User Manual

Series Drive

Preface

Thank you for choosing Series AC DRIVE. This user manual presents a detailed description of series with respect to product features, structural characteristics, functions, installation, parameter setting, troubleshooting, etc. Be sure to carefu lly read through the safety precautions before use, and use this product on the premise that personnel and equipment safety is ensured.

IMPORTANT NOTES

- Please assure the intactness of product enclosure and all safety covers before installation .Operation must conform to the requirements of this manual and local industrial safety regulations and/or electrical codes.
- Contents of this manual may be subject to appropriate modification as a result of product upgrade, specification change and update of the manual.
- In the event of damage or loss of user manual, users may ask local distributors, offices or our Technical Service Department for a new one.
- If any item as stated in this manual is not clear, please contact for technical Service.
- If any anomaly occurs after power up or during the operation, it is essential to stop the machine and identify the fault or seek technical services as soon as possible.

Contents

Chapter 1

Product Information

1.1 Model Explanation

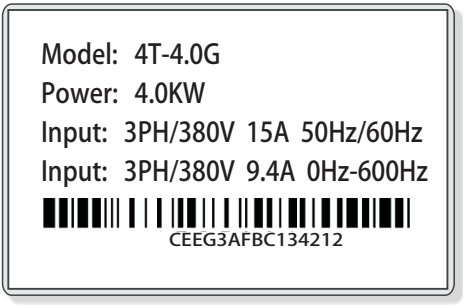
Model shown on product nameplate indicates the series name, applicable type of power supply, power class and the version of software and hardware, etc. via the combination of numbers, symbols and letters.

4 T - 1.5 G

1 2 3 4

Code	No.	Content
Voltage level	❶	2：220V 4：380V
Voltage Classification	❷	S：Single-phase T：Three phase
Adapted motor powe	❸	0.4KW~400KW
Model	❹	Heavy-duty

1.2 Nameplate Information



1.3 Information of Product Model

Drive model	Power rating (kW)	3-phase rated output current(A)	1-phase rated input current(A)	3-phase rated input current(A)	Applicable motor (kW)	Brake chopper
Single/ three-phase 220V input, heavy duty						
2S-0.4G	0.4	2.8	5.5	3.2	0.4	Inbuilt
2S-0.7G	0.75	4.8	9.2	6.3	0.75	
2S-1.5G	1.5	8.0	14.5	9	1.5	
2S-2.2G	2.2	10	23	15	2.2	
2S-4.0G	3.7	17	35	20.5	3.7	

Drive model	Power rating (kW)	3-phase rated output current(A)	3-phase rated input current(A)	Applicable motor (kW)	Brake chopper
Three-phase 220V input, heavy duty					
2T-5.5G	5.5	25	29	5.5	Inbuilt
2T-7.5G	7.5	30	35	7.5	
2T-11G	11	45	50	11	
2T-15G	15	60	65	15	
2T-18.5G	18.5	75	80	18.5	
2T-22G	22	90	95	22	
2T-30G	30	110	118	30	

Drive model	Power rating (kW)	Rated output current(A)	Rated input current(A)	Applicable motor (kW)	Brake chopper
Three-phase 400V input, heavy duty/ light duty					
4T-0.7G	0.75	2.8	3.5	0.75	Inbuilt
4T-1.5G	1.5	4.3	5.0	1.5	
4T-2.2G	2.2	5.6	6.0	2.2	
4T-4.0G	3.7	9.4	10.5	3.7	
4T-5.5G	5.5	13	14.6	5.5	
4T-7.5G	7.5	17	20.5	7.5	

Drive model	Power rating (kW)	Rated output current(A)	Rated input current(A)	Applicable motor (kW)	Brake chopper
4T-11G	11	25	29	11	Inbuilt
4T-15G	15	30	35	15	
4T-18.5G	18.5	37	44	18.5	Inbuilt optional
4T-22G	22	45	50	22	
4T-30G	30	60	65	30	
4T-37G	37	75	80	37	
4T-45G	45	90	95	45	
4T-55G	55	110	118	55	
4T-75G	75	150	157	45	–
4T-90G	90	176	180	90	–
4T-110G	110	210	215	110	–
4T-132G	132	253	232	132	–
4T-160G	160	310	285	160	–
4T-185G	185	350	326	185	–
4T-200G	200	380	354	200	–
4T-220G	220	430	403	220	–
4T-250G	250	470	441	250	–
4T-280G	280	520	489	280	–
4T-315G	315	590	571	315	–
4T-355G	355	650	624	355	–
4T-400G	400	725	700	400	–

Note:

- Means brake chopper is optionally inbuilt.Braking resistor needs to be mounted externally:
- Means the rated input current configured a DC reactor. The drive 4T2000B - 4T4000B is provided with an external-mounted DC reactor in shipment as default. Be sure to connect the DC reactor. Failure to comply may result in drive abnormal run.

