Preface

Thank you for choosing FRECON developed and produced FR20 series General purpose inverter.

FR20 series General purpose inverter is mainly positioned as a high-end market for OEM customers and the specific requirements of fan and pump load applications, its flexible design, both embedded SVC and VF control in one, can be widely used for speed control accuracy, torque response speed, low-frequency output characteristics and other situations with higher requirements.

This user manual supplies a detailed description of FR20 series vector control inverter includes product characterization, structural features, parameter setting, operation and commissioning, inspection maintenance and other contents. Be sure to carefully read through the safety precautions before use, and use this product on the premise that personnel and equipment safety is ensured.

IMPORTANT NOTES
◆To illustrate the details of the products, pictures in this manual based on products with outer casing or safety cover being removed. When using this product, please be sure to well install outer casing or covering by the rules, and operating in accordance with the manual contents. ◆ 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

CONTENTS

Chapter 1 Product Information

1.1 Nameplate Information

Fig.1-1 Nameplate information

Model Explanation

The model number on the product nameplate indicates the series to which it belongs, the type of applicable power supply, and the power level in the form of numbers, symbols, and letters.

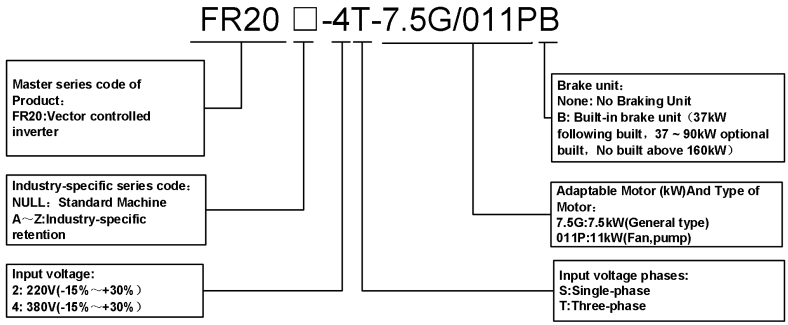


Fig.1-2 Model Explanation

1.2 Information of Product Model

Table 1-1 FR20 Product model and technical data

Model No	Power capacity kVA	Input current A	Output current A	Applicable motor	
				kW	HP
3-Phase:380V，50/60Hz Range:-15%～+30%					
FR20-4T-018G/022PB	24	38.5	37	18.5	25
FR20-4T-022G/030PB	30	46.5	45	22	30
FR20-4T-030G/037PB	40	62	60	30	40
FR20-4T-037G/045P(B)	57	76	75	37	50
FR20-4T-045G/055P(B)	69	92	91	45	60
FR20-4T-055G/075P(B)	85	113	112	55	70
FR20-4T-075G/090P(B)	114	157	150	75	100
FR20-4T-090G/110P(B)	134	186	176	90	125
FR20-4T-110G/132P(B)	160	220	210	110	150

1.3 Technical Features

Table 1-2 Technical features

Project		Specifications
Power input	Rated input voltage (V)	3-phase 380 V (-15%～+30%)
	Rated input current (A)	See table 2-1
	Rated input frequency (Hz)	50Hz/60Hz，tolerance±5%
Power output	Applicable motor(kW)	See table 2-1
	Rated output current (A)	See table 2-1
	The maximum output voltage (V)	0～rated input voltage, error<±3%
	The maximum output frequency (Hz)	0.00～600.00 Hz,unit0.01Hz
Control characteristics	V/F patterns	V/f control Sensor-less vector control 1 Sensor-less vector control 2 Close loop vector control with PG card(Only FR510A)
	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: 150% (V/f control, sensor-less vector control 1) 0.25Hz: 150% (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. P Model:120% Rated Current 60s,145% Rated Current 10s,160% Rated Current 1s.
	Torque boost	Automatic torque boost; Manual torque boost 0.1%～30.0%
	V/F Curve	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～Maximum frequency 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
	Input terminal	7 Switch input terminals, one way to make high-speed pulse input. 3-channel analog inputs, including 2-way 0～10V / 0～20mA voltage and current options, a way to support -10～+10 V input
	Output terminal	2-way switch output terminal, which supports a maximum road speed 100kHz pulse output. 2 relay output terminals. 2 analog output terminal, and optional voltage and current.
Featured functions	Parameter copy, parameter backup, flexible parameter displayed & hidden. Common DC bus. Various master & auxiliary command and switchover. Reliable speed search started. A variety of Accel / Decel curves programmable. Timing control,fixed length control, count function. Three faults recorded. Over excitation brake, overvoltage stall protection programmable, under voltage stall protection programmable, restart upon power loss. Four kinds of Accel/Decel time. Motor thermal protection. Flexible fan control. Process PID control, simple PLC, 16-step speed control programmable. Wobble frequency control. Multi-functional key programmable, field-weakening control. High-precision torque control, V/f separated control, torque control at sensor-less vector control.	
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℃(The ambient temperature is 40°C~50°C, please derate it)
	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 Flange mounting
	IP grade	IP20
	Cooling method	Fan cooled

1.4 Configuration, Mounting Dimensions and Weight

◆(18～110KW)Dimensions and wall mounting dimensions

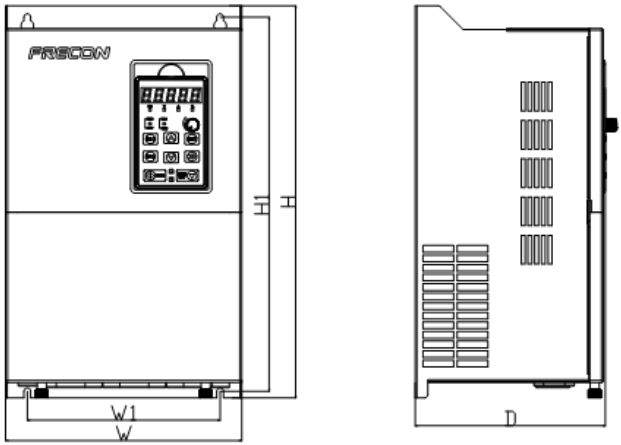


Fig 1-3 18～110kW Wall installation diagram

Table 1-3 Wall mount size chart

Model NO.	External and installation dimensions (mm)						Structural differences with FR500
	W	W1	H	H1	D	Mounting hole diameter	
3-Phase:380V, 50/60Hz Range:-15%～+30%							
FR20-4T-018G/022PB	195	150	473	460	210.2	5.5	Built-in DC reactor
FR20-4T-022G/030PB							
FR20-4T-030G/037PB	250	200	483	461	227	7	Built-in DC reactor
FR20-4T-037G/045P(B)							
FR20-4T-045G/055P(B)	310	200	545	523.5	260	7	Built-in DC reactor
FR20-4T-055G/075P(B)							
FR20-4T-075G/090P(B)	338	270	583	561.3	308.8	9.5	Built-in DC reactor
FR20-4T-090G/110P(B)							
FR20-4T-110G/132P(B)							

1.5 Product terminal configuration

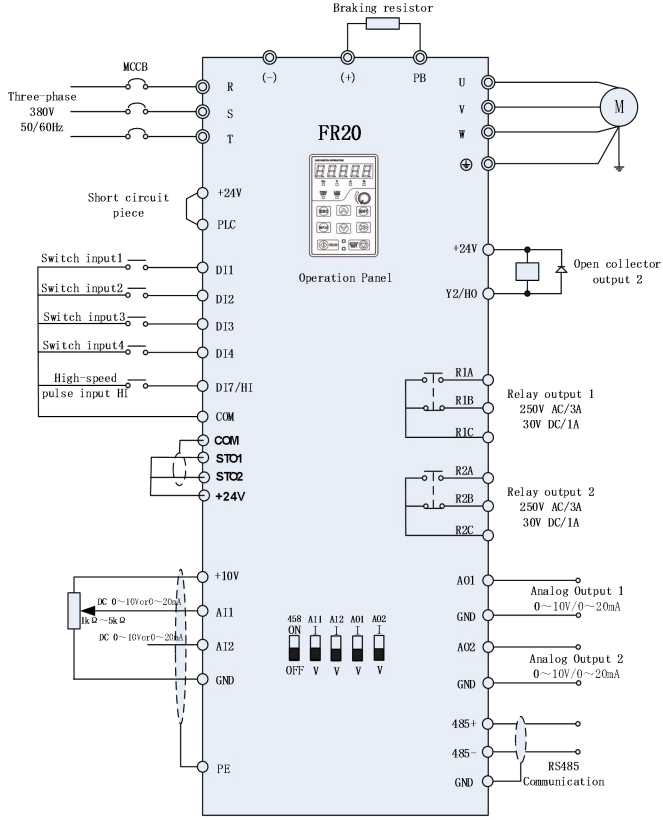


Fig.1-4 FR20 Inverter wiring diagram

Table 1-4 Main circuit terminal functions

Terminal marks	Designation and function of terminals.
R, S, T	AC power input terminals for connecting to 3-phase AC380V power supply.
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.

Note: The input side wiring of the inverter has no phase sequence requirement and can be connected arbitrarily.

