PREFACE

Thank you for choosing FRECON developed and produced FR150A series multifunctional compact inverter.

FR150A Series multifunction compact inverter is a compact, feature-rich, and highly price-competitive models. Particularly suitable for electronic equipment, food packaging, woodworking, treadmills and other small power transmission applications. This user manual presents a detailed description of FR150A series multifunction compact inverter product characterization, structural features, parameter setting, operation and commissioning, maintenance inspection, and other contents. Make sure to carefully read the safety precautions before application, and use this product on the premise that personnel and equipment safety is ensured.

IMPORTANT NOTES
◆To illustrate the details of some of the products ， in this manual have outer casing or safety shields be removed picture .When using this product, please be sure to install a good outer casing or covering, and in accordance with the contents of the manual operation. ◆The illustrations this manual for illustration only and may vary with different products you have ordered. ◆The company is committed to continuous improvement of products, product features will continue to upgrade, the information provided is subject to change without notice. ◆If you are using have questions, please contact our regional agents or our customer service center. Customer Service Tel 0755 -33067999. ◆The company's other products please visit our website: .http://www.frecon.com.cn

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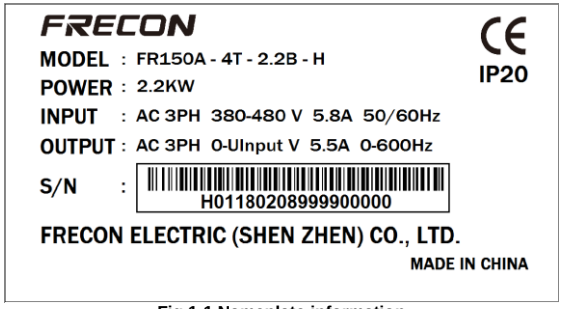


Fig.1-1 Nameplate information

Model Explanation

Model show on product nameplate contains information below

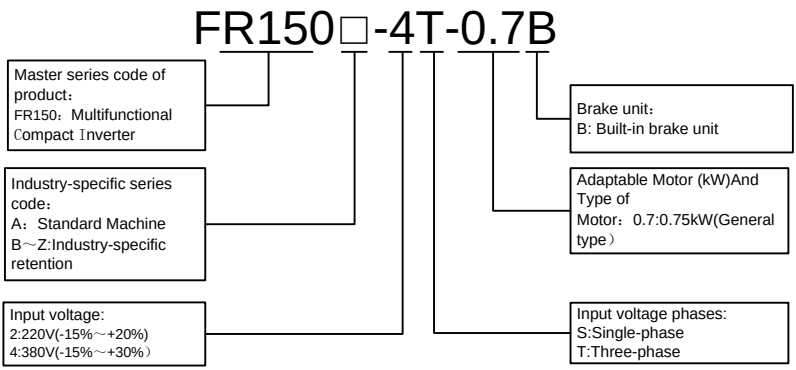


Fig.1-2 Model Explanation

1.2 Information of FR150A Product Model

Table 1-1 FR150A Product model and technical data

Model	Power capacity KVA	Rated input current A	Rated output current(heavy load)A	Rated output current(light load)A	Adaptive motor kW	HP
Single phase:220V，50/60Hz Range:-15%～+30%						
FR150A-2S-0.2B	0.5	4.9	1.6	2.5	0.25	0.25
FR150A-2S-0.4B	1.0	6.5	2.5	3	0.37	0.5
FR150A-2S-0.7B	1.5	9.3	4.2	4.6	0.75	1.0
FR150A-2S-1.1B	1.1	11	5.5	6.5	1.1	1.5
FR150A-2S-1.5B	3.0	15.7	7.5	8.5	1.5	2
FR150A-2S-2.2B	4.0	24	9.5	10.5	2.2	3
Three phase:380V，50/60Hz Range:-15%～+30%						
FR150A-4T-0.7B	1.5	3.4	2.5	3	0.75	1
FR150A-4T-1.5B	3.0	5.0	4.2	4.6	1.5	2
FR150A-4T-2.2B	4.0	5.8	5.5	6.5	2.2	3
FR150A-4T-4.0B	6.0	11	9.5	10.5	3.7、4	5
FR150A-4T-5.5B	8.9	14.6	13	17	5.5	7.5
FR150A-4T-7.5B	11	20.5	17	20	7.5	10
FR150A-4T-011B	17	26	25	32	11	15
FR150A-4T-015B	21	35	32	37	15	20
FR150A-4T-018B	24	38.5	37	45	18.5	25
FR150A-4T-022B	30	46.5	45	49	22	30
FR150A-4T-030B	40	62	60	75	30	40
FR150A-4T-037B	57	76	75	82	37	50
FR150A-4T-045	69	92	91	112	45	60
FR150A-4T-055	85	113	112	134	55	70
FR150A-4T-075	114	157	150	168	75	100
FR150A-4T-090	134	186	176	210	90	125
FR150A-4T-110	160	220	210	253	110	150
FR150A-4T-132	192	260	253	304	132	175
FR150A-4T-160	231	310	304	340	160	210

1.3 Technical Features of FR150A

Table 1-2 Technical features of FR150A

Project		Specifications
Power input	Rated input voltage (V）	1-Phase 220V (-15%～+20%) 3-phase 380 V (-15%～+30%)
	Rated input current (A）	See table 1-1
	Rated input frequency (Hz)	50Hz/60Hz，tolerance±5%
Power output	Applicable motor (kW)	See table 1-1
	Rated output current (A)	See table 1-1
	The maximum output voltage (V)	0～rated input voltage, error<±3%
	The maximum output	0.00～600.00 Hz,unit0.01Hz

	frequency (Hz)	
Control characteristics	V/f patterns	V/f control Sensor-less vector control 1 Sensor-less vector control 2
	Speed range	1:50 (V/f control) 1:100 (sensor-less vector control 1) 1:200 (sensor-less vector control 2)
	Speed accuracy	±0.5% (V/f control) ±0.2% (sensor-less vector control 1、2)
	Speed fluctuation	±0.3% (sensor-less vector control 1、2)
	Torque response	< 10ms (sensor-less vector control 1、2)
	Starting torque	0.5Hz: 180% (V/f control, sensor-less vector control 1) 0.25Hz:180%（sensor-less vector control 2）
Basic functions	Carrier frequency	0.7kHz～16kHz
	Overload capability	G Model:150% Rated Current 60s,180% Rated Current 10s,200% Rated Current 1s.
	Torque boost	Automatic torque boost；Manual torque boost 0.1%～30.0%
	V/F Curve	Three ways: Three ways: straight; multi-point type; N Th-type V / F curve（1.2_{Th} -type、1.4_{Th} -type、1.6_{Th} -type、1.8_{Th} -type、2_{Th} -type）
	Acceleration and deceleration Curve	Line or curve acceleration and deceleration mode. Four kinds of acceleration and deceleration time，Ramp Time Range :0.0～6000.0s
	DC brake	DC brake start frequency: 0.00～600.00Hz DC brake time:0.0s～10.0s DC brake current:0.0%～150.0%
Basic functions	Jog brake	Jog frequency range:0.00Hz～50.00Hz. Jog deceleration time: 0.0s～6000.0s.
	Simple PLC、Multi-speed	Through the built-in PLC or control terminal to achieve up to 16 speed running
	Built-in PID	Facilitate the realization of process control loop control system
	Automatic voltage adjustment（AVR）	When the grid voltage changes, can automatically maintain a constant output voltage
	Fast current limit function	Minimize over current fault protection inverter running
	Over voltage Over current	System automatically limits of current and voltage during operation to prevent frequent
Run	Command source	Given the control panel, control terminal, serial communication port given.
	Frequency given	9 kinds of frequency sources: digital setting, keyboard potentiometer setting, analog Voltage, given analog current reference pulse is given, the serial port is given, multi-speed given, PLC is given, the process PI D reference. There are several ways to switch
Protection function	Provide fault protection dozen: Overcurrent、Overvoltage、Undervoltage、Overtemperature、Overload Etc Protection.	

Display and keyboard	LED Display	Display Parameters
	Key lock and function selection	Realize some or all of the keys locked, scope definition section keys to prevent misuse
	Run and stop monitoring information	In the run or stop can be set to monitor U00 group four objects were.
Environment	Place of operation	Indoors, no direct sunlight, free from dust, corrosive gases, flammable gases, oil mist, water vapor, water drop and salt, etc.
	Altitude	0～2000m De-rate 1% for every 100m when the altitude is above 1000 meters
	Ambient temperature	-10℃～40℃
	Relative humidity	5～95%, no condensation
	Vibration	Less than 5.9m/s2 (0.6g)
	Storage temperature	-20℃～+70℃
Others	Efficiency	Rated power≥93%
	Installation	Wall-mounted or DIN-rail mounting
	IP grade	IP20
	Cooling method	Fan cooled

1.3 Configuration, Mounting Dimensions and Weight

◆FR150A (0.2~22kW)

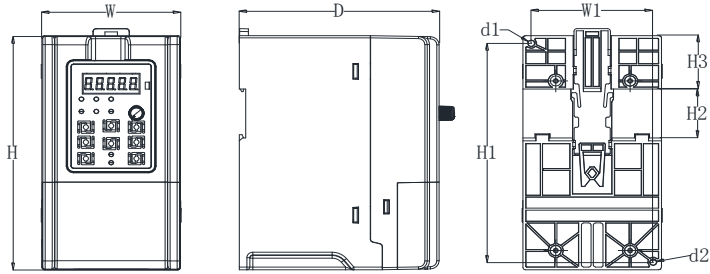


Fig 1-3 FR150A (0.2~22kW) product size diagram

◆FR150A (30~160kW)

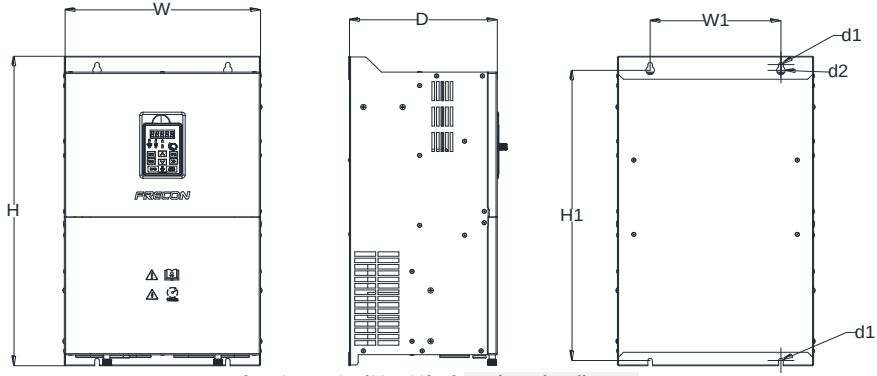


Fig 1-3 FR150A (30~160kW) product size diagram

Table 1-3 Configuration, mounting dimensions and weight

Model.	External and Install dimensions (mm)									N.W (kg)
	W	H	D	W1	H1	H2	H3	Install hole d1	Install hole d2	
FR150A-2S-0.2B	75	150	120	65	140	35	38.5	4.5	4.5	0.95
FR150A-2S-0.4B										
FR150A-2S-0.7B										
FR150A-2S-1.1B										
FR150A-4T-0.7B										
FR150A-4T-1.5B										
FR150A-2S-1.5B	93	171	132	82	160	35	39	4.5	4.5	1.46
FR150A-2S-2.2B										
FR150A-4T-2.2B										
FR150A-4T-4.0B										

Model.	External and Install dimensions (mm)									N.W (kg)
	W	H	D	W1	H1	H2	H3	Install hole d1	Install hole d2	
FR150A-4T-5.5B	117	187	160	102	172	-	-	4.7	4.7	2.5
FR150A-4T-7.5B										
FR150A-4T-011B	146	249	174	131	236	-	-	5.5	5.5	3.9
FR150A-4T-015B	198	300	182	183	287	-	-	5.5	5.5	6.2
FR150A-4T-018B										
FR150A-4T-022B										
FR150A-4T-030B	245	390	187	200	375	-	-	7	13	11.6
FR150A-4T-037B										
FR150A-4T-045	300	485	226	200	581	-	-	7	13	14.8
FR150A-4T-055										
FR150A-4T-075	335	600	236	200	581	-	-	9.5	17.5	22.8
FR150A-4T-090	310	620	280	200	601	-	-	9.5	17.5	25
FR150A-4T-110	310	650	309	200	620	-	-	11.5	22	40
FR150A-4T-132										
FR150A-4T-160	400	750	320	300	723	-	-	11.5	22	69

Chapter 2 Wiring and Terminals

2.1 Wiring way

2.1.1Single-phase 220V inverter typical wiring diagram

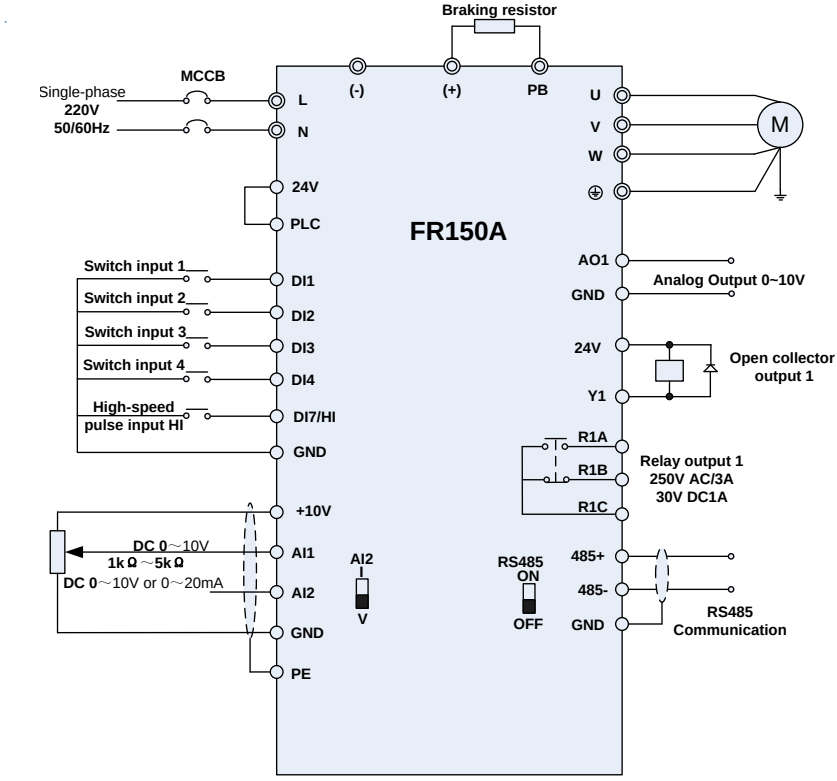


Fig.2-1 Single-phase 220V Inverter wiring diagram

Remarks:

1）◎refers to main circuit terminals.，○refers to control circuit terminals.