Chapter 2

Technical Features

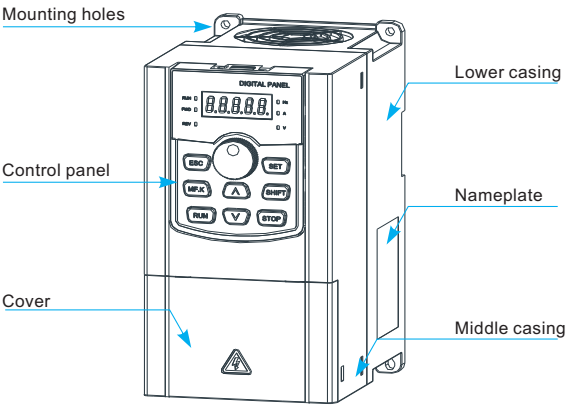
2.1 Specifications

Items		Specifications
Power Input	Rated input voltage	3-phase AC208V/AC220V/AC230V/AC240V/AC380V/ AC400V/AC415V/AC440V/AC460V/AC480V 1-phase AC220V/AC230V/AC240V
	Frequency	50Hz/60Hz, tolerance ±5%
	Voltage range	Continuous voltage fluctuation ±10%, short fluctuation -15%~+10%, i.e. 200V: 170V~264V, 400V: 323V~528V
		Voltage out-of-balance rate <3%, distortion rate as per the requirements of IEC61800-2
	Rated input current	See Table 1-1
Power output	Applicable motor(kW)	See Table 1-1
	Rated current(A)	See Table 1-1
	Output voltage(V)	3-phase: 0~rated input voltage, error<±3%
	Output frequency(Hz)	0.00~600.00Hz; unit: 0.01Hz
	Overload capacity	150%-1min, 180%-10s, 200%-0.5s every 10min
Control characteristics	V/f patterns	V/f control Sensor-less vector control
	Range of speed regulation	1:100 (V/f control) 1:200 (sensor-less vector control)
	Speed accuracy	±0.5% (V/f control) ±0.2% (sensor-less vector control)
	Speed fluctuation	±0.3% (sensor-less vector control)
	Torque response	<10ms (sensor-less vector control)
	Starting torque	0.5Hz: 180% (V/f control, sensor-less vector control)
Basic functions	Start frequency	0.00~600.00Hz
	Accel/Decel time	0.00~60000s
	Switching frequency	0.7kHz~16kHz
	Frequency setting	Digital setting + control panel ∧/∨ Digital setting + terminal UP/DOWN Communication Analog setting (AI1/AI2) Terminal pulse setting

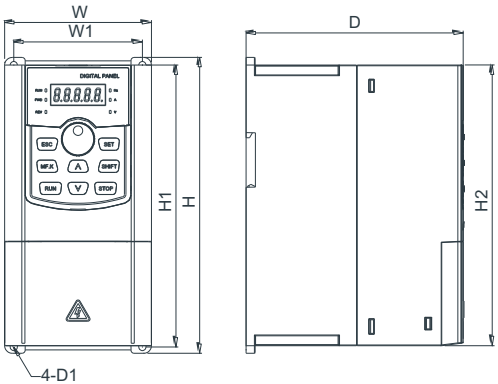
Items		Specifications
Basic functions	Motor start-up methods	Started from starting frequency DC brake start-up Flying start
	Motor stop methods	Ramp to stop Coast to stop Ramp stop + DC brake
	Dynamic braking capacity	Brake chopper working voltage: 200V level: 325-375V / 400V level: 650V-750V Service time: 0-100.0s; brake chopper for 4T0150B and below are inbuilt or can be inbuilt optionally.
	DC brake capacity	DC brake start frequency: 0.00~600.00Hz DC brake current: 0.0~100.0% DC brake time: 0.0~30.00s
	Input terminals	6 digital inputs, one of which can be used for high-speed pulse input, and compatible with active open collectors NPN, PNP and dry contact input. 2 analog inputs, one of which is voltage/current programm able, and the other supports voltage only. and the extended one is voltage/current programmable
	Output terminals	1 high-speed pulse output, 0~50kHz square wave signal output. It can output signals such as frequency setting, or output frequency, etc. 1 digital output 1 relay output (can be extended to 2)
		1 analog output (can be extended to 2), voltage/current output programmable; can output signals such as frequency setting, or output frequency, etc.
Featured functions	Parameter copy, parameter backup, flexible parameter displayed & hidden, various master & auxiliary setting and switchover, flying start, a variety of Accel/Decel curves optional, automatic correction of analog, brake control, 16-step speed control programmable (2-step speed supports flexible frequency command), wobble frequency control, count function, three history faults, over excitation brake, over voltage stall protection, under voltage stall protection, restart on power loss, skip frequency, frequency binding, four kinds of Accel/Decel time, motor thermal protection, flexible fan control, process PID control, simple PLC, multi-functional key programmable, droop control, autotuning, field-weakening control, V/f separated control.	