Table 3-1 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. Maximum output current: 10 mA Generally, it provides power supply to external potentiometer with resistance range of 1–5 kΩ.
	+24V-COM	External +24V power supply	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	
	AI3-GND	Analog input 3	Input Voltage Range: DC -10～+10V Input impedance:250kΩ
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	
	DI5- COM	Switch input terminals 5	
	DI6- COM	Switch input terminals 6	
	DI7/HI-COM	Switch input terminals 7 OR High-speed pulse input	Besides features of DI1–DI6, it can be used for high-speed pulse input. Maximum input frequency: 100 kHz
Analog output	AO1-GND	Analog output terminal 1	Output range:DC 0～10V/0～20mA，decided by toggle switches AO1, AO2 on the control board Impedance
	AO2-GND	Analog output terminal 2	

			requirements≥10kΩ
Switch output	Y1-COM	Open collector output 1	Voltage range:0～24V Current range:0～50mA
	Y2/HO-COM	Open collector output 2 OR High-speed pulse output	Besides features of Y1, it can be used for High-speed pulse output channels. The maximum output frequency:100kHz
Relay output	R1A-R1C	Normally open terminal	Contact driving capacity: AC250V，3A，COSØ=0.4. DC 30V，1A
	R1B-R1C	Normally closed terminal	
	R2A-R2C	Normally open terminal	
	R2B-R2C	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	
STO	STO1	STO channel 1	Internal connection: factory STO1 and STO2 are connected with +24V short tabs by default. External: STO1, STO2, +24V can be externally connected to an external 24V power supply, and the specific wiring can refer to STO related functions.
	STO2	STO channel 2	
	+24V	STO channel 1/2 power+	
	COM	STO channel 1/2 power ground	
USB	USB interface	USB interface	It can be used as a programming program or as a computer computer to communicate with an inverter
Shield	PE	Shield Ground	Ground terminal for shield
Auxiliary Interface		External operation panel interface	Use standard network cable Maximum cable distance: 50m

Chapter 2 List of Parameter

Group F00～F17 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

FR20 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 1 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

Description of the communication address in the parameter table:

The address in the parameter table is the RAM address, and the parameters modified

using this communication address will not be saved during power loss. If it is necessary to save the parameters during power loss, the EEPROM address needs to be modified, where EEPROM address = RAM address + 0x8000.

Table 2-1 Standard Function Parameter

Param.	Parameter Name	Setting Range	Default	Attr	RAM address
Group F00: System Parameters					
F00.00	Setting of User Password	0～65535	0	×	0000
F00.01	Display of Parameters	0: Display all parameters 1: Only display F00.00, F00.01 and user-defined parameters 2: Only display A0-00, A0-01, and the parameters different with factory default	0	×	0001
F00.02	Parameter Protection	0: All parameter programmable 1: Only this parameter programmable	0	×	0002
F00.03	G/P type display	0: G type (constant torque load) 1: P type (variable torque load e.g. fan and pump)	0	×	0003
F00.04	Parameter Initialization	0: No operation 1: Restore all parameters to factory default(excluding motor parameters) 2: Clear fault record 3: Back up current user parameters 4: Restore user backup parameters 5: Restore factory default.(include motor parameter) 6: Power consumption zero clearing (U00.35)	0	×	0004
F00.06	Parameter editing mode	0:Editable via keypad and RS485. 1:Editable via keypad 2:Editable via RS485	0	×	0006
F00.08	Motor control mode	Unit's place: Motor 1 control mode 0: V/F control 1:Sensor-less vector control 1 2: Sensor-less vector control 2	1	×	0008
F00.09	DI7/HI input mode	0: Digital input terminal 7 1: Pulse input(HI)	0	×	0009
F00.10	AI1\AI2 input mode	Unit's place: AI1 0: Analog input 1: Digital input Ten's place: AI2 (same as	00	×	000A

		AI1)			
F00.11	Y2/HO input mode	0: Digital 0utput terminal 2 1: Pulse output(HO)	0	×	000B
F00.12	PWM optimization	Unit's place: PWM modulation mode 0: Fixed carrier 1: Random carrier 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 Hundred's-place:overmodulation coefficient 0: Invalid 1~9: 1.01~1.09 times of over-modulation	500	×	000C
F00.13	Carrier frequency	0.700~16.000kHz	Model defined	△	000D
F00.14	Upper carrier frequency	1.000~16.000kHz	8.000 kHz	×	000E
F00.15	Lower carrier frequency	1.000~16.000kHz	2.000 kHz	×	000F
F00.16	Output voltage	5.0~150.0%	100.0 %	×	0010
F00.17	AVR	0: Disabled 1: Enabled 2: Disabled when decelerating.	1	×	0011
F00.18	Fan control	0: Run at power-on 1: Fan working during running	1	×	0012
F00.19	Factory password	0~99999	0	×	0013
F00.20	Inverter rated power	0.2~710.0kW	Model defined	⊙	0014
F00.21	Inverter rated voltage	60~660V	Model defined	⊙	0015
F00.22	Inverter rated current	0.1~1500.0A	Model defined	⊙	0016
F00.23	Software version	0.00~655.35	Model defined	⊙	0017
F00.24	Dealer password	0~65535	0	×	0018
F00.25	Run time setting	0~65535h	0h	×	0019

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	×	0100
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 6: Process PID output 7: X7/HI pulse input 8: AI2 9: AI3	1	×	0101
F01.02	Master Frequency Digital setting	0.00 ~ Fmax	50.00 Hz	△	0102
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 9: Analog input AI3	0	×	0103
F01.04	Auxiliary frequency digital setting	0.00 ~ Fmax	50.00 Hz	△	0104
F01.05	Auxiliary frequency range	0: Relative to maximum frequency 1: Relative to master frequency	0	×	0105
F01.06	Auxiliary frequency coeff	0.0 ~ 1000.0%	100.0 %	△	0106
F01.07	Jog frequency	0.00 ~ Fmax	5.00Hz	△	0107
F01.08	Maximum frequency	10.00 ~ 600.00Hz	50.00 Hz	×	0108
F01.09	Upper limit frequency	Fdown ~ Fmax	50.00 Hz	×	0109
F01.10	Lower limit frequency	0.00 ~ Fup	0.00Hz	×	010A

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	×	010B
F01.12	Lower limit frequency running time	0.0～6000.0s	60.0s	×	010C
F01.13	Up to this frequency, start frequency compensation	0.00~600.00Hz	50.00 Hz	△	010D
F01.14	Frequency compensation per 50Hz	0.00~50.00Hz	0.00Hz	△	010E
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	×	0200
F02.01	Running direction	0: Forward 1: Reverse	0	△	0201
F02.02	Reverse-proof action	0: Reverse enabled 1: Reverse disabled	0	×	0202
F02.03	Dead time between forward and reverse	0.0～6000.0s	0.0s	×	0203
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 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 0205takes the priority 0:Disable 1:Enable Ten thousand's place: Tracking direction	30000	×	0204

		0: Last direction when stop 1: Positive direction 2: Negative direction 3: Starting direction 4: Encoder detection			
F02.05	Start frequency	0.00 ~ 10.00Hz	0.00Hz	×	0205
F02.06	Startup frequency holding time	0.0 ~ 100.0s	0.0s	×	0206
F02.07	Startup DC brakin current	0.0 ~ 150.0%	0.0%	×	0207
F02.08	DC braking time at start	0.0 ~ 100.0s	0.0s	×	0208
F02.09	Speed search current	0.0 ~ 180.0%	100.0%	△	0209
F02.10	Sped search decel time	0.1 ~ 10.0s	2.0s	×	020A
F02.11	Sped search coefficient	0.01 ~ 5.00	0.30	△	020B
F02.12	Stop mode	0: Ramp to stop 1: Coast to stop	0	×	020C
F02.13	Initial frequency of stop DC braking	0.00 ~ 50.00Hz	2.00Hz	×	020D
F02.14	Stop DC braking current	0.0 ~ 150.0%	0.0%	×	020E
F02.15	Waiting time of stop DC braking	0.0 ~ 600.0s	0.0s	×	020F
F02.16	Stop DC braking time	0.0 ~ 600.0s	0.0s	×	0210
F02.17	Dynamic brake	0: Disabled 1: Enabled 2: Enabled at running 3: Enabled at deceleration	1	×	0211
F02.18	Voltage of dynamic braking	480 ~ 800V(380V Inverter) 280~400V(220V Inverter)	700V 350V	×	0212
F02.19	Brake use ratio	5.0 ~ 100.0%	100.0%	×	0213
F02.20	0Hz output selection	0: No voltage output 1: Voltage output	0	×	0214
F02.21	Auto-start of power-on again	0: Invalid 1: Valid	0	△	0215
F02.22	Waiting time between auto-start and power-on again	0.0~10.0s	0.5s	△	0216
Group F03: Accel/Decel Parameters					
F03.00	Accel time 1	0.0 ~ 6000.0s	Model defined	△	0300
F03.01	Decel time 1	0.0 ~ 6000.0s	Model defined	△	0301

F03.02	Accel time 2	0.0 ~ 6000.0s	15.0s	△	0302
F03.03	Decel time 2	0.0 ~ 6000.0s	15.0s	△	0303
F03.04	Accel time 3	0.0 ~ 6000.0s	15.0s	△	0304
F03.05	Decel time 3	0.0 ~ 6000.0s	15.0s	△	0305
F03.06	Accel time 4	0.0 ~ 6000.0s	15.0s	△	0306
F03.07	Decel time 4	0.0 ~ 6000.0s	15.0s	△	0307
F03.08	Jog accel time	0.0 ~ 6000.0s	15.0s	△	0308
F03.09	Jog decel time	0.0 ~ 6000.0s	15.0s	△	0309
F03.10	Accel/Decele curve	0: Linear Accel/Decel 1: S-curve Accel/Decel	0	×	030A
F03.11	Initial segment time of acceleration of S curve	0.0 ~ 6000.0s	0.0s	×	030B
F03.12	Time unit of acceleration and deceleration	0: 0.1s 1: 0.01s	0	×	030C
F03.13	Frequency switchover point between acceleration time 1 and acceleration time 2	0.00 ~ Fmax	0.00Hz	×	030D
F03.14	Frequency switchover point between deceleration time 1 and deceleration time 2	0.00 ~ Fmax	0.00Hz	×	030E
F03.15	End segment time of acceleration of S curve	0.0 ~ 6000.0s	0.0s	×	030F
F03.16	Initial segment time of deceleration of S curve	0.0 ~ 6000.0s	0.0s	×	0310
F03.17	End segment time of deceleration of S curve	0.0 ~ 6000.0s	0.0s	×	0311
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	1	×	0400
F04.01	Function of terminal DI2		2	×	0401
F04.02	Function of terminal DI3		7	×	0402
F04.03	Function of terminal DI4		13	×	0403
F04.04	Function of terminal DI5		0	×	0404