2）User selects braking resistor based on real needs，Please refer to the braking resistor Selection Guide.

3）Signal cable and power cable should be separated. Try to cross control cable and power cable in 90° if needed. The best selection of analog signal lines shielded twisted pair，Power cables use shielded three-core cable(The specifications of the motor cable than ordinary freshman profile)or Comply with manual drive.

2.1.2 Three-phase 380V inverter typical wiring diagram

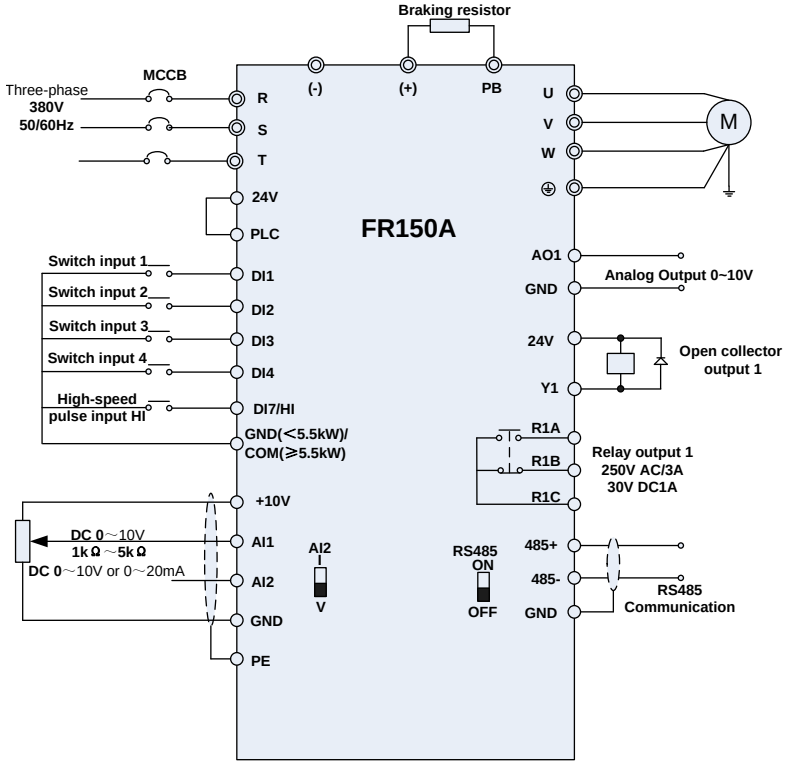


Fig.2-2 Three-phase 380V Inverter wiring diagram

2.2 Terminal Configuration

2.2.1 Main Circuit Terminals

◆ 0.2~1.1kW Main Circuit Terminals

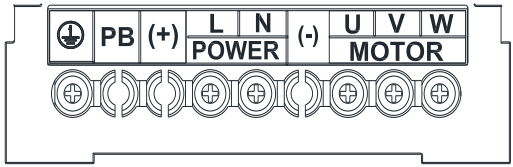


Fig.2-3 0.2~1.1kW main circuit terminals

◆0.7~4.0kW Main Circuit Terminals :

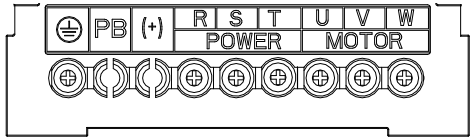


Fig.2-4 0.7~4.0kW Main Circuit Terminals

◆5.5～7.5 kW Main Circuit Terminals:

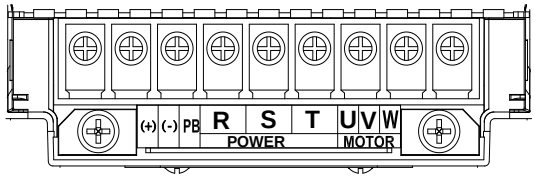


Fig.2-5 5.5~7.5kW Main Circuit Terminals

◆11～22 kW Main Circuit Terminals:

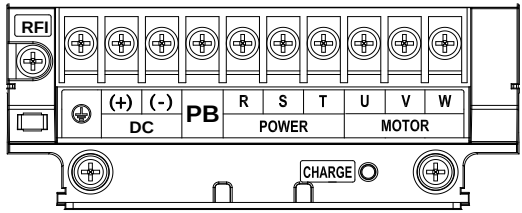


Fig.2-6 11~22kW Main Circuit Terminals

◆30～37kW Main Circuit Terminals:

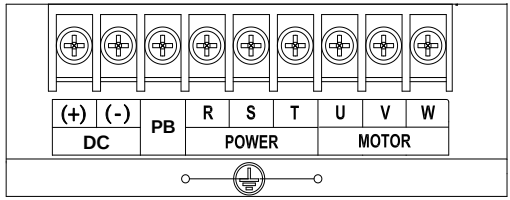


Fig.2-7 30～37kW Main Circuit Terminals

◆45～90kW Main Circuit Terminals:

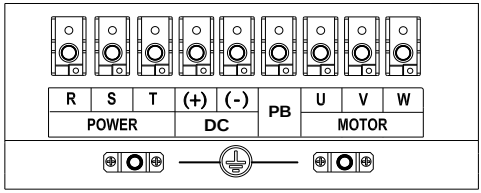


Fig.2-8 45～90kW Main Circuit Terminals

Power	Recommended power cablemm²	Recommended lug model	Terminal width mm	Tightening torque N.m
37kW	25	GTNR25-8	18	10
45kW	35	GTNR35-8	18	10
55kW	50	GTNR50-8	18	10
75kW	70	GTNR70-8	23	10
90kW	70	GTNR70-8	23	10

◆110～132kW Main Circuit Terminals:

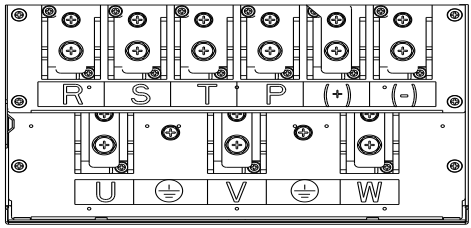


Fig.2-9 110～132kW Main Circuit Terminals

Power	Recommended power cablemm²	Recommended lug model	Terminal width mm	Tightening torque N.m
110kW	120	GTNR120-12	31	35
132kW	150	GTNR150-12	31	35

◆160kW Main Circuit Terminals:

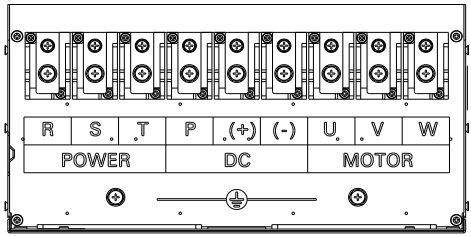


Fig.1-11 160kW Main Circuit Terminals

Power	Recommended power cablemm2	Recommended lug model	Terminal width mm	Tightening torque N.m
160kW	150	GTNR150-12	31	35

Table 2-1 main circuit terminal functions

Terminal marks	Designation and function of terminals.
R、S、T	Three-phase 380V AC power input terminals
L、N	Single-phase 220V AC power input terminals
U、V、W	AC output terminals of inverter for connecting to 3-phase induction motor.
(+)、(-)	Positive and negative terminals of internal DC bus.
PB	Positive and negative terminals of internal DC bus. Connecting terminals of braking resistor. One end connected to + and the other to PB.
⏚	Grounding terminal.

Remarks: No phase sequence requirements on wiring of the input side of inverter. Wiring Precautions:

1）Power input terminals (R、S 、T)/(L、N)

◆ The cable connection on the input side of the AC drive has no phase sequence requirement.

2）DC bus (+)、(－)

◆ Terminals (+) and (-) of DC bus have residual voltage after the AC drive is switched off. After indicator CHARGE goes off, wait at least 10 minutes before touching the equipment Otherwise, you may get electric shock.

◆ Do not connect the braking resistor directly to the DC bus. Otherwise, it may damage the AC drive and even cause fire.

3）Braking resistor connection terminals (+)、PB

◆ The cable length of the braking resistor shall be less than 5 m. Otherwise, it may damage the AC drive.

4）AC drive output terminals U、V、W

◆ The capacitor or surge absorber cannot be connected to the output side of the AC drive. Otherwise, it may cause frequent AC drive fault or even damage the AC drive.

If the motor cable is too long, electrical resonance will be generated due to the impact of distributed capacitance. This will damage the motor insulation or generate higher leakage current, causing the AC drive to trip in overcurrent protection. If the motor cable is greater than 100 m long, an AC output reactor must be installed close to the AC drive.

5）Terminal⏚PE

◆ This terminal must be reliably connected to the main earthing conductor. Otherwise, it may cause electric shock, mal-function or even damage to the AC drive.

◆ Do not connect the earthing terminal to the neutral conductor of the power supply.

2.1.2 Control circuit terminals

◆Control circuit terminals(<5.5kW):

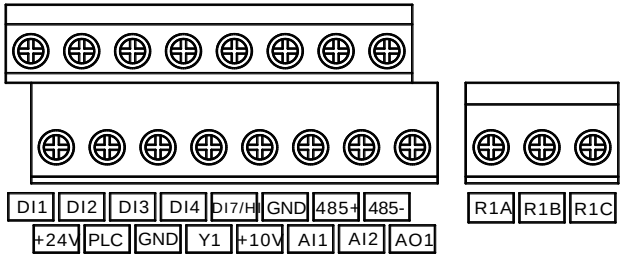


Fig.2-5 Control circuit terminals (<5.5kW)

Table 2-2 FR150A Description of control circuit terminals

Type	Terminal	Name	Function Description
Power supply	+10V-GND	External +10 V power supply	Provide +10 V power supply to external unit. Generally, it provides power supply to external potentiometer with resistance range of 1–5 kΩ. Maximum output current: 10 mA
	+24V-GND	External +24V power supply Applying to Overvoltage Category II circuit	Provide +24 V power supply to external unit. Generally, it provides power supply to DI/Do terminals and external sensors. Maximum output current: 200 mA
	PLC	Input terminal of external power supply	Connect to +24 V by default. When DI1-DI7 need to be driven by external signal, PLC needs to be connected to external power supply and be disconnected from +24 V.
Analog input	AI1-GND	Analog input 1	Input voltage range: DC 0～10V/0～20mA，decided by toggle switches AI1、AI2 on the control board Impedance: 250 kΩ (voltage input), 250 Ω (current input)
	AI2-GND	Analog input 2	
Switch input	DI1- GND	Switch input terminals 1	Maximum input frequency:200Hz Impedance:2.4kΩ Voltage range for level input:9V～30V
	DI2- GND	Switch input terminals 2	
	DI3- GND	Switch input terminals 3	
	DI4- GND	Switch input terminals 4	
	DI7/HI-GND	Switch input terminals 7 OR High-speed pulse input	Besides features of DI1–DI4, it can be used for high-speed pulse input. Maximum input frequency: 100 kHz
Analog output	AO1-GND	Analog output terminal 1	Output voltage range:0～10V Impedance requirements≥10kΩ
Switch output	Y1-GND	Open collector output 1	Voltage range:0～24V Current range:0～50mA
Relay output	R1A-R1C	Normally open	Contact driving capacity:

		terminal	AC250V，3A，COSØ=0.4. DC 30V，1A
	R1B-R1C	Normally closed terminal	
485 Communication	485+,485-	485 Communication Terminals	Rate: 4800/9600/19200/38400/57600/ 115200bps Termination resistor is set by the toggle switch on the control panel RS485
	GND	485 Communication shielded ground	
Shield	PE	Shield Ground	Ground terminal for shield
Auxiliary Interface		External operation panel interface	Use standard network cable Maximum cable distance: 50m

◆Control circuit terminals(≥5.5kW):

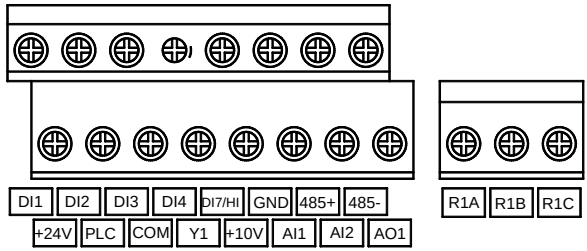


Fig.2-6 Control circuit terminals (≥5.5kW)

Type	Terminal	Name	Function Description
Power supply	+10V-GND	External +10 V power supply	Provide +10 V power supply to external unit. Generally, it provides power supply to external potentiometer with resistance range of 1–5 kΩ. Maximum output current: 10 mA
	+24V-COM	External +24V power supply Applying to Overvoltage Category II circuit	Provide +24 V power supply to external unit. Generally, it provides power supply to DI/Do terminals and external sensors. Maximum output current: 200 mA
	PLC	Input terminal of external power supply	Connect to +24 V by default. When DI1-DI7 need to be driven by external signal, PLC needs to be connected to external power supply and be disconnected from +24 V.
Analog input	AI1-GND	Analog input 1	Input voltage range: DC 0～10V/0～20mA，decided by toggle switches AI1、AI2 on the control board Impedance: 250 kΩ (voltage input), 250 Ω (current input)
	AI2-GND	Analog input 2	
Switch input	DI1- COM	Switch input terminals 1	Maximum input frequency:200Hz Impedance:2.4kΩ Voltage range for level input:9V～30V
	DI2- COM	Switch input terminals 2	

	DI3- COM	Switch input terminals 3	
	DI4- COM	Switch input terminals 4	
	DI7/HI-COM	Switch input terminals 7 OR High-speed pulse input	Besides features of DI1–DI4, it can be used for high-speed pulse input. Maximum input frequency: 100 kHz
Analog output	AO1-GND	Analog output terminal 1	Output voltage range:0～10V Impedance requirements≥10kΩ
Switch output	Y1-COM	Open collector output 1	Voltage range:0～24V Current range:0～50mA
Relay output	R1A-R1C	Normally open terminal	Contact driving capacity: AC250V，3A，COSØ=0.4. DC 30V，1A
	R1B-R1C	Normally closed terminal	
485 Communication	485+,485-	485 Communication Terminals	Rate: 4800/9600/19200/38400/57600/ 115200bps Termination resistor is set by the toggle switch on the control panel RS485
	GND	485 Communication shielded ground	
Shield	PE	Shield Ground	Ground terminal for shield
Auxiliary Interface		External operation panel interface	Use standard network cable Maximum cable distance: 50m

Chapter 3 Operation and display

3.1 Introduction of Keypad

As a human-machine interface, you can modify the parameters, monitor the working status and start or stop the inverter by operating the keypad. Its appearance and function area as shown in the following figure:

Fig.3-1 Keypad

3.1.1 Key and potentiometer Functions on keypad

There are 8 keys and a potentiometer on the keypad, whose functions are as shown in Table 3-1.

