Percentage of AO monitored values	0~250%	0

1) AO1-0 ~ 10V calibration is as follows:

f307 =1, f348 =18/17/16 Drive stop state, set f374 =1%, adjust the value of f354, so that the actual output voltage is 0.1V.Then set f374 =100%/150%/185% and adjust the value of f349 to make the actual output voltage 10V.

After calibration is completed, f348 modifies back to the internal functional variables that need to be monitored.

2) Ao1-4 ~ 20mA calibration is as follows:

f307 =0, f351 =20%, f348=18/17/16 Drive stop state, set f374 =0%, adjust the value of f432, make the actual output current is 4mA.Then set f374 =100%/150%/185% and adjust the value of f431 so that the actual output current is 20mA.

After calibration is completed, f348 modifies back to the internal functional variables that need to be monitored.

3) AO2-0 ~ 10V calibration is as follows:

f368 =1, f369 =18/17/16 Drive stop state, set f374 =1%, adjust the value of f434, make the actual output voltage is 0.1V.Then set f374 =100%/150%/185% and adjust the value of f433 to make the actual output voltage 10V.

After calibration is completed, f369 modifies back to the internal functional variables that need to be monitored.

4) AO2-4 ~ 20mA calibration is as follows:

f368 =0, f372 =20%, f369=18/17/16 Drive stop state, set f374 =0%, adjust the value of f373, make the actual output current is 4mA.Then set f374 =100%/150%/185% and adjust the value of f370 so that the actual output current is 20mA.

After calibration is completed, f369 modifies back to the internal functional variables that need to be monitored.
Note: Parameters f349 ~ f373 cannot be reset by f120 = 1.

NO.	Parameter Name	Setting Range	Default
f375	T1 output delay	0~60.0 s	0.0

NO.	Parameter Name	Setting Range	Default
f376	T2 output delay	0~60.0 s	0.0

f376 specified the time of LO2-CLO2 output delay.

6.5. Fault protection parameter group

NO.	Parameter Name	Setting Range	Default
f400	Retry selection (Selecting the number of times)	0~10	0

0: disabled 1~10 times.

This parameter resets the frequency drive automatically when the frequency drive gives an alarm. During the retry mode, the motor speed search function operated automatically as required and thus allows smooth motor restarting.

Protective operation detection relay signals (T1A-T1B-T1C or T2A-T2B-T2C terminal signals) are not sent during use of the retry function.

To allow a signal to be sent to the protective action detection relay (TA, B and C terminals) even during the retry process, assign the output terminal function 36 or 37 to F315.

A virtual cooling time is provided for overload tripping (E-21, E-22). In this case, the retry function will operate after the virtual cooling time and retry time.

In the event of tripping caused by an over-voltage (E-11), the retry function will not be activated until the voltage in the DC section comes down to a normal level.

In the event of tripping caused by overheating (E-24), the retry function will not be activated until the temperature in the frequency drive comes down low enough for it to restart operation.

Keep in mind that when F429 is set to 1 (trip retained), the retry function will not be performed, regardless of the setting of F400.

During retrying, the blinking display will alternate between A-08 and the monitor display specified by status monitor display mode selection parameter f610.

The number of retries will be cleared if the frequency drive is not tripped for the specified period of time after a successful retry. "A successful retry" means that the frequency drive output frequency reaches the command frequency without causing the frequency drive to re-trip.

Retry available fault including over-current (E-01, E-04), over-voltage (E-11), overheat (E-24), over load(E-21, E-22), and momentary power failure.

The retry function will be canceled at once if tripping is caused by an unusual event other than the retry available fault. This function will also be canceled if retrying is not successful within the specified number of times. “Function be canceled” means frequency drive will be tripped and stop supply to motor.

The interval time is proportional relation with retry times. The first retry is 1sec, the second retry is 2 sec and the 10th retry is 10sec.

retry time	1	2	3	4	5	6	7	8	9	10
success time	1s	2s	3s	4s	5s	6s	7s	8s	9s	10s

Before all fault reset attempts are finished:

The output terminal to which output terminal function 40 (or 41) is assigned will not indicate the fault.

The output terminal to which output terminal function 38 (or 39) is assigned can be used to indicate the appearance of automatically retry available fault.

The output terminal to which output terminal function 30 (or 31) is assigned can be used to indicate any type of the fault in the frequency drive even if during the period of retry.

NO.	Parameter Name	Setting Range	Default
F401	Electronic-thermal protection characteristic selection	0~7	0

Table 6.6 Description of F401

F401	motor type	overload tripped enable	overload stall
0	Standard motor	YES	NO
1		YES	YES
2		NO	NO
3		NO	YES
4		YES	NO

5		YES	YES
6		NO	NO
7		NO	YES

Overload stall: This is an optimum function for equipment such as fans, pumps and blowers with variable torque characteristics that the load current decreases as the operating speed decreases. When the frequency drive detects an overload, this function automatically lowers the output frequency before the motor overload trip E-21 is activated. This function operates a motor at frequencies that allow the load current to keep its balance so that the frequency drive can continue operation without being tripped.

Note: Do not use the overload stall function with loads having constant torque characteristics (such as conveyor belts in which load current is fixed with no relation to speed).

NO.	Parameter Name	Setting Range	Default
F402	Motor 150%-overload time limit	10~2400s	300

Parameter F403 is used to set the time elapsed before the motor trips under a load of 150% (overload trip E-22) within a range of 10 to 2400 seconds.

NO.	Parameter Name	Setting Range	Default
F403	Emergency stop selection	0~2	0
F404	Emergency braking time	0~20.0 s	1.0

0: Free stop

1: Ramp stop

2: Emergency DC braking

These parameters allow you to specify how to stop operation using an external control device when an external trip occurs. When operation stopped, the trip E-43 displayed. When setting F403 =2 (emergency DC braking), set also F507 (DC braking rate) and F404 (emergency braking time). Assigning the trip stop function (input terminal function 11 or 27) to the contact input terminal.

Note 1: Emergency stopping via the specified terminal is possible, even during panel operation.

Note 2) If DC braking is not needed to bring the motor to a stop under normal conditions, although F403 is set to 2 (emergency DC braking), set the DC braking starting frequency (F506) at 0.0 Hz.

NO.	Parameter Name	Setting Range	Default
F405	Input phase failure detection	0~1	0

0: Disabled, No tripping.

1: Enabled, Phase failure detection is enabled during operation.

This parameter detects frequency drive input Phase failure. If the abnormal voltage status of main circuit capacitor persists for few minutes or more, the tripping function will be activated.

Therefore, input phase failures cannot always be detected. A trip information E-41 will be displayed. If the power capacity is larger than the frequency drive capacity (more than 200kVA or more than 10 times), detection errors may occur. If this actually happens, install an AC or DC reactor.

Note1: Setting F405 = 0(input phase failure detection: disabled) may result in a breakage of the capacitor in the frequency drive main circuit if operation is continued under a heavy load in spite of the occurrence of an input phase failure.

Note2: Parameter F405 is invalid for single-phase input model.

NO.	Parameter Name	Setting Range	Default
F406	Output phase failure detection mode selection	0~5	0

0: Disabled.

1: At start-up (Only one time after power is turned on).

2: At start-up (each time).

3: During operation.

4: At start-up and during operation.

5: Detection of cutoff on output side. f406=0: No tripping.

f406=1: With the power on, the phase failure detection is enabled only at the start of the first operation. The frequency drive will trip if the Phase failure status persists for one second or more.

f406=2: The frequency drive checks for output phase failures each time it starts operation. The frequency drive will trip if the Phase failure status persists for one second or more.

f406=3: The frequency drive checks for output phase failures during operation. The frequency drive will trip if the Phase failure status persists for one second or more.

f406=4: The frequency drive checks for output phase failures at the start of and during operation. The frequency drive will trip if the Phase failure status persists for one second or more.

f406=5: If it detects an all-phase failure, it will restart on completion of re-connection. The frequency drive does not check for output phase failures when restarting after a momentary power failure.

Note1: A check for output phase failures is made during auto-tuning, regardless of the setting of this parameter.

Note2: Set f406=5 to open the motor-frequency drive connection by switching commercial power operation to frequency drive operation. Detection errors may occur for special motors such as high-speed motors.

NO.	Parameter Name	Setting Range	Default
f407	Under load fault alarm selection	0~1	0

0: Alarm only. Under load fault can be put out by setting the output terminal function selection parameter.

1: Tripping. The frequency drive will trip if a current below the current set with f408 flows for the period of time specified with f410. Trip information is displayed as "E- 06".

NO.	Parameter Name	Setting Range	Default
f408	Under current detection current	0~100%	0.00
f409	Under current detection current hysteresis	1~20%	10
f410	Under current detection time	0~255s	0

If a current smaller than the f408 specified value flows for more than the f410 specified time. When tripping is selected (see f407), enter the detection time to tripping. Trip information is displayed as "E-12". See figure 6.21.

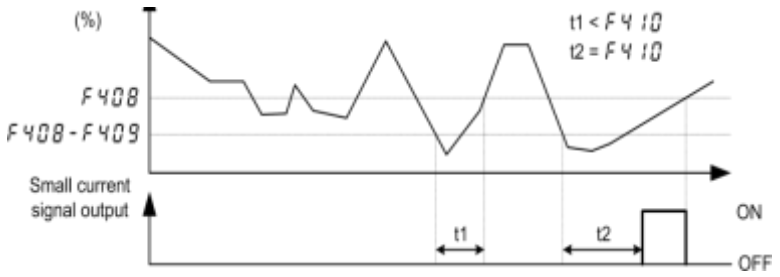


Figure 6.21 Description of small current

Note: The 100% standard value of f408 and f409 is the rated output current indicated on the motor nameplate.

NO.	Parameter Name	Setting Range	Default
f411	Over torque/over current indicator selection	0~5	0

0: Over-torque alarm: (70%)

- When the torque current reaches 70% of f412, the relay with function set as 48 will immediately operate;

- When the torque current reaches 100% of **f412** and the duration reaches **f414**, the function is set as relay operation of 32;
- When the above relay (function is 48 or 32) operates, the panel will not operate and the converter will not

stop. 1: Over-torque fault

- When the torque current reaches 70% of **f412**, the relay with function set as 48 will immediately operate, but the panel will not operate, and the converter will not stop;
- When the torque current reaches 100% of **f412** and the duration reaches **f414**, the function is set as relay action of 32 and the converter reports the fault e-07;

Over-torque alarm: (100%)

- When the torque current reaches 100% of **f412**, the relay with function set as 48 will immediately operate;
- When the torque current reaches 100% of **f412** and the duration reaches **f414**, the function is set as relay operation of 32;
- When the above relay (function is 48 or 32) operates, the panel will not operate and the converter will not

stop. 3: Over-current alarm: (70%)

- When the output current reaches 70% of **f412**, the relay with function set as 48 will immediately operate;
- When the output current reaches 100% of **f412** and the duration reaches **f414**, the function is set as relay operation of 32;
- When the above relay (function is 48 or 32) operates, the panel will not operate and the converter will not

stop. 4: Overcurrent fault

- When the output current reaches 70% of **f412**, the relay with function set as 48 will immediately operate, but the panel will not operate, and the drive will not stop;
- When the output current reaches 100% of **f412** and the duration reaches **f414**, the function is set as relay action of 32 and the frequency converter reports the fault **E-07**;

5: Overcurrent alarm: (100%)

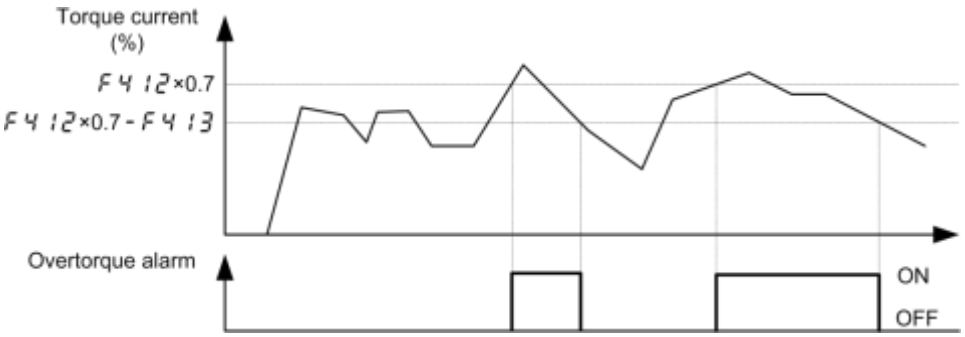
- When the output current reaches 100% of **f412**, the relay with function set as 48 will immediately operate;
- When the output current reaches 100% of **f412** and the duration reaches **f414**, the function is set as relay operation of 32;
- When the above relay (function is 48 or 32) operates, the panel will not operate and the converter will not stop.

NO.	Working conditions		Operating conditions and operation of the converter
	Torque current	Output current	
1	**f411**=0	**f411**=3	No action on the panel, the drive does not stop.
2	**f411**=1	**f411**=4	Torque/output current reached **f412**, and the duration reached **f414**, the panel reported failure **E-07**, the frequency converter stopped.
3	**f411**=2	**f411**=5	No action on the panel, the drive does not stop.

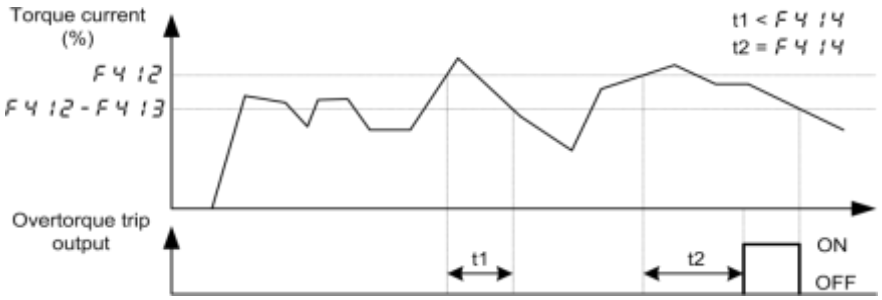
NO.	Working conditions		Working conditions	
	Torque current	Torque current	Relay (Function 48)	Relay (Function 32)
1	**f411**=0	**f411**=3	When the torque/output current reaches 70% of **f412**, the relay operates immediately.	The torque/output current reaches 100% of **f412** and the duration reaches **f414**. The relay operates.
2	**f411**=1	**f411**=4		
3	**f411**=2	**f411**=5	When the torque/output current reaches 100% of **f412**, the relay operates immediately.	

NO.	Parameter Name	Setting Range	Default
F412	Over-torque detection level	0~250%	130
F413	Over-torque detection level hysteresis	0~100%	10
F414	Over-torque detection time	0.0~10.0s	0.5

Use the F411 parameter to trip the frequency drive or to output the alarm if a torque current exceeding the F412-specified level flows for more than the F414-specified time. Trip information is displayed as "E-07".



a) Over-torque detection alarm output



b) Over-torque detection trip output

Figure 6.22 Description of Over-torque detection

Note 1: Output over-torque detection alarm by assigning the output terminal function 48 to T1 (T2, LO-CLO).

Output over-torque detection trip by assigning the output terminal function 32 to T1 (T2, LO-CLO).

Note 2: The 100% standard value of F412 and F413 is the rated output current indicated on the motor nameplate.

NO.	Parameter Name	Setting Range	Default
F415	Over-voltage limit operation	0~3	2

0: Enabled. When the frequency drive detects the upcoming over-voltage fault, it takes one of the following measures to avoid over-voltage: to increase deceleration time, to keep motor speed or raise motor speed.

1: Disabled

2: Enabled (Quick deceleration). The frequency drive will increase the voltage to the motor (over- excitation control) to increase the amount of energy consumed by the motor when the voltage reaches the

Over-voltage protection level, and therefore the motor can be decelerated more quickly than normal deceleration.

3: Enabled (Dynamic quick deceleration). the frequency drive will increase the voltage to the motor(over- excitation control) to increase the amount of energy consumed by the motor as soon as the motor begins to slow down, and therefore the motor can be decelerated still more quickly than quick deceleration.

Note: When motor speed falls, the frequency drive absorbs regenerative energy from the load and the motor. This often brings DC bus over-voltage fault. If F415 is set to 3, this portion of energy will not be fed back to the frequency drive , but converted to heat dissipation into the motor. In this case the motor intensely gives out heat.

NO.	Parameter Name	Setting Range	Default
F416	Over-voltage limit operation level	100~150%	130

F416 specifies the Over-voltage limit operation level.

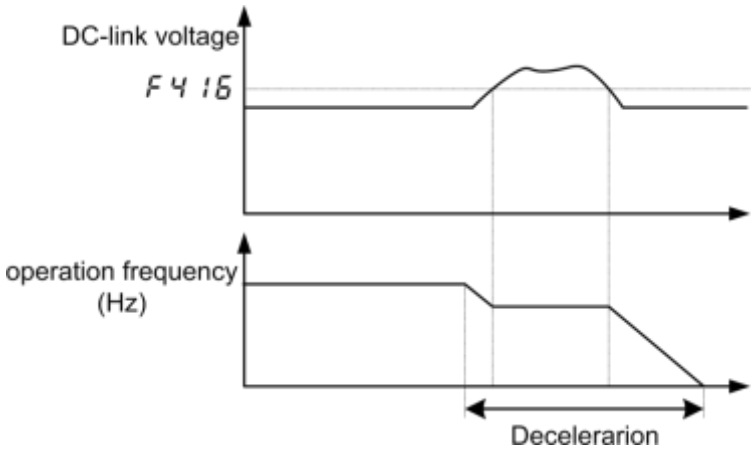


Figure 6.23 Description of over-voltage limit operation level

NO.	Parameter Name	Setting Range	Default
F417	Under voltage operation alarm selection	0~2	0

0: Alarm only (detection level below 60%), The frequency drive is stopped. However, it is not tripped. 1: Tripping (detection level below 60%). Frequency drive is stopped. It is also tripped

2: Alarm only (detection level below 50%, input reactor needed)

NO.	Parameter Name	Setting Range	Default
F418	Instantaneous power failure coast stop selection	0~2	0

0: disabled

1: factory reserved

2: Coast stop.

Coast stop in the event of momentary power failure: If a momentary power failure occurs during operation, the frequency drive coast stops forcibly. When operation is stopped, the message "P- 06" is displayed (alternately) on the keypad. After the forced coast stop, the frequency drive remains static until you put off the operation command momentarily.

NO.	Parameter Name	Setting Range	Default
F419	Forced fire-speed control function	0~1	0

0: Disabled.

1: Enabled.

To enable forced speed mode, set F419 to 1,and allocate input terminal function 33 to a input contact terminal. If F419 is set to 1 and input terminal function 33 is ON, the frequency drive will run at the frequency set by F73 . At this time,

Put OFF the input terminal function 33 will not stop the frequency drive .

The following frequency drive trip will not make it stop, but automatic restart is performed.: E-01 , E-04, E-11 , E-21, E- 22, E-23, E-24.

When the frequency drive is under local running mode, the frequency drive can only be stopped by powering off.

Note 1: The motor running direction is forward and the frequency drive runs according to the frequency command of the setpoint of f730.

Note 2: The following operations will not make the frequency drive or motor stop: disabling function 33, press STOP key or light trip occurs.

NO.	Parameter Name	Setting Range	Default
F420	Detection of output short-circuit during start-up	0~3	0

0: Each time (standard pulse)

1: Only one time after power is turned on (standard pulse)

2: Each time (short-time pulse)

3: Only one time after power is turned on (short-time pulse)

Note 1: when the phase resistor of the motor is small motor capacity is large, short-time pulse is recommended.

NO.	Parameter Name	Setting Range	Default
F421	Motor electric-thermal protection retention selection	0~1	0

0: Disabled. If the frequency drive is turned on and off, its motor thermal state memory (used for overload computation) will be cleared.

1: Enabled. Even if the frequency drive is turned off, the motor thermal state memory of the frequency drive is still retained. If motor overload fault E – 22 occurs in the frequency drive , the motor can be restarted only after a period of cooling time (computed by the frequency drive).

NO.	Parameter Name	Setting Range	Default
F422	AI1 input loss	0~100%	0

0: Disabled. The frequency drive will not monitor the signal state on the analog input terminal AI1.

1~100: Fault detection level. If signal on AI1 drops below the selected fault detection level and this low signal level lasts 300 ms or more, fault occurs in the inverter. The keyboard panel will display fault code E –38.

NO.	Parameter Name	Setting Range	Default
F423	Activation of the frequency drive during 4-20mA signal loss	0~4	0

0: No measures.

1: Coast stop.

2: Switch to Fallback speed. To switch to fallback speed F424. The duration is as long as the fault life time and the running command is still valid.

3: Speed maintaining. To maintain the speed at the time when fault occurs in the frequency drive . The duration is as long as the fault life time and the running command is still valid.

4: Slowdown stop.

NO.	Parameter Name	Setting Range	Default
F424	Fallback speed	0.0 Hz ~F004	0.0

See F423 = 2.

NO.	Parameter Name	Setting Range	Default
F425	PTC thermal selection	0~2	0

0: Disabled

1: Enabled (trip mode), If the PTC probe triggers the signal of fault, the frequency drive enters into fault state and displays "E – 25".

2: Enabled (alarm mode), if the PTC probe triggers the signal of fault, the frequency drive will trigger fault signal and continues running.

This function is used to protect motor from overheating using the signal of PTC built-in motor. Setting F4 25 to 1 or 2 can convert control terminal AI2 to a PTC motor thermal probe input. The wiring is shown in the following figure.

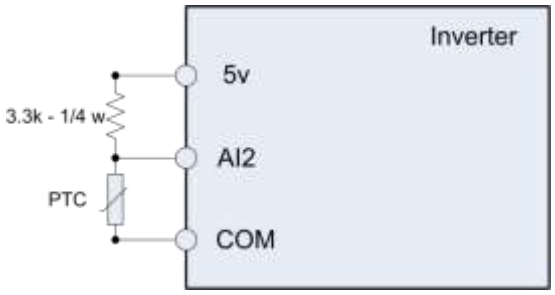


Figure 6.24 PTC wiring example

Note: PTC resistance must be connected in from AI2 terminal. One 3.3k-1/4 W resistance must be externally connected between 5 V and AI2.

NO.	Parameter Name	Setting Range	Default
F426	Resistor value for PTC detection	100~9999 Ω	3000

NO.	Parameter Name	Setting Range	Default
F428	Cumulative operation time alarm setting	0.0~999.9	610.0

This parameter allows you to set the frequency drive so that it will put out an alarm signal (Output terminal function = 50) after a lapse of the cumulative operation time set with F428.

Note: 0.1=10h.

NO.	Parameter Name	Setting Range	Default
F429	Frequency drive trip retention selection	0~1	0

0: Clearing. The fault occurs and after the frequency drive is turned off and on, If the fault cause has been eliminated, the inverter will be reset and can be started.

The information of just eliminated fault will be transmitted to the fault history record.

If the fault cause has not been eliminated yet, the fault will be displayed again and the running information related to the fault will be transmitted to the fault history record.

The information of the 4th from last fault will be eliminated from the fault history record. 1: Maintaining. The fault occurs and after the frequency drive is turned off and on,

If the fault cause has been eliminated, the inverter will be reset and can be started. The information of just eliminated fault will be transmitted to the fault history record.

If the fault cause has not been eliminated yet, original fault codes and all running data can be inquired as current fault under monitoring mode.