F04.05	Function of terminal DI6	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 2 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 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: No reverse 39: No forward	0	×	0405
F04.06	Function of terminal DI7		0	×	0406
F04.07	Function of terminal AI1		0	×	0407
F04.08	Function of terminal AI2		0	×	0408
F04.09	Function of terminal AI3		0	×	0409
F04.10	Filtering time of digital input terminal	0.000～1.000s	0.010 s	△	040A

F04.11	Delay time before terminal DI1 is valid	0.0～300.0s	0.0s	△	040B
F04.12	Delay time before terminal DI2 is valid	0.0～300.0s	0.0s	△	040C
F04.13	Terminal DI1～DI5 positive/negative logic	DI5, 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)	00000	×	040D
F04.14	Terminal DI6～AI3 positive/negative logic	AI3, AI2, AI1, DI7, DI6 0: Positive logic 1: Negative Logic	00000	×	040E
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	×	040F
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: Jog action to clear UP/DOWN 0: Not Clear 1: Clear	00001	×	0410
F04.17	Terminal UP/DOWN frequency change step size	0.00～50.00Hz 0.00:Disabled	1.00Hz/200ms	△	0411
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	×	0412
F04.19	Delay time before terminal	0.0～300.0s	0.0s	△	0413

	DI1 is invalid				
F04.20	Delay time before terminal DI2 is invalid	0.0～300.0s	0.0s	△	0414
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: Spindle orientation completion (FR510A only) 26: PID feedback loss 27: operation status (inching without output) 28: communication setting (address 2007h) 29: reserved	1	×	0500
F05.01	Y2 output function		3	×	0501
F05.02	Relay 1 output function		2	×	0502
F05.03	Relay 2 output function		11	×	0503
F05.04	Y1 output delay time	0.0～6000.0s	0.0s	△	0504
F05.05	Y2 output delay	0.0～6000.0s	0.0s	△	0505

	time				
F05.06	R1 output delay time	0.0～6000.0s	0.0s	△	0506
F05.07	R2 output delay time	0.0～6000.0s	0.0s	△	0507
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) Hundreds place: Relay 1 output (same as unit's place) Thousands place: Relay 2 output (same as unit's place)	0000	×	0508
F05.09	Detection width of frequency attained	0.00～20.00Hz	5.00Hz	×	0509
F05.10	FDT1 upper bound	0.00～Fmax	30.00Hz	×	050A
F05.11	FDT1 lower bound	0.00～Fmax	30.00Hz	×	050B
F05.12	FDT2 upper bound	0.00～Fmax	30.00Hz	×	050C
F05.13	FDT2 lower bound	0.00～Fmax	30.00Hz	×	050D
F05.14	Consecutive running time	0.0～6000.0Min 0.0:Disabled	0.0Min	×	050E
F05.15	Accumulative power-on time setting	0～6000h 0:Disabled	0h	×	050F
F05.16	Accumulative running time setting	0～6000h 0:Disabled	0h	×	0510
F05.17	Brake control selection	0: Disabled 1: Enabled	0	×	0511
F05.18	Brake opened frequency	Closed frequency ~30.00Hz	2.50Hz	×	0512
F05.19	Brake opened current	0.0~200.0%	0.0%	△	0513
F05.20	Brake open waiting time	0.00~10.00s	0.00s	×	0514
F05.21	Brake open operating time	0.00~10.00s	0.50s	×	0515
F05.22	Brake closed frequency	0.00Hz~opened frequency	2.00Hz	×	0516
F05.23	Brake close waiting time	0.00~10.00s	0.00s	×	0517
F05.24	Brake close operating time	0.00~10.00s	0.50s	×	0518
F05.25	Current overrun 1	0.1～1500.0A	0.0A	△	0519

F05.26	Current overrun 2	0.1～1500.0A	0.0A	△	051A
Group F06 Analog and Pulse Input					
F06.00	Minimum input of curve AI1	0.0%～input of inflection point1 of curve AI1	1.0%	△	0600
F06.01	Set value corresponding to minimum input of curve AI1	-100.0～100.0%	0.0%	△	0601
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 %	△	0602
F06.03	Set value corresponding to input of inflection point 1 of curve AI1	-100.0～100.0%	100.0 %	△	0603
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 %	△	0604
F06.05	Set value corresponding to input of inflection point 2 of curve AI1	-100.0～100.0%	100.0 %	△	0605
F06.06	Maximum input of curve AI1	Input of inflection point 2 of curve AI1～100.0%	100.0 %	△	0606
F06.07	Set value corresponding to maximum input of curve AI1	-100.0～100.0%	100.0 %	△	0607
F06.08	Minimum input of curve AI2	0.0%～input of inflection point1 of curve AI2	1.0%	△	0608
F06.09	Set value corresponding to minimum input of curve AI2	-100.0～100.0%	0.0%	△	0609
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 %	△	060A
F06.11	Set value corresponding to input of inflection point 1 of curve AI2	-100.0～100.0%	100.0 %	△	060B
F06.12	Input of inflection	Input of inflection point 1	100.0	△	060C

	point 2 of curve AI2	of curve AI2 ~ Maximum input of curve AI2	%		
F06.13	Set value corresponding to input of inflection point 2 of curve AI2	-100.0 ~ 100.0%	100.0 %	△	060D
F06.14	Maximum input of curve AI2	Input of inflection point A of curve AI2 ~ 100.0%	100.0 %	△	060E
F06.15	Set value corresponding to maximum input of curve AI2	-100.0 ~ 100.0%	100.0 %	△	060F
F06.16	Minimum input of curve AI3	0.0% ~ input of inflection point1 of curve AI3	0.0%	△	0610
F06.17	Set value corresponding to minimum input of curve AI3	-100.0 ~ 100.0%	-100.0 %	△	0611
F06.18	Input of inflection point 1 of curve AI3	Minimum input of curve AI1 ~ Input of inflection point 2 of curve AI3	25.0%	△	0612
F06.19	Set value corresponding to input of inflection point 1 of curve AI3	-100.0 ~ 100.0%	-50.0 %	△	0613
F06.20	Input of inflection point 2 of curve AI3	Input of inflection point 1 of curve AI3 ~ Maximum input of curve AI3	75.0%	△	0614
F06.21	Set value corresponding to input of inflection point 2 of curve AI3	-100.0 ~ 100.0%	50.0%	△	0615
F06.22	Maximum input of curve AI3	Input of inflection point A of curve AI3 ~ 100.0%	100.0 %	△	0616
F06.23	Set value corresponding to maximum input of curve AI3	-100.0 ~ 100.0%	100.0 %	△	0617
F06.24	Minimum input of curve keypad potentiometer	0.0 ~ Maximum input of curve keypad potentiometer	0.5%	△	0618

F06.25	Set value corresponding to minimum input of curve keypad potentiometer	-100.0 ~ 100.0%	0.0%	△	0619
F06.26	Maximum input of curve keypad potentiometer	Minimum input of curve keypad potentiometer ~ 100.0	99.5%	△	061A
F06.27	Set value corresponding to maximum input of curve keypad potentiometer	-100.0 ~ 100.0%	100.0 %	△	061B
F06.28	AI1 terminal filtering time	0.000 ~ 10.000s	0.100 s	△	061C
F06.29	AI2 terminal filtering time	0.000 ~ 10.000s	0.100 s	△	061D
F06.30	AI3 terminal filtering time	0.000 ~ 10.000s	0.100 s	△	061E
F06.31	Keypad potentiometer filtering time	0.000 ~ 10.000s	0.100 s	△	061F
F06.32	Minimum input of curve HI	0.00 kHz ~ Maximum input of curve HI	0.00k Hz	△	0620
F06.33	Set value corresponding to minimum input of curve HI	-100.0 ~ 100.0%	0.0%	△	0621
F06.34	Maximum input of curve HI	Minimum input of curve HI ~ 100.00kHz	50.00 kHz	△	0622
F06.35	Set value corresponding to maximum input of curve HI	-100.0 ~ 100.0%	100.0 %	△	0623
F06.36	HI terminal filtering time	0.000 ~ 10.000s	0.100 s	△	0624
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 11: AI3 12: HI 13: Output torque 14: AO communication	1	×	0700
F07.01	AO2 output function		2	×	0701
F07.02	Y2/HO output function (when used as HO)		3	×	0702

