

## PREFACE

Thank you for choosing FRECON developed and produced IF150 series drive special purpose for industrial fan.

IF150 series multifunctional compact driver is a compact, beautiful shape, easy to operate, with a strong price competitive advantage.

This user manual introduces the product features, structural features, parameter setting, operation, debugging, maintenance and inspection of IF150 series industrial large fan inverter in detail. Please read the safety precautions in this manual carefully before use, and use the product under the premise of ensuring personal and equipment safety

IMPORTANT NOTES
<ul style="list-style-type: none"><li>◆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.</li><li>◆The illustrations this manual for illustration only and may vary with different products you have ordered.</li><li>◆The company is committed to continuous improvement of products, product features will continue to upgrade, the information provided is subject to change without notice.</li><li>◆If you are using have questions, please contact our regional agents or our customer service center. Customer Service Tel 0755 -33067999.</li><li>◆The company's other products please visit our website: .<a href="http://www.frecon.com.cn">http://www.frecon.com.cn</a></li></ul>

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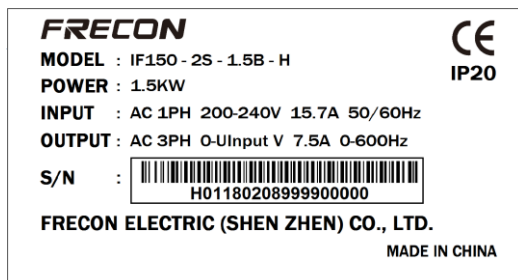
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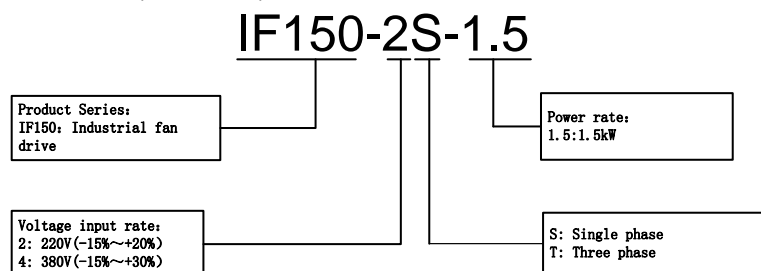
# CHAPTER 1 PRODUCT INFORMATION

## 1.1 Nameplate information



### Model Explanation

Model show on product nameplate contains information below



1.2 Information of IF150 Product Model

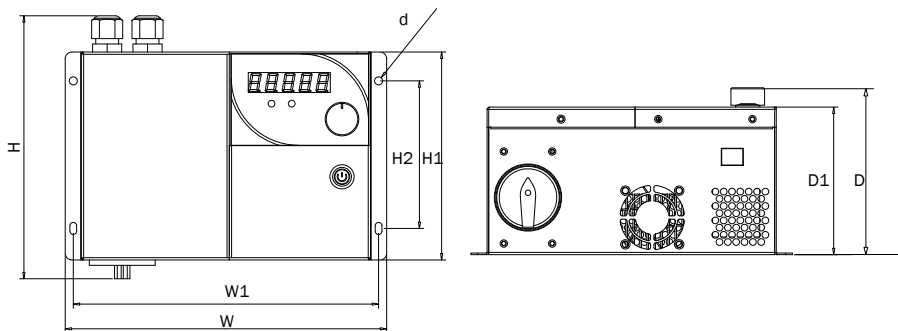
Model No.	Power capacity KVA	Rated input current A	Rated output current A	Applicable motor kW                  HP	
Single-Phase:220V, 50/60Hz		Range:-15%~+20%			
IF150-2S-1.5B	3.0	15.7	7.5	1.5	2
Three-Phase:380V, 50/60Hz		Range:-15%~+30%			
IF150-4T-1.5B	3.0	5.0	4.2	1.5	2
IF150-4T-2.2B	4.0	5.8	5.5	2.2	3