Table 3-1 Key functions on keypad

Symbol	Name	Function
ESC	Escape	Enter or exit Level I menu
ENT	Enter	Enter the menu interfaces level by level, and confirm the parameter setting
∧	Increment	Increase data or function code
∨	Decrement	Decrease data or function code
>>	Shift	Select the displayed parameters in turn in the stop or running state, and select the digit to be modified when modifying parameters
MF.K	Multifunction	Perform function switchover (such as jog run and quick switchover of command source or direction) according to the setting of F16.00
RUN	Run	Start the inverter in the keypad control mode
STOP RST	Stop/Reset	Stop the inverter when it is in the running state and perform the reset operation when it is in the fault state. The functions of this key are restricted in F16.01.
RUN + STOP RST	Key combinations	The inverter will free stop when the run and stop key are pressed simultaneously

3.1.2 Keypad Indicators

There are 8 Indicators on the keypad, whose descriptions are as shown in Table 3-2.

Table 3-2 Description of indicators

Indicator		Name	Meaning
Unit	Hz	Frequency	ON: currently displayed parameter is frequency
	V	Voltage	ON: currently displayed parameter is voltage
	A	Current	ON: currently displayed parameter is current
	%	Percentage	ON: currently displayed parameter is percentage
	All off	Other unit	Other unit or no unit
State	FWD/REV	Forward or reverse	ON: the drive is running reverse OFF: the drive is running forward Flash: dormant state
	LOC/REM	Keypad, terminals or communication	ON: Terminal control OFF: Keypad control Flash: Communication control
	(Green border)	Running state	ON: Running state OFF: Stopped state Flash: In process of stop
	(Red border)	Fault state	ON: Fault state OFF: Normal state Flash: Warning state

3.1.3 Keypad digital display

The keypad has five LED (digital) display, it can display a given frequency, output frequency and other parameters, monitoring data and alarm code. Table 3-3 shows meanings of the characters displayed on Keypad.

Table 3-3 Meanings of displayed characters

Displayed character	Character Meaning	Displayed character	Character Meaning	Displayed character	Character Meaning	Displayed character	Character Meaning
0	0	A	A	I	I	S	S
1	1	b	b	J	J	T	T
2	2	C	C	K	K	t	t
3	3	c	c	L	L	U	U
4	4	d	d	n	N	u	u
5	5	E	E	n	n	y	y
6	6	F	F	o	o	-	-
7	7	G	G	P	p	8.	8.
8	8	H	H	q	q	.	.
9	9	h	h	r	r		

3.1.4 Message status

A message appears when the state of completion of certain operations. Prompt message characters and their meanings are specified in Table 3-4.

Table 3-4 Prompt characters

Prompt symbol	Meaning	Prompt symbol	Meaning
Err00～Err99	Fault type	TUNE	Motor parameter identification in process
A00～A99	Alarm type	-END-	Write parameter

3.2 Viewing and Modifying Function Codes

The keypad of the FR150A adopts three-level menu.

◆The three-level menu consists of function code group (Level I), function code (Level II), and function code setting value (level III), as shown in the figure 3-2.

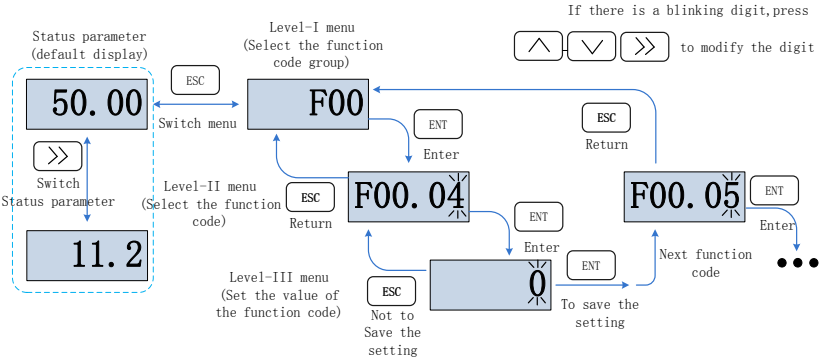


Fig.3-3 Operation procedure on the keypad

Explanation: In the level III menu, you can press the ESC key or ENT key to return to the level II menu. The difference is: If you do not have to modify the function code setting, press ENT will be automatically transferred to the next function code; If the function code settings are modified, it will display menu "-END-" 1 second when press ENT key, and redisplay the current function code settings, and it will be automatically transferred to the next function code when press the ENT key again. Press the ESC key to abandon the current parameter changes directly returns the current function code in level II.

◆Here is an example of changing the value of F01-02 to 15.00 Hz.

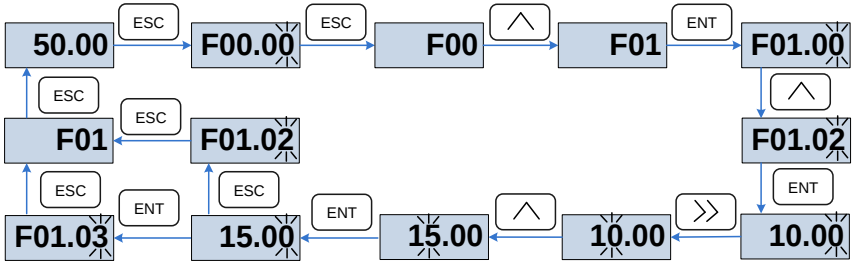


Fig.3-4 Example of changing the parameter value

In Level III menu, if the parameter has no blinking digit, it means that the parameter cannot be modified. This may be because:

（1）Such a function code is only readable, such as, AC drive model, actually detected parameter and running record parameter.

（2）Such a function code cannot be modified in the running state and can only be changed at stop.

3.3 Viewing Status Parameters

There are stop state parameters and running state parameters.

It has 4 status parameters in the stop or running state .You can press “>>” on the keypad to display status parameters. Which parameters are displayed is determined by the values of F16.03～F16.06（Running state parameters 1～4）、F16.07～F16.10（stop state parameters1～4），it can select the U00 group.

3.4 Motor Auto-tuning

Tuning is valid only when the keyboard command mode. Set tuning mode (stationary or rotating), press the ENT key to confirm, the keyboard will display TUNE, then press the RUN key, the inverter will drive motor acceleration and deceleration, positive inversion operation,and the run indicator lights. Tuning duration of about two minutes, when the display TUNE message disappears, returning to normal parameter display status, which means that the tuning is completed.

3.5 Password Setting

The inverter provides password protection function, it is set a user's password when F00.00 set to nonzero. If five minutes without operating the keypad, the password protection is effective, and the keypad will show “-----”, then the user must enter the correct password to enter the regular menu, otherwise inaccessible.

There are three ways a user password into force:

Method 1: Set F00.00 parameter to nonzero, then press the ESC + ENT key.

Method 2: Set F00.00 parameter to nonzero, then do not use the keypad within five minutes.

Method 3: Set F00.00 parameter to nonzero, then completely power down and then power.

If you want to cancel the password protection functions, only through a password to enter, and set F00.00 to 0.

3.6 Keypad lock

3.6.1 Keypad lock

The following three methods to any one immediately lock all or part of the keypad buttons; see the definition of the function code F16.02.

Method 1:Set F16.02parameter to nonzero, then press the ESC + ENT key.

Method 2:Set F16.02 parameter to nonzero, and then do not use the keypad within five minutes.

Method 3:Set F16.02 parameter to nonzero, then completely power down and then power.

3.6.2 Keypad unlock

Press the ESC + >> keys to unlock. Unlocking operation does not change the value of F16.02, That means when Meet the keypad locking conditions, the keypad will be locked again. If you want the control panel no longer be locked, after unlocking the F16.02 must change the value to 0.

3.7 Shortcut menus function code description

Factory setting mode is changed to be shortcut menu mode (F00.01=1) in the software version above V1.07, group 17 is for the parameters of shortcut menu.

The difference of display between shortcut manual and basic menu is in the second level menu, please refer to below the details of difference and the switching method.

Menu mode	Shortcut menu	Basic menu
Display difference	F01.01. The last digit of F01.01. function code is with radix point, no flashing	F01.01 F01.01 function code is without radix point, and flashing
Function difference	1. Press ∧ or ∨ for up-down switch in F17 function code 2. ESC can’t return back to first level menu	1. Press ∧ or ∨ up-down switch in sequency 2. Press ESC return back to first level menu

Switch	Method 1. Setting F00.01=0 to basic menu Method 2. Long Press  when display second level menu, switch to basic menu automatically	Method 1. Setting F00.01 to shortcut menu Method 2. Long press  when display second level menu, switch to shortcut menu automatically

If the shortcut menu is not enough, user can reset the shortcut menu, refer to group F17 for details.

Chapter 4 List of Parameter

Group F00～F16 are standard function parameters. Group U00 is status monitoring parameters. Group U01 is fault record parameters.

The symbols in the function code table are described as follows:

"△ " means the value of this parameter can be modified in stop and running status of drive;

"×" means the value of this parameter cannot be modified when drive is running;

"⊙" means this parameter is a measured value that cannot be modified;

Default: The value when restored to factory default. Neither measured parameter value nor recorded value will be restored.

Setting Range: the scope of setting and display of parameters

FR150A parameter groups are listed below:

Category	Parameter Group
System Parameters	F00: System Parameters
Basic Parameters	F01: Frequency Command
	F02: Start/Stop Control Start/Stop Control
	F03: Accelerate/Decelerate Parameters
Input & Output Terminals	F04: Digital Input
	F05: Digital Output
	F06: Analog and Pulse Input
	F07: Analog and Pulse Output
	F22: Virtual IO
Motor and Control Parameters	F08: Parameters of Motor 1
	F09: V/f Control Parameters of Motor 1
	F10: Vector Control Parameters of Motor 1
Protection Parameters	F11: Protection Parameters
Application Parameters	F12: Multi-Reference and Simple PLC Function
	F13: Process PID
	F14: Swing Frequency, Fixed Length , Count and Wakeup
Communication Parameters	F15: Communication Parameters
Keys and Display of Keypad Parameters	F16: Keys and Display of Keypad Parameters
User-defined Display Parameters	F17: User-defined Display Parameters
Monitoring Parameters	U00: Status monitoring
	U01: Fault record

4.1 Five LED (digital) display indicators

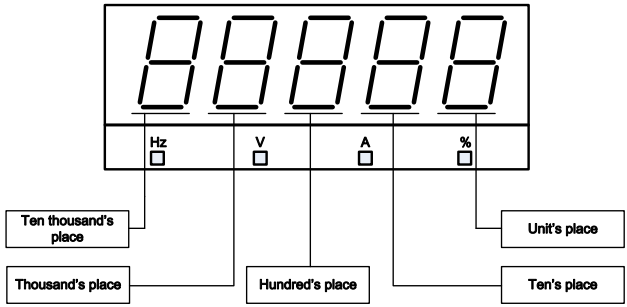


Fig.4-1 LED indicators

4.2 Standard Function Parameters

Table 5-1 Standard Function Parameters

Param.	Parameter Name	Setting Range	Default	Attr
Group F00: System Parameters				
F00.00	Setting of User Password	0～65535	0	×
F00.01	Function code display	0: Display all function code 1: Display F00.00、F00.01 and user setting function code 2: Display F00.00、F00.01 and the function code different with factory setting	1	×
F00.02	Parameter Protection	0: All parameter programmable 1: Only F00.02 and this parameter programmable	0	×
F00.04	Parameter Initialization	0: No operation 1: Restore all parameters to factory default (excluding motor parameters) 2: Clear fault record 3: Restore user backup parameters 4: Back up current user parameters 5: Restore factory default(include motor parameter) 6: Power consumption zero-clearing(U00.35)	0	×
F00.06	Parameter editing mode	0:Editable via keypad and RS485 1:Editable via keypad 2:Editable via RS485	0	×
F00.08	Motor 1 control mode	0: Voltage/Frequency (V/F) control 1:Sensor-less vector control 1 2: Sensor-less vector control 2	1	×
F00.09	DI7/HI input mode	0:Digital input terminal 7 1: Pulse input	0	×
F00.12	PWM optimization	Unit's place: PWM modulation mode 0: Fixed carrier 1: Random carrier	100	×

		2: Derating of fixed carrier 3: Derating of random carrier Ten's place: PWM modulation mode 0: Seven-segment mode 1: Five-segment mode 2: Five-segment and seven-segment automatic switchover Hundreds place: over-modulation adjustment 0: Invalid 1~9: 1.01~1.09 times of over-modulation		
F00.13	Carrier frequency	0.700～16.000kHz	Model defined	Δ
F00.14	Upper carrier frequency	0.700～16.000kHz	8.000k Hz	×
F00.15	Lower carrier frequency	0.700～16.000kHz	2.000k Hz	×
F00.16	Output voltage	5.0～150.0%	100.0%	×
F00.17	AVR	0: Disabled 1: Enabled 2: AVR is disabled if the DC bus voltage > the rated voltage of DC bus, and it will be enabled if the DC bus voltage≤ the rated voltage of DC bus.	1	×
F00.18	Fan control	0: Run at power-on 1: Fan working during running	1	×
F00.19	Factory password	0～65535	0	×
F00.20	Inverter rated power	0.2～710.0kW	Model defined	⊙
F00.21	Inverter rated voltage	60～660V	Model defined	⊙
F00.22	Inverter rated current	0.1～1500.0A	Model defined	⊙
F00.23	Software version	0.00～655.35	Model defined	⊙
F00.24	Dealer	0～65535	0	×
F00.25	Setting operation time	0～65535h (0:Invalid)	0h	×
Group F01: Frequency Command				
F01.00	Frequency source selection	0: Master frequency source 1: Auxiliary frequency source 2: Master +Auxiliary 3: Master - Auxiliary 4: MAX{Master, Auxiliary } 5: MIN {Master, Auxiliary } 6: AI1*(Master + Auxiliary) 7: AI2*(Master +Auxiliary)	0	×
F01.01	Master Frequency Command Source	0:Master digital setting (F01.02) 1: keypad potentiometer 2: Analog input AI1 3: Communication 4: Multi-reference 5: PLC	1	×