		given 1 15: AO communication given 2			
F07.03	AO1 offset	-100.0 ~ 100.0%	0.0%	△	0703
F07.04	AO1 gain	-2.000 ~ 2.000	1.000	△	0704
F07.05	AO1 filtering time	0.000 ~ 10.000s	0.000 s	△	0705
F07.06	AO2 offset	-100.0 ~ 100.0%	0.00%	△	0706
F07.07	AO2 gain	-2.000 ~ 2.000	1.000	△	0707
F07.08	AO2 filtering time	0.000 ~ 10.000s	0.000 s	△	0708
F07.09	HO maximum output pulse frequency	0.01 ~ 100.00kHz	50.00 kHz	△	0709
F07.10	HO output filtering time	0.000 ~ 10.000s	0.010 s	△	070A
Group F08 Parameters of Motor 1					
F08.00	Motor 1 type selection	0: Three phase asynchronous motors 1: PMSM (FR510A only) 2: Single phase asynchronous motors (Remove capacity) 3: Single phase asynchronous motors (No need to remove capacity)	0	×	0800
F08.01	Power rating of motor 1	0.1 ~ 1000.0kW	Model defined	×	0801
F08.02	Rated voltage of motor 1	60 ~ 660V	Model defined	×	0802
F08.03	Rated current of motor 1	0.1 ~ 1500.0A	Model defined	×	0803
F08.04	Rated frequency of motor 1	20.00 ~ Fmax	Model defined	×	0804
F08.05	Rated speed of motor 1	1 ~ 30000	Model defined	×	0805
F08.08	Stator resistance R1 of async motor 1	0.001 ~ 65.535Ω	Model defined	×	0808
F08.09	Rotor resistance R2 of async motor 1	0.001 ~ 65.535Ω	Model defined	×	0809
F08.10	Leakage inductance L1 of async motor 1	0.001 ~ 65.535mH	Model defined	×	080A
F08.11	Mutual inductance L2 of asynchronous motor 1	0.1 ~ 6553.5mH	Model defined	×	080B

F08.12	No-load current of async motor 1	0.1 ~ 1500.0A	Model defined	×	080C
F08.13	Field weakening coeff 1 of async motor 1	0.0 ~ 100.0	87%	×	080D
F08.14	Field weakening coeff 2 of async motor 1	0.1 ~ 100.0	75%	×	080E
F08.15	Field weakening coeff 3 of async motor 1	0.1 ~ 100.0	70%	×	080F
F08.21	Pole number of motor	0 ~ 1000	4	⊙	0815
F08.30	Autotuning of motor 1	0: No autotuning 1: Static autotuning of motor 2: Rotary autotuning of motor	0	×	081E
Group F09 V/f Control Parameters of Motor 1					
F09.00	V/f curve setting	00: Linear V/F 01: Multi-stage V/F 02: 1.2nd power V/F 03: 1.4nd power V/F 04: 1.6nd power V/F 05: 1.8nd power V/F 06: 2.0nd power V/F 07: V/F complete separation 08: V/F half separation 09: 1.2 power inverse curve V/F 10: 1.4 power inverse curve V/F 11: 1.6 power inverse curve V/F 12: 1.8 power inverse curve V/F 13: 2.0 power inverse curve V/F	0	×	0900
F09.01	Torque boost	0.0%–30.0% 0.0% (fixed torque boost)	0.0%	△	0901
F09.02	Cut-off frequency of torque boost	0.00 ~ Fmax	50.00 Hz	△	0902
F09.03	Multi-point V/F frequency 1(F1)	0.00 ~ F09.05	0.00Hz	△	0903
F09.04	Multi-point V/F voltage 1 (V1)	0.0 ~ 100.0	0.0%	△	0904
F09.05	Multi-point V/F frequency 2(F2)	F09.03 ~ F09.07	5.00Hz	△	0905
F09.06	Multi-point V/F voltage 2 (V2)	0.0 ~ 100.0	14.0%	△	0906
F09.07	Multi-point V/F	F09.05 ~ F09.09	25.00	△	0907

	frequency 3(F3)		Hz		
F09.08	Multi-point V/F voltage 3 (V3)	0.0～100.0	50.0%	△	0908
F09.09	Multi-point V/F frequency 4(F4)	F09.07～rated motor frequency	50.00 Hz	△	0909
F09.10	Multi-point V/F voltage 4 (V4)	0.0～100.0 Ue=100.0%	100.0 %	△	090A
F09.11	V/F slip compensation gain	0.0～300.0%	0.0%	△	090B
F09.12	Stator voltagedrop compensation gain	0.0～200.0%	100.0 %	△	090C
F09.13	Excitation boost gain	0.0～200.0%	100.0 %	△	090D
F09.14	Oscillation Suppression	0.0～300.0%	100.0 %	△	090E
F09.15	Voltage source for V/F separation	0: Digital setting (F09.16) 1: keypad potentiometer 2: AI1 3: Multi-reference 4: Pulse setting (DI7/HI) 5: PID 6: AI2 7: AI3 Tips:100% corresponds to the rated voltage of the motor.	0	×	090F
F09.16	Voltage digital setting for V/F separation	0~100.0(100% corresponds to the rated voltage of the motor.)	0.0%	△	0910
F09.17	Voltage rise time of V/F separation	0.0～6000.0s It indicates the time for the voltage rising from 0 V to rated Motor voltage.	0.1s	△	0911
F09.18	Set the IQ filter time below 0.5Hz in VVF mode	F09.19～3000ms	500ms	×	0912
F09.19	Set the IQ filter time above 2Hz in VVF mode	1ms～F09.18	100ms	×	0913
F09.20	Torque revision when run forward	0.0～5.0%	0.0%	△	0914
F09.21	Torque revision when run reverse	0.0～5.0%	1.0%	△	0915
Group F10 Vector Control Parameters of Motor 1					
F10.00	Speed/torque control	0: speed control 1: torque control	0	×	0A00
F10.01	ASR low-speed proportional gain Kp1	0.0～100.0	30.0	△	0A01

F10.02	ASR low-speed integration time Ti1	0.001～30.000s	0.10s	△	0A02
F10.03	ASR switching frequency 1	0.00～F10.06	5.00Hz	△	0A03
F10.04	ASR high-speed proportional gain Kp2	0.1～100.0	20.0	△	0A04
F10.05	ASR high-speed integration time Ti2	0.001～30.000s	0.50s	△	0A05
F10.06	ASR switching frequency 2	F10.03～Fmax	10.00 Hz	△	0A06
F10.07	ASR input filtering time	0.0～500.0ms	3.0ms	△	0A07
F10.08	ASR output filtering time	0.0～500.0ms	0.0ms	△	0A08
F10.09	Vector control slip gain	50～200%	100%	△	0A09
F10.10	Digital setting of torque upper limit in speed control mode	80.0～200.0%	165.0%	×	0A0A
F10.11	Excitation adjustment proportional gain Kp1	0.00～10.00	0.50	△	0A0B
F10.12	Excitation adjustment integral gain Ti1	0.0～10.0ms 0.0: No points.	0.800 ms	△	0A0C
F10.13	Torque adjustment proportional gain Kp2	0.00～10.00	0.50	△	0A0D
F10.14	Torque adjustment integral gain Ti2	0.0～10.0ms 0.0: No points.	0.800 ms	△	0A0E
F10.15	Excitation gain coefficient	50.0~200%	100%	△	0A0F
F10.16	Torque setting source under torque control	0: Set by F10.17 1: Keypad potentiometer 2: AI1 3: AI2 4: AI3 5: Pulse setting (DI7/HI) 6: Communication setting	0	×	0A10
F10.17	Digital setting of torque	-200.0～200.0%	50.0%	△	0A11
F10.18	Forward speed limited value under torque control	0.00～Fmax	50.00 Hz	△	0A12
F10.19	Reverse speed limited value	0.00～ Fmax	50.00 Hz	△	0A13

	under torque control				
F10.20	Set torque accel time	0.0～6000.0s	0.0s	△	0A14
F10.21	Set torque decel time	0.0～6000.0s	0.0s	△	0A15
F10.22	Static friction torque compensation	0.0～100.0%	5.00%	△	0A16
F10.23	Static friction frequency range	0.00～50.00Hz	5.00Hz	△	0A17
F10.24	Static Frequency of Open-Loop Torque	1.00～10.00Hz	1.00Hz	△	0A18
F10.25	SVC optimization method	0: Optimization method 1 1: Optimization method 2 2: Optimization method 3	0	△	0A19
F10.26	Max Frequency source under torque control	0: Set by F10.18 & F10.19 1: Keypad potentiometer 2: AI1 3: AI2 4: AI3 5: Pulse setting (DI7/HI)	0	×	0A1A
Group F11 Protection Parameters					
F11.00	Current limit control	0: Current limit disabled 1: Current limit mode 1 2: Current limit mode 2 3: Current limit mode 3	2	×	0B00
F11.01	Current limit	100.0～200.0%	150.0%	×	0B01
F11.02	Frequency decreasing time(limit current in constant speed operation)	0.0～6000.0s	5.0s	△	0B02
F11.03	Current limit mode 2 proportion gain	0.0～100.0%	3.0%	△	0B03
F11.04	Current limit mode 2 integral time	0.00～10.00s	1.00s	△	0B04
F11.05	Overvoltage Stall Control	0: Overvoltage stall disabled 1: Overvoltage stall mode 1 2: Overvoltage stall mode 2	2	×	0B05
F11.06	Overvoltage stall voltage	600～800V(380V Inverter) 320~400V(220V Inverter)	730V 370V	×	0B06
F11.07	Overvoltage Stall Mode 2 Proportion Gain	0.0～300.0%	50.0%	△	0B07
F11.08	Overvoltage stall mode 2 frequency limit	0.00～50.00Hz	5.00Hz	×	0B08