1.3 Technical Features of IF150

Project		Specifications
Power input	Rated input voltage (V)	1-Phase 220V (-15%~+20%) 3-phase 380 V (-15%~+30%)
	Rated input current (A)	See 1.2
	Rated input frequency (Hz)	50Hz/60Hz, tolerance±5%
Power output	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
	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 <sup>th</sup> -type、 1.4 <sup>th</sup> -type、 1.6 <sup>th</sup> -type、 1.8 <sup>th</sup> -type、 2 <sup>th</sup> -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

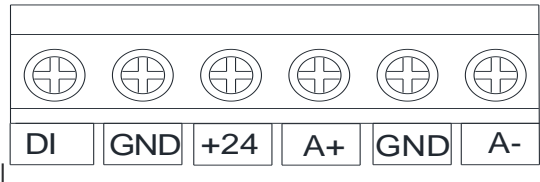
Project		Specifications
	DC brake	DC brake start frequency: 0.00~600.00Hz DC brake time:0.0s~10.0s DC brake current:0.0%~150.0%
Basic functions	Jog brake	Jog frequency range:0.00Hz~50.00Hz. Jog deceleration time: 0.0s~6000.0s.
	Simple PLC、 Multi-speed	Through the built-in PLC or control terminal to achieve 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
Run	Over voltage Over current	System automatically limits of current and voltage during operation to prevent frequent
	Command source	Given the control panel, control terminal, serial communication port given.
	Frequency given	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/s <sup>2</sup> (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



Model	External and Install dimensions (mm)								N.W (Kg)
	W	H	D	W1	H1	H2	D1	Install hole d	
IF150-2S-1.5	239	196	124	227	155	110	110	6	3.04
IF150-4T-1.5									
IF150-4T-2.2									

1.4 Control terminal



type	Terminal symbol	Terminal name	Function description
Power supply	+24 – GND	Power output	Output 24V power supply
Switching input	DI- GND	Switching input terminals	Maximum input frequency: 200Hz Input impedance: 2.4kΩ Voltage range at level input: 9V~30V
485 Communications	A+ - A-	485 communication terminal	Rate: 4800/9600/19200/38400/57600/115200bps The RS485 toggle switch on the control board sets the termination resistor
	GND	485 Communication Place	

### 1.5 Main Circuit Terminals

RA	RC	R/NC	S/L1	T/L2	
	PE	PE	U	V	W

Terminal	Description
R、S、T	AC Three-Phase power input
L1、L2	AC single-phase power input
NC	-
U、V、W	Inverter AC output terminal, connected to three-phase AC motor
RA、RC	Relay normally open contact
PE	Ground terminal

# CHAPTER 2 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:

"Δ" 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

IF150 parameter groups are listed below:

## 2.1 Standard Function Parameters

Table 5-1 Standard Function Parameters

Param.	Parameter Name	Setting Range	Default	Attr
<b>Group F00: System Parameters</b>				
F00.00	Setting of User Password	0~65535	0	×
F00.01	Function code display	0: Display all function code	1	×
		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		
F00.02	Parameter Protection	0: All parameter programmable	0	×
		1: Only F00.02 and this parameter programmable		
F00.04	Parameter Initialization	0: No operation	0	×
		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)		
F00.06	Parameter editing mode	0:Editable via keypad and RS485	0	×
		1:Editable via keypad		
		2:Editable via RS485		
F00.08	Motor 1 control mode	0: Voltage/Frequency (V/F) control	1	×
		1:Sensor-less vector control 1		
		2: Sensor-less vector control 2		



Param.	Parameter Name	Setting Range	Default	Attr
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 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	100	×
F00.13	Carrier frequency	0.700~16.000kHz	Model defined	△
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	×
<b>Group F01: Frequency Command</b>				
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	×