		6: Process PID output 7: X7/HI pulse input 8: Analog input AI2		
F01.02	Digital Setting of Master Frequency	0.00～Fmax	50.00Hz	Δ
F01.03	Auxiliary Frequency Command Source	0: Auxiliary digital setting (F01.04) 1: keypad potentiometer 2: Analog input AI1 3: Communication 4: Multi-reference 5: PLC 6: Process PID output 7: X7/HI pulse input 8: Analog input AI2	0	×
F01.04	Digital setting of auxiliary frequency	0.00～Fmax	50.00Hz	Δ
F01.05	Range of auxiliary frequency	0: Relative to maximum frequency 1: Relative to master frequency	0	×
F01.06	Coeff of auxiliary frequency	5.0～150.0%	100.0%	Δ
F01.07	Jog frequency	0.00～Fmax	5.00Hz	Δ
F01.08	Maximum frequency	20.00～600.00Hz	50.00Hz	×
F01.09	Upper limit frequency	Fdown～Fmax Lower limit frequency～maximum frequency	50.00Hz	×
F01.10	Lower limit frequency	0.00～Fup	0.00Hz	×
F01.11	Operation when command frequency lower than lower limit frequency	0: Run at lower limit frequency 1: Run at 0 Hz would be activated after the time delay set by F01.12	0	×
F01.12	Lower limit frequency running time	0.0～6000.0s	60.0s	×
F01.13	Up to this frequency, start frequency compensation	0.00~600.00Hz	50.00Hz	Δ
F01.14	Frequency compensation per 50Hz	0.00~50.00Hz	0.00Hz	Δ
Group F02: Start/Stop Control				
F02.00	Run command	0: Keypad control (LED off) 1: Terminal control (LED on) 2: Communication control (LED blinking)	0	×
F02.01	Running direction	0: Forward 1: Reverse	0	Δ
F02.02	Reverse-proof action	0: Reverse enabled 1: Reverse disabled	0	×
F02.03	Dead time between forward and reverse	0.0～6000.0s	0.0s	×
F02.04	Start mode	Unit's place: Start Mode 0:Start directly 1:Rotational speed track and restart Ten's place: short-circuit detection function 0:Ungrounded short-circuit detection	0000	×

		1:Grounding short-circuit detection before the first starts 2:Grounding short-circuit detection before each starts Hundred's place: Speed tracking 0:Track from zero speed 1:Track from max frequency Thousand's place: Select if Jog function takes the priority 0:Disable 1:Enable Ten thousand's place: Tracking direction 0: Last direction when stop 1: Positive direction 2: Negative direction 3: Starting direction		
F02.05	Start frequency	0.00～10.00Hz	0.00Hz	×
F02.06	Startup frequency holding time	0.0～100.0s	0.0s	×
F02.07	Startup DC brakin current	0.0～150.0%	0.0%	×
F02.08	DC braking time at start	0.0～100.0s	0.0s	×
F02.09	Speed search current	0.0～180.0%	100.0%	Δ
F02.10	Sped search decel time	0.0～10.0s	1.0s	×
F02.11	Sped search coefficient	0.01～5.00	0.30	Δ
F02.12	Stop mode	0: Ramp to stop 1: Coast to stop	0	×
F02.13	Initial frequency of stop DC braking	0.01～50.00Hz	2.00Hz	×
F02.14	Stop DC braking current	0.0～150.0%	0.0%	×
F02.15	Waiting time of stop DC braking	0.0～30.0s	0.0s	×
F02.16	Stop DC braking time	0.0～30.0s	0.0s	×
F02.17	Dynamic brake	0: Disabled 1: Enabled 2: Enabled at running 3: Enabled at deceleration	0	×
F02.18	Dynamic Brake Voltage	480～800V	700V	×
F02.19	Brake use ratio	5.0～100.0%	100.0%	×
F02.20	0Hz output selection	0: No voltage output 1: Voltage output	0	×
F02.21	Auto-start of power-on again	0: Invalid 1: Valid	0	Δ
F02.22	Waiting time between auto-start and power-on again	0.0~10.0s	0.5s	Δ
Group F03: Accel/Decel Parameters				
F03.00	Accel time 0	0.0～6000.0s	15.0s	Δ
F03.01	Decel time 0	0.0～6000.0s	15.0s	Δ
F03.02	Accel time 1	0.0～6000.0s	15.0s	Δ
F03.03	Decel time 1	0.0～6000.0s	15.0s	Δ
F03.04	Accel time 2	0.0～6000.0s	15.0s	Δ
F03.05	Decel time 2	0.0～6000.0s	15.0s	Δ
F03.06	Accel time 3	0.0～6000.0s	15.0s	Δ

F03.07	Decel time 3	0.0～6000.0s	15.0s	△
F03.08	Jog accel time	0.0～6000.0s	15.0s	△
F03.09	Jog decel time	0.0～6000.0s	15.0s	△
F03.10	Accel/Decele curve	0: Linear Accel/Decel 1: S-curve Accel/Decel	0	×
F03.11	Initial segment time of acceleration of S curve	0.0～6000.0s	0.0s	×
F03.12	Acceleration and deceleration time unit	0: 0.1s 1: 0.01s	0	×
F03.13	Frequency switchover point between acceleration time 0 and acceleration time 1	0.00～Fmax	0.00Hz	×
F03.14	Frequency switchover point between deceleration time 0 and deceleration time 1	0.00～Fmax	0.00Hz	×
F03.15	End segment time of acceleration of S curve	0.0～6000.0s	0.0s	×
F03.16	Initial segment time of deceleration of S curve	0.0～6000.0s	0.0s	×
F03.17	End segment time of deceleration of S curve	0.0～6000.0s	0.0s	×
Group F04 Digital Input				
F04.00	Function of terminal DI1	00: No function 01: Running forward (FWD) 02: Running reverse (REV) 03: Three-wire control 04: JOG forward 05: JOG reverse 06: Coast to stop 07: Fault reset (RESET) 08: Running suspended 09: External fault input 10: Terminal UP 11: Terminal DOWN 12: UP/DOWN (including ∧/∨ key) adjustment clear 13: Multi-step frequency terminal 1 14: Multi-step frequency terminal 2 15: Multi-step frequency terminal 3 16: Multi-step frequency terminal 4 17: Accel/Decel time determinant 1 18: Accel/Decel time determinant 1 19: Accel/Decel disabled(ramp stop not inclusive) 20: Switch to auxiliary speed Setting 21: PLC status reset 22: Simple PLC paused 23: Simple PLC paused 24: PID adjustment direction 25: PID integration paused 26: PID parameter switch 27: Swing frequency pause(output	1	×
F04.01	Function of terminal DI2		2	×
F04.02	Function of terminal DI3		7	×
F04.03	Function of terminal DI4		13	×
F04.06	Function of terminal D17		0 0 0 0 0 0	× × × × × ×

		the current frequency) 28: Swing frequency reset(output the central frequency) 29: Run command switched to keypad control 30: Run command switched to terminal control 31: Run command switched to communication control 32: Count input 33: Count clear 34: Length count 35: Length clear 36: DC brake input command at Stop 37: Speed/torque control switch 38: Disable Reverse 39: Disable Forward 50: Enable Special purpose machine function		
F04.10	Filtering time of digital input terminalD11~D17	0.000～1.000s	0.010s	Δ
F04.11	Delay time before DI1 is valid	0.0～300.0s	0.0s	Δ
F04.12	Delay time before DI2 is valid	0.0～300.0s	0.0s	Δ
F04.13	Terminal DI1～DI4 positive/negative logic	DI4、DI3、DI2、DI1 0: Positive logic(Terminals are on at 0V/off at 24V) 1: Negative Logic (Terminals are off at 0V/on at 24V)	0000	×
F04.14	Terminal DI7positive/negative logic	Reserved DI7 0: Positive logic 1: Negative Logic	00	×
F04.15	FWD/REV terminal control mode	0: Two-wire mode 1 1: Two-wire mode 2 2: Three-wire mode 1 3: Three-wire mode 2 4: Pulse operation stop	0	×
F04.16	Terminal UP/DOWN frequency adjustment control	Unit's place: action when stop 0: Clear 1: Holding Ten's place: action on power loss 0: Clear 1: Holding Hundreds place: integral function 0: No integral function 1: Integral function enabled Thousand's place: Select if it can be reduced to negative frequency 0: Disable 1: Enable Ten thousand's place: Select if JOG can clear UP/DOWN 0: Not zero-clear 1: Zero-clear	00001	×
F04.17	Terminal UP/DOWN	0.00～50.00Hz 0.00:Disabled	1.00Hz/	Δ

	frequency change step size		200ms	
F04.18	Terminal action selection when power on	0: Level effective 1: Edge trigger +Level effective(When power on) 2: Edge trigger +Level effective(Every start)	0	×
F04.19	Delay time before DI1 is invalid	0.0～300.0s	0.0s	Δ
F04.20	Delay time before DI2 is invalid	0.0～300.0s	0.0s	Δ
Group F05 Digital Output				
F05.00	Y1 output function	00: No output 01: Drive is running 02: Fault output 03: Frequency-level detection FDT1 output 04: Frequency-level detection FDT2 output 05: Drive in 0Hz running 1(no output at stop) 06: Drive in 0Hz running 2(output at stop) 07: Upper limit frequency attained 08: Lower limit frequency attained 09: Frequency attained 10: Inverter is ready to work 11: Drive (motor) overloaded alarm 12: Inverter overheat warning 13: Current running time attained 14: Accumulative power-on time attained 15: Consecutive running time attained 16: PLC cycle completed 17: Set count value attained 18: Designated count value attained 19: Length attained 20: Under load alarm 21: Brake output 22: DI1 23: DI2 24: When reach the range of set frequency(FDT1) 25: Reserved 26: PID feedback lost 27: operation status (inching without output) 28: communication setting (address 2007h)	1	×
F05.02	Relay 1 output function		2 11	× ×
F05.04	Y1 output delay time	0.0～6000.0s	0.0s	Δ
F05.06	R1 output delay time	0.0～6000.0s	0.0s	Δ
F05.08	Enabled state of digital output	Unit's place: Y1 0: Positive logic 1: Negative logic Ten's place: Y2 (same as unit's place)	0000	×

		Hundred's place: Relay 1 output (same as unit's place) Thousand's place: Relay 2 output (same as unit's place)		
F05.09	Detection width of frequency attained	0.00～20.00Hz	5.00Hz	×
F05.10	FDT1 upper bound	0.00～Fmax	30.00Hz	×
F05.11	FDT1 lower bound	0.00～Fmax	30.00Hz	×
F05.12	FDT2 upper bound	0.00～Fmax	30.00Hz	×
F05.13	FDT2 lower bound	0.00～Fmax	30.00Hz	×
F05.14	Consecutive running time	0.0～6000.0Min 0.0:Disabled	0.0Min	×
F05.15	Accumulative power-on time setting	0～65535h 0:Disabled	0h	×
F05.16	Accumulative running time setting	0～65535h 0:Disabled	0h	×
F05.17	Brake control selection	0: Disabled 1: Enabled	0	×
F05.18	Brake opened frequency	Closed frequency ~30.00Hz	2.50Hz	×
F05.19	Brake opened current	0.0~200.0%	0.0%	Δ
F05.20	Brake open waiting time	0.00~10.00s	0.00s	×
F05.21	Brake open operating time	0.00~10.00s	0.50s	×
F05.22	Brake closed frequency	0.00Hz~opened frequency	2.00Hz	×
F05.23	Brake close waiting time	0.00~10.00s	0.00s	×
F05.24	Brake close operating time	0.00~10.00s	0.50s	×
Group F06 Analog and Pulse Input				
F06.00	Minimum input of curve AI1	0.0%～input of inflection point1 of curve AI1	1.0%	Δ
F06.01	Set value corresponding to minimum input of curve AI1	-100.0～100.0%	0.0%	Δ
F06.02	Input of inflection point 1 of curve AI1	Minimum input of curve AI1～Input of inflection point 2 of curve AI1	100.0%	Δ
F06.03	Set value corresponding to input of inflection point 1 of curve AI1	-100.0～100.0%	100.0%	Δ
F06.04	Input of inflection point 2 of curve AI1	Input of inflection point 1 of curve AI1～Maximum input of curve AI1	100.0%	Δ
F06.05	Set value corresponding to input of inflection point 2 of curve AI1	-100.0～100.0%	100.0%	Δ
F06.06	Maximum input of curve AI1	Input of inflection point 2 of curve AI1～100.0%	100.0%	Δ
F06.07	Set value corresponding to maximum input of curve AI1	-100.0～100.0%	100.0%	Δ
F06.08	Minimum input of curve AI2	0.0%～input of inflection point1 of curve AI2	1.0%	Δ
F06.09	Set value corresponding to minimum input of curve AI2	-100.0～100.0%	0.0%	Δ

F06.10	Input of inflection point 1 of curve AI2	Minimum input of curve AI1～Input of inflection point 2 of curve AI2	100.0%	Δ
F06.11	Set value corresponding to input of inflection point 1 of curve AI2	-100.0～100.0%	100.0%	Δ
F06.12	Input of inflection point 2 of curve AI2	Input of inflection point 1 of curve AI2～Maximum input of curve AI2	100.0%	Δ
F06.13	Set value corresponding to input of inflection point 2 of curve AI2	-100.0～100.0%	100.0%	Δ
F06.14	Maximum input of curve AI2	Input of inflection point A of curve AI2～100.0%	100.0%	Δ
F06.15	Set value corresponding to maximum input of curve AI2	-100.0～100.0%	100.0%	Δ
F06.24	Minimum input of curve keypad potentiometer	0.0～Maximum input of curve keypad potentiometer	0.1%	Δ
F06.25	Set value corresponding to minimum input of curve keypad potentiometer	-100.0～100.0%	0.0%	Δ
F06.26	Maximum input of curve keypad potentiometer	Minimum input of curve keypad potentiometer～100.0	99.9%	Δ
F06.27	Set value corresponding to maximum input of curve keypad potentiometer	-100.0～100.0%	100.0%	Δ
F06.28	AI1 terminal filtering time	0.000～10.000s	0.100s	Δ
F06.29	AI2 terminal filtering time	0.000～10.000s	0.100s	Δ
F06.31	Keypad potentiometer filtering time	0.000～10.000s	0.100s	Δ
F06.32	Minimum input of curve HI	0.00 kHz～Maximum input of curve HI	0.00kHz	Δ
F06.33	Set value corresponding to minimum input of curve HI	-100.0～100.0%	0.0%	Δ
F06.34	Maximum input of curve HI	Minimum input of curve HI～100.00kHz	50.00kHz	Δ
F06.35	Set value corresponding to maximum input of curve HI	-100.0～100.0%	100.0%	Δ
F06.36	HI terminal filtering time	0.000～10.000s	0.100s	Δ
Group F07 Analog and Pulse Output				
F07.00	AO1 output function	00: No output 01: Output frequency 02: Command frequency 03: Output current 04: Output voltage 05: Output power 06: Bus voltage 07: +10V 08: keypad potentiometer 09: AI1 10: AI2 12: HI 13: Reserved 14:Communication given output	1	×