F11.10	Protection action 1	Unit's place: Bus undervoltage 0: Fault reported and coast to stop 1: Stop according to the stop mode 2: Fault reported but continue to run 3: Fault protection disabled	03330	×	0B0A
		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(Err12)(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	×	0B0B
		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	00030	×	0B0C

		continue to run 3: Fault protection disabled			
		Ten's place: Load becoming 0 (Err25) (Same as unit's place)			
		Hundred's place: reserved			
		Thousand's place: reserved			
		Ten thousand's place: reserved			
F11.14	Frequency selection for continuing to run upon fault	0: Current running frequency 1: Set frequency 2: Frequency upper limit 3: Frequency lower limit 4: Backup frequency upon abnormality	1	×	0B0E
F11.15	Backup frequency upon abnormality	0.00 ~ Fmax	0.00Hz	×	0B0F
F11.17	Motor overload protection time	30.0 ~ 300.0s	60.0s	×	0B11
F11.18	Overload alarm	Unit's place: detection option: 0: Always detect 1: Detect at constant speed only	00010	×	0B12
		Ten's place: compared object 0: Rated current of motor 1: Rated current of drive 2: Rated power of the motor 3: Rated power of drive			
		Hundred's place: Fault reported 0:No fault reported 1:Fault reported 2:Display warming			
		Thousand's place: whether to decelerate or not when overload alarm 0: No deceleration 1: Deceleration 2: PI adjustment (PI parameters are F13.08 and F13.09)			
		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 %	×	0B13
F11.20	Overload alarmactivated time that exceeding threshold	0.0 ~ 60.0s	5.0s	×	0B14
F11.21	Inverter overheat warning threshold	50 ~ overheat Temperature	Model defined	×	0B15
F11.22	Detection level of load loss	5.0 ~ 100.0%	20.0%	×	0B16
F11.23	Detection time of load loss	0.1 ~ 60.0s	5.0s	×	0B17
F11.24	Action selection at instantaneous power failure	0: Disabled 1: Deceleration 2: Bus voltage constant control	0	×	0B18
F11.25	Decel time at instantaneous power failure	0.0 ~ 6000.0s	5.0s	△	0B19
F11.26	Rapid current limit	0: Disabled 1: Rapid current limiting mode 1 2: Rapid current limiting mode 2	2	×	0B1A
F11.27	Times of automatic trip(fault) reset	0 ~ 20	0	×	0B1B
F11.28	Interval of automatic trip(fault) reset	0.1 ~ 100.0s	1.0s	×	0B1C
F11.29	DO action during fault auto reset	0: Not act 1: Act	0	×	0B1D
F11.30	Instantaneous power off bus voltage	60.0% ~ Recovery voltage	80.0%	△	0B1E
F11.31	Instantaneous power off recovery voltage	Power off voltage ~ 100.0%	85.0%	△	0B1F
F11.32	Instantaneous power off voltage detection time	0.00 ~ 10.00s	0.10s	△	0B20
F11.33	Instantaneous power off Kp	0.1 ~ 100.0%	40.0%	△	0B21
F11.34	Instantaneous power off integration time Ti	0.00 ~ 10.00s (0.00: Integration invalid)	0.10s	△	0B22
F11.35	Motor temperature sensor type	0:None 1:PT100 2:PT1000	0	×	0B23

		3:KTY			
F11.36	Zero drift value of motor temperature sensor	-100～100℃	0	△	0B24
F11.37	Reserved				0B25
F11.38	Motor temperature warning action threshold	0～110℃	90℃	△	0B26
F11.39	Motor temperature protection action threshold	90～200℃	110℃	△	0B27
Group F12: Multi-Reference and Simple PLC Function					
F12.00	Reference 0	-100.0～100.0%	0.0%	△	0C00
F12.01	Reference 1	-100.0～100.0%	0.0%	△	0C01
F12.02	Reference 2	-100.0～100.0%	0.0%	△	0C02
F12.03	Reference 3	-100.0～100.0%	0.0%	△	0C03
F12.04	Reference 4	-100.0～100.0%	0.0%	△	0C04
F12.05	Reference 5	-100.0～100.0%	0.0%	△	0C05
F12.06	Reference 6	-100.0～100.0%	0.0%	△	0C06
F12.07	Reference 7	-100.0～100.0%	0.0%	△	0C07
F12.08	Reference 8	-100.0～100.0%	0.0%	△	0C08
F12.09	Reference 9	-100.0～100.0%	0.0%	△	0C09
F12.10	Reference 10	-100.0～100.0%	0.0%	△	0C0A
F12.11	Reference 11	-100.0～100.0%	0.0%	△	0C0B
F12.12	Reference 12	-100.0～100.0%	0.0%	△	0C0C
F12.13	Reference 13	-100.0～100.0%	0.0%	△	0C0D
F12.14	Reference 14	-100.0～100.0%	0.0%	△	0C0E
F12.15	Reference 15	-100.0～100.0%	0.0%	△	0C0F
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 6: AI3	0	×	0C10
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	00000	×	0C11

		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: Run from the eighth step "multi-step frequency 8" 3: Run from the fifteenth step "multi-step frequency 15"			
		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)			
F12.18	Running time of step 0	0.0 ~ 6000.0s(h)	0.0s(h)	△	0C12
F12.19	Running time of step 1	0.0 ~ 6000.0s(h)	0.0s(h)	△	0C13
F12.20	Running time of step 2	0.0 ~ 6000.0s(h)	0.0s(h)	△	0C14
F12.21	Running time of step 3	0.0 ~ 6000.0s(h)	0.0s(h)	△	0C15
F12.22	Running time of step 4	0.0 ~ 6000.0s(h)	0.0s(h)	△	0C16
F12.23	Running time of step 5	0.0 ~ 6000.0s(h)	0.0s(h)	△	0C17
F12.24	Running time of step 6	0.0 ~ 6000.0s(h)	0.0s(h)	△	0C18
F12.25	Running time of step 7	0.0 ~ 6000.0s(h)	0.0s(h)	△	0C19
F12.26	Running time of step 8	0.0 ~ 6000.0s(h)	0.0s(h)	△	0C1A
F12.27	Running time of step 9	0.0 ~ 6000.0s(h)	0.0s(h)	△	0C1B
F12.28	Running time of step 10	0.0 ~ 6000.0s(h)	0.0s(h)	△	0C1C
F12.29	Running time of step 11	0.0 ~ 6000.0s(h)	0.0s(h)	△	0C1D
F12.30	Running time of step 12	0.0 ~ 6000.0s(h)	0.0s(h)	△	0C1E
F12.31	Running time of step 13	0.0 ~ 6000.0s(h)	0.0s(h)	△	0C1F
F12.32	Running time of step 14	0.0 ~ 6000.0s(h)	0.0s(h)	△	0C20
F12.33	Running time of step 15	0.0 ~ 6000.0s(h)	0.0s(h)	△	0C21
F12.34	Acceleration/deceleration time of simple PLC	0 ~ 3	0	△	0C22

	reference 0				
F12.35	Acceleration/deceleration time of simple PLC reference 1	0 ~ 3	0	△	0C23
F12.36	Acceleration/deceleration time of simple PLC reference 2	0 ~ 3	0	△	0C24
F12.37	Acceleration/deceleration time of simple PLC reference 3	0 ~ 3	0	△	0C25
F12.38	Acceleration/deceleration time of simple PLC reference 4	0 ~ 3	0	△	0C26
F12.39	Acceleration/deceleration time of simple PLC reference 5	0 ~ 3	0	△	0C27
F12.40	Acceleration/deceleration time of simple PLC reference 6	0 ~ 3	0	△	0C28
F12.41	Acceleration/deceleration time of simple PLC reference 7	0 ~ 3	0	△	0C29
F12.42	Acceleration/deceleration time of simple PLC reference 8	0 ~ 3	0	△	0C2A
F12.43	Acceleration/deceleration time of simple PLC reference 9	0 ~ 3	0	△	0C2B
F12.44	Acceleration/deceleration time of simple PLC reference 10	0 ~ 3	0	△	0C2C
F12.45	Acceleration/deceleration timeof simple PLC reference 11	0 ~ 3	0	△	0C2D
F12.46	Acceleration/deceleration time of simple PLC reference 12	0 ~ 3	0	△	0C2E
F12.47	Acceleration/deceleration time of simple PLC reference 13	0 ~ 3	0	△	0C2F
F12.48	Acceleration/deceleration time of simple PLC	0 ~ 3	0	△	0C30

	reference 14				
F12.49	Acceleration/deceleration time of simple PLC reference 15	0～3	0	△	0C31
F12.50	UP/DOWN function selection of Multi-reference	Unit's place: Action selection when power off 0:Zero clearing when power off 1:Hold when power off Ten's place: select if it can be reduced to negative 0:Disable 1:Enable	00	×	0C32
F12.51	UP/DOWN speed of Multi-reference	0.0～100.0% (0.0%Invalid)	0.0%	△	0C33
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 7: AI3	0	×	0D00
F13.01	PID digital setting	0.0～100.0%	50.0%	△	0D01
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 8: AI3 9:(AI1+AI2+AI3)/3	0	×	0D02
F13.03	PID setting feedback range	0.0～6000.0	100.0	△	0D03
F13.04	PID action direction	0: Forward action 1: Reverse action	0	×	0D04
F13.05	Filtering time of PID setting	0.000～10.000s	0.000 s	△	0D05
F13.06	Filtering time of PID feedback	0.000～10.000s	0.000 s	△	0D06
F13.07	Filtering time of PID output	0.000～10.000s	0.000 s	△	0D07
F13.08	Proportional gain Kp1	1.0～100.0	1.0	△	0D08