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Param.	Parameter Name	Setting Range	Default	Attr
F01.01	Master Frequency Command Source	0: Master digital setting (F01.02)	1	×
		1: keypad potentiometer		
		2: Analog input AI1		
		3: Communication		
		4: Multi-reference		
		5: PLC		
		6: Process PID output		
		7: X7/HI pulse input		
F01.02	Digital Setting of Master Frequency	8: Analog input AI2	50.00Hz	△
		0.00~Fmax		
F01.03	Auxiliary Frequency Command Source	0: Auxiliary digital setting (F01.04)	0	×
		1: keypad potentiometer		
		2: Analog input AI1		
		3: Communication		
		4: Multi-reference		
		5: PLC		
		6: Process PID output		
		7: X7/HI pulse input		
F01.04	Digital setting of auxiliary frequency	8: Analog input AI2	50.00Hz	△
		0.00~Fmax		
F01.05	Range of auxiliary frequency	0: Relative to maximum frequency	0	×
		1: Relative to master frequency		
F01.06	Coeff of auxiliary frequency	5.0~150.0%	100.0%	△
F01.07	Jog frequency	0.00~Fmax	5.00Hz	△
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	0	×
		1: Run at 0 Hz would be activated after the time delay set by F01.12		
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	△
F01.14	Frequency compensation per 50Hz	0.00~50.00Hz	0.00Hz	△
<b>Group F02: Start/Stop Control</b>				
F02.00	Run command	0: Keypad control (LED off)	0	×
		1: Terminal control (LED on)		
		2: Communication control (LED blinking)		
F02.01	Running direction	0: Forward	0	△
		1: Reverse		
F02.02	Reverse-proof action	0: Reverse enabled	0	×
		1: Reverse disabled		

Param.	Parameter Name	Setting Range	Default	Attr
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	0000	×
		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 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 braking 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%	△
F02.10	Speed search decel time	0.0~10.0s	1.0s	×
F02.11	Speed search coefficient	0.01~5.00	0.30	△
F02.12	Stop mode	0: Ramp to stop	0	×
		1: Coast to stop		
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	0	×
		1: Enabled		
		2: Enabled at running		
		3: Enabled at deceleration		
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	0	×
		1: Voltage output		

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Param.	Parameter Name	Setting Range	Default	Attr
F02.21	Auto-start of power-on again	0: Invalid 1: Valid	0	△
F02.22	Waiting time between auto-start and power-on again	0.0~10.0s	0.5s	△
<b>Group F03: Accel/Decel Parameters</b>				
F03.00	Accel time 0	0.0~6000.0s	15.0s	△
F03.01	Decel time 0	0.0~6000.0s	15.0s	△
F03.02	Accel time 1	0.0~6000.0s	15.0s	△
F03.03	Decel time 1	0.0~6000.0s	15.0s	△
F03.04	Accel time 2	0.0~6000.0s	15.0s	△
F03.05	Decel time 2	0.0~6000.0s	15.0s	△
F03.06	Accel time 3	0.0~6000.0s	15.0s	△
F03.07	Decel time 3	0.0~6000.0s	15.0s	△
<b>Group F08 Parameters of Motor 1</b>				
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%	×

Param.	Parameter Name	Setting Range	Default	Attr
F08.16	Synchronous motor stator resistance	0.001 ~ 65.535Ω	Model determination	×
F08.17	Synchronous motor straight shaft inductance	0.01 ~ 655.35mH	Model determination	×
F08.18	Synchronous motor cross-shaft inductance	0.01 ~ 655.35mH	Model determination	×
F08.19	Synchronous motor back EMF	0.1 ~ 6553.5V	Model determination	×
F08.20	Encoder mounting angle	0.0 ~ 359.9°	0.0°	×
F08.21	Motor's pole number	0 ~ 1000	4	⊖
F08.22	The synchronous machine closed-loop incremental encoder is zeroed in the first run	0: Non-return-to-zero	0	×
		1: Zero		
F08.23	Number of encoder lines	0 ~ 65535	1024	×
F08.24	Encoder type	0: ABZ incremental encoder	0	×
		1:UVW incremental encoders		
		2: Rotary encoder		
		3:ECN1313		
		4: Sine and cosine encoders		
F08.25	ABZ incremental encoder AB phase sequence	0: Positive	0	×
		1: reverse		
F08.26	Speed feedback PG disconnection detection time	0.0: Do not move    0.1 ~ 10.0s	0.0s	×
F08.27	Motor to encoder speed ratio	0.001 ~ 60.000	1.000	×
F08.28	Number of rotary encoder pole pairs	1 ~ 100	1	×
F08.30	Autotuning of motor 1	0: No auto tuning	0	×
		1: Static auto tuning of motor		
		2: Rotary auto tuning of motor		
Group F09 V/f Control Parameters of Motor 1				
F09.00	V/f curve setting	0: Linear V/f	0	×
		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		
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	△