F07.03	AO1 offset	-100.0～100.0%	0.0%	△
F07.04	AO1 gain	-2.000～2.000	1.000	△
F07.05	AO1 filtering time	0.000～10.000s	0.000s	△
Group F08 Parameters of Motor 1				
F08.00	Motor 1 type selection	0: Three phase asynchronous motors 1: Reserved 2: Single phase asynchronous motors（Remove capacity） 3: Single phase asynchronous motors（No need to remove capacity）	0	×
F08.01	Power rating of motor 1	0.1～1000.0kW	Model defined	×
F08.02	Rated voltage of motor 1	60～660V	Model defined	×
F08.03	Rated current of motor 1	0.1～1500.0A	Model defined	×
F08.04	Rated frequency of motor 1	20.00～Fmax	Model defined	×
F08.05	Rated speed of motor 1	1～30000	Model defined	×
F08.08	Stator resistance R1 of async motor 1	0.001～65.535Ω	Model defined	×
F08.09	Rotor resistance R2 of async motor 1	0.001～65.535Ω	Model defined	×
F08.10	Leakage inductance L1 of async motor 1	0.01～655.35mH	Model defined	×
F08.11	Mutual inductance L2 of asynchronous motor 1	0.1～6553.5mH	Model defined	×
F08.12	No-load current of async motor 1	0.1～1500.0A	Model Defined	×
F08.13	Field weakening coeff 1 of async motor 1	0.0～100.0	87%	×
F08.14	Field weakening coeff 2 of async motor 1	0.0～100.0	75%	×
F08.15	Field weakening coeff 3 of async motor 1	0.0～100.0	70%	×
F08.21	Motor's pole number	0～1000	4	⊙
F08.30	Autotuning of motor 1	0: No auto tuning 1: Static auto tuning of motor 2: Rotary auto tuning of motor	0	×
Group F09 V/f Control Parameters of Motor 1				
F09.00	V/f curve setting	0: Linear V/f 1: Multi-stage V/f 2:1.2nd power V/F 3:1.4th power V/F 4:1.6th power V/F 5:1.8th power V/F 6: 2.0nd power V/F	0	×
F09.01	Torque boost	0.1%–30.0% 0.0% (fixed torque boost)	0.0%	△
F09.02	Cut-off frequency of torque boost	0.00～Fmax	50.00Hz	△
F09.03	Multi-point V/F frequency 1(F1)	0.00～F09.05	0.00Hz	△

F09.04	Multi-point V/F voltage 1 (V1)	0.0～100.0	0.0%	Δ
F09.05	Multi-point V/F frequency 2(F2)	F09.03～F09.05	5.00Hz	Δ
F09.06	Multi-point V/F voltage 2 (V2)	0.0～100.0	14.0%	Δ
F09.07	Multi-point V/F frequency 3(F3)	F09.05～F09.09	25.00Hz	Δ
F09.08	Multi-point V/F voltage 3 (V3)	0.0～100.0	50.0%	Δ
F09.09	Multi-point V/F frequency 4(F4)	F09.07～rated motor frequency	50.00Hz	Δ
F09.10	Multi-point V/F voltage 4 (V4)	0.0～100.0 Ue=100.0%	100.0%	Δ
F09.11	V/F slip compensation gain	0.0～300.0%	80.0%	Δ
F09.12	Stator voltage drop compensation gain	0.0～200.0%	100.0%	Δ
F09.13	Excitation boost gain	0.0～200.0%	150.0%	Δ
F09.14	Oscillation Suppression	0.0～300.0%	100.0%	Δ
F09.18	Set the IQ filter time below 0.5Hz in VVF mode	F09.19～3000ms	500ms	×
F09.19	Set the IQ filter time above 2Hz in VVF mode	1ms～F09.18	100ms	×
F09.20	Torque revision when run forward	0.0～5.0%	0.0%	Δ
F09.21	Torque revision when run reverse	0.0～5.0%	1.0%	Δ
Group F10 Vector Control Parameters of Motor 1				
F10.00	Speed/torque control	0: speed control 1: torque control	0	×
F10.01	ASR low-speed proportional gain Kp1	0.0～100.0	15.0	Δ
F10.02	ASR low-speed integration time Ti1	0.001～30.000s	0.100s	Δ
F10.03	ASR switching frequency 1	0.00～F10.06	5.00Hz	Δ
F10.04	ASR high-speed proportional gain Kp2	0.0～100.0	10.0	Δ
F10.05	ASR high-speed integration time Ti2	0.001～30.000s	0.500s	Δ
F10.06	ASR switching frequency 2	F10.03～Fmax	10.00Hz	Δ
F10.07	ASR input filtering time	0.0～500.0ms	0.3ms	Δ
F10.08	ASR output filtering time	0.0～500.0ms	0.0ms	Δ
F10.09	Vector control slip gain	50～200%	100%	Δ
F10.10	Digital setting of torque upper limit in speed control mode	80.0～200.0%	165.0%	×
F10.11	Excitation adjustment proportional gain Kp1	0.00～10.00	0.50	Δ
F10.12	Excitation adjustment integral gain Ti1	0.0～3000.0ms	10.0ms	Δ
F10.13	Torque adjustment proportional gain Kp2	0.00～10.00	0.50	Δ
F10.14	Torque adjustment integral	0.0～3000.0ms	10.0ms	Δ

	gain Ti2			
F10.15	Excitation gain coefficient	50.0~200%	100%	Δ
F10.16	Torque setting source under torque control	0: Set by F10.17 1: Keypad potentiometer 2: AI1 3: AI2 5: Pulse setting (DI7/HI) 6: Communication setting	0	×
F10.17	Digital setting of torque	-200.0～200.0%	150.0%	Δ
F10.18	Forward speed limited value under torque control	0.00～Fmax	50.00Hz	Δ
F10.19	Reverse speed limited value under torque control	0.00～Fmax	50.00Hz	Δ
F10.20	Set torque accel time	0.0～6000.0s	0.0s	Δ
F10.21	Set torque decel time	0.0～6000.0s	0.0s	Δ
F10.22	Static friction torque compensation	0.0～100.0%	5.00%	Δ
F10.23	Static friction frequency range	0.00～20.00Hz	1.00Hz	Δ
F10.24	Sliding friction torque compensation	0.0～100.0%	1.0%	Δ
F10.25	SVC optimization method	0: Optimized Mode 0 1: Optimized Mode 1 2: Optimized Mode 2	1	×
F10.26	Max Frequency source under torque control	0: Set by F10.18 & F10.19 1: Keypad potentiometer 2: AI1 3: AI2 5: Pulse setting (DI7/HI)	0	×
Group F11 Protection Parameters				
F11.00	Current limit control	0: Current limit disabled 1: Current limit mode 1 2: Current limit mode 2	2	×
F11.01	Current limit	100.0～200.0%	150.0%	×
F11.02	Frequency decreasing time(limit current in constant speed operation)	0.0～6000.0s	5.0s	Δ
F11.03	Current limit mode 2 proportion gain	0.1～100.0%	3.0%	Δ
F11.04	Current limit mode 2 integral time	0.00～10.00s	10.00s	Δ
F11.05	Overvoltage Stall Control	0: Overvoltage stall disabled 1: Overvoltage stall mode 1 2: Overvoltage stall mode 2	2	×
F11.06	Overvoltage Stall Voltage	600～800V	730V	×
F11.07	Overvoltage Stall Mode 2 Proportion Gain	0.0～100.0%	50.0%	Δ
F11.08	Overvoltage stall mode 2 frequency limit	0.00～50.00Hz	5.00Hz	×
F11.10	Protection action 1	Unit's place: Bus under-voltage 0: Fault reported and coast to stop 1: Stop according to the stop mode 2: Fault reported but continue to	03330	×

		run 3: Fault protection disabled		
		Ten's place: Power input phase Loss (Err09)(Same as unit's place)		
		Hundred's place: Power output phase loss(Err10)(Same as unit's place)		
		Thousand's place: Motor overload (Err11)(Same as unit's place)		
		Ten thousand's place: Inverter overload(Err11)(Same as unit's place)		
F11.11	Protection action 2	External equipment fault（Err13) 0: Fault reported and coast to stop 1: Stop according to the stop mode 2: Fault reported but continue to run	00000	×
		Ten's place: EEPROM read/write fault (Err15) (Same as unit's place)		
		Hundred's place: Communication overtime error (Err18) (Same as unit's place)		
		Thousand's place: PID feedback loss (Err19) (Same as unit's place)		
		Ten thousand's place: Continuous running time reached (Err20) (Same as unit's place)		
F11.12	Protection action 3	Unit's place: Module temperature detection disconnection（Err24) 0: Fault reported and coast to stop 1: Stop according to the stop mode 2: Fault reported but continue to run	00030	×
		Ten's place: Load becoming 0 (Err25) (Same as unit's place)		
F11.14	Frequency selection for continuing to run upon fault	0: Current running frequency	1	×
		1: Set frequency		
		2: Frequency upper limit		
		3: Frequency lower limit		
		4: Backup frequency upon Abnormality		
F11.15	Backup frequency upon abnormality	0.00～Fmax	0.00Hz	×
F11.17	Motor overload protection time	30.0～300.0s	60.0s	×
F11.18	Overload alarm	Unit's place: detection option: 0: Always detect 1: Detect at constant speed only	00000	×

		Ten's place : compared object 0: Rated current of motor 1: Rated current of drive Hundred's place: report fault or not 0: Not report fault 1: Report fault 2:Show warning Thousand's place: deceleration or not 0: Deceleration 1: Not deceleration Ten thousand's place: given mode for overload threshold 0: F11.19 set 1: F11.19*VP 2: F11.19*AI1 3: F11.19*AI2 4: F11.19*AI3		
F11.19	Overload alarm threshold	0.0～200.0%	130.0%	×
F11.20	Overload alarm activated time that exceeding threshold	0.1～60.0s	5.0s	×
F11.21	Inverter overheat warning threshold	50.0℃～over heat temperature	Base on model	×
F11.22	Detection level of power loss	5.0～100.0%	20.0%	×
F11.23	Detection time of power loss	0.1～60.0s	5.0s	×
F11.24	Action selection at instantaneous power failure	0: Disabled 1: Deceleration 2: Bus voltage constant control	1	×
F11.25	Decel time at instantaneous power failure	0.0～6000.0s	5.0s	Δ
F11.26	Rapid current limit	0: Disabled 1: Enabled	0	×
F11.27	Times of automatic reset	0～20	0	×
F11.28	Interval of automatic reset	0.1～100.0s	1.0s	×
F11.29	DO action during fault auto reset	0: Not act 1: Act	0	×
F11.30	Instantaneous power off bus voltage	60.0%～Recovery voltage	80.0%	Δ
F11.31	Instantaneous power off recovery voltage	Power off voltage～100.0%	85.0%	Δ
F11.32	Instantaneous power off voltage judge time	0.01～10.00s	0.10s	Δ
F11.33	Instantaneous power off gain Kp	0.1～100.0%	40.0%	Δ
F11.34	Instantaneous integration time Ti	0.00～10.00s （0.00:Integration invalid）	0.10s	Δ
Group F12: Multi-Reference and Simple PLC Function				
F12.00	Reference 0	-100.0～100.0%	0.0%	Δ

F12.01	Reference 1	-100.0～100.0%	0.0%	Δ
F12.02	Reference 2	-100.0～100.0%	0.0%	Δ
F12.03	Reference 3	-100.0～100.0%	0.0%	Δ
F12.04	Reference 4	-100.0～100.0%	0.0%	Δ
F12.05	Reference 5	-100.0～100.0%	0.0%	Δ
F12.06	Reference 6	-100.0～100.0%	0.0%	Δ
F12.07	Reference 7	-100.0～100.0%	0.0%	Δ
F12.08	Reference 8	-100.0～100.0%	0.0%	Δ
F12.09	Reference 9	-100.0～100.0%	0.0%	Δ
F12.10	Reference 10	-100.0～100.0%	0.0%	Δ
F12.11	Reference 11	-100.0～100.0%	0.0%	Δ
F12.12	Reference 12	-100.0～100.0%	0.0%	Δ
F12.13	Reference 13	-100.0～100.0%	0.0%	Δ
F12.14	Reference 14	-100.0～100.0%	0.0%	Δ
F12.15	Reference 15	-100.0～100.0%	0.0%	Δ
F12.16	Reference 0 source	0: Digital setting（F12.00) 1: keypad potentiometer 2: AI1 3: Process PID output 4: X7/HI pulse input 5: AI2	0	×
F12.17	Running mode of simple PLC	Unit's place: PLC running mode 0: Stop after a single cycle 1: Continue to run with the last frequency after a single cycle 2: Repeat cycles Ten's place: started mode 0: Continue to run from the step of stop (or fault) 1: Run from the first step " multi-step frequency 0" 2: Restart from eighth step 3: Restart from eighth step Hundreds place: power loss memory 0: Memory disabled on power loss 1: Memory enabled on power loss Thousands place: unit of simple PLC running time 0: Second (s) 1: Minute (min)	0000	×
F12.18	Running time of step 0	0.0～6000.0s(h)	0.0s(h)	Δ
F12.19	Running time of step 1	0.0～6000.0s(h)	0.0s(h)	Δ
F12.20	Running time of step 2	0.0～6000.0s(h)	0.0s(h)	Δ
F12.21	Running time of step 3	0.0～6000.0s(h)	0.0s(h)	Δ
F12.22	Running time of step 4	0.0～6000.0s(h)	0.0s(h)	Δ
F12.23	Running time of step 5	0.0～6000.0s(h)	0.0s(h)	Δ
F12.24	Running time of step 6	0.0～6000.0s(h)	0.0s(h)	Δ
F12.25	Running time of step 7	0.0～6000.0s(h)	0.0s(h)	Δ
F12.26	Running time of step 8	0.0～6000.0s(h)	0.0s(h)	Δ
F12.27	Running time of step 9	0.0～6000.0s(h)	0.0s(h)	Δ