The information of the 4th from last fault will be reserved in the fault history record. Automatic fault reset will be disabled.

NO.	Parameter Name	Setting Range	Default
F430	Heat sink temperature reaches the alarm value	0~100 ℃	60

When the heat sink temperature reaches the setting value of F430, the frequency drive could output one alarm signal via logic output or relay output. Please refer to logic output function 66.

NO.	Parameter Name	Setting Range	Default
F431	Analog output current scaling (AO1)	1~1280	377

NO.	Parameter Name	Setting Range	Default
f432	Analog Output current Bias Calibration (AO1)	0~255	108

NO.	Parameter Name	Setting Range	Default
f432	Analog output voltage scaling (AO2)	1~1280	463

NO.	Parameter Name	Setting Range	Default
f434	Analog output voltage bias calibration (AO2)	0~255	126

See parameter f348 for detailed description of f431 ~f433. Note: Parameters f431 ~ f433 cannot be reset by f120 = 1.

6.6. Fault protection parameter group

NO.	Parameter Name	Setting Range	Default
f500	Auto-restart control selection	0~4	0

0: Disabled

1: At auto-restart after momentary stop

2: When turning standby (input terminal function =1) on or off

3: At auto-restart or when turning standby (input terminal function =1) on or off 4: At start-up

The f500 parameter detects the rotating speed and rotational direction of the motor during coasting the event of momentary power failure, and then after power has been restored, restarts the motor smoothly (motor speed search function).

This parameter also allows commercial power operation to be switched to frequency drive operation without stopping the motor. During operation, "A–08" is displayed. During the retry mode see f4 00), the motor speed search function operated automatically as required and thus allows smooth motor restarting.

At restart, it takes about 300 ms for the frequency drive to check to see the number of revolutions of the motor. For this reason, the start-up takes more time than usual. Use this function when operating a system with one motor connected to one frequency drive . This function may not operate properly in a system configuration with multiple motors connected to one frequency drive .

Setting f500 =1, (3): This function operates after power has been restored following detection of an undervoltage by the main circuits and control power.

Setting f500 =2, (3): This function operates after the standby terminal((input terminal function =1) connection has been opened first and then connected again.

Setting f500 =4, a motor speed search is performed each time operation is started. This function is useful especially when the motor is not operated by the frequency drive but it is running because of external force.

Setting f500 = 0 (Disabled) and disabling the retry function (f4 00=0), when apply the frequency drive to crane or hoist. Such machines may have its load moved downward during the above waiting time from input of the operation starting command to the restart of the motor.

NO.	Parameter Name	Setting Range	Default
f501	Auto-stop time limit for lower-limit frequency operation	0.0~600.0s	0.1

0: disabled（0.0）. None.

1: Enabled（0.1~600.0s）. If operation is carried out continuously at a frequency below the lower-limit frequency (f009) for the period of time set with f501, the frequency drive will enter into sleep mod and automatically slow down the motor to a stop. At that time,A -10" is displayed (alternately) on the keypad. This function will be canceled if a frequency command above the lower-limit frequency (f009) +0.2Hz.

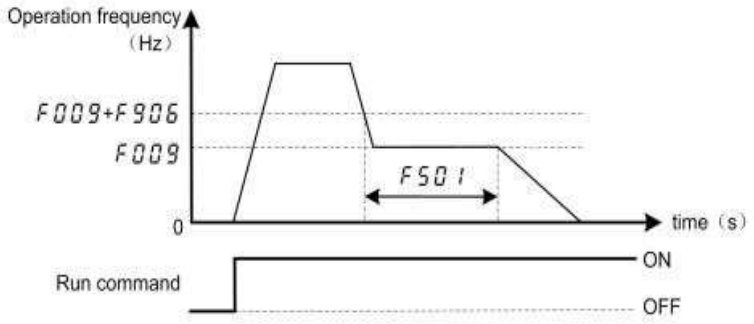


Figure 6.25 Description of sleep mode

Note: This function is enabled even at the start of operation and during switching between forward and reverse run.

NO.	Parameter Name	Setting Range	Default
F502	Pumpless operation selection	0~1	1

0: disabled.

1: enabled.

When switching from remote mode to local mode using *f601*, the status of start and stop, and operating frequency at remote mode are moved to local mode. By contraries, when switching from local mode to remote mode, they are not moved to remote mode.

Table 6.7 F502 description

F setting	switching between remote mode and local mode	description
0	Remote → Local	motor stops
	Local → Remote	run immediately with run command and frequency setting under remote control.
1	Remote → Local	motor runs continuously with original run command and frequency setting under remote control.
	Local → Remote	run immediately with run command and frequency setting under remote control.

E.g., when F601=1, the frequency drive runs at 20 Hz of frequency setting under remote control mode. If switched to local mode (make F713=0), the frequency drive continues to run at 20 Hz under local control mode.

NO.	Parameter Name	Setting Range	Default
F503	Starting frequency setting	0.5~10.0Hz	0.5

The frequency set with *f503* is put out as soon as operation is started. Use the *f503* parameter when a delay in response of starting torque according to the acceleration/deceleration time is probably affecting operation.

Setting the starting frequency to a value from 0.5 to 3Hz is recommended (F503 is usually set to the motor rated slip frequency). The occurrence of an over-current can be suppressed by setting this frequency below the rated slippage of the motor.

Rated slip frequency can be calculated with the parameters written on the nameplate of the motor:

$$f_s = f_0 - \frac{n_N * P}{60}.$$

P ——pole pairs. n_N ——motor rated speed (Pm) .

f_0 ——base frequency (Hz) . f_s ——motor rated slip frequency (Hz)

NO.	Parameter Name	Setting Range	Default
F504	Operation starting frequency	0.0 Hz ~F007	0.0
F505	Operation starting frequency hysteresis	0.0 Hz ~F007	0.0

The Run/stop of operation can be controlled simply with these two parameters. The frequency drive begins accelerating after the frequency setting signal has reached point B. Deceleration ends when the frequency setting signal decreases below point A.

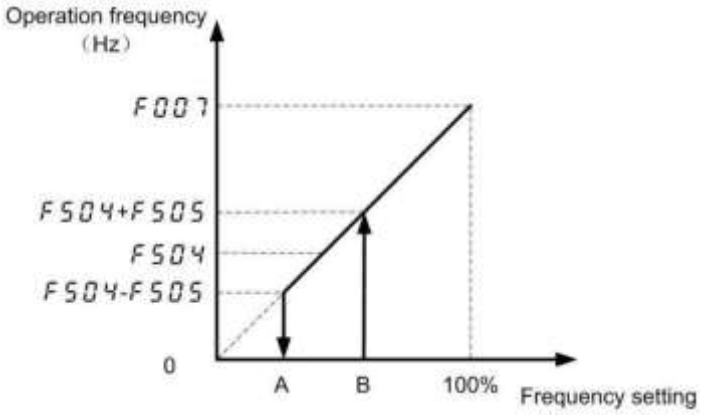


Figure 6.26 Description of Operation starting frequency

NO.	Parameter Name	Setting Range	Default
F506	DC braking starting frequency	0.0 Hz ~F007	0.0
F507	DC braking current	varies by model	varies by model
F508	DC braking time	0.0~20.0 s	1.0

A large braking torque can be obtained by applying a direct current to the motor. These parameters set the direct current to be applied to the motor, the application time and the starting frequency. During DC braking, A- 07 displays.

DC braking can be activated by two methods as follows:

Automatically DC braking: when operation frequency decreases below *f* 506, DC braking is activated. Input terminal signal: when the input terminal function 13 is ON, DC braking is activated.

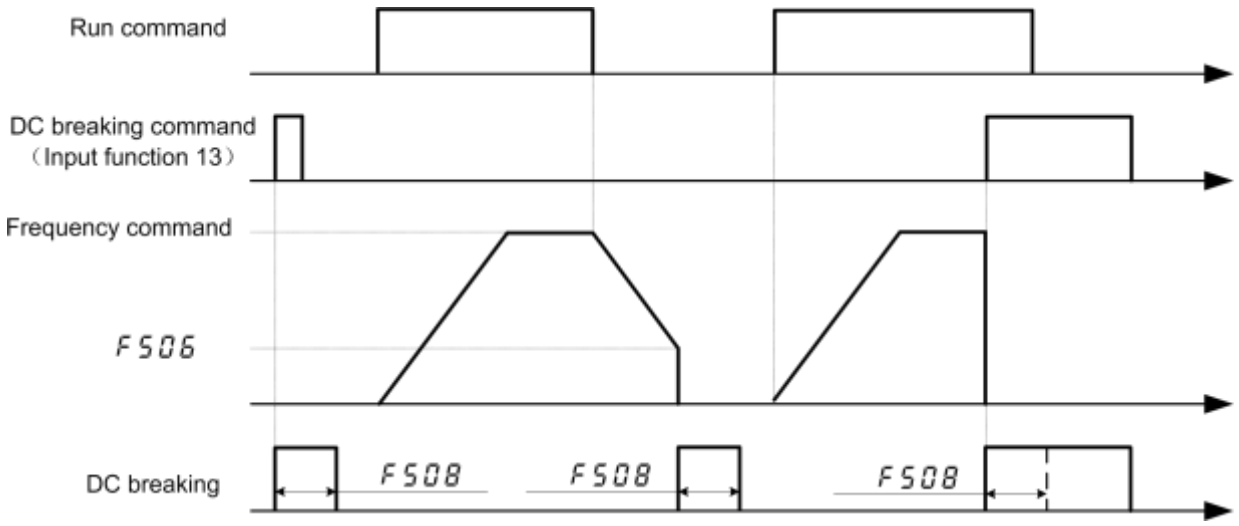


Figure 6.27 DC braking sequence

Note1: During DC braking, the overload protection sensitivity of the frequency drive increases. The DC braking current may be adjusted automatically to prevent tripping.

Note 2: During DC braking, the carrier frequency is 6 kHz or less irrespective of the setting of parameter *f*012

(PWM carrier frequency).

NO.	Parameter Name	Setting Range	Default
F510	Acceleration/deceleration 1 pattern	0~3	0

0: Linear, Linear, applied to most occasions.

1: S-type curve 1, for the need to minimize the slope time while minimizing the impact of the occasion.

2: S-curve 2, can be used for high-speed main axis where the acceleration needs to be reduced when the motor is running above its rated operating frequency (weak magnetic field, output electromagnetic torque decreases).

3： Elevator acceleration / deceleration curve.

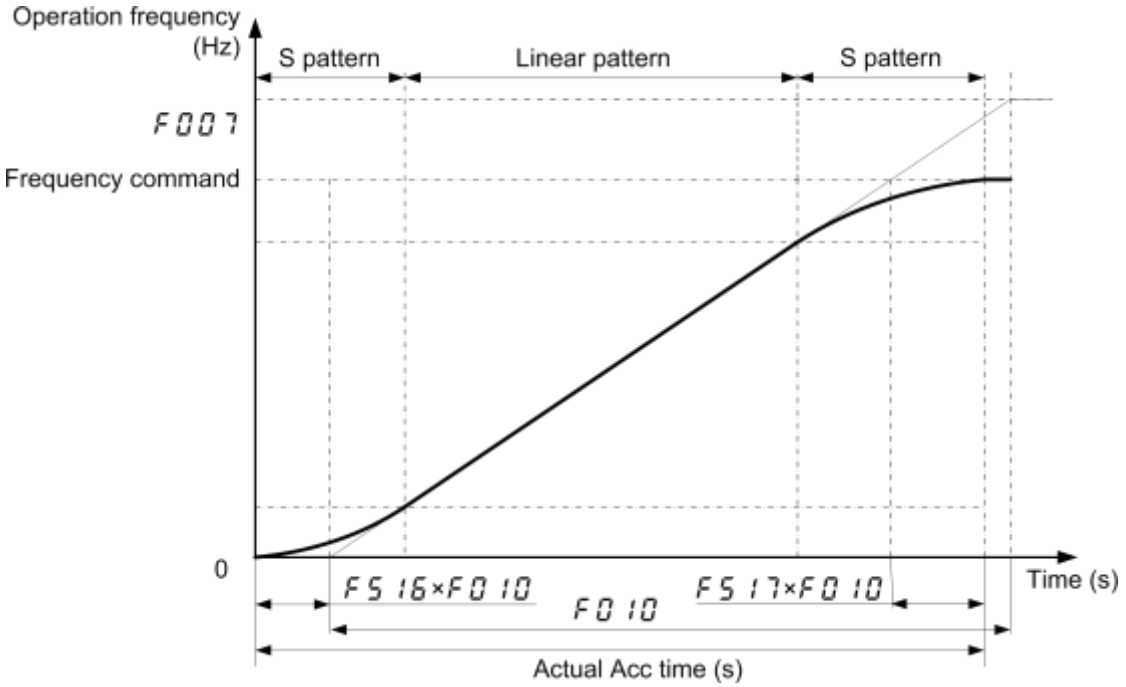


Figure 6.28 S-pattern acceleration/deceleration 1

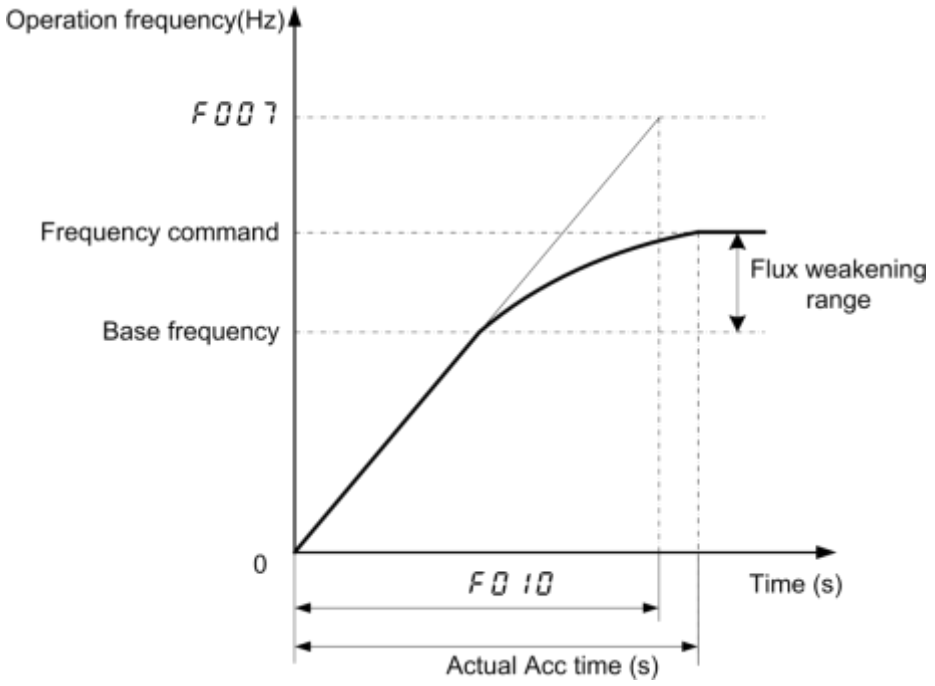


Figure 6.29 S-pattern acceleration/deceleration 2

LI1	LI4	LI3	LI2	Reference speed(frequency)selected	Acceleration/ deceleration times
OFF	OFF	OFF	OFF	Speed 0 0.00Hz	f 18
ON	OFF	OFF	OFF	Speed 1 (Run speed defined) defined by f003	f 18
ON	OFF	OFF	ON	Speed 2 (Run speed defined) defined by f716	f 10
ON	OFF	ON	OFF	Speed 3 (Maintenance speed) defined by f717	f 1 /f011
ON	OFF	ON	ON	Speed 4 (Creep speed) defined by f718	f 11
ON	ON	OFF	OFF	Speed 5 (Run speed defined) defined by f719	f 18
ON	ON	OFF	N	Speed 6 (Run speed defined) defined by f720	f 10
ON	ON	ON	OFF	Speed 7 (Maintenance speed) defined by f721	f 1 /f011
ON	ON	ON	ON	Speed 8 (Creep speed) defined by f722	f 11

Figure 6.30 Speed selection table

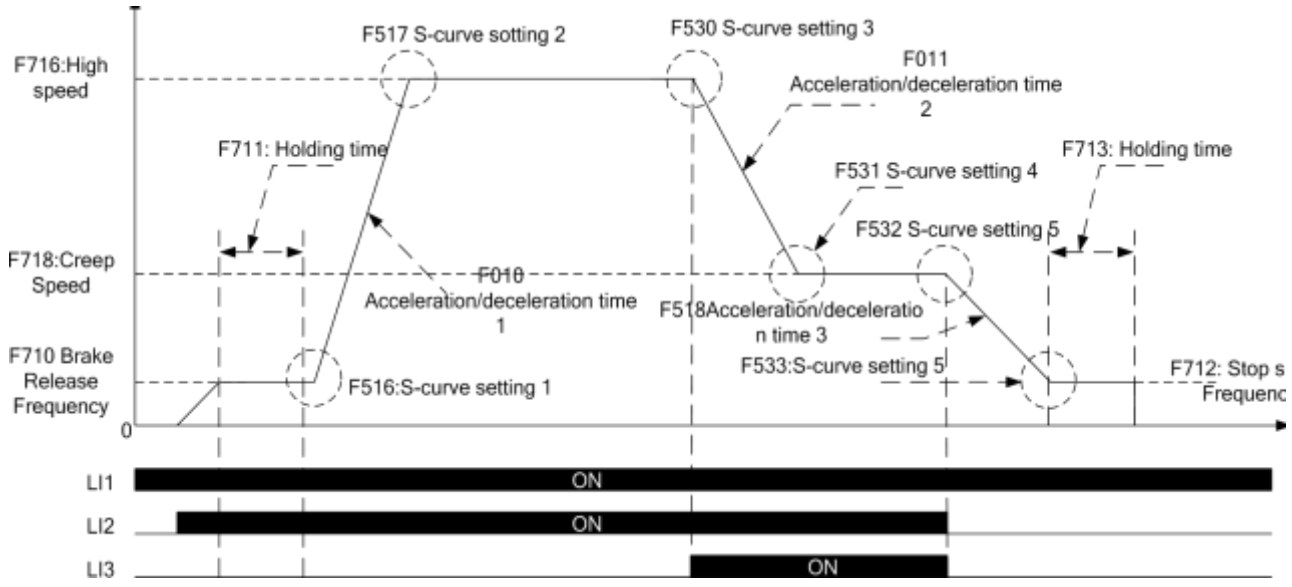


Figure 6.31 Elevator acceleration / deceleration curve

NO.	Parameter Name	Setting Range	Default
f511	Acceleration/deceleration 2 pattern	0~2 00	0
f512	Acceleration/deceleration 3 pattern	0~2 00	0

NO.	Parameter Name	Setting Range	Default

F513	Acceleration/deceleration 1 and 2 switching frequency	0.0 Hz ~F 8	0.0
F514	Acceleration/deceleration 2 and 3 switching frequency	0.0 Hz ~F 8	0.0

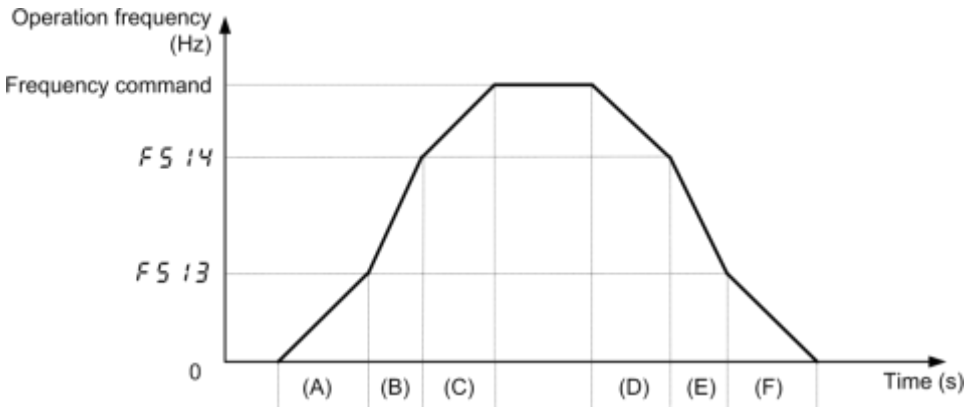


Figure 6.32 Acc/Dec parameters switching automatically

When set *F513*≠0 and the frequency drive output frequency increases above (or decreases below) *F513* setting, *F518*(or *F519*）is effective. Note:

(A) and (F) according to Acc/Dec 1；(B) and (E) according to Acc/Dec 2；(C) and (D) according to Acc/Dec 3.

NO.	Parameter Name	Setting Range	Default
F515	Selecting an acceleration/deceleration pattern	1~3	1

1: Acc/Dec 1, *F010* , *F011* and *F510* are valid.

2: Acc/Dec 2, *F518* , *F519* and *F511* are valid.

3: Acc/Dec 3, *F520* , *F521* and *F012* are valid.

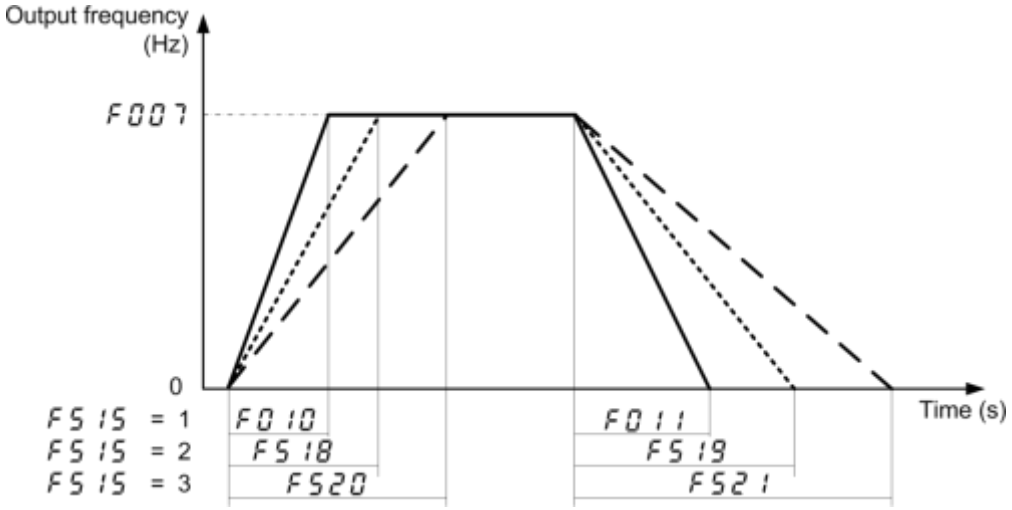


Figure 6.33 Acc/Dec parametersdescription

NO.	Parameter Name	Setting Range	Default
F516	S-pattern lower-limit adjustment amount	0~50 %	10
F517	S-pattern upper-limit adjustment amount	0~50 %	10

F516 and *F517* are used to adjust the relative proportion of the upper arc and lower arc of the S curve against the complete acceleration/deceleration time.

NO.	Parameter Name	Setting Range	Default
f5.18	Acceleration time 2	0.0~3200s	20.0
f5.19	Deceleration time 2	0.0~3200s	20.0
f5.20	Acceleration time 3	0.0~3200s	20.0
f5.21	Deceleration time 3	0.0~3200s	20.0

Three acceleration times and three deceleration times can be specified individually. A method of selection or switching can be selected from among the following:

1) Selection by means of parameters, see *f5.15*

2) Switching by changing frequencies, see *f5.13*, *f5.14*

3) Switching by means of terminals, see input terminal function 5, 64.