F13.09	Integration time Ti1	0.00～10.00s	0.10s	△	0D09
F13.10	Differential time Td1	0.000～10.000s	0.000 s	△	0D0A
F13.11	Proportional gain Kp2	0.0～100.0	20.0	△	0D0B
F13.12	Integration time Ti2	0.00～10.00s	2.00s	△	0D0C
F13.13	Differential time Td2	0.000～10.000s	0.000 s	△	0D0D
F13.14	PID parameter switch	0: No switch, determined by parameters Kp1, Ti1 and Td1 1: Auto switch on the basis of input offset 2: Switched by terminal	0	×	0D0E
F13.15	PID parameter switchover deviation 1	0.0～100.0%	20.0%	×	0D0F
F13.16	PID parameter switchover deviation 2	0.0～100.0%	80.0%	×	0D10
F13.17	PID offset limit	0.0～100.0%	0.0%	×	0D11
F13.18	PID integral property	Unit's place (Whether to stop integral operation when the output reaches the limit) 0: Continue integral operation 1: Stop integral operation Ten's place (Integral separated) 0: Invalid 1: Valid Hundreds: PID control algorithm 0: incremental 1: Positional type	000	×	0D12
F13.19	PID differential limit	0.0～100.0%	0.5%	×	0D13
F13.20	PID initial value	0.0～100.0%	0.0%	×	0D14
F13.21	Holding time of PID initial value	0.0～6000.0s	0.0s	×	0D15
F13.22	PID output frequency upper limit	PID output frequency lower limit～100.0% (100.0% corresponds to maximum frequency)	100.0 %	×	0D16
F13.23	PID output frequency lower limit	–100.0%～PID output frequency lower limit	0.0%	×	0D17
F13.24	Low value of PID	0.1～100.0%	0.0%	×	0D18

	feedback loss	0.0%: Not judging feedback loss			
F13.25	Detection time for low value of PID feedback loss	0.0～30.0s	1.0s	×	0D19
F13.26	PID operation selection	Unit's place: PID operation selection when stop 0:Do not operate when stop 1:Operate when stop	00000	×	0D1A
		Ten's place: output is limited by output frequency 0:No limited 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 2: Normal operation			
F13.27	UP/DWON speed of PID digital given	0.0～100.0% (0.0% Invalid)	0.0%	△	0D1B
F13.28	High value of PID feedback loss	0.1～100.0% 0.0%: Not judging feedback loss	0.0%	×	0D1C
F13.29	Detection time for high value of PID feedback loss	0.0～30.0s	1.0s	×	0D1D
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	×	0D1E
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	×	0D1F
Group F14: Swing Frequency, Fixed Length , Wakeup and Count					
F14.00	Swing frequency	0: Relative to the setting	0	×	0E00

	setting mode	frequency 1: Relative to the maximum frequency			
F14.01	Swing frequency amplitude	0.0 ~ 100.0%	0.0%	△	0E01
F14.02	Jump frequency amplitude	0.0 ~ 50.0%	0.0%	△	0E02
F14.03	Rising Time of Swing frequency	0.0 ~ 6000.0s	5.0s	△	0E03
F14.04	Dropping Time of Swing frequency	0.0 ~ 6000.0s	5.0s	△	0E04
F14.05	Set length	0m ~ 65535m	1000 m	×	0E05
F14.06	Number of pulses per meter	0.1 ~ 6553.5	100.0	×	0E06
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 2: Refer to Ai1 channel 3: Refer to AI2 channel 4: Refer to AI3 channel	00	×	0E07
F14.08	Set count value	1 ~ 65535	1000	×	0E08
F14.09	Designated count value	1 ~ 65535	1000	×	0E09
F14.10	Wakeup frequency	Dormant frequency (F14.12) ~ Fmax	0.00Hz	△	0E0A
F14.11	Wakeup delay time	0.0 ~ 6000.0s	0.0s	△	0E0B
F14.12	Dormant frequency	0.00 ~ Wakeup frequency	0.00Hz	△	0E0C
F14.13	Dormant delay time	0.0 ~ 6000.0s	0.0s	△	0E0D
F14.14	Wake up mode selection	0: Frequency 1: Pressure	0	×	0E0E
F14.15	Dormancy mode selection	0: Frequency 1: Pressure	0	×	0E0F
F14.16	Voltage feedback source	Unit's place: pressure feedback 0: AI1 1: AI2 2: DI7/HI pulse input 3: AI3 Ten's place: pressure dormancy mode 0:Positive direction, dormancy on big pressure and wakeup on small pressure 1:Negative direction,	0	×	0E10

		dormancy on small pressure and wakeup on big pressure			
F14.17	Wake up pressure	0.0%～100.0%	10.0%	△	0E11
F14.18	Dormancy pressure	0.0%～100.0%	50.0%	△	0E12
F14.19	Frequency hopping upper limit value 1	0.00～600.00Hz	0.00Hz	×	0E13
F14.20	Frequency hopping lower limit value 1	0.00～600.00Hz	0.00Hz	×	0E14
F14.21	Frequency hopping upper limit value 2	0.00～600.00Hz	0.00Hz	×	0E15
F14.22	Frequency hopping lower limit value 2	0.00～600.00Hz	0.00Hz	×	0E16
F14.23	Frequency hopping upper limit value 3	0.00～600.00Hz	0.00Hz	×	0E17
F14.24	Frequency hopping lower limit value 3	0.00～600.00Hz	0.00Hz	×	0E18
Group F15: Communication Parameters					
F15.00	Baud rate	0: 4800bps 1: 9600bps 2: 19200bps 3: 38400bps 4: 57600bps 5: 115200bps	1	×	0F00
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	×	0F01
F15.02	Local address	1～247 0: Broadcast address	1	×	0F02
F15.03	Communication timeout	0.0～60.0s	0.0s	×	0F03
F15.04	Response time delay	0～200ms	1ms	×	0F04
F15.05	Master-slave Communication Mode	0:The inverter is the slave 1:The inverter is the master	0	×	0F05
F15.06	The Master Communication Sending Data	0: Set frequency 1: Current running frequency	0	×	0F06
F15.07	Message return when communication	0: No return 1: Return	1	△	0F07

	error				
F15.08	U group return value	0: Positive and negative 1: Absolute value	0	△	0F08
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 5: Reverse operation.	1	×	1000
F16.01	Keyboard operation display	Unit's digit: 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 digit: Speed display (U00.05) 0:According to the actual speed 1:Multiply frequency by speed coefficient(F16.11) Hundred's digit: Decimal places 0: No decimal places 1: One decimal places 2: Two decimal places 3: Three decimal places	0001	×	1001
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	×	1002
F16.03	LED displayed parameters setting 1 on running status	0～99(correspond U00.00～U00.99)	0	△	1003
F16.04	LED displayed parameters setting 2 on running status	0～99(correspond U00.00～U00.99)	6	△	1004
F16.05	LED displayed parameters setting 3 on	0～99(correspond U00.00～U00.99)	3	△	1005

	running status				
F16.06	LED displayed parameters setting 4 on running status	0～99(correspond U00.00～U00.99)	2	△	1006
F16.07	LED displayed parameters setting 1 on stop status	0～99(correspond U00.00～U00.99)	1	△	1007
F16.08	LED displayed parameters setting 2 on stop status	0～99(correspond U00.00～U00.99)	6	△	1008
F16.09	LED displayed parameters setting 3 on stop status	0～99(correspond U00.00～U00.99)	15	△	1009
F16.10	LED displayed parameters setting 4 on stop status	0～99(correspond U00.00～U00.99)	16	△	100A
F16.11	Speed display coefficient	0.00~600.00	1.00	△	100B
F16.12	Power display coefficient	0.0~300.0%	100.0 %	△	100C
F16.13	The enable difference range of U00.00 and U00.01	0.00Hz~5.00Hz	0.10Hz	△	100D
Group F17 User-defined Display Parameters					
F17.00	User-defined Display Parameter 0	00.00～49.99	00.00	△	1100
F17.01	User-defined Display Parameter 1	00.00～49.99	00.00	△	1101
F17.02	User-defined Display Parameter 2	00.00～49.99	00.00	△	1102
F17.03	User-defined Display Parameter 3	00.00～49.99	00.00	△	1103
F17.04	User-defined Display Parameter 4	00.00～49.99	00.00	△	1104
F17.05	User-defined Display Parameter 5	00.00～49.99	00.00	△	1105
F17.06	User-defined Display Parameter 6	00.00～49.99	00.00	△	1106
F17.07	User-defined Display Parameter 7	00.00～49.99	00.00	△	1107
F17.08	User-defined Display	00.00～49.99	00.00	△	1108

	Parameter 8				
F17.09	User-defined Display Parameter 9	00.00～49.99	00.00	△	1109
F17.10	User-defined Display Parameter 10	00.00～49.99	00.00	△	110A
F17.11	User-defined Display Parameter 11	00.00～49.99	00.00	△	110B
F17.12	User-defined Display Parameter 12	00.00～49.99	00.00	△	110C
F17.13	User-defined Display Parameter 13	00.00～49.99	00.00	△	110D
F17.14	User-defined Display Parameter 14	00.00～49.99	00.00	△	110E
F17.15	User-defined Display Parameter 15	00.00～49.99	00.00	△	110F
F17.16	User-defined Display Parameter 16	00.00～49.99	00.00	△	1110
F17.17	User-defined Display Parameter 17	00.00～49.99	00.00	△	1111
F17.18	User-defined Display Parameter 18	00.00～49.99	00.00	△	1112
F17.19	User-defined Display Parameter 19	00.00～49.99	00.00	△	1113
F17.20	User-defined Display Parameter 20	00.00～49.99	00.00	△	1114
F17.21	User-defined Display Parameter 21	00.00～49.99	00.00	△	1115
F17.22	User-defined Display Parameter 22	00.00～49.99	00.00	△	1116
F17.23	User-defined Display Parameter 23	00.00～49.99	00.00	△	1117
F17.24	User-defined Display Parameter 24	00.00～49.99	00.00	△	1118
F17.25	User-defined Display Parameter 25	00.00～49.99	00.00	△	1119
F17.26	User-defined Display Parameter 26	00.00～49.99	00.00	△	111A