F12.28	Running time of step 10	0.0～6000.0s(h)	0.0s(h)	Δ
F12.29	Running time of step 11	0.0～6000.0s(h)	0.0s(h)	Δ
F12.30	Running time of step 12	0.0～6000.0s(h)	0.0s(h)	Δ
F12.31	Running time of step 13	0.0～6000.0s(h)	0.0s(h)	Δ
F12.32	Running time of step 14	0.0～6000.0s(h)	0.0s(h)	Δ
F12.33	Running time of step 15	0.0～6000.0s(h)	0.0s(h)	Δ
F12.34	Acceleration/deceleration time of simple PLC reference 0	0～3	0	Δ
F12.35	Acceleration/deceleration time of simple PLC reference 1	0～3	0	Δ
F12.36	Acceleration/deceleration time of simple PLC reference 2	0～3	0	Δ
F12.37	Acceleration/deceleration time of simple PLC reference 3	0～3	0	Δ
F12.38	Acceleration/deceleration time of simple PLC reference 4	0～3	0	Δ
F12.39	Acceleration/deceleration time of simple PLC reference 5	0～3	0	Δ
F12.40	Acceleration/deceleration time of simple PLC reference 6	0～3	0	Δ
F12.41	Acceleration/deceleration time of simple PLC reference 7	0～3	0	Δ
F12.42	Acceleration/deceleration time of simple PLC reference 8	0～3	0	Δ
F12.43	Acceleration/deceleration time of simple PLC reference 9	0～3	0	Δ
F12.44	Acceleration/deceleration time of simple PLC reference 10	0～3	0	Δ
F12.45	Acceleration/deceleration timeof simple PLC reference 11	0～3	0	Δ
F12.46	Acceleration/deceleration time of simple PLC reference 12	0～3	0	Δ
F12.47	Acceleration/deceleration time of simple PLC reference 13	0～3	0	Δ
F12.48	Acceleration/deceleration time of simple PLC reference 14	0～3	0	Δ
F12.49	Acceleration/deceleration time of simple PLC reference 15	0～3	0	Δ
F12.50	UP/DOWN function selection of Multi-reference	Unit's place: Action selection when power off 0:Zero clearing when power off	00	×

		1:Hold when power off Ten's place: select if it can be reduced to negative 0:Disable 1:Enable		
F12.51	UP/DOWN speed of Multi-reference	0.0～100.0% (0.0%Invalid)	0.0%	Δ
Group F13 Process PID				
F13.00	PID setting	0: F13.01 digital setting 1: keypad potentiometer 2: AI1 3: Communication 4: Multi-Reference 5: DI7/HI pulse input 6: AI2	0	×
F13.01	PID digital setting	0.0～100.0%	50.0%	Δ
F13.02	PID feedback	0: AI1 1: AI2 2: Communication 3: AI1+AI2 4: AI1-AI2 5: Max{AI1，AI2} 6: Min{AI1，AI2} 7: DI7/HI pulse input	0	×
F13.03	PID setting feedback range	0.0～6000.0	100.0	Δ
F13.04	PID action direction	0: Forward action 1: Reverse action	0	×
F13.05	Filtering time of PID setting	0.000～10.000s	0.000s	Δ
F13.06	Filtering time of PID feedback	0.000～10.000s	0.000s	Δ
F13.07	Filtering time of PID output	0.000～10.000s	0.000s	Δ
F13.08	Proportional gain Kp1	0.0～100.0	1.0	Δ
F13.09	Integration time Ti1	0.01～10.00s	0.10s	Δ
F13.10	Differential time Td1	0.000～10.000s	0.000s	Δ
F13.17	PID offset limit	0.0～100.0%	1.0%	×
F13.22	PID output frequency upper limit	PID output frequency lower limit～100.0%（100.0% corresponds to maximum frequency ）	100.0%	×
F13.23	PID output frequency lower limit	–100.0%～PID output frequency lower limit	0.0%	×
F13.24	Low value of PID feedback loss	0.1～100.0% 0.0%: Not judging feedback loss	0.0%	×
F13.25	Detection time for low value of PID feedback loss	0.0～30.0s	1.0s	×
F13.26	PID operation at stop	Unit's place: PID operation selection when stop 0:Do not operate when stop 1:Operate when stop Ten's place: output is limited by output frequency 0:No limited	00000	×

		1:limited Hundred's place: UP/DOWN digital given of PID 0:Zero clearing when power off 1:Hold when power off Thousand's place: PID feedback loss detection when stop 0:Not detect when stop 1:detect when stop Then thousand's place: action for PID feedback loss 0:Report fault 1:Ramp to stop		
F13.27	UP/DWON speed of PID digital given	0.0～100.0% (0.0% Invalid)	0.0%	Δ
F13.28	High value of PID feedback loss	0.1～100.0% 0.0%: Not judging feedback loss	100.0%	×
F13.29	Detection time for high value of PID feedback loss	0.0～30.0s	1.0s	×
F13.30	PID upper limit source	0:F13.22 1:F13.22*VP 2:F13.22*AI1 3:F13.22*AI2 4:F13.22*HI 5:F13.22*AI3	0	×
F13.31	PID lower limit source	0:F13.23 1:F13.23*VP 2:F13.23*AI1 3:F13.23*AI2 4:F13.23*HI 5:F13.23*AI3	0	×
Group F14: Swing Frequency, Fixed Length , Wakeup and Count				
F14.00	Swing frequency setting mode	0: Relative to the setting frequency 1: Relative to the maximum frequency	0	×
F14.01	Swing frequency amplitude	0.0～100.0%	0.0%	Δ
F14.02	Jump frequency amplitude	0.0～50.0%	0.0%	Δ
F14.03	Rising Time of Swing frequency	0.0～6000.0s	5.0s	Δ
F14.04	Dropping Time of Swing frequency	0.0～6000.0s	5.0s	Δ
F14.05	Set length	0m～65535m	1000m	×
F14.06	Number of pulses per meter	0.1～6553.5	100.0	×
F14.07	Command when the length attained	Unit's place: stop when the length reaches 0: Not stop 1: Stop Ten's place: length calculation method 0: pulse by pulse 1: Reference maximum frequency	00	×

		2: Refer to Ai1 channel 3: Refer to AI2 channel 4: Refer to AI3 channel		
F14.08	Set count value	1～65535	1000	×
F14.09	Designated count value	1～65535	1000	×
F14.10	Wakeup frequency	Dormant frequency (F14.12)～Fmax	0.00Hz	Δ
F14.11	Wakeup delay time	0.0～6000.0s	0.0s	Δ
F14.12	Dormant frequency	0.00～Wakeup frequency	0.00Hz	Δ
F14.13	Dormant delay time	0.0～6000.0s	0.0s	Δ
F14.14	Wake up mode selection	0: Frequency 1: Pressure	0	×
F14.15	Dormancy mode selection	0: Frequency 1: Pressure	0	×
F14.16	Voltage feedback source	Unit's place: pressure feedback channel 0: AI1 1: AI2 2: DI7/HI pulse input Ten's place: pressure dormancy mode 0:Positive direction, dormancy on big pressure and wakeup on small pressure 1:Negative direction, dormancy on small pressure and wakeup on big pressure	00	×
F14.17	Wake up pressure	0.0%～Dormancy pressure	10.0%	Δ
F14.18	Dormancy pressure	Wake up pressure～100.0%	50.0%	Δ
Group F15: Communication Parameters				
F15.00	Baud rate	0: 4800bps 1: 9600bps 2: 19200bps 3: 38400bps 4: 57600bps 5: 115200bps	1	×
F15.01	Data format	No check, data format (1-8-N-2) for RTU 1: Even parity check, data format (1-8-E-1) for RTU 2: Odd Parity check, data format (1-8-O-1) for RTU 3: No check, data format(1-8-N-1) for RTU	0	×
F15.02	Local address	1～247　　0: Broadcast address	1	×
F15.03	Communication timeout	0.0～60.0s	0.0s	×
F15.04	Response time delay	0～200ms	1ms	×
F15.05	Master-slave Communication Mode	0:The inverter is the slave 1:The inverter is the master	0	×
F15.06	The Master Communication Sending Data	0: Set frequency 1: Current running frequency	0	×
F15.07	Information return when communication error	Range:0～1	1	Δ
F15.08	Group U00.00 output	0: Positive and negative value	0	Δ

	frequency numerical attribute	1: Absolute value		
Group F16 Keys and Display of Keypad Parameters				
F16.00	MF.K key setting	0: No function 1: Jog 2: Forward/reverse switchover 3: Run command sources shifted 4: Jog reverse	1	×
F16.01	Function of STOP/RST key	Unit's place: Function selection of STOP/RESET key 0: stop function of STOP/RESET key is valid only in keyboard operation mode 1: Stop function of STOP/RES key is valid in any operation mode Ten's place: Speed display（U00.05） 0: According to the actual speed 1: Multiply frequency by speed coefficient(F16.11) Hundred's place: Decimal places 0: No decimal places 1: One decimal places 2: Two decimal places 3: Three decimal places	1	×
F16.02	Keys locked option	0: Not locked 1: Full locked 2: Keys locked other than RUN, STOP/RST 3: Keys locked other than STOP/RST 4: Keys locked other than >>	0	×
F16.03	LED displayed parameters setting 1 on running status	0～99(correspond U00.00～U00.99)	0	Δ
F16.04	LED displayed parameters setting 2 on running status	0～99(correspond U00.00～U00.99)	6	Δ
F16.05	LED displayed parameters setting 3 on running status	0～99(correspond U00.00～U00.99)	3	Δ
F16.06	LED displayed parameters setting 4 on running status	0～99(correspond U00.00～U00.99)	2	Δ
F16.07	LED displayed parameters setting 1 on stop status	0～99(correspond U00.00～U00.99)	1	Δ
F16.08	LED displayed parameters setting 2 on stop status	0～99(correspond U00.00～U00.99)	6	Δ
F16.09	LED displayed parameters setting 3 on stop status	0～99(correspond U00.00～U00.99)	15	Δ
F16.10	LED displayed parameters setting 4 on stop status	0～99(correspond U00.00～U00.99)	16	Δ
F16.11	Speed display coefficient	0.00~100.00	1.00	Δ
F16.12	Power display coefficient	0.0~300.0%	100.0%	Δ
F16.13	The enable difference range of U00.00 and U00.01	0.00Hz~5.00Hz	0.10Hz	Δ
Group F17 User-defined Display Parameters				
F17.00	User-defined Display	00.00～49.99	00.03	Δ

	Parameter 0			
F17.01	User-defined Display Parameter 1	00.00～49.99	01.01	Δ
F17.02	User-defined Display Parameter 2	00.00～49.99	01.02	Δ
F17.03	User-defined Display Parameter 3	00.00～49.99	01.08	Δ
F17.04	User-defined Display Parameter 4	00.00～49.99	01.09	Δ
F17.05	User-defined Display Parameter 5	00.00～49.99	02.00	Δ
F17.06	User-defined Display Parameter 6	00.00～49.99	02.01	Δ
F17.07	User-defined Display Parameter 7	00.00～49.99	02.12	Δ
F17.08	User-defined Display Parameter 8	00.00～49.99	03.00	Δ
F17.09	User-defined Display Parameter 9	00.00～49.99	03.01	Δ
F17.10	User-defined Display Parameter 10	00.00～49.99	04.00	Δ
F17.11	User-defined Display Parameter 11	00.00～49.99	04.01	Δ
F17.12	User-defined Display Parameter 12	00.00～49.99	04.02	Δ
F17.13	User-defined Display Parameter 13	00.00～49.99	04.03	Δ
F17.14	User-defined Display Parameter 14	00.00～49.99	05.02	Δ
F17.15	User-defined Display Parameter 15	00.00～49.99	08.01	Δ
F17.16	User-defined Display Parameter 16	00.00～49.99	08.02	Δ
F17.17	User-defined Display Parameter 17	00.00～49.99	08.03	Δ
F17.18	User-defined Display Parameter 18	00.00～49.99	08.04	Δ
F17.19	User-defined Display Parameter 19	00.00～49.99	08.05	Δ
F17.20	User-defined Display Parameter 20	00.00～49.99	08.30	Δ
F17.21	User-defined Display Parameter 21	00.00～49.99	11.10	Δ
F17.22	User-defined Display Parameter 22	00.00～49.99	13.00	Δ
F17.23	User-defined Display Parameter 23	00.00～49.99	13.01	Δ
F17.24	User-defined Display Parameter 24	00.00～49.99	13.02	Δ
F17.25	User-defined Display Parameter 25	00.00～49.99	13.08	Δ
F17.26	User-defined Display Parameter 26	00.00～49.99	13.09	Δ
F17.27	User-defined Display Parameter 27	00.00～49.99	00.00	Δ
F17.28	User-defined Display Parameter 28	00.00～49.99	00.00	Δ

F17.29	User-defined Display Parameter 29	00.00～49.99	00.00	△
F22Group:Virtual IO				
F22.00	Function selection of virtual VDI1 terminal	The same as function code F04.00	0	×
F22.01	Function selection of virtual VDI2 terminal	The same as function code F04.00	0	×
F22.02	Function selection of virtual VDI3 terminal	The same as function code F04.00	0	×
F22.03	Function selection of virtual VDI4 terminal	The same as function code F04.00	0	×
F22.04	Function selection of virtual VDI5 terminal	The same as function code F04.00	0	×
F22.05	Valid status setting mode of virtual VDI terminals	VDI5、VDI4、VDI3、VDI2、VDI1 0:Validity of VDI depends on virual VDOx's status 1:Validity of VDI set by function code F22.06	00000	×
F22.06	Settings of virtual VDI terminal status	VDI5、VDI4、VDI3、VDI2、VDI1 0: Invalid 1: Valid	00000	△
F22.07	Function selection of virtual VDO1 terminals output	0 : Internal short circuited to physics DIx Other: The same as function code F05.00	0	△
F22.08	Function selection of virtual VDO2 terminals output	0 : Internal short circuited to physics DIx Other: The same as function code F05.00	0	△
F22.09	Function selection of virtual VDO3 terminals output	0 : Internal short circuited to physics DIx Other: The same as function code F05.00	0	△
F22.10	Function selection of virtual VDO4 terminals output	0 : Internal short circuited to physics DIx Other: The same as function code F05.00	0	△
F22.11	Function selection of virtual VDO5 terminals output	0 : Internal short circuited to physics DIx Other: The same as function code F05.00	0	△
F22.12	Virtual VDO1 output delay time	0.0s~6000.0s	0.0s	△
F22.13	Virtual VDO2 output delay time	0.0s~6000.0s	0.0s	△
F22.14	Virtual VDO3 output delay time	0.0s~6000.0s	0.0s	△
F22.15	Virtual VDO4 output delay time	0.0s~6000.0s	0.0s	△
F22.16	Virtual VDO5 output delay time	0.0s~6000.0s	0.0s	△
F22.17	VDO output terminal positive and negative logic	VDO5、VDO4、VDO3、VDO2、VDO1 0: Positive logic 1: Negative logic	00000	△
Group U00 Status Monitoring				