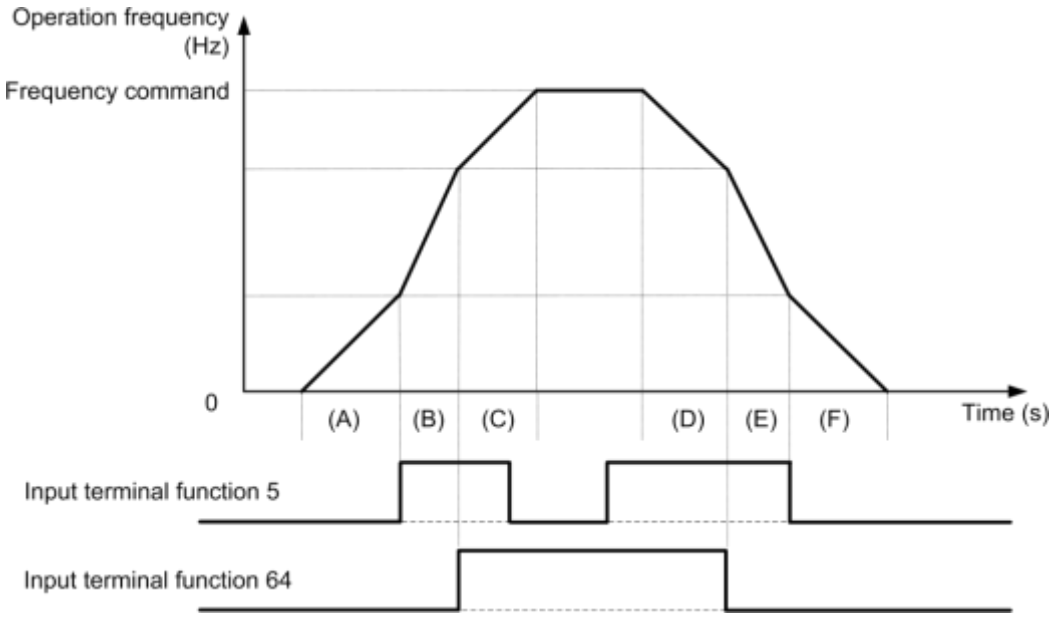


Figure 6.34 Using input contact terminal select Acc/Dec

Table 6.8 Using input contact terminal select Acc/Dec

input terminal function 64	input terminal function 5	Acc/Dec selection
0	0	Acc/Dec1
0	1	Acc/Dec 2
1	0	Acc/Dec 3
1	1	Acc/Dec 3

Table 6.9 Using input contact terminal and switching frequency select Acc/Dec

Frequency command	Input terminal function 5	Input terminal function 64	Acc/Dec selection
Fc =< *f5.13*	0	0	ACC1
	1	0	ACC2
	0	1	ACC1
	1	1	ACC2

f513 < Fc =< *f514*	0	0	ACC2
	1	0	ACC1
	0	1	ACC2
	1	1	ACC1
f514 < Fc	0	0	ACC3
	1	0	ACC3
	0	1	ACC3
	1	1	ACC3

Note:

(A) and (F) according to Acc/Dec 1；(B) and (E) according to Acc/Dec 2；(C) and (D) according to Acc/Dec 3.

NO.	Parameter Name	Setting Range	Default
f522	Reverse-run prohibition	0~2	0

0: Forward/reverse run permitted.

1: Reverse run prohibited.

2: Forward run prohibited.

NO.	Parameter Name	Setting Range	Default
f523	stop pattern	0~3	2

0: Ramp stops. If *f506* ~ *f508* is set effectively, the drive will perform DC braking.

1: The keyboard stops freely. When the command channel is the keyboard panel, the motor stops freely.

2:2 Free stop is controlled by wire 2. When the operation command is controlled by wire 2 at terminal 2, the motor will be stopped freely.

3: Free stop of wire control; free stop of motor when the operation command is terminal 3 wire control.

Note 1: No matter whether the DC braking parameters are valid or not, the drive cannot perform DC braking during free stop.

Note 2: As long as the setting of *f523* is not free stop in the corresponding mode, the frequency converter will slow down and stop.

NO.	Parameter Name	Setting Range	Default
f526	Positive and negative operation is preferred	0~4	1

0: When positive and negative commands are given at the same time, the converter will run in reverse

1: The drive stops when positive and negative commands are given at the same time

2: When the positive and negative commands are given at the same time, the drive runs according to the commands given first.

3: When the positive and negative commands are given at the same time, the converter will run according to the commands given after both.

4: At the same time, the drive runs as the forward and reverse rotation command.

NO.	Parameter Name	Setting Range	Default
f527	regenerative braking selection	0~2	2

0: Disabled

1: Enabled (with resistor overload protection)

2: Enabled (without resistor overload protection)

Connect an external braking resistor in the following cases to enable dynamic braking function:

1) When decelerating the motor abruptly or if overvoltage tripping (E-11) occurs during deceleration stop.
2) When a continuous regenerative status occurs during downward movement of a lift or the winding-out operation of a tension control machine.
3) When the load fluctuates and a continuous regenerative status results even during constant speed operation of a machine such as a press.

Note 1: To connect a dynamic braking resistor, set the overvoltage limit operation parameter F415 = 1(Disabled).

NO.	Parameter Name	Setting Range	Default
F528	regenerative braking resistance	1.0~1000.0 Ω	20.0
F529	regenerative braking resistor capacity	0.01~30.0 kw	0.12

NO.	Parameter Name	Setting Range	Default
F530	Positive and negative dead zone time	0.0~25.0s	0

F530 is only used for switching directions when running commands that are valid. The F530 setting is invalid if you first clear the run command and then change the direction of the run.

Note 1: When frequency is set by AI1 and F754 =1 (curve 2) :

(1) After the frequency converter receives the stop command and stops, if the given frequency is 0Hz, start first and then adjust the output frequency. No matter the given frequency is positive or reverse, startdirectly regardless of dead zone time;

(2) The direction of 0Hz is consistent forward, that is, before is positive rotation, and 0Hz is positiverotation; Before is reversal, 0Hz is reversal. Therefore, in the running process, after the given frequency changes to 0Hz and the motor stops rotating, if the frequency in the same direction is given again before the shutdown, the dead zone time is ignored and the motor starts directly. However, the final effect may be affected by the fluctuation of a given voltage when a potentiometer is used for a given frequency.

Note 2: F530 is also valid except when AI1 sets the frequency and F754 =1 (curve 2).But there are two caveats:

(1) F530 has no effect on inching at present. For example, when F002=0, f301 =2,F302 =19 and F526 =3 are set, the inverted inching is triggered by forward running of LI1, and then LI2 is closed at the same time. At this time, the dead zone setting time of f530 is invalid, and there will be no pause at 0Hz when switching forward and backward.

(2) The direction of 0Hz is not kept consistent forward.

NO.	Parameter Name	Setting Range	Default
F531	Modbus protocol selection for HMI RS485 communication port	0~1	0

0: HMI RS485 communication port is the standard MODBUSprotocol

1: HMI RS485 communication port is Display Modbus protocol (select this protocol when using external panel)

NO.	Parameter Name	Setting Range	Default
F532	Acceleration / deceleration S - curve lower limit 3	0~50 %	10
F533	Acceleration / deceleration S - curve upper limit 3	0~50 %	10

F530/F532, F531/F533 similar to F516 and F517 used to modify the relative proportions of upper and lower arcs of the S-curve to the entire acceleration / deceleration time.

6.7. Keyboard panel parameter group

NO.	Parameter Name	Setting Range	Default
f600	Prohibition of panel reset operation	0~1	0

0: Permitted

1: Prohibited

This parameter can prohibited/ permitted the reset operation by <STOP> key.

NO.	Parameter Name	Setting Range	Default
f601	Switching between remote control and Local control	0~2	1

0: Local control mode, Start and stop, and frequency setting are effective only by keypad keys. f002~f005 is invalid.

1: Remote control mode, Start and stop, and frequency setting follow the selection of *f*002, f003.

2. JOG key function is set in coordination with f700. See parameter f700 for details.

Note: When f700 =0, and f601 =0/2, JOG key is for local/remote switching function, setting of f601 is invalid, JOG key action shall prevail, see parameter f700 for details.

NO.	Parameter Name	Setting Range	Default
f602	Password check/input	0~9999	0

1. When f772 =0, the password protection function is invalid: no matter what f602 value is, any parameter can be modified;
2. When f772 ≠0, the password protection function takes effect:

(1) If f602 ≠f772, only the given frequency of f602 itself and the keyboard in the default state of power on can be modified;

(2) If f602 = f772, any parameter can be modified; However, after the time set by f773, f602 automatically reset to 0, and the protection parameter was modified. If you want to continue modifying the parameters, you need to enter the password again via *f*602.

3. When the password protection function is effective, if f602 ≠ f772, the value of f772 will be displayed as "---"; If f602 = f772, the normal password Settings are displayed when viewing the value of f772.
4. When the password protection function is effective and f602 = f772, if f773 =0, f602 is always effective and will not reset automatically.

NO.	Parameter Name	Setting Range	Default
f603	Current/voltage display mode	0~1	1

0: %, display in percentage terms.

1: A (ampere)/V (volt), display in amperes/volts.

These parameters are used to change the unit of monitor display. Like current monitor and Voltage monitor display. (% ⇔ A (ampere)/V (volt))

Note1: f603 converts the following parameter settings: Motor electronic-thermal protection level 1 and 2 (f106, f110), DC braking current (f507), Stall prevention level 1 and 2 (f107, f111), Small current detection current (f408).

Note2: Base frequency voltage 1 and 2（f102, f109）always displayed in the unit of V.

NO.	Parameter Name	Setting Range	Default
f604	Frequency free unit magnification	0.00~200.0	0.00

0.00: Free unit display disabled (display of frequency).

0.01-200.0: Value displayed = actual frequency [×] *f604*.

e.g., output frequency = 50Hz, if *f604*=30.0, Value displayed on the panel is 1500.

Note: This parameter displays the frequency drive output frequency as the value obtained by multiplying it by a positive number. This does not mean that the actual motor speed or line speed is indicated with accuracy.

NO.	Parameter Name	Setting Range	Default
f605	Arbitrary unit conversion options	0~1	0

0: Frequency can be converted to any unit

1:Frequency cannot be converted to arbitrary units

NOTE:When *f605*=1, *f604* invalid

NO.	Parameter Name	Setting Range	Default
f606	Inclination characteristic of free unit display	0~1	1

0: Negative inclination (downward slope)

1: Positive inclination (upward slope)

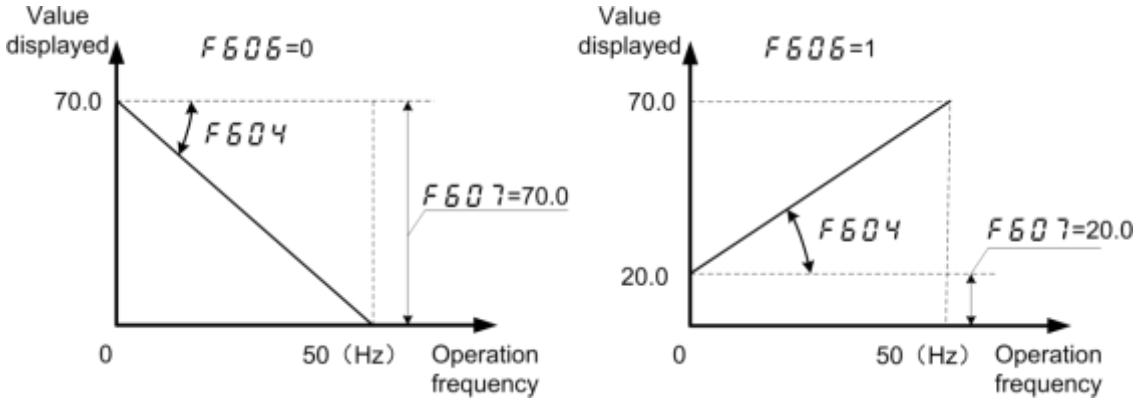


Figure 6.35 Description of free unit

If *f604* is not set as 0.00, value displayed is obtained as follows:

- When *f606*=0, value displayed =*f604*x (*f607* – actual frequency value)
- When *f606*=1, value displayed =*f604*x (*f607* + actual frequency value)

NO.	Parameter Name	Setting Range	Default
f607	Bias of free unit display	0.00Hz ~*f007*	0.00

NO.	Parameter Name	Setting Range	Default
f608	Free step 1 (pressing a panel key once)	0.00 Hz ~*f007*	0.00

0.00: disabled. 0.01~*f007*: enabled.

Under normal conditions, the frequency command value from the keypad increases in steps of 0.1 Hz each time you press the ▲ key.

If *f608* is not 0.00, the frequency command value will increase by the value with *f608* each time you press the ▲ key. Similarly, it will decrease by the value set with *f608* each time you press the ▼ key. In this case, the output frequency displayed in standard monitor mode changes in steps of 0.1 Hz, as usual.

The frequency (*f000*) set on the keypad changes in steps of 10.0 Hz: 0.0 → 20.0 → .....50.0 (Hz), each time you press the ▲ key. This function comes in very handy when operating the load at limited frequencies that change in steps of 1Hz, 5Hz, 10Hz, and so on

NO.	Parameter Name	Setting Range	Default
f609	Free step 2 (panel display)	0~255	0

0: disabled.

1~255: enabled.

When f608 is not 0.00, and f609 is not 0 (disabled):

Output frequency displayed in standard monitor mode = Internal output frequency × f609÷f608.

Example: When f608 =1.00 (Hz), and f609 =1: Each time you press the ▲ key, the frequency setting changes in steps of 1Hz: 0→ 1 → 2 → ... → 50(Hz) and also the value displayed on the keypad changes in steps of 1. Use these settings to hide decimal fractions and also the value displayed on the keypad changes in steps of

1. Use these settings to hide decimal fractions.

The settings of f609 and f608 have no effect when the free unit selection (f604) is enabled.

NO.	Parameter Name	Setting Range	Default
f610	Standard monitor display selection	0~11	0

0: Output frequency (Hz(free))

1: Frequency command (Hz(free))

2: Output current(%/A)

3: Frequency drive rated current (A)

4: Frequency drive load (%)

5: Output power (kW)

6: Stator frequency (Hz (free)) 7: Communication data display

8: Output speed

9: Communication counter

10: Normal communication counter

11: Stop - given frequency (f900 =0) /PID given (f900 ≠0), run - output frequency

Note: The parameter f610 determines the default value displayed on the first line of the keyboard panel when in power mode.

NO.	Parameter Name	Setting Range	Default
f611	Panel running order clear selection	0~1	1

0: Clear（when standby terminal OFF）.

1: Keep（when standby terminal OFF）.

Note 1: When f611=0, Put OFF the standby terminal (see input function 1) will stop the motor..

NO.	Parameter Name	Setting Range	Default
f612	Panel operation prohibition (f000)	0~1	0

0: Permitted

1: Prohibited

This parameter can prohibited/permitted set panel operation frequency(f000) by key ▲and ▼.

NO.	Parameter Name	Setting Range	Default
f613	Prohibition of panel operation (RUN/STOP keys)	0~1	0

0: Permitted.

1: Prohibition.

NO.	Parameter Name	Setting Range	Default
f614	Prohibition of panel stop operation	0~1	0

0: Permitted.

1: Prohibition.

NO.	Parameter Name	Setting Range	Default
f616	Integral output power retention selection	0~1	1

0: (clear), with the main power off, not retention of integral output power values.

1: (memory), with the main power off, retention of integral output power values.

NO.	Parameter Name	Setting Range	Default
f617	Integral output power display unit selection	0~3	varies by model

0: 1kWh. 1: 10kWh. 2: 100kWh. 3: 1000kWh.

NO.	Parameter Name	Setting Range	Default
f618	Search and resetting of changed parameters selection	0~1	0

0: Disable. Not display “-uf-" parameter group. 1: Enable. Display “-uf-" parameter group.

Users can automatically searches for those parameters that are programmed with values different from the standard default setting and displays them in the “-uf-" parameter group. Parameter setting can also be changed within this group.

NO.	Parameter Name	Setting Range	Default
f619	Frequency converter internal temperature monitoring 1		
f620	Frequency converter internal temperature monitoring 2		
NO.	Parameter Name	Setting Range	Default
f621	LCD contrast control	15-40	25
f622	Factory reserved		

NO.	Functional description		
f623	Additional function		
Bit	Description	0	1
0	The upper fan runs by itself	OFF	ON
1	Output positive power monitoring	OFF	ON
2-15	Factory reserved		

NO.	Parameter Name	Setting Range	Default
f624	Keyboard panel displays 2	Same as f610	2
	Quick Monitoring 1	Same as f610	
f625	Keyboard panel displays 3	Same as f610	1
	Quick Monitoring 2	1 ~ 8: see f610 9: PID is given 10: PID feedback	
f626	Keyboard panel displays 4	Same as f610	5
	Quick Monitoring 2	1 ~ 8: see f610 9: PID is given 10: PID feedback	

- Quick monitoring:

Fast monitoring is mainly used for LED panels (including: single LED, double LED).

In the default state of power-on, parameters set by f610, f624, f625 and f626 can be displayed by switching ENT button. (If it is a double LED panel, switch the display on the first row)

f624 has the same options as *f610*;

Options (1-8) of *f625* and *f626* are the same as those of *f610*. Option 9 is given PID and option 10 is PID feedback, as follows:

0: Motor working frequency (Hz or customized display).

1: Speed given (Hz or customized display). (marked with the letter F)

2: Motor current (% or A). (identified by letter C)

3: Rated current of frequency converter (A). (identified by letter C)

4: Frequency converter thermal state (%).

5: Output power (kW).

6: Internal speed given (Hz or custom display after PID function).

7: Serial communication data.

8: Output speed (PM).

9: PID given pressure. (identified by letter G)

10: PID feedback pressure. (marked with letter B)

- Multi-line monitoring:

Multi-line monitoring is mainly used for LCD panels and double LED panels.

The parameter *f624* determines the type of value displayed by default on the second line of the keyboard panel when in power-on mode.

The parameter *f625* determines the type of value displayed by default on the third line of the keyboard panel when in power-on mode.

The parameter *f626* determines the type of value displayed by default on the fourth row of the keyboard panel in power-on mode.

NO.	Parameter Name	Setting Range	Default
f627	Relay output -PID feedback check out	0.00~99.99	0.00
f628	Relay output -PID feedback to detect bandwidth	0.00~99.99	0.00

f627 and *f628* mainly cooperate with relay function [84] to realize pressure reduction pump control;

f628 is also used in the relay function [86] to monitor the status of feedback pressure.

NO.	Parameter Name	Setting Range	Default
f629	Factory reserved	-	-

6.8. Additional function parameter group

NO.	Parameter Name	Setting Range	Default
f700	Panel JOG mode selection	0~1	0

JOG key for multifunctional reuse key, *f700* and *f601* can be set together to achieve the following functions: forward/reverse switch, local/remote switch, shortcut menu function (default), inching function.

NO.	*f7*	*f 1*	JOG key function
1	0	0	Local/remote switching, power off to maintain; (Local sign: SET and MON lights on at the same time)
2	0	1	Non-function
3	0	2	Local/remote switching, power outage recovery default Settings; (Local sign: SET and MON lights on at the same time)

4	1	0 / 1 / 2	Inching function
5	2	0 / 1 / 2	Shortcut Menu 1
6	3	0 / 1 / 2	Shortcut Menu 2
7	4	0 / 1 / 2	Shortcut Menu 3
8	5	0 / 1 / 2	Same as F700=4。
9	6	0 / 1 / 2	Positive and negative switching (no LED identification)

Note: When JOG key is for local/remote switching function, the setting of *F601* is invalid, and JOG key action shall prevail.

NO.	Parameter Name	Setting Range	Default
F701	Jog run frequency	0.0~20.0	5.0

NO.	Parameter Name	Setting Range	Default
F702	Jog stopping pattern	0~2	0

0: Slow down stop. 1: coast stop. 2: DC braking.

Use the jog run parameters to operate the motor in jog mode. Input of a jog run signal generates a jog run frequency output at once, irrespective of the designated acceleration time.

NO.	Parameter Name	Setting Range	Default
F703	Jump frequency 1	0.0 Hz ~F007	0.0
F704	Jumping width 1	0.0~30.0 Hz	0.0
F705	Jump frequency 2	0.0 Hz ~F007	0.0
F706	Jumping width 2	0.0~30.0 Hz	0.0
F707	Jump frequency 3	0.0 Hz ~f007	0.0
F708	Jumping width 3	0.0~30.0 Hz	0.0

Resonance due to the natural frequency of the mechanical system can be avoided by jumping the resonant frequency during operation. During jumping, hysteresis characteristics with respect to the jump frequency are given to the motor.

Do not set the jump parameters, if multiple jump frequency setting width overlapped.

During acceleration or deceleration, the jumping function is disabled for the operation frequency.

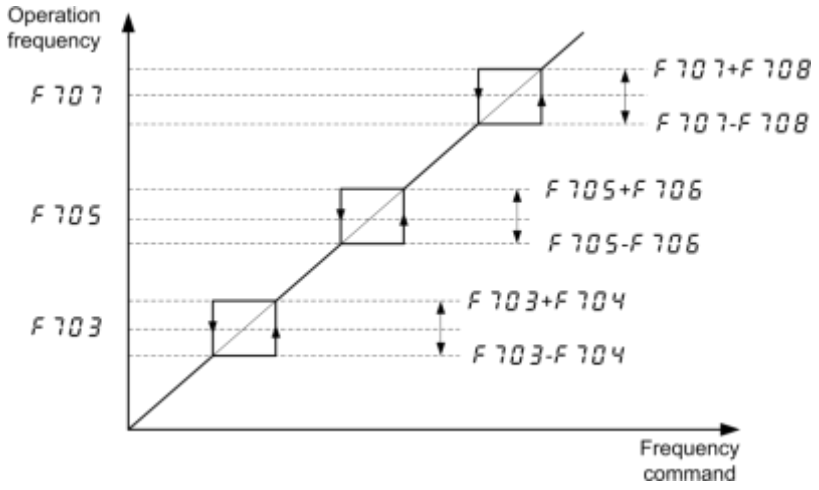


Figure 6.36 Description of jump frequency

NO.	Parameter Name	Setting Range	Default
f709	Braking mode selection	0 ~3	0

0: OFF . 1: Forward direction.

2: Reverse direction. 3: Same set direction to f522.