F17.27	User-defined Display Parameter 27	00.00～49.99	00.00	△	111B
F17.28	User-defined Display Parameter 28	00.00～49.99	00.00	△	111C
F17.29	User-defined Display Parameter 29	00.00～49.99	00.00	△	111D
F22 Group:Virtual IO					
F22.00	Function selection of virtual VDI1 terminal	The same as function code F04.00	0	×	1600
F22.01	Function selection of virtual VDI2 terminal	The same as function code F04.00	0	×	1601
F22.02	Function selection of virtual VDI3 terminal	The same as function code F04.00	0	×	1602
F22.03	Function selection of virtual VDI4 terminal	The same as function code F04.00	0	×	1603
F22.04	Function selection of virtual VDI5 terminal	The same as function code F04.00	0	×	1604
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	×	1605
F22.06	Settings of virtual VDI terminal status	VDI5, VDI4, VDI3, VDI2, VDI1 0: Invalid 1: Valid	00000	△	1606
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	△	1607
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	△	1608
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	△	1609
F22.10	Function selection of	0:Internal short circuited to physics DIx	0	△	160A

	virtual VDO4 terminals output	Other: The same as function code F05.00			
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	△	160B
F22.12	Virtual VDO1 output delay time	0.0s~6000.0s	0.0s	△	160C
F22.13	Virtual VDO2 output delay time	0.0s~6000.0s	0.0s	△	160D
F22.14	Virtual VDO3 output delay time	0.0s~6000.0s	0.0s	△	160E
F22.15	Virtual VDO4 output delay time	0.0s~6000.0s	0.0s	△	160F
F22.16	Virtual VDO5 output delay time	0.0s~6000.0s	0.0s	△	1610
F22.17	VDO output terminal positive and negative logic	VDO5, VDO4, VDO3, VDO2, VDO1 0: Positive logic 1: Negative logic	00000	△	1611
Group U00 Status Monitoring					
U00.00	Running frequency	0.00 ~ Fup	0.00Hz	⊙	3000
U00.01	Set frequency	0.00 ~ Fmax	0.00Hz	⊙	3001
U00.02	Output voltage	0 ~ 660V	0.0V	⊙	3002
U00.03	Output current	0.0 ~ 3000.0A	0.0A	⊙	3003
U00.04	Output power	0.0 ~ 3000.0kW	0.0kW	⊙	3004
U00.05	Estimated Motor Speed	0 ~ 60000rpm	0rpm	⊙	3005
U00.06	Bus voltage	0 ~ 1200V	0V	⊙	3006
U00.07	Synchronous Frequency	0.00 ~ Fup	0.00Hz	⊙	3007
U00.08	PLC step	0 ~ 15	1	⊙	3008
U00.09	Program Operation Time	0.0 ~ 6000.0s(h)	0.0s(h)	⊙	3009
U00.10	PID set	0 ~ 60000	0	⊙	300A
U00.11	PID feedback	0 ~ 60000	0	⊙	300B
U00.12	Status of DI1 ~ DI5 digital input terminal	DI5 DI4 DI3 DI2 DI1	00000	⊙	300C
U00.13	Status of DI6 ~ DI7 digital input terminal	DI7 DI6	00	⊙	300D
U00.14	Status of digital output terminal	R2 R1 Y2 Y1	0000	⊙	300E
U00.15	AI1 input	0.0 ~ 100.0%	0.0%	⊙	300F
U00.16	AI2 input	0.0 ~ 100.0%	0.0%	⊙	3010
U00.17	AI3 input	0.0 ~ 100.0%	0.0%	⊙	3011

U00.18	Keypad potentiometer input	0.0～100.0%	0.0%	⊙	3012
U00.19	HI input	0.00～100.00kHz	0.00kHz	⊙	3013
U00.20	AO1 output	0.0～100.0%	0.0%	⊙	3014
U00.21	AO2 output	0.0～100.0%	0.0%	⊙	3015
U00.22	HO output	0.00～100.00kHz	0.00kHz	⊙	3016
U00.23	Temperature of inverter	-40.0℃～120.0℃	0.0℃	⊙	3017
U00.24	Accumulative power-on time	0～65535min	0min	⊙	3018
U00.25	Accumulative running time	0～6553.5min	0.0min	⊙	3019
U00.26	Cumulative power-on time	0～65535h	0h	⊙	301A
U00.27	Cumulative running time	0～65535h	0h	⊙	301B
U00.28	Count value	0～65535	0	⊙	301C
U00.29	Length value	0～65535m	0m	⊙	301D
U00.30	Linear speed	0～65535m/min	0m/Min		301E
U00.31	Output torque	0.0～300.0%	0.0%	⊙	301F
U00.32	PTC motor temperature detection	-40℃～200℃	0℃	⊙	3020
U00.33	Speed that detected by encoder	0～60000rpm	0rpm	⊙	3021
U00.34	Monitoring of encoder line number	0～65535	0	⊙	3022
U00.35	Power consumption	0～65535kWh	0kWh	⊙	3023
U00.36	VDI1～VDI5 input status	VDI5 VDI4 VDI3 VDI2 VDI1	00000	⊙	3024
U00.37	VDO1～VDO5output status	VDO5 VDO4 VDO3 VDO2 VDO1	00000	⊙	3025
U00.38	High speed pulse X7 or the line number of extension card monitoring	0～65535	0	⊙	3026
U00.42	Output excitation ratio	0～100.0%	0.0%	⊙	302A
U00.43	Output torque	0～6553.5N.m	0.0N.m	⊙	302B
U00.44	The matching degree of sliding	0~9999	0	⊙	302C

	mode filtering ratio				
U00.45	The cycle count value of encoder A	0~99999	0	⊙	302D
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 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 detectiondisconnection Err25: Load becoming 0 Err26: With-wave current limit fault Err27: Inverter soft-start relay is off Err28: EEPROM version is notcompatible Err29: Instantaneous overcurrent	0	⊙	3100

		Err30: Instantaneous overvoltage Err39: PTC motor temperature too high Err40: Setting operation time ends Err41: Overload warning			
U01.01	Running frequency when the latest fault occurred	0.00 ~ Fup	0.00Hz	⊙	3101
U01.02	Output current when the latest fault occurred	0.0 ~ 3000.0A	0.0A	⊙	3102
U01.03	Bus voltage when the latest fault occurred	0 ~ 1200V	0V	⊙	3103
U01.04	Cumulative running time when the latest fault occurred	0 ~ 65535h	0h	⊙	3104
U01.05	Code of previous fault	Same as U01.00	0	⊙	3105
U01.06	Running frequency when previous fault occurred	0.00 ~ Fup	0.00Hz	⊙	3106
U01.07	Output current when previous fault occurred	0.0 ~ 3000.0A	0.0A	⊙	3107
U01.08	Bus voltage when previous fault occurred	0 ~ 1200V	0V	⊙	3108
U01.09	Cumulative running time when previous fault occurred	0 ~ 65535h	0h	⊙	3109
U01.10	Before-previous fault code	Same as U01.00	0	⊙	310A
U01.11	Running frequency when before-previous fault occurred	0.00 ~ Fup	0.00Hz	⊙	310B
U01.12	Output current when before-previous fault occurred	0.0 ~ 3000.0A	0.0A	⊙	310C
U01.13	Bus voltage when before-previous fault	0 ~ 1200V	0V	⊙	310D

	occurred				
U01.14	Cumulative running time when before-previous fault occurred	0～65535h	0h	⊙	310E
U01.15	Previous 3 categories of faults	The same with U01.00	Err00	⊙	310F
U01.16	Previous 4 categories of faults	The same with U01.00	Err00	⊙	3110
U01.17	Previous 5 categories of faults	The same with U01.00	Err00	⊙	3111
U01.18	Previous 6 categories of faults	The same with U01.00	Err00	⊙	3112
U01.19	Previous 7 categories of faults	The same with U01.00	Err00	⊙	3113
U01.20	Previous 8 categories of faults	The same with U01.00	Err00	⊙	3114
U01.21	Previous 9 categories of faults	The same with U01.00	Err00	⊙	3115
U01.22	Previous 10 categories of faults	The same with U01.00	Err00	⊙	3116
U01.23	Previous 11 categories of faults	The same with U01.00	Err00	⊙	3117
U01.24	Previous 12 categories of faults	The same with U01.00	Err00	⊙	3118
U01.25	Previous 13 categories of faults	The same with U01.00	Err00	⊙	3119

Chapter 3 Maintenance and Troubleshooting

FR20 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	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.

		of too small 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 undervoltage	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	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.

		is faulty.	
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 small power class.	1: Set F11-17 correctly. 2: Reduce the load and check the motor and the mechanical condition. 3: Select an AC drive of 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 equipmen t 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/writ e fault	The EEPROM chip is damaged.	Replace the main control board.
Err16	Motor auto-tunin g cancelled	Since the identification process, press STOP / RST key	Press STOP / RST key to reset
Err17	Motor auto-tunin g fault	1: the motor and the inverter output terminals are not connected	1: check the connection between the inverter and motor 2: The motor is disengaged load 3: Check the motor