U00.00	Running frequency	0.00～Fup	0.00Hz	⊙
U00.01	Set frequency	0.00～Fmax	0.00Hz	⊙
U00.02	Output voltage	0～660V	0.0V	⊙
U00.03	Output current	0.0～3000.0A	0.0A	⊙
U00.04	Output power	0.0～3000.0kW	0.0kW	⊙
U00.05	Estimated Motor Speed	0～60000rpm	0rpm	⊙
U00.06	Bus voltage	0～1200V	0V	⊙
U00.07	Synchronous Frequency	0.00～Fup	0.00Hz	⊙
U00.08	PLC step	0～15	0	⊙
U00.09	Program Operation Time	0.0～6000.0s(h)	0.0s(h)	⊙
U00.10	PID set	0～60000	0	⊙
U00.11	PID feedback	0～60000	0	⊙
U00.12	Status of DI1～DI5 digital input terminal	DI5 DI4 DI3 DI2 DI1	00000	⊙
U00.13	Status of DI6～DI7 digital input terminal	DI7 DI6	00	⊙
U00.14	Status of digital output terminal	R2 R1 Y2 Y1	0000	⊙
U00.15	AI1 input	0.0～100.0%	0.0%	⊙
U00.16	AI2 input	0.0～100.0%	0.0%	⊙
U00.18	Keypad potentiometer input	0.0～100.0%	0.0%	⊙
U00.19	HI input	0.00～100.00kHz	0.00kHz	⊙
U00.20	AO1 output	0.0～100.0%	0.0%	⊙
U00.23	Temperature of inverter	-40.0℃～120.0℃	0.0℃	⊙
U00.24	Accumulative power-on time	0～65535min	0min	⊙
U00.25	Accumulative running time	0～6553.5min	0.0min	⊙
U00.26	Cumulative power-on time	0～65535h	0h	⊙
U00.27	Cumulative running time	0～65535h	0h	⊙
U00.28	Count value	0～65535	0	⊙
U00.29	Length value	0～65535m	0m	⊙
U00.35	Power consumption	0～65535kWh	0kWh	⊙
U00.36	VDI1～VDI5 input status	VDI5 VDI4 VDI3 VDI2 VDI1	00000	⊙
U00.37	VDO1～VDO5output status	VDO5 VDO4 VDO3 VDO2 VDO1	00000	⊙
U00.38	High speed pulse X7 or the line number of extension card monitoring	0～65535	0	⊙
Group U01 Fault Record				
U01.00	Code of the latest fault	Err00: No fault Err01: Accel overcurrent Err02: Decel overcurrent Err03: Constant-speed overcurrent Err04: Accel overvoltage Err05: Decel overvoltage Err06: Constant-speed overvoltage Err07: Bus undervoltage Err08: Short circuit Err09: Power input phase loss Err10: Power output phase loss	Err00	⊙

		Err11: Motor overload Err12: Inverter overload Err13: External equipment fault Err14: Module overheat Err15: EEPROM read/write fault Err16: Motor auto-tuning cancelled Err17: Motor auto-tuning fault Err18: Communication overtime Error Err19: PID feedback loss Err20: Continuous running time Reached Err21: Parameter upload fault Err22: Parameter download fault Err23: Braking unit fault Err24: Module temperature detection disconnection Err25: Load becoming 0 Err26: With-wave current limit fault Err27: Inverter soft-start relay is off Err28: EEPROM version is not compatible Err29: reserved Err30: reserved Err41: Overload warning Err42: Pulse feedback disconnection		
U01.01	Running frequency when the latest fault occurred	0.00～Fup	0.00Hz	⊙
U01.02	Output current when the latest fault occurred	0.0～3000.0A	0.0A	⊙
U01.03	Bus voltage when the latest fault occurred	0～1200V	0V	⊙
U01.04	Cumulative running time when the latest fault occurred	0～65535h	0h	⊙
U01.05	Code of previous fault	Same as U01.00	Err00	⊙
U01.06	Running frequency when previous fault occurred	0.00～Fup	0.00Hz	⊙
U01.07	Output current when previous fault occurred	0.0～3000.0A	0.0A	⊙
U01.08	Bus voltage when previous fault occurred	0～1200V	0V	⊙
U01.09	Cumulative running time when previous fault occurred	0～65535h	0h	⊙
U01.10	Before-previous fault code	Same as U01.00	Err00	⊙
U01.11	Running frequency when before-previous fault occurred	0.00～Fup	0.00Hz	⊙
U01.12	Output current when before-previous fault occurred	0.0～3000.0A	0.0A	⊙

U01.13	Bus voltage when before-previous fault occurred	0～1200V	0V	⊙
U01.14	Cumulative running time when before-previous fault occurred	0～65535h	0h	⊙
U01.15	Previous 3 categories of faults	The same with U01.00	Err00	⊙
U01.16	Previous 4 categories of faults	The same with U01.00	Err00	⊙
U01.17	Previous 5 categories of faults	The same with U01.00	Err00	⊙
U01.18	Previous 6 categories of faults	The same with U01.00	Err00	⊙
U01.19	Previous 7 categories of faults	The same with U01.00	Err00	⊙
U01.20	Previous 8 categories of faults	The same with U01.00	Err00	⊙
U01.21	Previous 9 categories of faults	The same with U01.00	Err00	⊙
U01.22	Previous 10 categories of faults	The same with U01.00	Err00	⊙
U01.23	Previous 11 categories of faults	The same with U01.00	Err00	⊙
U01.24	Previous 12 categories of faults	The same with U01.00	Err00	⊙
U01.25	Previous 13 categories of faults	The same with U01.00	Err00	⊙
Group H00 Pulse Feedback Function				
H00.00	Special purpose function enable	0: Invalid 1:Valid	0	×
H00.01	Pulse number per revolution	1～10000	600	△
H00.02	Motor pole number	2～10	4	×
H00.03	Speed control gain Kp	0.0～100.0	1.0%	△
H00.04	Speed control integration time Ti	0.00～100.00s	1.00s	△
H00.05	Frequency limit for PI control	0.00～100.00Hz	10.00Hz	△
H00.06	Detection time when fault signal feedback	0.0: Function disabled 0.1～10.0s	1.0s	×
H00.07	Action selection with fault signal feedback	0:Report error and coast to stop 1:Give warning and ramp to stop 2:Give warning and continue running	0	×
H00.08	Filter time of speed feedback	0～10000ms	30ms	△
H00.09	Pulse number	0～99999	0	⊙
H00.10	Revolution feedback	0.00～600.00Hz	0.00Hz	⊙
H00.11	Frequency from master	0.00～600.00Hz	0.00Hz	⊙
H00.12	When to implement PI control	0: when speed reached 1: when running	0	×

4.3 Pulse Feedback

H00.00	Special purpose function enable	0: Invalid 1:Valid	0	×

Select whether to enable pulse feedback function or not.

H00.01	Pulse number per revolution	1～10000	600	Δ

Set pulse number of per revolution. Then Revolution = (Total pulse)/(H00.01);

H00.02	Motor pole number	2～10	4	×

Set pole number of motor.

H00.03	Speed control gain Kp	0.0～100.0%	1.0%	Δ
H00.04	Speed control integration time Ti	0.00～100.00s	1.00s	Δ
H00.05	Frequency limit for PI control	0.00～100.00Hz	10.00Hz	Δ

This three function codes are used for PI control. H00.03 and H00.04 are PI parameters, H00.05 is used to limit PI output.

H00.06	Detection time when fault signal feedback	0.0: Function disabled 0.1～10.0s	1.0s	×
H00.07	Action selection with fault signal feedback	0:Report error and coast to stop 1:Give warning and ramp to stop 2:Give warning and continue running	0	×

When fault signal feedback comes and keep it for a period of time(H00.06), then drive will do the action set in H00.07.

H00.08	Filter time of speed feedback	0～10000ms	30ms	Δ

Set the filter time for speed feedback. Its value will affect the responding time of drive.

H00.09	Pulse number	0～99999	0	⊙
H00.10	Revolution feedback	0.00～600.00Hz	0.00Hz	⊙
H00.11	Frequency from master	0.00～600.00Hz	0.00Hz	⊙

This three parameters are used for monitoring

H00.12	When to implement PI control	0: when speed reached 1: when running	0	×

Set the timing when implement PI control.

Chapter 5 Maintenance and Troubleshooting

FR150A inverter provides a number of warning information and protection, when a fault occurs, the protective function is activated, the inverter will stop output, inverter fault relay contact, and in the inverter displays the fault code on the display panel. Before seeking service user can press the self-examination tips in this section, analyze problems, and identify solutions. If the problem still cannot be excluded, seek services, or contact the dealer you purchase the drive with my company.

Display	Fault Name	Possible Causes	Solutions
Err01	Accel overcurrent	1: The output circuit is grounded or short circuited. 2: The acceleration time is too short. 3: Manual torque boost or V/F curve is not appropriate. 4: The voltage is too low. 5: The startup operation is performed on the rotating motor. 6: A sudden load is added during acceleration. 7: The AC drive model is of too small power class.	1: Eliminate external faults. 2: Increase the acceleration time. 3: Adjust the manual torque boost or V/F curve. 4: Adjust the voltage to normal range. 5: Select rotational speed tracking restart or start the motor after it stops. 6: Remove the added load. 7: Select an AC drive of higher power class
Err02	Decel overcurrent	1: The output circuit is grounded or short circuited. 2: The deceleration time is too short. 3: The voltage is too low. 4: A sudden load is added during deceleration. 5: The braking unit and braking resistor are not installed.	1: Eliminate external faults. 2: Increase the deceleration time. 3: Adjust the voltage to normal range. 4: Remove the added load. 5: Install the braking unit and braking resistor.
Err03	Constant-speed overcurrent	1: The output circuit is grounded or short circuited. 2: The voltage is too low. 3: A sudden load is added during operation. 4: The AC drive model is of too small power class.	1: Eliminate external faults 2: Adjust the voltage to normal range. 3: Remove the added load 4: Select an AC drive of higher power class.
Err04	Accel overvoltage	1: The input voltage is too high. 2: An external force drives the motor during acceleration. 3: The acceleration time is too short. 4: The braking unit and braking resistor are not installed.	1: Adjust the voltage to normal range. 2: Cancel the external force or install a braking resistor. 3: Increase the acceleration time. 4: Install the braking unit and braking resistor.

Err05	Decel overvoltage	1: The input voltage is too high. 2: An external force drives the motor during deceleration. 3: The deceleration time is too short. 4: The braking unit and braking resistor are not installed.	1: Adjust the voltage to normal range. 2: Cancel the external force or install the braking resistor. 3: Increase the deceleration time. 4: Install the braking unit and braking resistor.
Err06	Constant-speed overvoltage	1: The input voltage is too high 2: An external force drives the motor during deceleration.	1: Adjust the voltage to normal range. 2: Cancel the external force or install the braking resistor.
Err07	Bus under voltage	1: Instantaneous power failure occurs on the input power supply. 2: The AC drive's input voltage is not within the allowable range. 3: The bus voltage is abnormal. 4: The rectifier bridge and buffer resistor are faulty. 5: The drive board is faulty. 6: The main control board is faulty.	1: Reset the fault. 2: Adjust the voltage to normal range. 3: Contact the agent or Frecon.
Err08	Short circuit	1: The output circuit is grounded or short circuited. 2: The connecting cable of the motor is too long. 3: The module overheats. 4: The internal connections become loose. 5:The main control board is faulty 6: The drive board is faulty. 7: The inverter module is faulty.	1: Eliminate external faults. 2: Install a reactor or an output filter. 3: Check the air filter and the cooling fan. 4: Connect all cables properly. 5: Contact the agent or Frecon.
Err09	Power input phase loss	1: The three-phase power input is abnormal. 2: The drive board is faulty. 3: The lightening board is faulty. 4: The main control board is faulty.	1: Eliminate external faults. 2: Contact the agent or FRECON.
Err10	Power output phase loss	1: The cable connecting the AC drive and the motor is faulty. 2: The AC drive's three-phase outputs are unbalanced when the motor is running. 3: The drive board is faulty. 4: The module is faulty.	1: Eliminate external faults. 2: Check whether the motor Three-phase winding is normal. 3: Contact the agent or Frecon.
Err11	Motor overload	1: F11-17 is set improperly. 2: The load is too heavy or locked-rotor occurs on the motor. 3: The AC drive model is of too	1: Set F11-17 correctly. 2: Reduce the load and check the motor and the mechanical condition. 3: Select an AC drive of

		small power class.	higher power class.
Err12	Inverter overload	1: The load is too heavy or locked-rotor occurs on the motor. 2: The AC drive model is of too small power class.	1: Reduce the load and check the motor and mechanical condition. 2: Select an AC drive of higher power class.
Err13	External equipment fault	1: External fault signal is input via DI.	Reset the operation.
Err14	Module overheat	1: The ambient temperature is too high. 2: The air filter is blocked. 3: The fan is damaged. 4: The thermally sensitive resistor of the module is damaged. 5: The inverter module is damaged.	1: Lower the ambient temperature. 2: Clean the air filter. 3: Replace the damaged fan. 4: Replace the damaged thermally sensitive resistor. 5: Replace the inverter module.
Err15	EEPROM read/write fault	The EEPROM chip is damaged.	Replace the main control board.
Err16	Motor auto-tuning cancelled	Since the identification process, press STOP / RST key	Press STOP / RST key to reset
Err17	Motor auto-tuning fault	1: the motor and the inverter output terminals are not connected 2: The motor does not disengage the load 3: The electrical fault	1: check the connection between the inverter and motor 2: The motor is disengaged load 3: Check the motor
Err18	Communication overtime error	1: The PC is not working properly 2: The communication line is not normal 3: F15 set communication parameters set incorrectly	1: Check the PC Connection 2: Check the communication cable 3: The communication parameters are set correctly
Err19	PID feedback loss	PID feedback set value is less than F13.24	Check the PID feedback signal or set to an appropriate value F13.24
Err20	Continuous running time reached	Set the running time to reach this function	reference F05.14 Description
Err21	Parameter upload fault	1: Is not installed or is not plugged parameter copy card 2: Parameter copy card anomalies 3: The control board abnormalities	1: a copy of the card is properly installed parameters 2: for technical support 3: for technical support
Err22	Parameter download fault	1: Is not installed or is not plugged parameter copy card 2: Parameter copy card anomalies 3: The control board abnormalities	1: A copy of the card is properly installed parameters 2: For technical support 3: For technical support
Err23	Braking unit fault	1: The brake line failure or damage the brake pipe 2: An external braking resistor is too small	1: Check the brake unit, replace the brake pipe 2: Increasing the braking resistor

Err24	Module temperature detection disconnection	The temperature sensor failure or cable break	For technical support
Err25	Load becoming 0	The AC drive running current is lower than F11.22	Check that the load is disconnected or the setting F11-22 and F11-23 is correct.
Err26	With-wave current limit fault	1: The load is too heavy or locked rotor occurs on the motor. 2: The AC drive model is of too small power class.	1: Reduce the load and check the motor and mechanical condition. 2: Select an AC drive of higher power class.
Err27	Inverter soft-start relay is off	1: The grid voltage is too low 2: Rectifier module failure	1: Check the grid voltage 2: Demand for technical support
Err28	Software version compatibility fault	1: The upper and lower transmission module parameters in the parameter version of the control panel version mismatch.	re-upload module parameters to pass down
Err40	The setting running time ends	Running time more than F00.25	1. Contact the dealer
Err41	Overload warning	Overload	1、check F11.19 2: Select an AC drive of higher power class.
Err42	Pulse feedback disconnection	No pulse input	1、check the terminal that is of pulse input or the Pulse Generator

Appendix A: Modbus Communication Protocol

1. Application Scope

1. Applicable series: FRECON FR series inverter
2. Applicable network: Support Modbus protocol, RTU format, with single-master/multi-slave Communication network of RS485 bus.