NO.	Parameter Name	Setting Range	Default
f710	Braking Release frequency	0.0~20.0 Hz	3.0
f711	Braking Release time	0.0 ~25.0s	0.5
f712	Braking Creeping frequency	0.0~20.0 Hz	3.0
f713	Braking Creeping time	0.0 ~25.0s	1.0

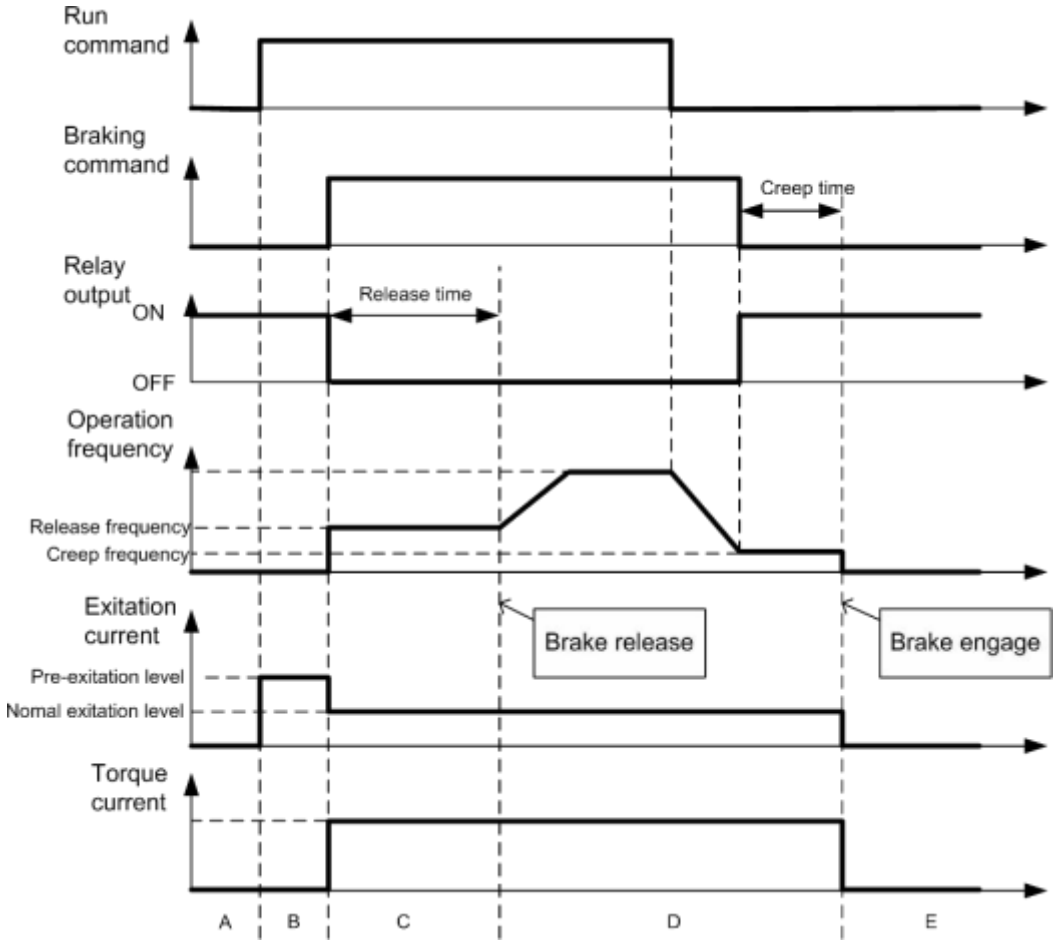


Figure 6.37 Description of braking mode sequence

NO.	Parameter Name	Setting Range	Default
f714	Droop control gain	0~100%	0
f715	Droop control insensitive torque band	0~100%	10

The droop control function refers to the function of operating the power-running motor at operating frequency F1 (Hz) that is lower than command frequency F0 (Hz) by droop frequency Δf (Hz) when the torque current is T1 (%).The droop frequency Δf can be calculated, using the following expression.

Droop frequency Δf (Hz)= f101 × f714× (Torque current T1 – f715)

When the torque current is above the specified droop insensitive torque band (f715), the frequency is reduced during power running or increased during regenerative braking.

The above figure shows an example of the operating frequency during power running. During regenerative braking, control is performed in such a way as to increase the frequency.

The droop function is activated above the torque current set with **f715**.

The amount of droop frequency Δf varies depending on the amount of torque current T1.

Note: If the base frequency exceeds 100Hz, count it as 100Hz. Control is exercised between the starting frequency (**f503**) and the maximum frequency (**f007**).

[An example of calculation]

Parameter setting: Base frequency **f101**=60 (Hz), droop gain **f714**=10 (%) Droop insensitive torque band **f715**=30 (%)

Droop frequency Δf (Hz) and operating frequency F1 when command frequency F0 is 50 (Hz) and torque current T1 is 100 (%) are as follows.

Droop frequency Δf (Hz)=vl × **f714** × (T1 – **f715**)

=60 (Hz) × 10 (%) × (100 (%) - 30 (%))

=4.2 (Hz)

Operation frequency F1 (Hz) = F0 - Δf = 50 (Hz) - 4.2 (Hz)=45.8 (Hz)

NO.	Parameter Name	Setting Range	Default
f716	Preset-speed 1	**f00** ~**f008**	3.0
f717	Preset-speed 2	**f00** ~**f008**	6.0
f718	Preset-speed 3	**f00** ~**f008**	9.0
f719	Preset-speed 4	**f00** ~**f008**	12.0
f720	Preset-speed 5	**f00** ~**f008**	15.0
f7 1	Preset-speed 6	**f00** ~**f008**	18.0
f722	Preset-speed 7	**f00** ~**f008**	21.0
f7 3	Preset-speed 8	**f00** ~**f008**	24.0
f7 4	Preset-speed 9	**f00** ~**f008**	27.0
f725	Preset-speed 10	**f00** ~**f008**	30.0
f726	Preset-speed 11	**f00** ~**f008**	33.0
f7 7	Preset-speed 12	**f00** ~**f008**	36.0
f7 8	Preset-speed 13	**f00** ~**f008**	39.0
f729	Preset-speed 14	**f00** ~**f008**	45.0
f730	Preset-speed 15	**f00** ~**f008**	50.0

A maximum of 15 speed steps can be selected just by switching an external contact signal. Multi-speed frequencies can be programmed anywhere from the lower limit frequency *f* **009** to the upper limit frequency **f008**.

Use the input terminal function selection to allocate “Preset-speed command 1” to “Preset-speed command 4” terminal. For more information, see table 6.8.

Table 6.8 Relation between Preset-speed command and Preset-speed

Setting Frequency	Preset-speed command 4	Preset-speed	Preset-speed command 2	Preset-speed
preset-speed commands are invalid	0	0	0	0
Preset-speed 1	0	0	0	1
Preset-speed 2	0	0	1	0

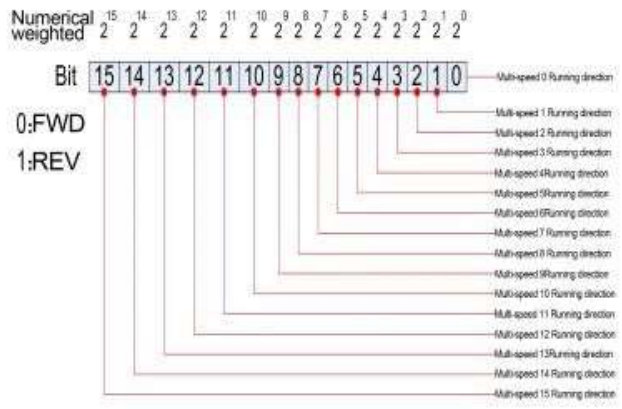
Preset-speed 3	0	0	1	1
Preset-speed 4	0	1	0	0
Preset-speed 5	0	1	0	1
Preset-speed 6	0	1	1	0
Preset-speed 7	0	1	1	1
Preset-speed 8	1	0	0	0
Preset-speed 9	1	0	0	1
Preset-speed 10	1	0	1	0
Preset-speed 11	1	0	1	1
Preset-speed 12	1	1	0	0
Preset-speed 13	1	1	0	1
Preset-speed 14	1	1	1	0
Preset-speed 15	1	1	1	1

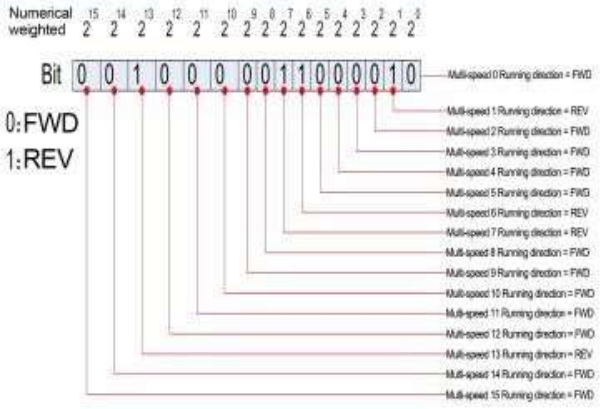
NO.	Parameter Name	Setting Range	Default
f731	Factory reserved		
f732	Multi-speed 0 run time	0~6500.0s(min)	0.0
f733	Multi-speed 1 run time	0~6500.0s(min)	0.0
f734	Multi-speed 2 run time	0~6500.0s(min)	0.0
f735	Multi-speed 3 run time	0~6500.0s(min)	0.0
f736	Multi-speed 4 run time	0~6500.0s(min)	0.0
f737	Multi-speed 5 run time	0~6500.0s(min)	0.0
f738	Multi-speed 6 run time	0~6500.0s(min)	0.0
f739	Multi-speed 7 run time	0~6500.0s(min)	0.0
f740	Multi-speed 8 run time	0~6500.0s(min)	0.0
f741	Multi-speed 9 run time	0~6500.0s(min)	0.0
f742	Multi-speed 10 run time	0~6500.0s(min)	0.0
f743	Multi-speed 11 run time	0~6500.0s(min)	0.0
f744	Multi-speed 12 run time	0~6500.0s(min)	0.0
f745	Multi-speed 13 run time	0~6500.0s(min)	0.0
f746	Multi-speed 14 run time	0~6500.0s(min)	0.0
f747	Multi-speed 15 run time	0~6500.0s(min)	0.0

Multi-step speed 0 means f000 setup value. when PLC is running

NO.	Name	Range	Default
f748	PLC speed direction choice	0 ~65535	0

Setup method: Running direction follows the parameter, i.e. Turn 16bit Binary number into decimal system value.





Setup instruction　　Setup Example

Parameter setup value

$$F748 = Bit15*2^{15} + Bit14*2^{14} + \ldots + Bit1*2^{1} + Bit0*2^{0}$$

$$= 0*2^{15} + 0*2^{14} + 1*2^{13} + \ldots + 1*2^{7} + 1*2^{6} + \ldots + 1*2^{1} + 0*2^{0}$$

= 8192 + 128 +64 +2 = 8386

Times square quick solution table

$2^{15}=32768$, $2^{14}=16384$, $2^{13}=8192$, $2^{12}=4096$, $2^{11}=2048$, $2^{10}=1024$, $2^{9}=512$, $2^{8}=256$,

$2^{7}=128$, $2^{6}=64$, $2^{5}=32$, $2^{4}=16$, $2^{3}=8$, $2^{2}=4$, $2^{1}=2$, $2^{0}=1$

NO.	Name	Range	Default
F749	Simple PLC running mode choice	0 ~2	0

0：Stop after one-time running. The drive completes one cycling running and then automatically stop. Need one more running command to restart.

1： Run one time and keep final value running. The drive automatically keeps the final running frequency and direction after one single cycling running.

2：Cycling running. The drive will automatically come into next cycling after fulfilling one cycle until there is stop command.

Logic output function.

NO.	Name	Range	Default
F750	Simple PLC restart mode choice	0 ~1	0

0: Run from the first paragraph. If the machine stops during operation (by stop command, fault), it will start from the first section after starting again.

1: Continue operation from the frequency of interruption time. If the machine stops during operation (by stop command, failure), the drive will automatically record the running time of the current stage, and automatically enter this stage after starting again, and continue the operation of the remaining time at the frequency defined in this stage.

NO.	Name	Range	Default
F751	Simple PLC power-off memory choice	0 ~1	0

0：Don't memorize power-off history.　1：Memorize power-off history.

PLC power-off memory means recording PLC running phase and running frequency before powering-off.

NO.	F7	F751	Power off state	Power up again, run time status
1	0	0	Downtime	Run from the first section of the PLC
			Running	Run from the first section of the PLC
2	1	0	Downtime	Run from the first section of the PLC
			Running	Run from the first section of the PLC
3	0	1	Downtime	Run from the first section of the PLC
			Running	Run from the time of power outage frequency
4	1	1	Downtime	Run from the down frequency
			Running	Run from the time of power outage frequency

NO.	Name	Range	Default
F752	Simple PLC running time unit choice	0 ~1	0

0：Second (s) 1：Minute (min)

NO.	Name	Range	Default
F753	Nonstandard function selection	0~65535	0

0: Standard features

1~65535: Non-standard functions.

Note 1: This parameter shall be effective if the frequency converter is switched on after power off.

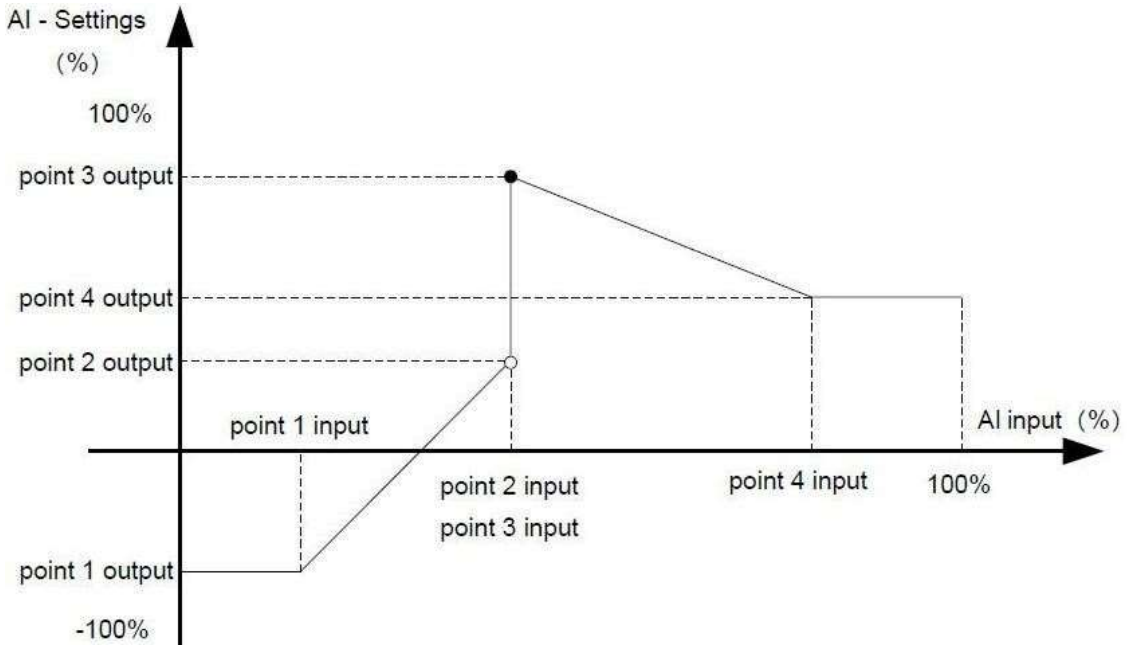
Note 2: This parameter cannot be reset by F120 = 1.

NO.	Name	Range	Default
F754	AI1 curve selection	0~1	0

0: Curve 1 (point 2, see F325 ~ F328)

1: Curve 2 (4 points, see F755 ~F762)

AI1 has two setting curves, which can be selected by parameter F754.Where curve 1 is a 2-point line and curve 2 is a 4-point curve (as shown in the figure below).



When the corresponding frequency of AI1 is set through the 4-point curve in the figure above:

(1) The frequency set by AI1 can be positive or negative. When is positive, the operation can be reversed; when is negative, the operation can be reversed. In addition, f530 can set the dead zone time during the forward reverse switch.

(2) When AI1 input＜f755，the output frequency is f756;

When AI1 input＜f761，the output frequency is f762

(3) Step is allowed to occur at a given frequency of AI1.

NO.	Name	Range	Default
f755	AI1 curve 2 set point 1 input	0.0 ~ 100.0%	0.0%
f756	AI1 curve 2 sets point 1 output	-100% ~ 100%	0.0%
f757	AI1 curve 2 set point 2 input	0.0 ~ 100.0%	30.0%
f758	AI1 curve 2 sets point 2 output	-100% ~ 100%	30.0%
f759	AI1 curve 2 set point 3 input	0.0 ~ 100.0%	60.0%
f760	AI1 curve 2 sets point 3 output	-100% ~ 100%	60.0%
f761	AI1 curve 2 set point 4 input	0.0 ~ 100.0%	100.0%
f762	AI1 curve 2 sets point 4 output	-100% ~ 100%	100.0%
f763	LI1 effective delay	6500.0 ~ 0.0 s	0.0
f764	LI1 invalid delay	6500.0 ~ 0.0 s	0.0
f765	LI2 effective delay	6500.0 ~ 0.0 s	0.0
f766	LI2 invalid delay	6500.0 ~ 0.0 s	0.0
f767	AI1 filtering coefficient	0.00 -10.00	0.30
f768	AI2 filtering coefficient	0.00 -10.00	0.30
f769	AO1 filtering coefficient	0.00 -10.00	0.00
f770	AO2 filtering coefficient	0.00 -10.00	0.00

Note: f767 and f768 are filtering coefficients of analog input AI1 and AI2.By increasing the value appropriately, the anti-interference ability of analog input can be enhanced, but its sensitivity will be weakened.

f769 and f770 are filter coefficients of ANALOG output AO1 and AO2.Increasing this value can enhance the stability of analog output, but weaken its sensitivity.

NO.	Name	Range	Default
f771	Enable Reverse Jog frequency	0.0~20Hz	0.0

0: Reverse inching frequency is forbidden. At this time, press f701 for inching frequency, the inching acceleration time is 0.1s (not adjustable), and the deceleration time is f 11.

0.1~20.0: enable reverse inching frequency. At this point, press f701 for inching frequency and f518 and f519 for inching deceleration time. For reverse inching, the inching frequency is f771, and the reverse inching acceleration and deceleration time is f520 and f521.

NO.	Name	Range	Default
f772	Password Setting	0~9999	0
f773	Password duration	0~9999	5

See parameter f602 for detailed description of f772 and f773.

6.9. Communication function parameter group

NO.	Parameter Name	Setting Range	Default
f800	Modbus baud rate	0~1	1

0: 9600 bps. 1: 19200 bps. 2: 4800 bps. 3: 2400 bps. 4: 1200 bps.

Remarks: it only works after re-power on if we decide to modify f800.

NO.	Parameter Name	Setting Range	Default
f801	Modbus parity	1	1

0: NONE, datum format : < 8, N, 2 >. 1: EVEN, datum format :< 8, E, 2 >. 2: ODD, datum format :< 8, O, 2 >.
Remarks: it only works after re-power on if we decide to modify f801.

NO.	Parameter Name	Setting Range	Default
f802	Modbus address	0~247	1

NO.	Parameter Name	Setting Range	Default
f803	Modbus timeout	0~100	0

0: timeout check disabled.

1-100: 1=1s.

NO.	Parameter Name	Setting Range	Default
f804	Modbus transfer waiting time	0~2.00s	0.00

NO.	Parameter Name	Setting Range	Default
f805	Modbus behavior on communication fault	0~4	4

0: Frequency drive stop, communication command, frequency mode open(by f002, f003)

1: None (continued operation) 2: Deceleration stop

3: Coast stop 4: Communication error (E-33 trip) or Network error (E-35 trip)

NO.	Parameter Name	Setting Range	Default
f806	Number of motor poles for communication	1~8	2

The parameter setup will place the influence upon the display of u010 .

NO.	Parameter Name	Setting Range	Default
f813	Module writes data 1	0~6	1
f814	Module writes data 2	0~6	3

0：Off 1: Communication command control (FA05)

2: Reservations 3: Communication frequency setting (FA08)

4 ~ 6: reservations

Note: (1) the setting of f813-f814 must be switched on after power off until the LED display is black.

(2) Block first address is 1813H (hexadecimal 1813).

NO.	Parameter Name	Setting Range	Default
f815	Module data read 1	0~21	1
f816	Module data read 2	0~21	2
f817	Module data read 3	0~21	12

f818	Module data read 4	0~21	18
f819	Module data read 5	0~21	8

0: Off
1: Status Information (FD03)
2: Output frequency (FD12)
3: Output current (FE08)
4: Output voltage (FE10)
5: Fault information (FC39)
6: PID feedback value (FA36)
7: Input terminal information (FD01)
8: Output terminal information (FD02)
9: AI1 input (FE30)
10: AI2 input (FE31)
11: Motor speed (FE50)
12: Absolute value of output current (E002), unit 0.01a
13: Absolute value of output voltage (E006), unit V
14: Absolute value of input voltage of DC bus (E009), unit V
15: PID given value (FA35)
16: Output torque (FE20), 0.01% of rated torque per unit motor
17: Input power (FE28), 0.01kW
18: Output power (FE29), 0.01kW
19: Input power accumulation/input electric energy (FE44), the unit is determined according to the parameter f617
20: Output power accumulation/output electric energy (FE45), the unit is determined according to the parameter f617
21: Cumulative running time (FE17), unit h (hours)

Note:

(1) The setting of f815-f819 must be switched on after power off until the LED display is black.
(2) Block first address 1815H (hexadecimal 1815)
(3)The range of the number of registers read is 2-5 (2-5).

NO.	Parameter Name	Setting Range	Default
f821	Factory reserved		
f822	Factory reserved		
f823	Factory reserved		
f824	Factory reserved		
f825	Factory reserved		
f826	Factory reserved		
f827	Factory reserved		
f828	Factory reserved		
f829	Factory reserved		

NO.	Parameter Name	Setting Range	Default
f830	PID setting of keypad	0~100%	0.0

f830=100% can make the sensor output the maximum value.

The 100% standard value of f830 is the measurement range of sensor. If the measurement range of pressure sensor is 0.0~1.6Mpa for example, set f830 =100% means that pressure setting is 1.6Mpa.

Note 1: When f900=0, f830 is not effective.

Note 2: f830 is completely corresponded to f916. When one has changed, the other will automatically updated.