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Param.	Parameter Name	Setting Range	Default	Attr
F09.04	Multi-point V/F voltage 1 (V1)	0.0~100.0	0.0%	△
F09.05	Multi-point V/F frequency 2(F2)	F09.03~F09.05	5.00Hz	△
F09.06	Multi-point V/F voltage 2 (V2)	0.0~100.0	14.0%	△
F09.07	Multi-point V/F frequency 3(F3)	F09.05~F09.09	25.00Hz	△
F09.08	Multi-point V/F voltage 3 (V3)	0.0~100.0	50.0%	△
F09.09	Multi-point V/F frequency 4(F4)	F09.07~rated motor frequency	50.00Hz	△
F09.10	Multi-point V/F voltage 4 (V4)	0.0~100.0      Ue=100.0%	100.0%	△
F09.11	V/F slip compensation gain	0.0~300.0%	80.0%	△
F09.12	Stator voltage drop compensation gain	0.0~200.0%	100.0%	△
F09.13	Excitation boost gain	0.0~200.0%	150.0%	△
F09.14	Oscillation Suppression	0.0~300.0%	100.0%	△
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%	△
F09.21	Torque revision when run reverse	0.0~5.0%	1.0%	△
F09.22	PMSM accelerated current compensation setpoint	0.0~200.0%	0.0%	△
F09.23	Compensates for the current drop time after PMSM acceleration is complete	0.0~100.0s	2.0s	△
F09.24	The ID current value is maintained after PMSM acceleration is complete	0.0~200.0%	0.0%	△
<b>Group F10 Vector Control Parameters of Motor 1</b>				
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	△
F10.02	ASR low-speed integration time Ti1	0.001~30.000s	0.100s	△
F10.03	ASR switching frequency 1	0.00~F10.06	5.00Hz	△
F10.04	ASR high-speed proportional gain Kp2	0.0~100.0	10.0	△
F10.05	ASR high-speed integration time Ti2	0.001~30.000s	0.500s	△
F10.06	ASR switching frequency 2	F10.03~Fmax	10.00Hz	△

Param.	Parameter Name	Setting Range	Default	Attr
F10.07	ASR input filtering time	0.0~500.0ms	0.3ms	△
F10.08	ASR output filtering time	0.0~500.0ms	0.0ms	△
F10.09	Vector control slip gain	50~200%	100%	△
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	△
F10.12	Excitation adjustment integral gain Ti1	0.0~3000.0ms	10.0ms	△
F10.13	Torque adjustment proportional gain Kp2	0.00~10.00	0.50	△
F10.14	Torque adjustment integral gain Ti2	0.0~3000.0ms	10.0ms	△
F10.15	Excitation gain coefficient	50.0~200%	100%	△
F10.16	Torque setting source under torque control	0: Set by F10.17	0	×
		1: Keypad potentiometer		
		2: AI1		
		3: AI2		
		5: Pulse setting ( DI7/HI )		
		6: Communication setting		
F10.17	Digital setting of torque	-200.0~200.0%	150.0%	△
F10.18	Forward speed limited value under torque control	0.00~Fmax	50.00Hz	△
F10.19	Reverse speed limited value under torque control	0.00~Fmax	50.00Hz	△
F10.20	Set torque accel time	0.0~6000.0s	0.0s	△
F10.21	Set torque decel time	0.0~6000.0s	0.0s	△
F10.22	Static friction torque compensation	0.0~100.0%	5.00%	△
F10.23	Static friction frequency range	0.00~20.00Hz	1.00Hz	△
F10.24	Sliding friction torque compensation	0.0~100.0%	1.0%	△
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	0	×
		1: Keypad potentiometer		
		2: AI1		
		3: AI2		
		5: Pulse setting ( DI7/HI )		
F10.27	The synchronous motor starts the excitation current	0.0 ~ 150.0%	50.0%	×
F10.28	Synchronous motor field weakening control	0:无效 1:有效	1	×
F10.29	Synchronous motor weakening voltage	70.0 ~ 100.0%	95%	△