		2: The motor does not disengage the load 3: The electrical fault	
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
Err29	Instantaneous overcurrent	1. Inverter output circuit being grounded or short-circuit; 2. The acceleration and deceleration time is too short; 3. Manually torque boost or V/F curve not appropriate; 4. Voltage too low; 5. Start the running motor; 6. Sudden-load in the acceleration process; 7. Model selection of inverter power is too small.	1. Troubleshooting peripheral problems; 2. To increase the acceleration time; 3. Adjust the manually torque boost or V/F curve; 4. Adjust the voltage to normal range; 5. Select RPM track start or start after motor stopped; 6. Cancel sudden-load; 7. Select the inverter with larger power.
Err30	Instantaneous overvoltage	1: Input voltage is too high; 2. There is external force drag the motor to run in deceleration process; 3. The deceleration time is too short; 4. No installation of braking resistor.	1: Adjust the voltage to normal range; 2. Cancel external force or install brake resistor; 3. To increase the deceleration time; 4. Install braking resistor
Err39	Motor temperature too high	1, PTC sensor configuration not right 2, Motor temperature protection value too small 3, Motor temperature too high	1, Reset PTC sensor parameter 2, Increase motor temperature protection value 3, Waiting until motor is cooled
Err40	The setting running time ends	1, Running time more than F00.25	1. Contact the dealer
Err41	Overload warning	1, when F11.18 = 00100 and the current output amp is more than F11.19	1, Check the current load
Err44	Short circuit to ground	When the ten's place of F02.04 is set and the drive output is circuited to the ground.	1. Check the value of F02.04 and the output circuit of drive
Err46	STO Failure 1	1. STO1 is activated, and STO2 is normal2 2.STO2 is activated, and STO1 is normal	1. Check whether STO1 and STO2 have 24VDC input 2. Check whether the positive and negative polarity of STO1 or STO2

		3 STO1 and STO2 are activated at the same time	24VDC input is reversed 3. for technical support
Err47	STO Failure 2	1. The STO power supply voltage is abnormal 2. The STO-L pulse optocoupler self-test is abnormal 3. The STO-Buffer self-test is abnormal 4. The STO-RAM self-test is abnormal 5. The STO-FLASH self-test is abnormal	1. Check whether the power supply is normal. 2. for technical support

Appendix A:Modbus Communication Protocol

1.Application Scope

1.Applicable series: FRECON FR series inverter.

2.Applicable network: Support Modbus protocol, RTU format, withsingle-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

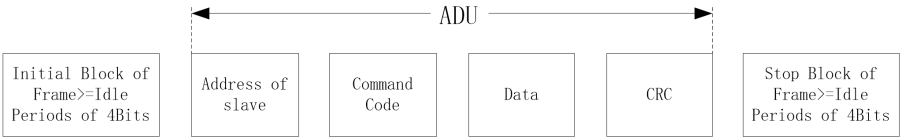
RS485 is asynchronous half-duplex Communication mode. LSB has transmission priority.

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
F10	0x0A	0x8A
F11	0x0B	0x8B
F12	0x0C	0x8C
F13	0x0D	0x8D
F14	0x0E	0x8E
F15	0x0F	0x8F
F16	0x10	0x90
F17	0x11	0x91
F18	0x12	0x92
F19	0x13	0x93
F20	0x14	0x94
F21	0x15	0x95
F22	0x16	0x96

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 1 (0~1000 corresponds to 0~100.0%)
2006H	AO output 2 (0~1000 corresponds to 0~100.0%)
2007H	DO Output Control Bit0: Y1 Bit1: Y2 Bit2: R1 Bit3: R2 Bit4~Bit15: Retention

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	The current fault type of the frequency converter.
2103H	Current warning type of the frequency converter.

5. 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 the inverter with high inertia loads or need to slow down rapid deceleration, Motor will in the state of power generation, the energy is transferred to the inverter DC link via the inverter bridge, causing the bus voltage of the inverter rises, when more than a certain value, the inverter will report overvoltage fault, and even lead to inverter power module damage of overvoltage, to prevent this happening, you must configure the brake components.

The following is recommended braking resistor power rating and resistance. Depending on the load, the user can change the values appropriately, but must be within the recommended range

Inverter Model No	Brake unit		125% braking torque (10% ED, max 10 sec)		Minimum allowable braking resistance
	Model	Number	Recommended specifications for braking resistors.	Number of braking resistors	
FR20-4T-018G/022PB			4.0kW 32Ω	1	24Ω
FR20-4T-022G/030PB			4.5kW 27Ω	1	24Ω
FR20-4T-030G/037PB			6.0kW 20Ω	1	19.2Ω
FR20-4T-037G/045P(B)	Built-in optional		7.0kW 20Ω	1	19.2Ω
FR20-4T-045G/055P(B)			9.0kW 13Ω	1	12.8Ω
FR20-4T-055G/075P(B)			11.0kW 10.2Ω	1	9.6Ω
FR20-4T-075G/090P(B)			15.0kW 7.5Ω	1	6.8Ω
FR20-4T-090G/110P(B)			18.0kW 6.5Ω	1	6.3Ω
FR20-4T-110G/132P(B)			26.0kW 6Ω	1	6Ω

Remark:

Cable should withstand voltage above AC450V,and temperature resistance of cable: 105℃.

Appendix C: Selection of peripheral devices

Inverter Model NO	Circuit breaker (A)	Contactor (A)	Power terminal cable specifications mm^2	Ground terminal cable specifiatiosmm^2	Terminal screw specifications
Three phase:380V，50/60Hz Range:-15%～+30%					
FR20-4T-018G/022PB	100	63	10	10	M5
FR20-4T-022G/030PB	100	63	10	10	M5
FR20-4T-030G/037PB	100	63	16	10	M6
FR20-4T-037G/045PB	160	100	16	16	M8
FR20-4T-045G/055P(B)	200	125	25	16	M8
FR20-4T-055G/075P(B)	200	125	35	25	M8
FR20-4T-075G/090P(B)	250	160	50	25	M8
FR20-4T-090G/110P(B)	250	160	70	35	M8
FR20-4T-110G/132P(B)	350	350	120	60	M10

Appendix D:Keyboard size

Numeric keypad size

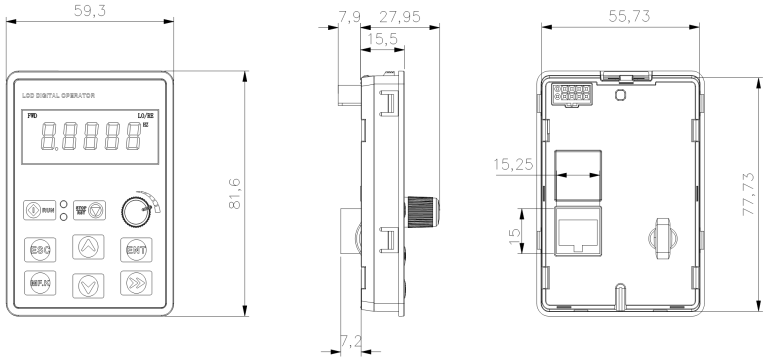


Figure D-1 0.7~5.5kW operation keyboard size drawing

Large keyboard size

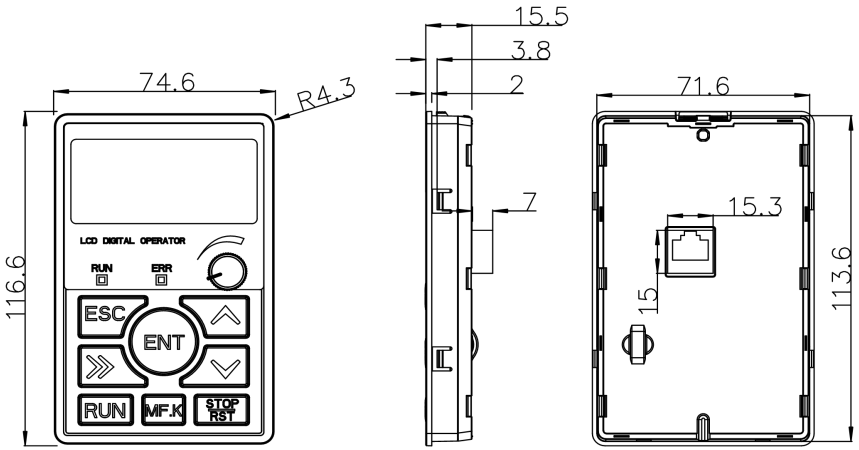


Figure D-2 Dimensions of 7.5~110kW operation keyboard

Keyboard External Installation:

1. Instructions for installing the external keyboard: First, the mounting panel is opened according to the size shown in Figure 2-9 according to the power range of the machine, and then the keyboard tray is inserted into the mounting panel, and then the keyboard assembly is loaded into the keyboard tray. (When removing the keyboard tray, please take out the keyboard first, and then take it out according to the diagram)

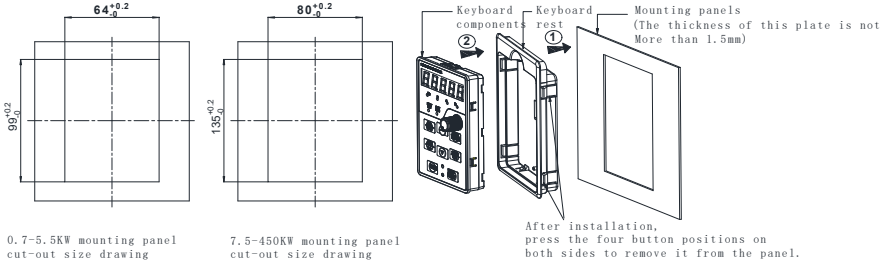


Figure D-3 Dimensions of 4~110kW keyboard external installation opening