6.10. Process PID parameter group

PID control is a common method used in process control. By carrying out proportional, integral and differential operations on the deviation between the feedback signal of the controlled quantity and the target quantity, the output frequency of the drive can be adjusted to form a negative feedback system to stabilize the controlled quantity on the target quantity .Suitable for flow control, pressure control, temperature control and other process control. The control basic principle block diagram is as follows:

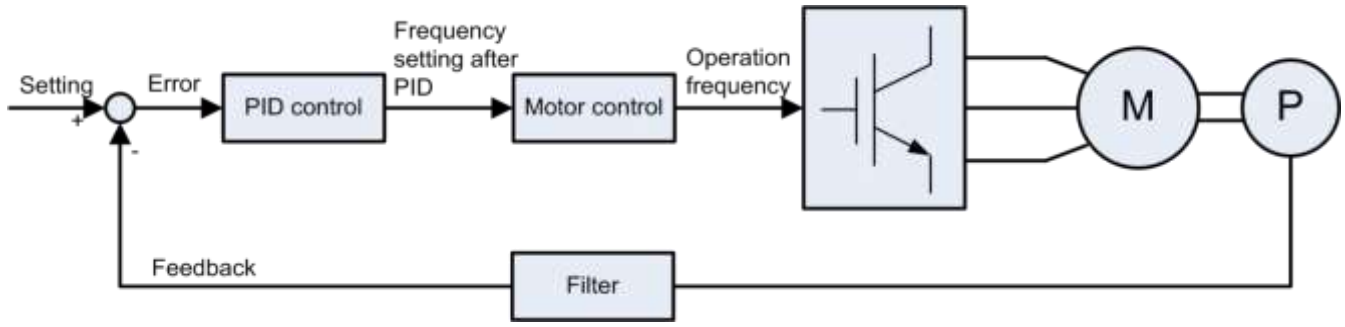


Figure 6.38 Block diagram of PID process control

f900~f916 define built-in process PID control function parameters of the frequency drive. The block diagram of process PID control function is shown as below:

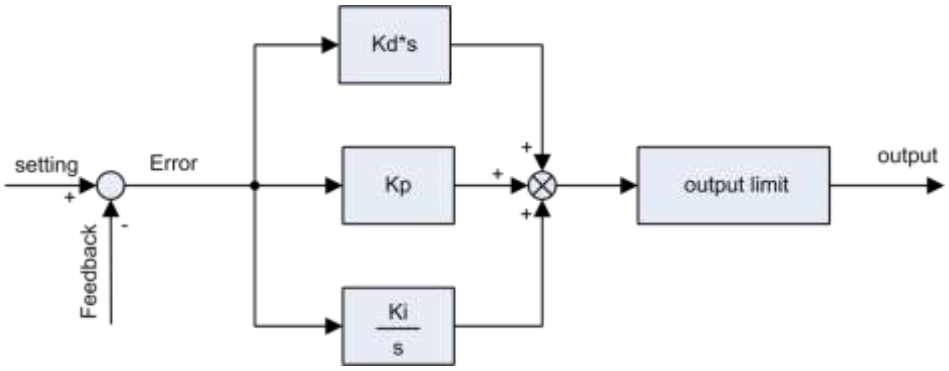


Figure 6.39 Block diagram of built-in PID controller

PID dormancy mode (the priority is reduced in order) :

- Pressure dormancy (key parameter: f912)
- Sleep at lower frequency (key parameter: f009)
- PID wake-up mode (the priority is reduced in order) :
- Deviation wake-up (key parameter: f907)
- Feedback value wake-up (key parameter: f908)
- Pressure wake-up (key parameter: f911)
- Frequency wake-up (key parameters: f009, f906)

NO.	Parameter Name	Setting Range	Default
f900	PID control enabled/disabled	0~2	0

0: Disabled

1: Enabled (Feedback: AI1)

2: Enabled (Feedback: AI2)

Note 1: The control parameter for enabling or disabling THE PID function is *f900*, not *f003* for the given PID source selection parameter.

Note 2: PID given source (*f003*) and feedback source (*f900*) cannot be set to the same channel.

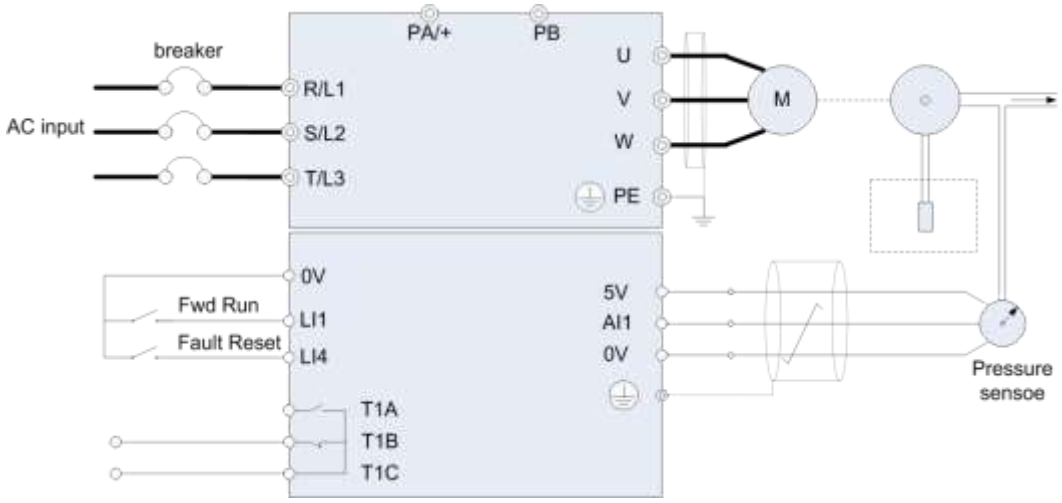


Figure 6.40 PID wiring example

Process quantity input data (frequency or percentage term) and feedback input data can be combined as follows for the PID control. See table 6.9.

Table 6.9 PID setting and PID feedback

PID given source		PID feedback source
f003（*f*　　）setting	Given source	*f*　　setting
0	Built-in potentiometer	*f900*=1: AI1, 0~5VDC or 0~10V DC or 4~20mA DC. *f900*=2: AI2, 0~10V DC.
1	AI1	
2	AI2	
3	Keyboard panel (given frequency) - not recommended	
4	Communication setting (given frequency)	
5	UP/DOWN from external contact	
6	-	
7	Keyboard panel (PID given) -*f918*	
(when under remote control, *f002*=0)	Multistep speed setting	

Note 1: *f003* is the multiplexing parameter for the given source of frequency and PID When *f900* =0 (PID is disabled), *f003* is the given source of frequency;

When *f900* ≠0 (PID enabled), *f003* is the given source for THE PID.

Note 2: The control parameter for enabling or disabling PID functionality is *f900*, not *f003*.

Note 3: When the given PID source is *f003*=7, you can set THE PID by default by ▼ or by parameter *f918*. The two methods have the same effect.

Note 4: With the relevant parameters such as *f021*, the given parameters of *f003* (main set) and *f005* (secondary set) can be calculated as the final PID to achieve the primary and secondary operation function given by PID. For details, please see parameters *f021* ~ *f024* and *f006*.

NO.	Parameter Name	Setting Range	Default
f901	Proportional gain	0.01~100.0	varies by model

f902	Integral gain	0.01~100.0	varies by model
f903	Differential gain	0.00~2.55	0.00

The control effect of f901: The greater the setpoint is, the smaller the deviation between target value and feedback value after stability is. However, excessively large setpoint may arouse vibration in the controlled object and make it unstable. Furthermore, if the setpoint is small, the deviation between target value and feedback value after stability becomes greater.

The control effect of f902: Any residual deviation after proportional gain tuning can be cleared with time through integral gain function. Higher integral gain can realize rapid response to process deviation, but may result in instability such as oscillation.

The control effect of f903: Differential gain will tune the response time of the frequency drive according to the rapid change during the process. Unnecessary raise of differential gain value may result in greater fluctuation of the motor speed and make the system unstable.

NO.	Parameter Name	Setting Range	Default
f904	PID controls wait/delay time	0~2400s	0

When f403≠0, the frequency converter will not enter the PID control immediately when starting, and the PID will only be enabled after the time delay set by f904.

During the time set by f904, PID is disabled, f308 switched to select channel for the given source of frequency, and the motor is accelerated to the speed corresponding to the given source. For example, when f003 =7, the corresponding output frequency =f007*f918/ f917.

NO.	Parameter Name	Setting Range	Default
f905	PI regulator deviates the input signal to take the reverse/direction	0~1	0

0: Disable/positive. PID feedback < timing, frequency converter output increases; On the contrary, the output frequency of the converter decreases.

1: Enable/react. PID feedback < timing, frequency converter output decreased; On the contrary, the output frequency of the converter increases.

Note: PID regulator negation is performed in two ways: Make f905=1, or define logic input function as 38 and the corresponding terminal is closed.

Note: PID regulator can be inverted in two ways. Let f905 =1, or define the logical input function as 38 and close the corresponding input terminal.

NO.	Parameter Name	Setting Range	Default
f906	Sleep mode awakening hysteresis bandwidth	0.0 Hz ~ f007	0.2
f907	Sleeping mode awakening threshold based on PI deviation	0.0 Hz ~f007	0.0
f908	Sleeping mode awakening threshold based on PI feedback	0.0 Hz ~f007	0.0
f910	wake up delay	0~600.0s	0.0
f911	Auto wake up level	0~100.0%	0.0

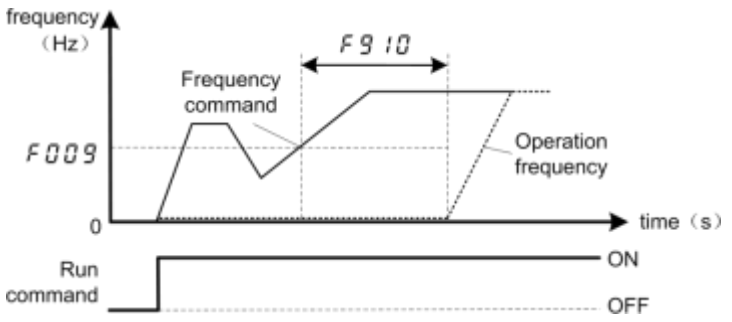


Figure 6.41 description of wake up from sleep mode

There are three types of wakeup: deviation wakeup, threshold wakeup (absolute value or percentage) and frequency wakeup. *f905* =0 (deviation signal is taken to reverse disable/positive effect) is described below.

Deviation wake-up: If the following conditions are met, the frequency converter will quit the sleep state.

(given - feedback) > wake-up bias (parameter *f907*);

- The state duration ≥ wake control/delay time (*f910*).

(1) Threshold awakening: If the following conditions are met, the converter will quit the sleep state.

- feedback > wake-up threshold (parameter *f908* or (*f918***f911*%));
- The state duration ≥ wake control/delay time (*f910*).

(2) Frequency awakening: If the following conditions are met, the frequency converter will enter the sleep state.

- Operating frequency ≥ sleep frequency (*f919*) + wake frequency hysteresis bandwidth (*f906*);
- The duration of the two states above ≥ wake control/delay time (*f910*).

Note 1: priority is: bias to wake up > threshold (absolute value) to wake up > threshold (percentage) to wake up > frequency, that is, only when high-priority parameter =0, will the low-priority wake-up mode be entered.

Note 2: The absolute value of *f907* and *f908* is adopted. When it is pressure signal, 1.00 means 1.0mpa.
Note 3: The percentage of *f911* is adopted, and the reference value of 100% is PID given to *f918*.

Note 4: *f906* cannot be 0 when sleeping through the lower frequency, otherwise there may be maloperation.

NO.	Parameter Name	Setting Range	Default
f909	sleeping mode action	0~1	0

0: Motor slowdown to a stop.

1: Motor keep running at the speed setting by *f009*.

NO.	Parameter Name	Setting Range	Default
f912	Dormancy threshold (percentage)	0~100%	0.0
f915	Sleep control/delay time	0~600.0s	0.1
f919	Dormancy frequency	0.0 Hz ~ *f008*	0.0
f920	Dormancy tolerance	0.0~25.0%	0.0

There are two ways of dormancy: feedback threshold dormancy (percentage) and frequency dormancy. *f905* =0 (deviation signal is taken to reverse disable/positive effect) is described below.

(1) Feedback threshold sleep:

When the > dormancy threshold is fed back (*f918***f912*%), and the duration ≥ dormancy time (*f915*), it will enter the dormancy state.

(2) Frequency dormancy: when the following three conditions are met at the same time, the frequency converter will enter the sleep state.

- Feedback ≥ (*f918*-*f918* * *f920*%);
- Output frequency ≤ sleep frequency *f919*;
- The simultaneous duration of the above two is ≥ sleep time *f915*.

Note 1: priority: threshold hibernation > frequency dormancy (that is, only when the dormancy threshold *f912*=0, enter the frequency dormancy mode).

Note 2: When *f915* =0, the sleep function is disabled.

Note 3: Both *f912* and *f920* are set in percentages, and the reference value corresponding to 100% is GIVEN by PID *f918*.

NO.	Parameter Name	Setting Range	Default
f913	Upper limit of PID	0~100%	100.0
f914	Lower limit of PID	0~*f913*	0.0

When *f900* ≠0, *f913* and *f914* are valid, and the given PID is limited to *f914* ~ *f913*.

Example: With *f9.18* set to timing, the value of *f9.18* itself may be out of the range of [*f9.14*, *f9.13*], but the final actual given will be limited to [*f9.14*, *f9.13*].

The setting of *f9.13* and *f9.14* adopts percentage, and the reference value corresponding to 100% is sensor range *f9.17*.

NO.	Parameter Name	Setting Range	Default
f9.16	PID given control deviation	0.0~100.0%	0.0
f9.17	Sensor range	0.00 ~ 99.99	1.00
f9.18	PID given	0.00 ~ *f9.17*	0.00

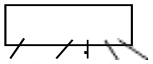
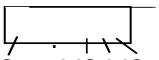
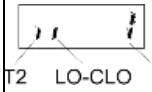
Both *f9.17* and *f9.18* are set in absolute value. When is the pressure signal, 1.00 represents 1.0mpa.

f916 is the maximum allowable deviation of the feedback from the given. Within the range of deviation, the PID controller stops working, and the accuracy and stability of the PID system can be adjusted by setting the value reasonably.

The setting of *f9.16* USES a percentage, and the reference value of 100% is PID given to *f9.18*.Therefore, the allowable deviation range of actual pressure is: [*f9.18* -- *f9.18* * *f9.16*%, *f9.18* + *f9.18* * *f9.16*%].

6.11. Monitoring function parameter group

Table 6.10 Status monitor mode

NO.	Parameter Name	Description
u000	CPU1 Version	E.g. *v100*, G-type, v= g; P-type, v= p;
u 01	Operation frequency	Value is displayed in Hz/free unit. See *f6.04*.
u002	Direction of rotation	*0* Forward run, *1* Reverse run.
u003	Frequency command value	Value is displayed in Hz/free unit. See *f6.04*.
u004	Load current	The frequency drive output current (%/A) is displayed.
u005	Input voltage (AC RMS)	The frequency drive input voltage (%/V) is displayed.
u006	Output voltage (AC RMS)	The frequency drive output voltage command (%/V) is displayed.
u007	Input terminal status indicated	4kW or below:  AI1-AI2 LI4 LI3 LI2 LI1 ：OFF *1*：ON 5.5kW or above:  LI8 ... LI3 LI2 LI1 ：OFF *1*：ON
u008	Output terminal status indicated	 T2 LO-CLO T1 ：OFF *1*：ON , without T2 at 5.5kW or below
u009	cumulative operation time	(0.01=1 hour, 1.00=100 hours)
u010	Output speed	Displays the motor speed (min-1) by calculating with output frequency and pole numbers.
u 11	Rated current	The rated current of the frequency drive (A) is displayed.
u 12	Torque current	The torque current (%/A) is displayed.
u 13	Load current	The frequency drive output current (load current) (%/A) is displayed.
u014	Torque	The torque (%) is displayed.

NO.	Parameter Name	Description
u 15	Input power	The frequency drive input power (kW) is displayed.
u 16	Output power	The frequency drive output power (kW) is displayed.
u 17	PID feedback	The PID feedback value is displayed. (Hz/free unit)
u018	Frequency command value (PID-computed)	The PID-computed frequency command value is displayed. (Hz/free unit)
u019	Integral input power	The integrated amount of power (kWh) supplied to the frequency drive is displayed.
u020	Integral output power	The integrated amount of power (kWh) supplied from the frequency drive is displayed.
u 21	Communication counter	Displays the counter numbers of communication through the network.
u022	Normal state communication counter	Displays the counter numbers of communication only at normal state in the all communication through network.
u 23	Cpu2 version	v1 0
u024	Parts replacement alarm information	ON: Needs to be replaced
u025	Cpu1 revision	
u026	PID setting	Displayed in % term.
u 27	PID feedback	Displayed in % term.
u1--	Past trip 1	Enter into the display of detailed information on past trip 1
u --	Past trip 2	Enter into the display of detailed information on past trip 2
u3--	Past trip 3	Enter into the display of detailed information on past trip 3
u4--	Past trip 4	Enter into the display of detailed information on past trip 4

Note 1: Items displayed can be changed by pressing ▲ or ▼ key in the monitor mode.

Note 2: You can switch between % and A (ampere)/V (volt), using the parameter *f* 604 (current/voltage unit selection).

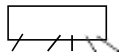
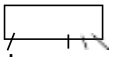
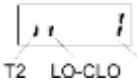
Note 3: The input/output voltage displayed is as large as the AC root-mean-square input.

Note 4: The integrated amounts of input and output power will be reset to zero, if you press and hold down the ENT key for 3 seconds or more when power is off or when the input terminal function 32 is turned on or displayed.

Note 5: The cumulative operation time increments only when the machine is in operation.

Note 6: At the occurrence of a trip, maximum values are not always recorded and displayed for reasons of detecting time.

Table 6.11 Display of detailed information on past trip n (n=1,2,3,4)

NO.	Parameter Name	Description
–	Cause of trip	E.g. E–01
un00	Continuous trips	The number of time the same trip occurred in succession is displayed. (Unit: times)
un01	CPU1 Version	E.g.: v100 , G-type, v= g; P-type, v= p；
un02	Operation frequency	Value is displayed in Hz/free unit. See f6 4.
un03	Direction of rotation	0 Forward run , 1 Reverse run.
un04	frequency command value	Value is displayed in Hz/free unit. See f6 4.
un05	load current	The frequency drive output current (%/A) is displayed.
un06	input voltage (AC RMS)	The frequency drive input voltage (%/V) is displayed.
un07	output voltage (AC RMS)	The frequency drive output voltage command (%/V) is displayed.
un08	Input terminal status indicated	4kW or below:  0：OFF 1：ON AI1-AI2 LI4 LI3 LI2 LI1 5.5kW or above:  0：OFF i：ON LI8 ... LI3 LI2 LI1
un09	Output terminal status indicated	 0：OFF 1：ON , without T2 at 4kW or below T2 LO-CLO T1

Note 1: If no trip occurred in the past, the message “nerr” will be displayed. Detailed information for past trip is not accessed.

Note 2: Details on a past trip can be displayed, even after the frequency drive is turned off or reset.

7. FAULT DIAGNOSIS AND MEASURES

7.1. Fault code, cause and measures

When fault (failure) occurs, the frequency drive takes the following actions: The keyboard panel blinks to display the fault code, the frequency drive stops output and the motor freely stops.

Table 7.1 Fault display and measures

Code of fault	Type of fault	Possible cause	Measures (troubleshooting)
E-01	Overcurrent protection	• Acceleration time is too short. • V/f parameter is wrongly set. • When the frequency drive starts, the load is still in rotation. • Frequency drive is supplying power to low-impedance motor. • Interphase short circuit or earthing failure. • Abrupt fluctuation of the load	• Increase acceleration parameter (F010 or F618) and the deceleration time (F011 or F519) • Select the correct setpoint for V/f. • Adopt forward/reverse speed tracking and restart function (STR function). • Tune the switching frequency. • Check wiring to see if there is Interphase short circuit or earthing failure. • Reduce fluctuation of the load
E-02	Interphase short circuit	• Interphase output is short circuit. • Motor impedance is too low.	• Confirm the wiring and insulation status.
E-03	Starting overcurrent	• Earthing failure • IGBT unit damage	• Confirm whether the wiring and device are earthing • Connect with factory
E-04	Earthing fault	• Earthing failure • IGBT unit damage	• Confirm whether the wiring and device are earthing • Connect with factory
E-06	Underload fault	• Frequency drive 's output current is lower than low current detection threshold.	• Check whether F407~F410 are correctly set.
E-07	Over torque fault	• The motor estimates that the torque has reached the level set by F412.	• Adjust the settings of F411~F414. • Confirm the load status.
E-11	Undervoltage fault	• Abnormal fluctuation of input voltage; Power network capacity higher than 200 kVA; There is switchable capacitor to improve power factor on the power network; Machine that SCRs is connected to the power network. • Frequency drive starts the load already in rotation. • There is possible phase failure. • The deceleration time is too short.	• Install input reactor or use braking resistance. • Adopt forward/reverse speed tracking and restart function (STR function) (F500 = 1) • Set F418 = 2. • Determine the cause of output phase failure (such as poor connection, open circuit of output or open circuit of motor winding) and correct it. • Increase the deceleration time (F011 or F519) • Enable overvoltage fault protection (F415).

Code of fault	Type of fault	Possible cause	Measures (troubleshooting)
E-12	DC bus undervoltage fault	● Put voltage is too low.	● Check input voltage. ● Set F417 to select alarm or tripping. ● Adopt forward/reverse speed tracking and restart function (STR function) (F500 = 1) ● Set F418= 2.
E-21	Frequency drive overload	● Acceleration time is too short. ● DC braking current level is too high. ● V/f parameter is wrongly set. ● When the frequency drive starts, the load is still in rotation. ● The load is too large.	● Increase acceleration parameter ● F010 or F518). ● Decrease the setting of f507 or ● F508. ● Correctly set V/f parameter. ● Set parameter F418 = 2. ● Adopt one frequency drive with higher rated power.
E-	Motor overload	● V/f parameter is wrongly set. ● The motor is blocked. ● The motor continues to run at low speed. ● The load applied to the motor is too large.	● Correctly set V/f parameter. ● Check the load.
E-23	Braking resistor overload	Improper specification selection for braking resistor	Select competent braking resistor. Prohibit braking resistor overload protection F527=2
E-24	Frequency drive overheat fault	● Frequency drive 's cooling fan does not work. ● Environment temperature is too high. ● Certain ventilation opening is blocked. ● There is heat source near the frequency drive .	● Reset the frequency drive 's fault after cooling and restart the frequency drive . ● Expand the free space around the frequency drive ; Remove all heat sources near the frequency drive to lower the environment temperature.
E-25	Motor PTC overheating fault	External PTC embedded in the motor winding indicates existence of motor overheating.	● Correct motor overheating. ● Check whether PTC is working properly. ● Check logic input functions 27 and 28.
E-31	EEPROM fault	● Data writing and read errors occur. ● The frequency drive has power failure during parameter reset.	● Power on the frequency drive to eliminate the fault. If the fault can not be eliminated, contact us or our distributor for maintenance or repair of the frequency drive .
E-32	Control board fault	● Control board cannot work	● Connect manufacturer to maintain
E-33	Communicati on fault	● Network communication error.	● Check network control devices and cables. ● Check the setting of communication overtime parameter F803. ● Check remote keyboard panel cable.

Code of fault	Type of fault	Possible cause	Measures (troubleshooting)
E-31	EEPROM fault	● Data writing and read errors occur. ● The frequency drive has power failure during parameter reset.	● Power on the frequency drive to eliminate the fault. If the fault can not be eliminated, contact us or our distributor for maintenance or repair of the frequency drive .
E-32	Control board fault	● Control board cannot work	● Connect manufacturer to maintain
E-33	Communication fault	● Network communication error.	● Check network control devices and cables. ● Check the setting of communication overtime parameter F803. ● Check remote keyboard panel cable.
E-34	Current sensor fault	● The current sensor is in abnormal status.	● Replace the frequency drive .
E-35	Network fault	● Network error	● Check network control devices and cables.
E-36	Frequency drive type error	● Frequency drive hardware fault	● F120=7 ● If error is still, connect manufacturer to maintain
E-38	AI1 signal Loss	● AI1 analog signal level is lower than the level set by the parameter F422.	● Check signal on AI1 to eliminate the cause of signal loss. ● Confirm whether F422 is correctly set.
E-39	Frequency drive inside communication error	● Communication error between keyboard and control board CPU	● Connect manufacturer to maintain
E-41	Input phase failure	● The input side of the main circuit is phase failure. ● The inside component of the frequency drive is in abnormal state.	● Determine the cause of input phase failure and correct it. ● Set F405 = 0.
E-42	Output phase failure	● The output side of the main circuit is phase failure.	● Determine the cause of input phase failure (such as poor connection, open circuit of output or open circuit of motor winding) and correct it. ● Set F406 = 0.
E-43	Emergency stop fault	● Use the keyboard panel to perform stop operation when the motor works under remote mode.	● Perform fault reset.
E-45	Torque boost is too large	● Setting of torque boost parameter ● F203 is too high. ● Motor impedance is too low.	● Repeat self-tuning of the frequency drive and downward tune parameter F203.