# IF150 Series Industrial Fan Drive

Param.	Parameter Name	Setting Range	Default	Attr
F10.30	Synchronous motor field weakening ratio Kp	0.0 ~ 500.0%	50.0%	△
F10.31	Synchronous motor weakening integration time Ti	0.00 ~ 60.00s	0.5s	△
F10.32	Synchronous motor field weakening limiting	0.0 ~ 200.0%	100.0%	△
F10.33	Synchronous motor excitation current frequency high point	F10.34 ~ 600.00Hz	4.00Hz	△
F10.34	Synchronous motor excitation current frequency low point	0.0 ~ F10.33	3.00Hz	△
F10.35	Synchronous motor excitation current conversion delay	0.0 ~ 10.0s	1.0s	△
F10.36	Synchronous motor speed estimation scale	0.00 ~ 10.00	0.20	△
F10.37	Synchronous motor speed estimation integration time	0.1 ~ 1000.0ms	20.0ms	△
F10.38	Synchronous motor synovial filtering ratio	0.0001 ~ 2.0000	0.1057	△
<b>Group F11 Protection Parameters</b>				
F11.00	Current limit control	0: Current limit disabled	2	×
		1: Current limit mode 1		
		2: Current limit mode 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	△
F11.03	Current limit mode 2 proportion gain	0.1 ~ 100.0%	3.0%	△
F11.04	Current limit mode 2 integral time	0.00 ~ 10.00s	10.00s	△
F11.05	Overvoltage Stall Control	0: Overvoltage stall disabled	2	×
		1: Overvoltage stall mode 1		
		2: Overvoltage stall mode 2		
F11.06	Overvoltage Stall Voltage	600 ~ 800V	730V	×
F11.07	Overvoltage Stall Mode 2 Proportion Gain	0.0 ~ 100.0%	50.0%	△
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 run 3: Fault protection disabled	03330	×



Param.	Parameter Name	Setting Range	Default	Attr
		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	×

Param.	Parameter Name	Setting Range	Default	Attr
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	×
		1: Deceleration		
		2: Bus voltage constant control		
F11.25	Decel time at instantaneous power failure	0.0~6000.0s	5.0s	△
F11.26	Rapid current limit	0: Disabled	0	×
		1: Enabled		
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	0	×
		1: Act		
F11.30	Instantaneous power off bus voltage	60.0%~Recovery voltage	80.0%	△
F11.31	Instantaneous power off recovery voltage	Power off voltage~100.0%	85.0%	△