The typical RTU message frame format:

Start Bit	Device Address	Function Code	Data	CRC	Stop Bit
T1-T2-T3-T4	8Bit	8Bit	n*8Bit	16Bit	T1-T2-T3-T4

2. Physical Interface

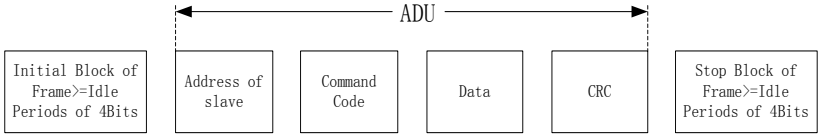
RS485 is asynchronous half-duplex Communication mode. LSB has transmission priority.

Default data format of RS485 terminal: 1-8-N-1，bits rate: 9600bps.

Data format 1-8-N-1, 1-8-O-1, 1-8-E-1, optional bits rates 4800bps, 9600bps, 19200bps, 38400bps, 57600bps and 115200bps can be selected.

Shielded twisted-pair cable is recommended Communication cable to lower external interference.

3. Protocol Format



The parity in ADU (Application Data Unit) is obtained via the CRC16 parity of the 1st three Parts of ADU and switch the low bytes and high bytes. Low bytes of CRC parity go first, and high bytes of it follow in the protocol format.

4. Description of Protocol Format

4.1 Address Code

Address of slave inverter. The setting range: 1～247, 0 is broadcast address.

4.2 Command Code

Command Code	Function
03H	Read parameters and status byte of inverter
06H	Write single function code or control parameter of inverter
08H	Circuit diagnosis and setting

4.3 Allocation of Register Addresses

name	Description
Function Code (F00.00～U01.99)	High byte function code group number, F00～F31, U00, U01, respectively, corresponding to the high byte address is 00H～1FH, 30H, 31H. Low byte of the group function code number, from 0 to 99 corresponding to the low byte address is 00H～63H. For example: Modify F01.02 function code value, no power-down when storing the corresponding register address (referred to as RAM address) to 0102H. EEPROM is frequently modified, will reduce the life of the EEPROM. If you modify the value of the function code-down storage needs, you can make this function code is the highest position a high address. Note that this address is only to write, not read. For example: Modify F01.02 function code value, and the corresponding need to power down when storing the register address (referred to as EEPROM address) to 8102H.

Function code group	RAM address high byte	EEPROM address high byte
F00	0x00	0x80
F01	0x01	0x81
F02	0x02	0x82
F03	0x03	0x83
F04	0x04	0x84
F05	0x05	0x85
F06	0x06	0x86
F07	0x07	0x87
F08	0x08	0x88
F09	0x09	0x89
F11	0x0B	0x8B
F12	0x0C	0x8C
F13	0x0D	0x8D
F14	0x0E	0x8E
F15	0x0F	0x8F
F16	0x10	0x90
F17	0x11	0x91
F22	0x1E	0x9E
U00 (Read Only)	0x30	--
U01 (Read Only)	0x31	--
H00	0x40	0xC0

4.4 Address and control command functions: (write only)

Command word address	Command Function
2000H	0001: Forward run 0002: Reverse Run 0003: Inching Forward 0004: Reverse Jog 0005: Slowdown stop 0006: freewheel 0007: Fault reset
2001H	Communication setting frequency (0～Fmax (Unit: 0.01Hz))
2002H	PID given range (0 to 1000, 1000 corresponds to 100.0%)
2003H	PID feedback range (0～1000, 1000 corresponds to 100.0%)
2004H	Torque set point (-3000～3000, 1000 corresponds to 100.0% motor rated current)
2005H	AO output，Range(0～1000，1000 corresponding to 100.0%)

4.5 The status and function of the read address Description: (read only)

Status word address	functional status word
2100H	0000H: parameter setting 0001H: slave run 0002H: JOG operation 0003H: learning run 0004H: Slave parking 0005H: JOG parking 0006H: Fault Status
2101H	Bit0: 0 are given effective 1 Given negative effective Bit1:0 frequency output Forward 1 frequency output inversion Bit2～3: 00 Keyboard start-stop 01 terminal start-stop 10 start-stop communication 11 Reserved Bit4: 0 Factory password is invalid 1 factory password is valid Bit5: 0 user password is invalid 1 valid user password Bit6～7: 00 basic function code group 01 user-defined function code group 10 different functions with the factory default code group 11 Others
2102H	Inverter current fault type

5. Explanation of Command

Command code 0x03: Read parameter and status of inverter.

ADU Item	Byte No.	Range
Master requests:		
Address of slave	1	0～127
Command Code	1	0x03
Register start address	2	0x0000～0xFFFF
The number of register	2	0x0000～0x0008
CRC parity(Low bytes go first)	2	
Slave responds :		
Address of slave	1	The local address
Command Code	1	0x03
Register start address	1	2*number of registers
The number of register	2*number of registers	
CRC parity	2	

Remarks: Read maximum 8 function codes consecutively.

Command code 0x06: Write single function code or control parameter of inverter.

ADU Item	Byte No.	Range
Master requests:		
Address of slave	1	0～127
Command Code	1	0x06
Register start address	2	0x0000～0xFFFF
The number of register	2	0x0000～0xFFFF
CRC parity	2	
Slave responds :		
Address of slave	1	The local address
Command Code	1	0x06
Register start address	2	0x0000～0xFFFF
The number of register	2	0x0000～0xFFFF
CRC parity	2	

Command code 0x08: Circuit Diagnosis and Setting

ADU Item	Byte No.	Range
Master requests:		
Address of slave	1	0～127
Command Code	1	0x08
Register start address	2	0x0000～0xFFFF
The number of register	2	
CRC parity	2	
Slave responds :		
Address of slave	1	The local address
Command Code	1	0x08
Register start address	2	0x0000～0xFFFF
The number of register	2	
CRC parity	2	

Remarks: Command code 0x08 is only for circuit check.

6. CRC Parity

Sending equipment calculates CRC parity value first, and then attaches it to the sending message. Upon receipt of the message, receiving equipment will calculate CRC parity value again, and compare the operation result with received CRC parity value. If the two values are different, it indicates that there is error during transmission.

Calculation process of CRC parity:

1. Define a CRC parity register, and initialize it as FFFFH.
2. Conduct XOR calculation between the first byte of sending message and the value of CRC parity register, and then upload the result to CRC parity register. Start from address code, the start bit and stop bit will not be calculated.
3. Collect and check LSB (the least significant bit of CRC parity register).
4. If LSB is 1, shift each bit of CRC parity register rightwards by 1 bit, the highest bit filled with 0. Conduct XOR calculation between the value of CRC register and A001H, and then upload the result to CRC parity register.
5. If LSB is 0, shift each bit of CRC parity register rightwards by 1 bit, the highest bit filled with 0.
6. Repeat steps 3, 4 and 5 until completing 8 rounds of shifting.
7. Repeat steps 2, 3, 4, 5 and 6, and process the next byte of sending message. Repeat above process continuously until each byte of sending message is processed.
8. CRC parity date will be saved in CRC parity register after calculation.
9. LUT (Look-up table) method is to obtain CRC parity in the system with limited time resources. Simple CRC functions as shown in following (C language Programming):

```
unsigned int CRC_Cal_Value (unsigned char *Data, unsigned char Length)
{
    unsigned int crc_value = 0xFFFF;
    Int i = 0;
    while (Length--)
    {
        crc_value ^= *Data++;
        for (i=0; i<8; i++)
        {
            If (crc_value & 0x0001)
            {
                crc_value = (crc_value>>1) ^ 0xa001;
            }
            else
            {
                crc_value = crc_value>>1;
            }
        }
    }
    return (crc_value);
}
```

7. Error Message Response

Inverter will send an error message report when the master sends error data or inverter receives the error data due to the external interference.

When Communication error occurs, slave combines the highest bit 1 of command code and error code as the response to the master.

Responding data frame format when errors happened in Communication:

ADU Item	Byte No.	Range
Error response:		
Address of slave	1	0～127
Error command code	1	The highest bit 1 of command code
Error code	1	0x01～0x13
CRC parity(Low bytes go first)	2	

Responding command code at normal Communication and error Communication

Responding Command Code at Normal Communication	Responding Command Code at Error Communication
03H	83H
06H	86H
08H	88H

Description of Error Code:

error	Description	error	Description
01H	Exceptional command code	03H	Illegal Data
02H	Exceptional data address	04H	Operation failed

For example, for U00.00 write data 50.00HZ frequency. The host sends the data frame (hex):

01H	06H	30H	00H	13H	88H	8BH	9CH

Because F00.00 is read only, inverter responds error message. Inverter responds data frame in hexadecimal format:

01H	86H	02H	C3H	A1H

Command code is 86H in error message, the highest bit 1 of 06H. If error code detail is 11H, it means the parameter is read only.

After responding to the error data receipt, master can revise the responding program via resending data frame or based on the error message responded by the inverter.

8. Illustration

1, No. 01 reads the output frequency value (U00.00), returned 5000, that 50.00Hz.
To send data:
01 03 30 00 00 01 8B 0A
The received data is:
01 03 02 13 88 B5 12
2, No. 01 Drive communication given frequency 30.00Hz, send the data content of 3000.
To send data:
01 06 20 01 0B B8 D4 88
The received data is:
01 06 20 01 0B B8 D4 88
3, communications sent on the 1st drive forward run command, write to the address 2000H 01
To send data:
01 06 20 00 00 01 43 CA
The received data is:
01 06 20 00 00 01 43 CA
4, No. 01 communications sent inverter deceleration stop command, the address to write to 2000H 05
To send data:
01 06 20 00 00 05 42 09
The received data is:
01 06 20 00 00 05 42 09

Appendix B: Braking Resistor

When deceleration or rapid deceleration in high inertia load, motor will be in the state of power generation, the load power will pass the converter part to inverter DC part lead to the rise of inverter bus voltage, when it is higher than a certain value, inverter will alarm with voltage fault, even damage the power module, so we must configure braking system.

FR150A multi-functional compact inverter built-in braking unit in all series models, customer need to only connect external braking resistor. We recommend below configuration of resistor power and value. User can adjust the value in the range properly according to the load

Model	Brake unit		125%braking torque (10%ED,max 10s)		Minimum allowable braking resistance
	model	num	Recommended brake resistor specifications	Number of brake resistors	
FR150A-2S-0.2B	Build in		100W 600Ω	1	360Ω
FR150A-2S-0.4B			100W 600Ω	1	360Ω
FR150A-2S-0.7B			200W 600Ω	1	100Ω
FR150A-2S-1.1B			300W 360Ω	1	100Ω
FR150A-2S-1.5B			300W 180Ω	1	100Ω
FR150A-2S-2.2B			300W 180Ω	1	100Ω
FR150A-4T-0.7B			200W 600Ω	1	100Ω
FR150A-4T-1.5B			300W 360Ω	1	100Ω
FR150A-4T-2.2B			300W 180Ω	1	100Ω
FR150A-4T-4.0B			300W 180Ω	1	100Ω
FR150A-4T-5.5B			400W 150Ω	1	100Ω
FR150A-4T-7.5B			600W 100Ω	1	80Ω
FR150A-4T-011B			800W 75Ω	1	60Ω
FR150A-4T-015B			800W 75Ω	1	60Ω
FR150A-4T-018B			1.1kW 50Ω	1	43Ω
FR150A-4T-022B			1.6kW 40Ω	1	31Ω
FR150A-4T-030B			4.0kW 32Ω	1	24Ω
FR150A-4T-037B			4.5kW 27Ω	1	24Ω
FR150A-4T-045	FRBU-4T-045	1	6.0kW 20Ω	1	19.2Ω
FR150A-4T-055	FRBU-4T-132	1	7.0kW 20Ω	1	19.2Ω
FR150A-4T-075			7.0kW 20Ω	1	19.2Ω
FR150A-4T-090			9.0kW 13Ω	1	12.8Ω
FR150A-4T-110			11.0kW 10.2Ω	1	9.6Ω
FR150A-4T-132			15.0kW 7.5Ω	1	6.8Ω
FR150A-4T-160	FRBU-4T-315	1	18.0kW 6.5Ω	1	6.3Ω

Note: The wire in the table is for single resistor, when resistors in parallel, the wire should be bigger. The withstand voltage of wire for single phase inverter is above AC300V, for three phase inverter is above AC450V, temperature tolerance of wire 105℃