Code of fault	Type of fault	Possible cause	Measures (troubleshooting)
E-46	Self-setting error	● Confirm whether motor rated parameter settings are correct. ● The motor capacity is far smaller than that of the frequency drive . ● Cable of the motor is too thin. ● Motor is still in rotation when the self-setting starts.	● Correctly set motor rated parameters. ● Use frequency drive with larger capacity. ● Apply thicker cable of the motor. ● Confirm the motor has stopped before the self-setting begins.
E-98	Pull-out keypad communication fault	● Communication fault between pull- out keypad and internal CPU	● Please contact us
E-99	Big power display communication fault	● Communication fault for frequency drive above 18.5kW(including) display keypad and internal CPU	● Please contact us

7.2. Description of alarm and indication code

Table 7.2 Alarm display and measures

Code	Description	Cause	Measures
A-00	Fault reset is acceptable.	Under fault code display state, press STOP key and A- 00 is displayed.	Press the STOP key again and the fault is eliminated.
A-01	Under-voltage indication	Insufficient input voltage	Check the 3-phase input power supply. If the power supply is normal, the frequency drive has to be repaired.
0.0 (flash)	"Running ready" is invalid	Under remote control mode the corresponding terminal to the logic input function 1 is not closed.	Configure one logic input function as 1, and close this terminal.
A-	Abnormal setting of frequency point	Frequency points at point 1 and point 2 are set too closely.	Do not set f325 and f327 too closely. Do not set f329 and f331 too closely.
A-06	Free stop action during transient power failure.	f418 is set to 2 and transient power failure occurs.	Input running signal to the frequency drive again or reset the frequency drive .
A- 7	In DC braking	DC braking function is activated.	If the code disappears in several seconds, the frequency drive comes back to normal.
A- 8	In running retrial	The frequency drive is in the process of restart. Forward/reverse speed tracking and restart function (STR function) is activated.	The alarm code is momentarily displayed then disappears, and the frequency drive restarts.
A-10	In low speed sleep	See parameter f501.	Disabled This function or raise the frequency instruction to f006+f906.

Code	Description	Cause	Measures
A-11	Key fault on the keyboard	Certain key on the keyboard panel is continuously pressed more than 20 s or the panel is damaged.	If all keys are released but the alarm does not disappear, the frequency drive has to be repaired.
A-12	In the process of parameter initialization	See parameter f120.	If the alarm code is momentarily displayed and then disappears, the frequency drive comes back to normal.
A-13	Loss of analog signal	Analog input terminal detection level is lower than the setting level of f422.	Check analog input terminal
E1	Exceeding displayed digit number by 1 digit	Displayed digit number exceeds 4 digits.	Try to reduce the set point of f422.
Eun1	In the process of self-setting	Frequency drive is performing self-setting.	If the alarm code is momentarily displayed and then disappears, the frequency drive comes back to normal.

Table 7.3 Display of early warning code

Code	Type	Description
---C	Over-current early warning	Frequency drive is in current amplitude limiting state. See parameters f107 and f111.
--U-	Over-voltage early warning	frequency drive approaches over-voltage fault. See parameters f415 and f416.
-I--	Overload early warning	This code is displayed when the motor or frequency drive overload counter exceeds 50%.
H---	Overheat early warning	Frequency drive approaches overheat fault.

Note: Early warning types can occur simultaneously. E.g., when overheat early warning and over-current early warning happen in the same time, the corresponding code is H--C.

7.3. Restart of the frequency drive after fault occurs

After failure occurs in the frequency drive , it can be restarted only when the cause of the failure has been eliminated. Please follow the undermentioned operations to realize fault reset of the frequency drive .

When the command source of the frequency drive is keyboard panel (under local control mode, or under remote mode and f002 = 1), press STOP key on the keyboard panel after the fault is eliminated. The keyboard will display A– 00. Press the STOP key again, and the frequency drive realizes fault reset. At this moment it is allowable to re-supply power to the motor.

When the frequency drive is under remote control mode and f002 = 0, set the input function configuration of any logic input terminal to 10. Then the frequency drive can use this terminal to perform fault reset.

When the frequency drive is under remote control mode and f002 = 2, fault reset is realized through remote communication devices. See Appendix A: Serial communication.

Switch off the frequency drive and power it on again.

Note: When the fault is motor or frequency overload (E–21 or E– 22), frequency drive reset function can not be performed if computed cooling time is not up. The computed cooling time is specified as: E–21, 30 seconds after the fault occurs; E– 22, 120 seconds after the fault occurs.

8. APPENDIX A: SERIAL COMMUNICATION

Serial communication is the information exchange channel of the frequency drive with upper computer. Through serial communication, users can use personal computer or industrial control equipment (such as PLC etc.) as host to set frequency drive (slave)'s running frequency or command, modify or read data, read working state and fault information etc. and realize remote or centralized control of the frequency drive .

V75 series frequency drive adopt RS-485 bus and Modbus protocol for serial communication.

A1. RS-485 bus

The hardware circuit of serial communication for V75 series frequency drive follows RS-485 standard and a RJ45 interface is provided. Here RS-485 two-wire wiring method is adopted. The array sequence of the corresponding pins of RJ45 interface is shown as below:

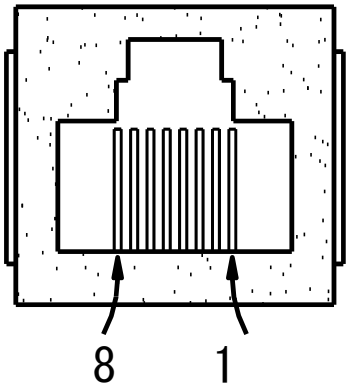


Figure A.1 RJ45 front view Table A.1 Pin output signal allocation

Pin	Signal description
1	Reserved
2	Common port (signal ground & power ground)
3	Reserved
4	A (RS-485)
5	B (RS-485)
6	Reserved
7	+24 V
8	Common port (signal ground & power ground)

RS-485 two-wire wiring method is half-duplex serial communication. At the same moment the host and slave can not simultaneously transmit or receive data. Only one transmits data and another receives them.

RS-485 two-wire wiring method supports bus-type topological structure. At most 32 nodes can be connected to the same bus. Normally master-slave communication method is adopted in the RS-485 communication network, namely, one master commands as many as 31 slaves.

Under the circumstance of multi-computer communication or long-distance communication, it is suggested to connect the signal ground of the master station with the common port of the frequency drive to raise the ant-interference ability of communication.

A2. Modbus protocol

Modbus is a master-slave communication protocol. The master governs the whole communication process. Only when the master sends command to the slave, the slave executes the actions or/and send feedback information to the master. Otherwise the slave performs no operation and the slave can not communicate with each other directly.

There are two kinds of dialogues between the master and slaves:

(1) Point-to-point: Master sends command individually to a certain slave which executes action or/and sends feedback information.

When the master command is correct, the slave executes corresponding actions and transmits feedback of result information to the master.

When the master command is false, the slave transmits feedback of error information to the master but executes no actions.

(2) Broadcast mode: The master sends command to all slaves which execute action but send no feedback information.

Modbus protocol has two kinds of transmission patterns: Modbus RTU and Modbus ASCII. V75 series frequency drive supports Modbus RTU.

A2.1 Description of Modbus-RTU message format

When the Modbus-RTU mode is used for communication, the communication information (message) is represented directly with hexadecimal code (1-9, A-F). Two hexadecimal codes form one byte. The message format is shown as below:

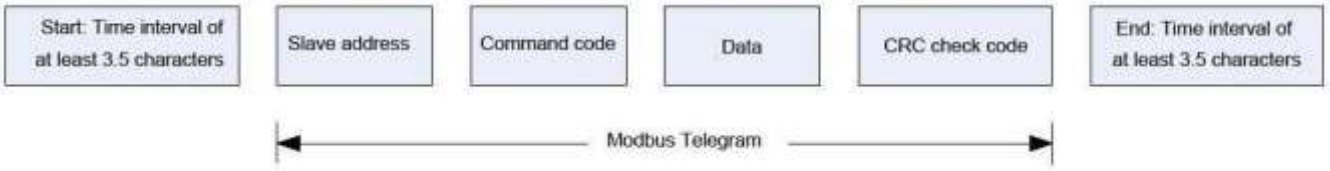


Figure A.2 Modbus Message Format

As shown in Figure A.2, during the communication process, the master and slave determine the start and end of Modbus message according to time interval of at least 3.5 characters. The message includes the complete data information to be transmitted: in the sequence of slave address, command code, data and CRC code. Its length varies with the change of the command code.

The message of Modbus-RTU is classified into three types and two formats:

1) Request (Interrogation) message: Command request message transmitted by master to slave;

2) Normal response message: The slave's feedback message when the master's command is correct.

3) Error response message: The slave's feedback message when the master's command is false / invalid.

4) and 2) have the same format, while 3) adopts other format. **1**.

Format of request message and normal response message. Table

A.2 Format of request message and normal response message

Number	Name	Function
1	Slave address	• Configured from 0 to 247 • All slaves execute command but provide no feedback information; If slave address is set to 1~247, the dialog is point-to-point mode. All address-matching slaves execute command and provide feedback information. • Under the point-to-point mode, when the matching slave responses, it sends back the slave address of itself.
2	Command code	• V75 series frequency drive supports part of command codes of Modbus protocol. • All slaves execute command code and the matching slave responses code include: 03H:Read one word (2 bytes) 06H:Write one word (2 bytes) • During error response, the feedback command code of the slave = the request command code of the master + 80H.
3	Data	This part is the main content of communication and the core of data exchange. Its content and length vary with the variation of the command codes. See the following concrete descriptions of every command code.

4	CRC code	Cyclical redundancy check (CRC) code is used for error detection of received data done by the receiving equipment and for judging whether the received data are correct. Please refer to “A2.3 Cyclical redundancy check (CRC)” for generation of CRC code. Note: CRC code first sends low bytes then high bytes. Except this, all messages of Modbus-RTU adopt the transmission sequence of “high bytes first - then low bytes”.

A2.2 Detailed message description of different commands

A2.2.1 Read N words (2*N bytes) -- command code 03H

1.Master request message

Table A.3 Command code 03H host query message format

Slave address	Command code	Communication address		Read word number		CRC code	
1 byte	1 byte	2 bytes		2 bytes		2 bytes	
		High byte	Low byte	High byte	Low byte	High byte	Low byte
	03H			00H	01H		

1) Slave address and CRC code: See “Table A.2”.

2) Command code: 03H, request to read N words (2*N bytes) of the slave machine. Notice that N is at most 5.

3) Communication address: The address of read data. This is not the real physical address for data storage, but a number corresponding to the data. Every control, state or monitoring parameter of V75 series frequency drive corresponds to a communication address. See “A2.5 Communication parameter”.

4) Read word number: The length of the read data with the word (2 bytes) as the count unit. When current request asks for reading one word, it is set to 0001H.

Message of slave normal response

Table A.4 Command code 03H of slave machine normal reply message

Slave address	Command code	Read bytes number	Read bytes number 2		…	Read bytes number N		CRC code	
1 byte	1 byte	1 byte	2 bytes		…	2 bytes		2 bytes	
			High byte	Low byte	…	High byte	Low byte	High byte	Low byte
	03H				…				

1) Slave address and CRC code: See “A2.2”.

2) Command code: 03H. The same as the master request command code.

3) Read word number: The length of the read data with byte as the count unit. When current master requests to read one word, set read byte number transmitted from the slave to 02H.

Note: The count unit of the length of the read data is different from that of request message.

4) Read data: Data corresponding to the communication address in the request message. Note: Read data firstly sends high byte then low byte in an opposite direction to CRC code.

2. Slave error response message

Table A.5 Slave error response message of Command code 03H

Slave address	Command code	Error code	CRC code	
1 byte	1 byte	1 byte	2 bytes Low byte	High byte
	83H			

1) Slave address and CRC code: See “A2.2”.

2) Command code: 83H. It is = 03H + 80H.

3) Error code. For detail see “A2.4 Error code”.

4) Example: Read upper limit frequency.

Master request message: 01 03 00 08 00 01 05 C8

Normal response message: 01 03 02 13 88 B5 12 (Suppose that current upper limit frequency is 50 Hz)

Error response message: 01 83 03 01 31 (Suppose that read word number is altered from 0001 to 0002)

A2.2.2 Write one word (2 bytes) — Command code 06H

1.Master request message

Table A.6 Format of master request message

Slave address	Command code	Communication address		Write data		CRC code	
1 byte	1 byte	2 bytes		2 bytes		2 bytes	
		High byte	Low byte	High byte	Low byte	Low byte	High byte
	06H						

1) Slave address and CRC code: See “Table A.2”.

2) Command code: 06H. Request to write 1 word (2 bytes) of the slave.

3) Communication address: The address of read data. This is not the real physical address for data storage, but a number corresponding to the data. Every control, state or monitoring parameter of V75 series frequency drive corresponds to a communication address. See “A2.5 Communication parameter”.

4) Write data: Request data written by the slave.

2.Slave normal response message

Table A.7 Slave normal response message

Slave address	Command code	Communication address		Write data		CRC code	
1 byte	1 byte	2 bytes		2 bytes		2 bytes	
		High byte	Low byte	High byte	Low byte	Low byte	High byte
	06H						

Slave’s normal response message is the same as the master’s request message.

3.Slave error response message

Table A.8 Format of slave error response message

Slave address	Command code	Error code	CRC code	
1 byte	1 byte	1 byte	2 bytes	
			Low byte	High byte
	86H			

1) Slave address and CRC code: See “Table A2.2”.

2) Command code: 86H. It is = 06H + 80H.

3) Error code. For detail see “A2.4 Error code”.

4) Example: To write upper limit frequency

Master request message: 01 06 00 08 13 24 05 23 (Suppose that the set upper limit frequency is 49 Hz)

Normal response message: 01 06 00 08 13 24 05 23

Error response message: 01 86 04 43 A3 (Suppose current writing operation cannot be performed)

A2.2.3 Write multiple words (2*N bytes) -- command code 10H

1. Host query message

Table A.9 Format of host query message in command code 10H

Slave address	Command code	Communication address		Write words		Write data	Write 1		…	Write N		CRC code	
1 byte	1 byte	2 bytes		2 bytes		1 byte	2 bytes		…	2 bytes		2 bytes	
		Low byte	High byte	Low byte	High byte		Low byte	High byte	…	Low byte	High byte	Low byte	High byte
	10H								…				

1) Slave address and CRC check code: see Table A.2.

2) Command code: 10H, N words (2*N bytes) of the request write slave machine. Notice that N is at most 5.

3) Communication first address: the first address to write data. The address is not the actual physical address of the data, but a number corresponding to the data. Each control, state and monitoring parameter of the converter corresponds to a communication address, see "A2.5 Communication Parameters" for details.

4) Write words: the number of slave words written.

5) Number of bytes written: Number of bytes written by slave = number of words written *2.

6) Write data 1~ write data N: The data requested to be written from the machine.

2. The slave answers the message normally

Table A.10 Command code 10H for slave normal reply message format

Slave address	Command code	Communication address		Write data		CRC code	
1 byte	1 byte	2 bytes		2 bytes		2 bytes	
		Low byte	High byte	Low byte	High byte	Low byte	High byte
	10H						

1) Slave address and CRC check code: see Table A.2.

2) Command code: 10H, which is consistent with the request command code of the host.

3) Communication first address: The same as the communication first address of the host.

4) Write words: the same as the number of words written by the host. 3.Slave machine error response message

Table A.11 Format of slave error response message in command code 10H

Slave address	Command code	Error code	CRC code	
1 byte	1 byte	1 byte	2 bytes	
			Low byte	High byte
	90H			

1) Slave address and CRC check code: see Table A.2.

2) Command code: 90H, namely the sum of 10H and 80H.

3) Error code: see "A2.4 Error code" for details.

1. Example: Write five consecutive parameters starting with the F3 00 parameter Host query message: 01 10 03 00 05 0A 00 01 00 03 00 04 00 01 00 00 0B 9D AE

(Suppose F300=1; F301 = 3; F302 = 4; F303 = 1; F304 =11 five parameters) Normal reply message: 01 10 03 00 00 05 00 4E

Error response message: 01 90 03 0C 01 (assuming incorrect data setting)

A2.3 Cyclic redundancy check (CRC)

Modbus-RTU's communication message uses cyclic redundancy check (CRC) for transmission error check.

During each communication, the sender computes CRC code of transmitted data according to CRC rules, then

sends the data by attaching the CRC code to them; After receiving the data, the receiver re-computes the CRC code according to the same rules. The computed content does not include the received CRC code. The receiver compares the re-calculated CRC code with the received code. If they are not the same, the transmitted data are determined to be false.

V75 series frequency drive adopts CRC16 rule for message check of serial communication. Every CRC code consists of 2 bytes, including 16-bit binary value. The calculation is as follows:

1) Initialize CRC register (16 bit) to 0xFFFF;
2) Perform XOR to the first byte (slave address) and the low 8 bits of the register, and then put the computed result back to CRC register;
3) Make a right shift by 1 bit to the content of CRC register and fill in the highest bit with 0;
4) Check the shift-out bit after right shift;

- If the shift-out bit is 0, repeat 3), namely, make another right shift;
- If the shift-out bit is 1, make XOR to CRC register and 0xA001, and put the computed result back to the CRC register;

5) Repeat steps 3) and 4) until 8 right shifts are made. Implement the same procedure to all the 8-bit data; Repeat steps 2) ~ 5) to implement the processing of the next byte in the message;
6) After all the bytes in the message are computed according to the above procedures, the content in the CRC register is the CRC code.

After the CRC code is acquired through the above-mentioned method, attach it to the transmitted data and send them. It is necessary to exchange the high and low bytes of the CRC code, namely, to send the low byte firstly and then the high byte.

There are two methods to compute CRC code with software: table look-up and on-line computation. Computation speed of the table look-up is fast but its table data occupy considerable space; On-line computation method requires no table data. It saves space but needs much time. Suitable computation method is selected according to concrete circumstance during application.

A2.4 Error code

When the slave is not able to implement master's request, the slave gives feedback of corresponding error code to indicate cause of the current error. Refer to the following table for the concrete meaning of error code.

Table A.12 Description of error code

Error code	Description
01	Command code error
	Command code other than 03H 06 and 10H is set in the request message
02	Communication address error
	Visited communication address does not exist. The register corresponding to the communication address does not permit performance of the action demanded by the current command code.
03	Data setting error
	Written data exceeds the allowable range of the register. Improper setting of certain parameter in the request message.
04	Unable to continue implementing the master's request.
	Error occurs during the process of writing data. Currently the register corresponding to the communication address does not permit performance of the action demanded by the command code.

A2.5 Communication parameter

1) Control parameter

Control parameters are edited through serial communication in order to realize frequency drive 's function setting, running frequency setting, start/stop control and logic/analog output setting.

2) Basic parameters

Basic parameters consist of 10 groups: F0 – f9. They are used to control the function setting of the frequency drive . Their detailed description, communication addresses and value ranges are shown in "5. Detailed

description of parameters".

Note: The communication address of the basic parameter corresponds to its display code. However, it is required to change F at the highest bit to 0;

Example: The display code of parameter "Running command selection" is *f001*, so the corresponding communication address is 0001;

Another example: The display code of parameter "Default keyboard panel display value" is *F702*, so the corresponding communication address is *F702*.

3) Communication control word (Communication address: *fA05*)

4) Communication running frequency setting (Communication address: *fA08*)

Table A.13 Detailed description of communication control word

Bit	Description of function	0	1	Default value
0	JOG	NO-JOG	Jog frequency	0
1	Forward/reverse rotation	Forward rotation	Reverse rotation	0
2	Running/stop	Stop	Running	0
3	Free stop	No action	Free stop	0
4	Emergency stop	No action	Emergency stop	0
5	Fault reset	No action	Reset	0
6	Given frequency by communication	Disable	Enable	0
7	Given code by communication	Disable	Enable	0
8	Multi-speed 1	OFF	ON	0
9	Multi-speed 2	OFF	ON	0
10	Multi-speed 3	OFF	ON	0
11	Multi-speed 4	OFF	ON	0
12	Motor parameter switch	1nd Motor Parameter	2nd Motor Parameter	0
13	PID control Disabling	Enabling PID control	Disabling PID control	0
14	Acceleration/ deceleration curve switch	Acceleration/ deceleration curve 1	Acceleration/ deceleration curve 2	0
15	DC braking	No DC braking	DC braking start	0

Table A.14 Communication running frequency setting

Bit	Description of function	Default
0-15	Running frequency data of communication setting. Hexadecimalsetting: 50Hz (50Hz)x100 = 5000 1388Hz It is if setting: 50Hz, write 1388H in the FA08 address	0.0

5) Communication analog output setting (Communication address: FA16)

Table A.15 Communication analog output setting

Bit	Description of function	Lower limit	Upper limit	Default
0-15	Analog output data of communication setting (in correspondence with analog output function 10)	0 （0000H）	1023 （03FFH）	0

2. Monitoring parameter

Monitoring parameters can be read through serial communication to see the running state of the converter. The following table is the description of monitoring parameters.