Param.	Parameter Name	Setting Range	Default	Attr
F11.32	Instantaneous power off voltage judge time	0.01~10.00s	0.10s	△
F11.33	Instantaneous power off gain Kp	0.1~100.0%	40.0%	△
F11.34	Instantaneous integration time Ti	0.00~10.00s（0.00:Integration invalid）	0.10s	△
Group F15: Communication Parameters				
F15.00	Baud rate	0: 4800bps	1	×
		1: 9600bps		
		2: 19200bps		
		3: 38400bps		
		4: 57600bps		
		5: 115200bps		
F15.01	Data format	No check, data format (1-8-N-2) for RTU	0	×
		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		
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	0	×
		1:The inverter is the master		
F15.06	The Master Communication Sending Data	0: Set frequency	0	×
		1: Current running frequency		
F15.07	Information return when communication error	Range:0~1	1	△
F15.08	Group U00.00 output frequency numerical attribute	0: Positive and negative value	0	△
		1: Absolute value		
Group F16 Keys and Display of Keypad Parameters				
F16.00	MF.K key setting	0: No function	1	×
		1: Jog		
		2: Forward/reverse switchover		
		3: Run command sources shifted		
		4: Jog reverse		
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	1	×
		Ten's place: Speed display（U00.05） 0: According to the actual speed 1: Multiply frequency by speed coefficient(F16.11)		

Param.	Parameter Name	Setting Range	Default	Attr
		Hundred's place: Decimal places 0: No decimal places 1: One decimal places 2: Two decimal places 3: Three decimal places		
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	△
F16.04	LED displayed parameters setting 2 on running status	0~99(correspond U00.00~U00.99)	6	△
F16.05	LED displayed parameters setting 3 on running status	0~99(correspond U00.00~U00.99)	3	△
F16.06	LED displayed parameters setting 4 on running status	0~99(correspond U00.00~U00.99)	2	△
F16.07	LED displayed parameters setting 1 on stop status	0~99(correspond U00.00~U00.99)	1	△
F16.08	LED displayed parameters setting 2 on stop status	0~99(correspond U00.00~U00.99)	6	△
F16.09	LED displayed parameters setting 3 on stop status	0~99(correspond U00.00~U00.99)	15	△
F16.10	LED displayed parameters setting 4 on stop status	0~99(correspond U00.00~U00.99)	16	△
F16.11	Speed display coefficient	0.00~100.00	1.00	△
F16.12	Power display coefficient	0.0~300.0%	100.0%	△
F16.13	The enable difference range of U00.00 and U00.01	0.00Hz~5.00Hz	0.10Hz	△
<b>Group U00 Status Monitoring</b>				
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	⊖

Param.	Parameter Name	Setting Range	Default	Attr
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~VDO5 output status	VDO5 VDO4 VDO3 VDO2 VDO1	00000	⊙
U00.38	High speed pulse X7 or the line number of extension card monitoring	0~65535	0	⊙
<b>Group U01 Fault Record</b>				
U01.00	Code of the latest fault	Err00~Err41	Err00	⊙
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	⊙

Param.	Parameter Name	Setting Range	Default	Attr
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	⊙

## CHAPTER 3 MAINTENANCE AND TROUBLESHOOTING

IF150 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.

Display	Fault Name	Possible Causes	Solutions
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.



Display	Fault Name	Possible Causes	Solutions
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 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

Display	Fault Name	Possible Causes	Solutions
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.

# APPENDIX A: MODBUS COMMUNICATION PROTOCOL

## 1. Application Scope

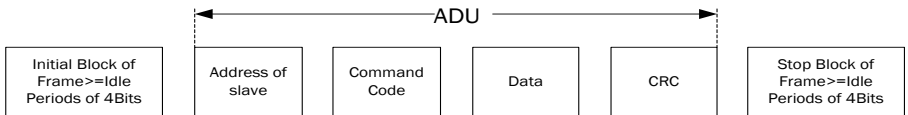
1. Applicable series: FRECON FR series inverter
2. Applicable network: Support Modbus protocol, RTU format, with single-master/multi-slave Communication network of RS485 bus.  
The typical RTU message frame format:

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)	<p>High byte function code group number, F00～F31, U00, U01, respectively, corresponding to the high byte address is 00H～1FH, 30H, 31H.</p> <p>Low byte of the group function code number, from 0 to 99 corresponding to the low byte address is 00H～63H.</p> <p>For example: Modify F01.02 function code value, no power-down when storing the corresponding register address (referred to as RAM address) to 0102H.</p> <p>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.</p> <p>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.</p>

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