Table A.16 Monitoring parameters 1

No.	Communication address	Description of function	Unit	Note
1	FD03	Real-time running state	-	See table A.18 for details
2	FD12	Real-time running frequency	0.01 Hz	
3	FE18	Actual output frequency	0.01 Hz	
4	FE09	DC bus input voltage	0.01 %	
5	FE10	Output voltage	0.01 %	
6	FE08	Output current	0.01 %	
7	FE20	Output torque	0.01 %	
8	FE29	Output power	0.01 kW	
9	FE50	Motor speed (estimated)	1 Pm	
10	FE11	Logic input	-	See Table A.19 for details
11	FE12	Logic output	-	See Table A.20 for details
12	FE30	Logic input AI1 (10-bit accuracy)	-	Range (0-1023)
13	FE31	Logic input AI2 (10-bit accuracy)	-	Range (0-1023)
14	FC39	Fault monitoring	-	See A.21 for details
15	FE41	Frequency converter rated current		

Table A.17 Monitoring parameter specification 2

No.	Communication address	Description of function	Unit	Note
1	E000	Real-time running state	-	See table A.18 for details
2	E001	Real-time running frequency	0.01Hz	
3	E002	output current	0.01A	
4	E003	Fault monitoring	-	See Table A.21 for details
5	E004	PID given		
6	E005	PID feedback		
7	E006	output voltage	V	
8	E007	Motor speed (estimated)	1Pm	
9	E008	Output torque	0.01%	
10	E009	DC bus input voltage	V	
11	E010	Input power	0.01kW	
12	E011	Output power	0.01kW	

No.	Communication address	Description of function	Unit	Note
13	E012	Input power accumulates	W.h	
14	E013	Output power accumulation	W.h	
15	E014	Cumulative running time	hr.	
16	E015	Logic input	-	See Table A.19 for details
17	E016	Logic output	-	See Table A.20 for details
18	E017	Analog input AI1 (10-bit precision)	-	Range (0-1023)
19	E018	Analog input AI2 (10-bit precision)	-	Range (0-1023)

Table A.18 Real-time running state monitoring

Communication address	Description of function		
FD03	Real-time running state monitoring		
Bit	Description	0	1
0	Reserved	-	-
1	Fault	No fault	Tripping
2-8	Reserved	-	-
9	Forward/reverse rotation	Forward rotation	Reverse rotation
10	Running/stop	Stop	Running
11-15	Reserved	-	-

Table A.19 Logic input state monitoring

Communication address	Description of function		
FE11	Logic input state monitoring		
Bit	Description	0	1
0	Terminal L1	OFF	ON
1	Terminal L2	OFF	ON
2	Terminal L3	OFF	ON
3	Terminal L4	OFF	ON
4	Terminal L5	OFF	ON
5	Terminal L6	OFF	ON
6	Terminal L7 or As AI1 during logic input	OFF	ON
7	Terminal L8 or As AI1 during logic input	OFF	ON
8-15	Reserved	-	-

Table A.20 Logic Output state monitoring

Communication address	Description of function		
FE12	Logic output state monitoring		
Bit	Description	0	1
0	Terminal LO1-CLO1	OFF	ON
1	Relay T2	OFF	ON
2	Relay T1	OFF	ON
3-15	Reserve	-	-

Table A.21 Fault monitoring

Communication address	Description of function	
FC39	Fault monitoring	
Value	Corresponding fault	Panel display
0000H	No fault	nErr
0001H	Acceleration overcurrent	E-01
0002H	Deceleration overcurrent	E-01
0003H	Constant speed overcurrent	E-01
0008H	Input phase failure	E-41
0009H	Output phase failure	E-42
000AH	Acceleration overvoltage	E-11
000BH	Deceleration overvoltage	E-11
000CH	Constant speed overvoltage	E-11
000DH	Frequency drive overload	E-21
000EH	Motor overload	E-22
0010H	Overheat tripping	E-24
0011H	Emergency tripping	E-43
0012H	EEPROM error 1 (write error)	E-31
0013H	EEPROM error 2 (Read error)	E-31
0014H	EEPROM error 3 (Internal error)	E-31
0018H	External communication error	E-33
001AH	Current detection fault	E-34
001EH	Undervoltage	E-12

9. APPENDIX B: CONCISE PARAMETER LIST

[-F0-]					
NO.	Parameter Name	Setting Range	Default	WRT	User setting
F000	Operation frequency of keypad	F009~F008	0.0	○	
F001	V/F control mode selection	0: V/F constant 1 ：Variable torque 2：Sensor-less vector control 3：Energy saving	0	•	
F002	Command mode selection 1	0：Terminal board 1：Keypad 2：Serial communication	1	•	
F003	Frequency setting mode selection 1	0：Built-in potentiometer 1：AI1 input 2：AI2 input 3：Keypad(Given frequency) 4：Serial communication (Given frequency) 5：UP/DOWN setting 6：AI1+AI2 7：PID setting of keypad (PID given) 8: Simple PLC running	3	•	
F004	Command mode selection 2	0：Terminal board 1：Keypad 2：Serial communication	0	○	
F005	Frequency setting mode selection 2	0：Built-in potentiometer 1：AI1 input 2：AI2 input 3：Keypad(Given frequency) 4：Serial communication (Given frequency) 5： UP/DOWN speed given6： AI1+AI2 7：PID setting of keypad (PID given) 8: Simple PLC running option	2	○	

NO.	Parameter Name	Setting Range	default	WRT	User setting
F006	Frequency /PID given source conversion	0: Switch between F003 and F005 1: Switch is disabled 2: Switch between F003 and F021 selected frequency /PID source 3: Switch between F005 and F021 selected frequency	0	○	
F007	Maximum frequency	30.0~400.0 Hz	50.0	●	
F008	Upper limit frequency	0.5 Hz ~F007	50.0	○	
F009	Lower limit frequency	0.0 Hz ~F008	0.0	○	
F010	Acceleration time 1	0.1~3200 s	varies by model	○	
F011	Deceleration time 1	0.1~3200 s	varies by model	○	
F012	PWM carrier frequency	1.5k~12.0 kHz	varies by model	○	
F013	Carrier frequency control mode selection	0：not reduced automatically 1：reduced automatically	1	●	
F014	Random PWM mode	0: Disable. 1: Enable.	0	○	
F015	Automatic acceleration/deceleration	0: Disabled (manual). 1: Automatic (at acceleration & deceleration) 2: Automatic (only at acceleration)	0	●	
F016	Factory reserved	-	-		
F017	Parameter setting miro function	0: Default value. 1: 2-wire control (Negative logic mode, ramp stop). 2: 3-wire control (Negative logic mode, ramp stop). 3: External input UP/DOWN setting (Negative logic mode, slowdown stop). 4 ~ 16: Factory reserved 17: PID sleep & Wake Control (F003 =7 F910 =0.1s F911 =75.0% F915 =5.0s F919 =38.0Hz) 18: PID basic control (F002 =1 F003=7 F367=1 F523=2 F900 =1 F917=100 F918 =20)	0	●	
F018	Factory reserved	-	-		
F020	Factory reserved	-	-		

NO.	Parameter Name	Setting Range	default	WRT	
f021	Primary and secondary frequencies /PID are given	0: Single channel given 1: f003 + f 005 2: f003-f005 3: MAX (f003, f005) 4: MIN (f003, f005)	0	○	
f022	f005 frequency given coefficient	0.0~ 100.0%	100.0 %		
f023	f005 frequency bias given	0.0Hz~400.0Hz	0.0Hz		
f024	Lower limit selection and f005 = 3/7 setting	0~ 5	0		
f099	Factory reserved	Same as f020			

[-f1-]					
NO.	Parameter Name	Setting Range	default	WRT	User setting
f100	Auto-tuning	0: Auto-tuning disabled 1: Application of individual settings of f203 2: Auto-tuning enabled	0	•	
f101	Base frequency 1	25.0~400.0 Hz	50.0	•	
f102	Base frequency voltage1	50~660 V	varies by model	•	
f103	Motor rated current	0.1~200.0 A	varies by model	•	
f104	Motor rated speed	100~15000 Pm	varies by model	•	
f105	Motor no-load current	10.0~100.0%	varies by model	•	
f106	Motor thermal protection current setting	varies by model	varies by model	○	
f107	stall prevention level 1	varies by model	varies by model	•	
f108	Base frequency 2	25.0~400.0 Hz	50.0	•	
f109	Base frequency voltage 2	50~660V	varies by model	•	
f110	Motor electronic-thermal protection level 2	varies by model	varies by model	○	
f111	Stall prevention level 2	varies by model	varies by model	○	
f112	factory reserved	-			
f113	factory reserved	-			
f114	factory reserved	-			
f115	factory reserved	-			

NO.	Parameter Name	Setting Range	default	WRT	User setting
F120	Default setting	0: - 1: Standard default setting (Initialization) 2: Save user-defined parameters 3: Call user-defined parameters 4: Trip record clear 5: Cumulative operation time clear 6: Cumulative fan operation time record clear 7: Initialization of type information 8: P-type rating. 9: G-type rating.	0	•	

[-F2-]

NO.	Parameter Name	Setting Range	default	WRT	User setting
F 01	Supply voltage correction	0: Supply voltage uncorrected, output voltage limited. 1: Supply voltage corrected, output voltage limited. 2: Supply voltage uncorrected, output voltage unlimited. 3: Supply voltage corrected, output voltage unlimited.	3	•	
F202	Voltage boost 1	0.0~30.0%	varies by model	○	
F203	Torque boost	0.0~30.0%	varies by model	○	
F 04	Slip frequency gain	0~150%	50	○	
F205	Exciting current coefficient	100~130	100	•	
F206	Voltage boost 2	0~30%	varies by model	○	
F207	Speed control response coefficient	1~150	40	•	
F208	Speed control stability coefficient	1~100	20	•	
F209	Stall prevention control coefficient 1	10~250	100	•	
F210	Stall prevention control coefficient 2	50~150	100	•	
F211	Maximum voltage adjustment coefficient	90~120%	104	•	
F212	Waveform switching adjustment coefficient	0.1~14kHz	14.0	•	
F 13	factory reserved				
F 14	factory reserved				

NO.	Parameter Name	Setting Range	default	WRT	User setting
f 15	factory reserved				
f 16	factory reserved				
f 17	multipoint profile V/F patter	0: factory reserved. 1: factory reserved. 2: Enable multipoint profile V/F patter.	0	•	
f 18	point 1 output frequency （F1）	0~f220	10.0	•	
f219	point 1 output frequency voltage（V1）	0~100%	20.0	•	
f220	point 2 output frequency （f2）	f 18~f220	20.0	•	
f221	point 2 output frequency voltage（V2）	0~100%	40.0	•	
f222	point 3 output frequency （f3）	f 20~f1 1	30.0	•	
f223	point 3 output frequency voltage（V3）	0~100%	60.0	•	

[-f3-]

NO.	Parameter Name	Setting Range	default	WRT	User setting
f300	AI1 terminal function selection	0: AI1 - analog input 1: AI1 - contact input (Sink mode) 2: AI1 - contact input (Source mode)	0	•	
f301	Input terminal function for LI1	0: No function is assigned 1: Standby terminal 2: Forward run command 3: Reverse run command 4: Jog run mode 5: Acceleration/deceleration 2 pattern selection 6: Preset-speed command 1 7: Preset-speed command 2 8: Preset-speed command 3 9: Preset-speed command 4 10: Reset command 11: Trip stop command from external input device 13: DC braking command 14: PID control disabling 15: Permission of parameter editing 16: Combination of standby and reset commands 17: Frequency source switching to AI1	2	•	
f302	Input terminal function for LI2		3	•	
f303	Input terminal function for LI3		0	•	
f304	Input terminal function for LI4		10	•	

NO.	Parameter Name	Setting Range	default	WRT	User setting
F304	Input terminal function for LI4	18: Combination of forward run and jog run 19: Combination of reverse run and jog run 20: Frequency setting source switching 21: No.2 Switching of V/F setting 22: No.2 motor switching 23: Frequency UP signal input from external contacts 24: Frequency DOWN signal input from external contacts 25: Frequency UP/DOWN cancellation signal input from external contacts 26: inversion of trip stop command from external device 27 Thermal trip stop signal input from external device 28: inversion of thermal trip stop signal input from external device 29: Forced switching from remote to local control 30: Operation holding (stop of 3-wire operation) 31: Forced switching of command mode and terminal board command 32: Display cancellation of the cumulative power amount (kWh) 33: Fire-speed control seef419 34: Coast stop (gate off) 35: Inversion of Reset 36: Forced switching of stall prevention level 2 37: PID control integral value clear PID control integral value clear 38: inversion of PID error signal 39: Forward running command + Acc&Dec curve 2 40: Reverse running command + Acc&Dec curve 2 41: Forward running command + Multi-speed section 1 42: Reverse running command + Multi-speed section 1 43: Forward running command + Multi-speed section 2 44: Reverse running command + Multi-speed section 2 45: Forward running command + Multi-speed section3 46: Reverse running command + Multi-speed section 3 47: Forward running command + Multi-speed section 4	10	•	

NO.	Parameter Name	Setting Range	default	WRT	User setting
F304	Input terminal function for LI4	48: Reverse running command + Multi-speed section 4 49: Multi-speed section 1 + Acc&Dec curve 2 50: Multi-speed section 2 + Acc&Dec curve 2 51: Multi-speed section 3 + Acc&Dec curve 2 52: Multi-speed section 4 + Acc&Dec curve 2 53: Forward running command +Multi-speed section 1+ Acc&Dec curve 2 54: Reverse running command +Multi-speed section 1+ Acc&Dec curve 2 55: Forward running command +Multi-speed section 2+ Acc&Dec curve 2 56: Reverse running command +Multi-speed section 2+ Acc&Dec curve 2 57: Forward running command +Multi-speed section 3+ Acc&Dec curve 2 58: Reverse running command +Multi-speed section 3+ Acc&Dec curve 2 59: Forward running comman +Multi-speed section 4+ Acc&Dec curve 2 60: Reverse running command +Multi-speed section 4+ Acc&Dec curve 2 61: UP/DOWN speed clean up+ fault reset 62: Running permission+ Forward running command (only 2-wire control) 63: Running permission+ reverse running command (only 2-wire control) 64: Acc&dec curve 3 65: Acce/Dece curve 3 + Forward running command 66: Acce/Dece curve 3 + Reverse running command 67: Command source switch 68: Command source + frequency source switch 69: Three-wire control stop reverse 70: Reset when simple PLC stops 71: Simple PLC hold 72: Simple PLC pause 73/74: PID control + frequency given source switch 75: (UP/DOWN) stop speed clearance	10	•	

NO.	Parameter Name	Setting Range	Default	WRT	User setting
f305	AI1 voltage-current input selection	0:0～5V voltage signal input. 1:0～10V voltage signal input. 2: 0-20mA(4-20mA) current signal input.	0	•	
f306	sink/source mode selection	0: Source (Positive) logic terminal mode. 1: Sink (Negative) logic terminal mode	1	•	
f307	AO voltage-current output selection	0: Current signal output. 1: Voltage signal output.	1	•	
f308	Input terminal function of AI1	f301~f304	0	•	
f309	Always-active terminal selection 1	f301~f304	1	•	
f310	Always-active terminal selection 2	f301~f304	0	•	
f311	Output terminal function A of LO1-CLO1	f315	4	•	
f312	Output terminal function B of LO1-CLO1	f315	255	•	
f313	AI2 terminal function selection	0: AI2 - analog input 1: AI2 - contact input (Sink) 2: AI2 - contact input (Source)	0	•	
f314	Input terminal function of AI2	f301~f304	0	•	
f315	Output terminal function A of T1 (T1A-T1B-T1C)	0： Output frequency higher than lower limit frequency 2：Output frequency equals to upper limit frequency 4：Output frequency is higher or equal to f337 6： (set frequency -f339)<output frequency<(set frequency+f339) 8：(f338-f339)＜output frequency＜(f338+f339) 10：Output frequency higher or equal to f338+f339 12：f003 or f005 source supply given speed=AI1 signal 14：f003 or f005 source supply given speed=AI2 signal 16：AI1's value higher or equal to f340 +f341 18：AI2's value is higher or equal to f342+f343 20：AI2 is the speed given source 22：Frequency drive forward motor power supply (acceleration, deceleration, constant speed or DC braking) 24：Ready for running of the frequency drive (running permission and running command available)	40	•	

NO.	Parameter Name	Setting Range	Default	WRT	User setting
f315	Output terminal function A of T1 (T1A-T1B-T1C)	26：Motor reverse running 28：Under local mode for frequency drive 30：Fault happened in the frequency drive 32：Evaluated motor torque is at f412 level time is still less than f414 set value. 34：Motor current is less than f408 and its lasting time is over f410 setting. 36：Fault occurred and could not reset. 38：Fault occurred but it could reset. 40：Fault occurs in the frequency drive 42：Alarm occurs 44：Motor heating status has reached 50% of motor overload fault level. 46：DC braking resistor status has reached 50% DC braking resistor overload fault level. 48: Evaluated motor torque reaches f412*70% 50: Run time≥f428 set value 52：The equipment sends maintenance alarm warning. (Fan, PCB or capacitor needs replacement.) 54：PTC heating sensor needle has detected motor temperature reaching 60% of trip level. 56：Undervoltage alarm is valid. 58：Brake pull 60：In the process of motor acceleration process 62：In the process of motor deceleration 64：In the process of motor deceleration or acceleration 66：Heat sink temperature has reached alarm value 68：One PLC recycle completes 70：One PLC speed section completes 72: The drive is ready to receive the running signal 74~78: unused 80: LI1 input is valid 82: LI2 input is valid 84: PID feedback pressure equal to or higher than f627 + f628 86: PID feedback pressure equal to or higher than f918 + f628 88~253: Unused 254：Relay constant output OFF 255：Relay constant output ON	40	•	

NO.	Parameter Name	Setting Range	Default	WRT	User setting
F316	Output terminal logic selection of LO1-CLO1	0：And logic 1：Or logic	0	•	
F317	LO1-CLO1 output delay	0.0~60.0 s	0.0	○	
F318	Relay 1 closing delay	0.0~60.0 s	0.0	○	
F319	External contact input - UP response time	0.0~10. 0 s	0.1	○	
F320	External contact input - UP frequency steps	0.0 Hz ~F007	0.1	○	
F321	External contact input - DOWN response time	0.0~10.0 s	0.1	○	
F322	External contact input - DOWN frequency steps	0.0 Hz ~F007	0.1	○	
F323	Initial up/down frequency	0.0 Hz ~F007	0.0	○	
F324	Change of the initial up/down frequency	0/2/4：disabled 1/3/5：enabled	1	○	
F325	AI1 input point 1 setting	0~100%	0	○	
F326	AI1 input point 1 frequency	0.0~400.0 Hz	0.0	○	
F327	AI1 input point 2 setting	0~100%	100	○	
F328	AI1 input point 2 frequency	0.0~400.0 Hz	50.0	○	
F329	AI2 input point 1 setting	0~100%	0	○	
F330	AI2 input point 1 frequency	0.0~400.0 Hz	0.0	○	
F331	AI2 input point 2 setting	0~100%	50	○	
F332	AI2 input point 2 frequency	0.0~400.0 Hz	50.0	○	
F333	AI1 input bias	0~255	varies by model	○	
F334	AI1 input gain	0~255	varies by model	○	
F335	AI2 input bias	0~255	varies by model	○	
F336	AI2 input gain	0~255	varies by model	○	
F337	Low-speed signal output frequency	0.0 Hz ~F007	0.0	○	
F338	Speed reach detection output frequency	0.0 Hz ~F007	0.0	○	
F339	Speed reach detection band	0.0 Hz ~F007	2.5	○	
F340	AI1 input reach detection level	0~100%	0	○	

NO.	Parameter Name	Setting Range	Default	WRT	User setting
f341	AI1 input reach detection band	0~20%	3	○	
f342	AI2 input reach detection level	0~100%	0	○	
f343	AI2 input reach detection band	0~20%	3	○	
f344	Frequency command agreement detection range	0.0 Hz ~f007	2.5	○	
f345	Logic output/pulse train output selection (LO1-CLO1)	0: Logic output 1: Pulse train output	0	•	
f346	Pulse train output function selection (LO - CLO)	0: Output frequency 1: Output current 2: Set frequency (Before PID) 3: Frequency setting value (After PID) 4: DC voltage 5: Output voltage command value 6:Input power 7:Output power 8:AI1 Input value 9:AI2 Input value 10:Torque 11:Torque current 12:Motor cumulative load factor 13:Drive cumulative load factor 14:PBR (braking reactor) cumulative load factor	0	○	
f347	Maximum numbers of pulse train	500~1600	800	○	
f348	AO1 selection	0:Output frequency 1:Output current 2:Set frequency (before PID) 3:Frequency setting value (after PID) 4:DC voltage 5:Output voltage command value 6:Input power 7:Output power 8:AI1 input 9:AI2 input 10:Torque 11:Torque current 12:Motor cumulative load factor 13:Drive cumulative load factor 14:brake resistor cumulative load factor 15:Serial communication data 16:185% proofread	0	○	

NO.	Parameter Name	Setting Range	Default	WRT	User setting
f349	AO1 gain adjustment	1~1280	varies by model	○	
f350	Inclination characteristic of analog output	0：Negative 1：Positive	1	○	
f351	Bias of analog output	0~100%	0	○	
f352	output frequency when AO1 = 0V	0 Hz ~f007	0.0	○	
f353	output frequency when AO1 = 10V	0 Hz ~f007	0.0	○	
f354	AO1 bias	0~255	128	○	
f355	Analog Output Voltage Bias Calibration (AO1)	f301~f304（5.5kW and above）	0	•	
f356	Input terminal function for LI6	f301~f304（5.5kW and above）	0	•	
f357	Input terminal function for LI7	f301~f304（5.5kW and above）	0	•	
f358	Input terminal function for LI8	f301~f304（5.5kW and above）	0	•	
f359	Output terminal function A of T2	See f315	0	•	
f360	Relay 2 auxiliary functions	See f315	255	•	
f361	Output terminal logic selection of T2	0：And Logic（5.5kW and above） 1：Or Logic	0	•	
f362	Relay 2 closing delay	0~60.0s（5.5kW and above）	0.0	•	
f363	Input terminal active mode	8 bits - hexadecimal display, each option: 0: Closure is valid 1: Disconnect effective			
f364	Logical input terminal filtering	0~200	0		
f365	Relay output 1 assistant function	f315	255		
f366	Relay output 1 function logic relation	0~1	0		
f367	Terminal run detection selection at power on	0：disable 1：enable	0		
f368	Analog output signal type(AO2)	0：Current signal output 1：Voltage signal output	1	•	
f369	Analog output function selection (AO2)	f348	0	○	

NO.	Parameter Name	Setting Range	Default	WRT	User setting
F370	Analog output current scaling (AO2)	1~1280	Based on machine	○	
F371	AO2 Analog output slope	0：Negative slope 1：Positive slope	1	○	
F372	AO2 Analog output bias	0~100%	0	○	
F373	Analog Output current Bias Calibration (AO2)	0~255	4	•	
F374	Percentage of AO monitored values	0~250%	0	•	
F375	Relay 1 disconnect delay	0~60.0s	0.0	•	
F376	Relay 2 disconnect delay	0.0~60.0s	0.0	•	

[-F4-]

NO.	Parameter Name	Setting Range	Default	WRT	User setting
F400	Retry selection	0: disabled 1~10 times.	0	•	
F401	Electronic-thermal protection characteristic selection	0：Trip enable，stall disable (standard motor) 1：Trip enable，stall enable (standard motor) 2：Trip disable，stall disable (standard motor)	0	○	
F401	Electronic-thermal protection characteristic selection	0：Trip enable，stall disable (standard motor) 1：Trip enable，stall enable (standard motor) 2：Trip disable，stall disable (standard motor) 3：Trip disable，stall enable (standard motor) 4：Trip ensable，stall disable (forced cooling motor) 5：Trip enable，stall disable (forced cooling motor) 6：Trip enable，stall enable (forced cooling motor) 7：Trip disable，stall disable (forced cooling motor) 8：Trip disable，stall enable (forced cooling motor)	0	○	
F402	Motor 150%-overload time limit	10-2400 s	300	○	
F403	Emergency stop selection	0: Coast stop 1: Slowdown stop 2: Emergency DC braking	0	•	
F404	emergency braking time	0.0-20.0 s	1.0	○	

NO.	Parameter Name	Setting Range	Default	WRT	User setting
F405	Input phase failure detection	0: Disabled, No tripping. 1: Enabled	0	•	
F406	Output phase failure detection mode selection	0: Disabled 1: At start-up (Only one time after power is turned on) 2: At start-up (each time) 3: During operation 4: At start-up + during operation 5: Detection of cutoff on output side	0	•	
F407	Small current trip/alarm selection	0：Alarm 1：trip	0	○	
F408	Small current detection current	0~100%	0.00	○	
F409	Small current detection current hysteresis	1~20%	10	○	
F410	Small current detection time	0-255 s	0	○	
F411	Over-torque trip/Overcurrent indication	0: Over-torque alarm (70%) 1: Over-torque fault 2:Over-torque alarm (100%) 3: Over-current alarm (70%) 4: Overcurrent fault 5: Overcurrent alarm (100%)	0	○	
F412	Over-torque detection level	0~250%	130	○	
F413	Over-torque detection level hysteresis	0~100%	10	○	
F414	Over-torque detection	0.0~10.0 s	0.5	○	
F415	Overvoltage limit operation	0: Enabled. speed. 1: Disabled 2: Enabled (Quick deceleration). 3: Enabled (Dynamic quick deceleration).	2	•	
F416	Overvoltage limit operation level	100-150%	130	•	
F417	Undervoltage trip/alarm selection	0: Alarm only (detection level below 60%) 1: Tripping (detection level below 60%). 2: Alarm only (detection level below 50%)	0	•	
F418	Instantaneous power failure coast stop selection	0: disabled 1: factory reserved 2: Coast stop.	0	•	
F419	Forced fire-speed control function	0: Disabled. 1: Enabled.	0	○	

NO.	Parameter Name	Setting Range	Default	WRT	User setting
F420	Detection of output short- circuit during start-up	0: Each time (standard pulse) 1: Only one time after power is turned on (standard pulse) 2: Each time (short-time pulse)F420 3: Only one time after power is turned on (short-time pulse)	0	•	
F421	Motor electric-thermal protection retention selection	0: disabled. 1: Enabled.	0	○	
F422	AI1 input loss	1~100%	0	○	
F423	Activation of the frequency drive during 4-20mA signal loss	0: No measures. 1: Coast stop. 2: switch to Fallback speed. 3: Speed maintaining. 4: Slowdown stop.	0	•	
F424	Fallback speed	0.0 Hz ~F007	0.0	○	
F425	PTC thermal selection	0: Disabled 1: Enabled (trip mode) 2: Enabled (alarm mode)	0	○	
F426	Resistor value for PTC detection	100-9999Ω	3000	○	
F428	Cumulative operation time alarm setting	0.0-999.9 h (0.1=10 hour)	610.0	○	
F429	Frequency drive trip retention selection	0：clearing 1：maintaining	0	○	
F430	Heat sink temperature reaches the alarm value	0 ~100℃	60	•	
F431	Analog output current scaling (AO1)	1~1280			
F432	Analog Output current Bias Calibration (AO1)	0~255			
F433	Analog output voltage scaling (AO2)	1~1280			
F434	Analog Output Voltage Bias Calibration (AO2)	0~255			

[-F5 -]					
NO.	Parameter Name	Setting Range	Default	WRT	User setting
F500	Auto-restart control selection	0: Disabled 1: At auto-restart after momentary stop 2: When turning standby (input terminal function =1) on or off 3: At auto-restart or when turning standby (input terminal function =1) on or off 4: At start-up 5~7： Factory reserved 8：DC braking and then start.	0	•	
F501	auto-stop time limit for lower-limit frequency operation	0.0: disable 0.1-600.0 s	0.1	○	
F502	Pumpless operation selection	0: disabled. 1: enabled.	1	○	
F503	Starting frequency setting	0.5~10.0 Hz	0.5	○	
F504	Operation starting frequency	0.0 Hz ~F007	0.0	○	
F505	Operation starting frequency hysteresis	0.0 Hz ~F007	0.0	○	
F506	DC braking starting frequency	0.0 Hz ~F007	0.0	○	
F507	DC braking current	varies by model	varies by model	○	
F508	DC braking time	0.0~20.0 s	1.0	○	
F510	Acceleration/deceleration 1 pattern	0：Linear 1： S pattern 1 2：S pattern 2 3 : Elevator acceleration / deceleration curve	0	○	
F511	Acceleration/deceleration 2 pattern	0：Linear 1： S pattern 1 2：S pattern 2	0	○	
F512	Acceleration/deceleration 3 pattern	0：Linear 1： S pattern 1 2：S pattern 2	0	○	
F 13	Acceleration/deceleration 1 and 2 switching frequency	0.0 Hz ~F008	0.0	○	
F 14	Acceleration/deceleration 2 and 3 switching frequency	0.0 Hz ~F008	0.0	○	
F 15	Selecting an acceleration/deceleration pattern	1：Acc/Dec 1 2：Acc/Dec 2 3：Acc/Dec 3	1	○	

NO.	Parameter Name	Setting Range	Default	WRT	User setting
F5.16	S-pattern lower-limit adjustment amount	0~50%	10	○	
F5.17	S-pattern upper-limit adjustment amount	0~50%	10	○	
F5.18	Acceleration time 2	0.0~3200 s	20.0	○	
F5.19	Deceleration time 2	0.0~3200 s	20.0	○	
F5.20	Acceleration time 3	0.0~3200 s	20.0	○	
F5.21	Deceleration time 3	0.0~3200 s	20.0	○	
F5.22	Reverse-run prohibition	0: Forward/reverse run permitted. 1: Reverse run prohibited. 2: Forward run prohibited.	0	●	
F5.23	stop type	0: Ramp shutdown 1: Free shutdown of keyboard 2: 2 line control free stop 3: 2 line control free stop	2	○	
F5.26	Positive and negative operation is preferred	0: Forward + reverse ->reverse 1: forward + reverse -& GT;downtime 2: Forward + reverse -& GT;Let me give you the direction 3: Forward + reverse -& GT;In the direction given by 4: Forward + reverse -& GT;positive	1	○	
F5.27	regenerative braking selection	0: Disabled 1: Enabled (with resistor overload protection) 2: Enabled (without resistor overload protection)	2		
F5.28	regenerative braking resistance	1.0~1000.0Ω	20.0	●	
F5.29	regenerative braking resistor capacity	0.01~30.0 kW	0.12	●	
F5.30	Positive and negative dead zone time	0.0~25.0s	10	○	
F5.31	Acceleration / deceleration S - curve upper limit 2	0~50 %	10	●	
F5.32	Acceleration / deceleration S - curve lower limit 3	0~50 %	10	●	
F5.33	Acceleration / deceleration S - curve upper limit 3	0~50 %	10	●	

[-F6-]					
NO.	Parameter Name	Setting Range	Default	WRT	User setting
F600	Prohibition of panel reset operation	0: Permitted 1: Prohibited	0	○	
F 01	Switching between remote control and Local control	0：Local control mode 1：remote control mode 2. JOG function is set with F700	1	○	
F602	Password check/input	0~9999	0	○	
F603	Current/voltage display mode	0: % 1: A (ampere)/V (volt),	1	○	
F604	Frequency free unit magnification	0：unit is Hz 0.01-200.0：free unit	0.00	○	
F605	Factory reserved	-	0	•	
F606	Inclination characteristic of free unit display	0: Negative inclination (downward slope) 1: Positive inclination (upward slope)	1	○	
F 07	Bias of free unit display	0.00 Hz ~F007	0.00	○	
F608	Free step 1 (pressing a panel key once)	Disabled：0.00 Enabled ：0.01 Hz~F 007	0.00	○	
F609	Free step 2 (panel display)	0：disabled 1~255：enabled	0	○	
F610	Standard monitor display selection	0: Output frequency(Hz(free)) 1: Frequency command(Hz(free)) 2:Output current(%/A) 3:Frequency drive rated current (A) 4:Frequency drive load (%) 5:Output power (kW) 6: Stator frequency (Hz (free)) 7:communication data display 8: Output speed 9: Communication counter 10: Normal communication counter 11: Stop - given frequency (F900 =0)/given PID (F900 ≠0), Run - output frequency	0	○	
F611	Panel running order clear selection	0：clear 1：keep	1	○	
F612	Panel operation prohibition (F000)	0: Permitted 1: Prohibited	0	○	
F 13	Prohibition of panel operation (RUN/STOP keys)	0: Permitted. 1: Prohibition.	0	○	
F 14	Prohibition of panel emergency stop operation	0: Permitted. 1: Prohibition.	0	○	

NO.	Parameter Name	Setting Range	Default	WRT	User setting
f616	Integral output power retention selection	0: (clear) 1: (memory)	1	○	
f617	Integral output power display unit selection	0: 1kWh. 1: 10kWh. 2: 100kWh. 3: 1000kWh.	varies by model	○	
f618	Search and resetting of changed parameters selection	0: disable 1: enable	0	○	
f619	factory reserved	Frequency converter internal temperature monitoring 1			
f620	factory reserved	Frequency converter internal temperature monitoring 2			
f 21	LCD contrast control	15~40	25		
f622	factory reserved				
f623	Bit0: Fan self-running	0: The fan works when the converter is running 1. The fan works when the drive is powered on	0	○	
	Bit1: Positive power monitoring	0: Monitoring both positive and negative power 1: Monitor only positive power			
f624	Keyboard panel displays 2	Same as f610	2	○	
	Quick Monitoring 1	Same as f 10			
f625	Keyboard panel displays 3	Same as f610	1	○	
	Quick Monitoring 2	1 ~ 8: see f610 9: PID is given 10: PID feedback			
f626	Keyboard panel displays 4	Same as f610	5	○	
	Quick Monitoring 2	1 ~ 8: see f610 9: PID is given 10: PID feedback			
f627	Relay output -PID feedback check out	0.00~99.99	0.00		
f 28	Relay output -PID feedback to detect bandwidth	0.00~99.99	0.00		
f629	Factory reserved				

[-F7-]					
NO.	Parameter Name	Setting Range	Default	WRT	User setting
F700	JOG key function setting	0~6	5	○	
F7 1	jog run frequency	0.0~20.0 Hz	5.0	○	
F702	Jog stopping pattern	0: Slow down stop. 1: coast stop. 2: DC braking.	0	•	
F7 3	Jump frequency 1	0.0 Hz ~F007	0.0	○	
F7 4	Jumping width 1	0.0 ~30.0 Hz	0.0	○	
F705	Jump frequency 2	0.0 Hz ~F007	0.0	○	
F706	Jumping width 2	0.0~30.0 Hz	0.0	○	
F7 7	Jump frequency 3	0.0 Hz ~F007	0.0	○	
F7 8	Jumping width 3	0.0~30.0 Hz	0.0	○	
F709	Braking mode selection	0~3	0	•	
F710	Release frequency	F503~20.0Hz	3.0	○	
F711	Release time	0~25.0s	0.5	○	
F712	Creeping frequency	F503~20.0Hz	3.0	○	
F713	Creeping time	0~25.0s	1.0	○	
F714	Droop gain	0~100%	0	○	
F715	Droop insensitive torque band	0~100%	10	○	
F716	Preset-speed 1	F009~F008	3.0	○	
F717	Preset-speed 2	F009~F008	6.0	○	
F718	Preset-speed 3	F009~F008	9.0	○	
F719	Preset-speed 4	F009~F008	12.0	○	
F720	Preset-speed 5	F009~F008	15.0	○	
F7 1	Preset-speed 6	F009~F008	18.0	○	
F722	Preset-speed 7	F009~F008	21.0	○	
F7 3	Preset-speed 8	F009~F008	24.0	○	
F7 4	Preset-speed 9	F009~F008	27.0	○	
F725	Preset-speed 10	F009~F008	30.0	○	
F726	Preset-speed 11	F009~F008	33.0	○	
F7 7	Preset-speed 12	F009~F008	36.0	○	
F7 8	Preset-speed 13	F009~F008	39.0	○	
F729	Preset-speed 14	F009~F008	45.0	○	
F730	Preset-speed 15	F009~F008	50.0	○	
F731	factory reserved				
F732	Multi-speed 0 run time	0~65000.0s(min)	0.0		
F733	Multi-speed 1 run time	0~65000.0s(min)	0.0		
F734	Multi-speed 2 run time	0~65000.0s(min)	0.0		

NO.	Parameter Name	Setting Range	Default	WRT	User setting
F735	Multi-speed 3 run time	0~65000.0s(min)	0.0		
F736	Multi-speed 4 run time	0~65000.0s(min)	0.0		
F737	Multi-speed 5 run time	0~65000.0s(min)	0.0		
F738	Multi-speed 6 run time	0~65000.0s(min)	0.0		
F739	Multi-speed 7 run time	0~65000.0s(min)	0.0		
F740	Multi-speed 8 run time	0~65000.0s(min)	0.0		
F741	Multi-speed 9 run time	0~65000.0s(min)	0.0		
F742	Multi-speed 10 run time	0~65000.0s(min)	0.0		
F743	Multi-speed 11 run time	0~65000.0s(min)	0.0		
F744	Multi-speed 12 run time	0~65000.0s(min)	0.0		
F745	Multi-speed 13 run time	0~65000.0s(min)	0.0		
F746	Multi-speed 14 run time	0~65000.0s(min)	0.0		
F747	Multi-speed 15 run time	0~65000.0s(min)	0.0		
F732	Multi-speed 0 run time	0~65000.0s(min)	0.0		
F733	Multi-speed 1 run time	0~65000.0s(min)	0.0		
F734	Multi-speed 2 run time	0~65000.0s(min)	0.0		
F735	Multi-speed 3 run time	0~65000.0s(min)	0.0		
F736	Multi-speed 4 run time	0~65000.0s(min)	0.0		
F737	Multi-speed 5 run time	0~65000.0s(min)	0.0		
F738	Multi-speed 6 run time	0~65000.0s(min)	0.0		
F739	Multi-speed 7 run time	0~65000.0s(min)	0.0		
F740	Multi-speed 8 run time	0~65000.0s(min)	0.0		
F741	Multi-speed 9 run time	0~65000.0s(min)	0.0		
F742	Multi-speed 10 run time	0~65000.0s(min)	0.0		
F743	Multi-speed 11 run time	0~65000.0s(min)	0.0		
F744	Multi-speed 12 run time	0~65000.0s(min)	0.0		
F745	Multi-speed 13 run time	0~65000.0s(min)	0.0		
F746	Multi-speed 14 run time	0~65000.0s(min)	0.0		
F747	Multi-speed 15 run time	0~65000.0s(min)	0.0		
F748	PLC speed direction option	0~65535	0		
F749	Simple PLC running mode	0: run one time and then stop 1: run one time and keep running at the final value 2: recycle running	0		
F750	Simple PLC restart mode selection	0: start running from the first phase 1: keep running from the interrupt frequency	0		
F751	Simple PLC Power drop memory selection	0: no memory for power drop 1: memory for power drop	0		

NO.	Parameter Name	Setting Range	Default	WRT	User setting
F752	Simple PLC running time unit selection	0: second (s) 1: min	0		
F753	Nonstandard function selection	0~65535	0	○	
F754	AI1 curve selection	0：Curve（Point 2） 1：Curve（Point 4）	0	○	
F755	AI1 curve 2 set point 1 input	0.0 ~ 100.0%	0.0%	○	
F756	AI1 curve 2 sets point 1 output	-100% ~ 100%	0.0%	○	
F757	AI1 curve 2 set point 2 input	0.0 ~ 100.0%	30.0%	○	
F758	AI1 curve 2 sets point 2 output	-100% ~ 100%	30.0%	○	
F759	AI1 curve 2 set point 3 input	0.0 ~ 100.0%	60.0%	○	
F760	AI1 curve 2 sets point 3 output	-100% ~ 100%	60.0%	○	
F761	AI1 curve 2 set point 4 input	0.0 ~ 100.0%	100.0%	○	
F762	AI1 curve 2 sets point 4 output	-100% ~ 100%	100.0%	○	
F763	LI1 effective delay	6500.0 ~ 0.0 s	0.0	○	
F764	LI1 invalid delay	6500.0 ~ 0.0 s	0.0	○	
F765	LI2 effective delay	6500.0 ~ 0.0 s	0.0	○	
F766	LI2 invalid delay	6500.0 ~ 0.0 s	0.0	○	
F767	AI1 filtering coefficient	0.00 -10.00	0.30	○	
F768	AI2 filtering coefficient	0.00 -10.00	0.30	○	
F769	AO1 filtering coefficient	0.00 -10.00	0.00	○	
F770	AO2 filtering coefficient	0.00 -10.00	0.00	○	
F772	Password Setting	0~9999	0	○	
F773	Password duration	0~9999 min	5	○	

[-F8-]					
NO.	Parameter Name	Setting Range	Default	WRT	User setting
F800	Modbus baud rate	0：9600 bps 1：19200 bps 2：4800 bps 3：2400 bps 4：1200 bps	1	○	
F801	Modbus parity	0: NONE 1: EVEN 2: ODD	1	○	
F802	Modbus address	0-247	1	○	
F803	Modbus timeout	0: timeout check disabled. 1-100s	0	○	
F804	Modbus transfer waiting time	0~2.00 s	0.00	○	
F805	Modbus behavior on communication fault	0: Frequency drive stop, communication command, frequency mode open(by F002, F003) 1: None (continued operation) 2: Deceleration stop 3: Coast stop 4: Communication error (E-33 trip) or Network error (E-35 trip)	4	○	
F806	Number of motor poles for communication	1~8	2	○	
F813	Module writes data 1	0：Off 1: Communication command control (FA05) 2: Reservations 3: Communication frequency setting (FA08) 4 ~ 6: reservations	1	○	
F814	Module writes data 2		3	○	
F815	Module dates read 1	0: Off 1: Status Information (FD03) 2: Output frequency (FD12) 3: Output current (FE08) 4: Output voltage (FE10) 5: Fault information (FC39) 6: PID feedback value (FA36) 7: Input terminal information (FD01) 8: Output terminal information (FD02) 9: AI1 input (FE30) 10: AI2 input (FE31) 11: Motor speed (FE50)	1	○	
F816	Module dates read 2		2	○	

F817	Module dates read 3	12: Absolute value of output current (E002), unit 0.01a 13: Absolute value of output voltage (E006), unit V 14: Absolute value of input voltage of DC bus (E009), unit V 15: PID given value (FA35) 16: Output torque (FE20), 0.01% of rated torque per unit motor 17: Input power (FE28), 0.01kW 18: Output power (FE29), 0.01kW 19: Input power accumulation/input electric energy (FE44), the unit is determined according to the parameter F617 20: Output power accumulation/output electric energy (FE45), the unit is determined according to the parameter F617 21: Cumulative running time (FE17), unit h (hours)	12	○	
F818	Module dates read 4		18	○	
F819	Module dates read 5		8	○	
F821	factory reserved				
F822	factory reserved				
F823	factory reserved				
F824	factory reserved				
F825	factory reserved				
F826	factory reserved				
F827	factory reserved				
F828	factory reserved				
F829	factory reserved				
F830	PID setting of keypad	0~100%	0.0	○	

[-F9-]

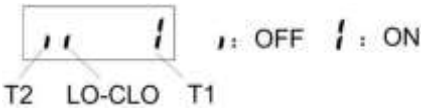
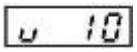
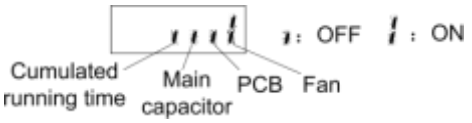
NO.	Parameter Name	Setting Range	Default	WRT	User setting
F900	PID control setting	0: Disabled, 1: Enabled (Feedback: AI1) 2: Enabled (Feedback: AI2)	0	○	
F901	Proportional gain（P control）	0.01~100.0	varies by model	○	
F902	Integral gain	0.01~100.0	varies by model	○	
F903	Differential gain	0.00~2.55	0.00	○	
F904	PID control waiting time	0~2400 s	0	○	
F905	PID regulator deviation input signal negation/Direction	0：disable/Direct action 1：enable/Reaction	0	○	
F906	Sleep mode awakening hysteresis bandwidth	0.0 Hz ~F007	0.2	○	

f907	Sleeping mode awakening threshold based on PI deviation	0.0 Hz ~f917	0.0	○	
f908	Sleeping mode awakening threshold based on PI feedback	0.0 Hz ~f917	0.0	○	
f909	sleeping mode action	0: Motor slowdown to a stop. 1: Motor keep running at lower limit frequency.	0	●	
f910	wake up delay	0~600.0s	0.0	●	
f911	Auto wake up level	0~200.0%	0.0	○	
f912	Auto sleep level	0~200.0%	100	○	
f913	Upper limit of PID setting	0~100%	100	●	
f914	Lower limit of PID setting	0~f913	0	●	
f915	Delay control of sleep mode	Disable：0.0 Enable ：0.1-600.0 s	0.1	○	
f916	PID control deviation limit	0~100%	0.0	○	
f917	Sensor range	0.00~99.99	1.00		
f918	PID adjustment	0.00~f917	0.00		
f919	Sleeping frequency	0.0Hz~f008	0.0		
f920	Sleeping threshold tolerance	0.0~25.0%	0.0		

Note 1：in the volume of "WRT"，"○"：means writable at stop or running status.；"●"：means unwritable at stopor running status；

Note 2：we can obtained Modbus parameter address by replacing 'F' of '0'. E.g. *f 908*'s address is 0x0908。

[-u0-]		
NO.	Parameter Name	Description
u000	CPU1 Version	E.g.: u100 , G-type, v= g; P-type, v= p；
u001	Operation frequency	Value is displayed in Hz/free unit. See f604.
u002	Direction of rotation	0 Forward run, 1 Reverse run.
u003	frequency command value	Value is displayed in Hz/free unit. See f604.
u004	Load current	The frequency drive output current (%/A) is displayed.
u005	Input voltage (AC RMS)	The frequency drive input voltage (%/V) is displayed.
u006	Output voltage (AC RMS)	The frequency drive output voltage command (%/V) is displayed.
u007	Input terminal status indicated	4kW or below: 0：OFF 1：ON AI1-AI2 LI4 LI3 LI2 LI1 5.5kW or above: . 0：OFF 1：ON LI8 … LI3 LI2 LI1

NO.	Parameter Name	Description
u008	Output terminal status indicated	 , without T2 at 4kW or below
u009	Cumulative operation time	(0.01=1 hour, 1.00=100 hours)
u010	Output speed	Displays the motor speed (min-1) by calculating with output frequency and pole numbers.
u 11	Rated current	The rated current of the frequency drive (A) is displayed.
u 12	Torque current	The torque current (%/A) is displayed.
u 13	Load current	The frequency drive output current (load current) (%/A) is displayed.
u 14	Torque	The torque (%) is displayed.
u 15	Input power	The frequency drive input power (kW) is displayed.
u 16	Output power	The frequency drive output power (kW) is displayed.
u 17	PID feedback	The PID feedback value is displayed. (Hz/free unit)
u018	Frequency command value (PID-computed)	The PID-computed frequency command value is displayed. (Hz/free unit)
u019	Integral input power	The integrated amount of power (kWh) supplied to the frequency drive is displayed.
u020	Integral output power	The integrated amount of power (kWh) supplied from the frequency drive is displayed.
u 21	Communication counter	Displays the counter numbers of communication through the network.
u022	Normal state communication counter	Displays the counter numbers of communication only at normal state in the all communication through network.
u 23	Cpu2 version	
u024	Parts replacement alarm information	 ON: Needs to be replaced
u025	Cpu1 revision	
u026	PID setting	Displayed in % term.
u 27	PID feedback	Displayed in % term.
u1--	Past trip 1	Enter into the display of detailed information on past trip 1
u --	Past trip 2	Enter into the display of detailed information on past trip 2
u3--	Past trip 3	Enter into the display of detailed information on past trip 3
u4--	Past trip 4	Enter into the display of detailed information on past trip 4

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