Items		Specifications
Environment	Place of operation	Indoors, no direct sunlight, free from dust, corrosive gases, flammable gases, oil mist, water vapor, water drop or salt, etc.
	Altitude	0-2000m. De-rate 1% for every 100m when the altitude is above 1000 meters
	Ambient temperature	-10℃-40℃. The rated output current should be derated 1% for every 1℃ when the ambient is 40℃--60℃
	Relative humidity	0~95%, no condensation
	Vibration	Less than 5.9m/s2 (0.6g)
	Storage temperature	-40℃~+70℃
Others	Efficiency at rated Amps	Rated power 7.5kW and below: ⩾93% 11~ 45kW: ⩾ 95% 55kW and above: ⩾98%
	IP grade	IP20
	Cooling method	Forced air cooling

2.2 Structure diagram



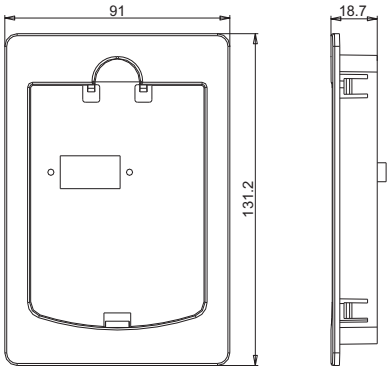
2.3 Product Size



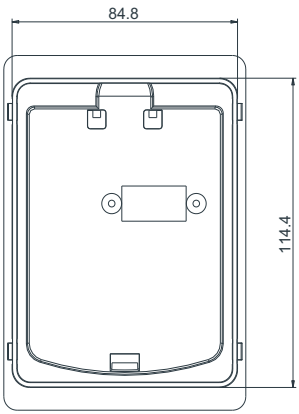
Model	External and installation dimensions (mm)						Pore size	Weight (kg)
	W1	H1	H	H2	W	D		
2S-0.7G	67.5	160	170	----	84.5	129	Φ4.5	1.0
2S-1.5G								
4T-1.5G								
4T-2.2G								
2S-2.2G	85	185	194	----	97	143.5	Φ5.5	1.4
2S-4.0G								
4T-4.0G								
4T-5.5G								
2T-5.5G	106	233	245	----	124	171.2	Φ5.5	2.5
4T-7.5G								
4T-11G								
2T-7.5G	120	317	335	----	200	178.2	Φ8	8.4
2T-11G								
4T-15G								
4T-18.5G								
4T-22G								

Model	External and installation dimensions (mm)						Pore size	Weight (kg)
	W1	H1	H	H2	W	D		
2T-15G	150	387.5	405	----	255	195	Φ8	12.8
2T-18.5G								
4T-30G								
4T-37G								
2T-22G	180	437	455	----	300	225	Φ10	17.8
2T-30G								
4T-45G								
4T-55G								
4T-75G	260	750	785	----	395	291	Φ12	50
4T-90G								
4T-110G								
4T-132G	360	950	990	----	500	368	Φ14	88
4T-160G								
4T-185G								
4T-200G								
4T-220G	400	1000	1040	----	650	406	Φ14	123
4T-250G								
4T-280G								
4T-315G	600	1250	1300	----	815	428	Φ14	165
4T-355G								
4T-400G								

2.4 keyboard size



External dimension of external keyboard



Installation opening size of external keyboard

Chapter 3

Main Circuit Terminals and Wiring

WARNING

- Only qualified personnel familiar with AC motor drives are allowed to implement wiring. Failure to comply may result in equipment damage and/or personnel injury even death.
- Wiring should be in strict accordance with this manual, otherwise hazard of electric shock or equipment damage exists.
- Make sure input power supply has been completely disconnected before wiring operation. Failure to comply will result in personnel injury even death.
- All wiring operations and lines should comply with EMC and national and local industrial safety regulations and/or electrical codes. The conductor diameter should be in accordance with recommendations of this manual. Otherwise, hazard of equipment damage, fire, and/or personnel injury exists.
- Since leakage current of the drive may exceed 3.5mA, for safety's sake, the drive and the motor must be grounded so as to avoid hazard of electric shock.
- Be sure to perform wiring in strict accordance with the drive terminal marks. Never connect three-phase power supply to output terminals U/T1, V/T2 and W/T3. Failure to comply will result in equipment damage.

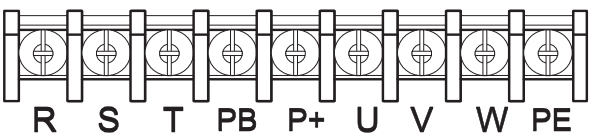
ATTENTION

- Signal wires should be away from main power lines to the best of possibility. In the event that this cannot be ensured, vertical cross arrangement should be adopted, reducing EMI interference to the signal wires as much as possible.
- In case the motor cable exceeds 100m, an appropriate output reactor should be mounted.

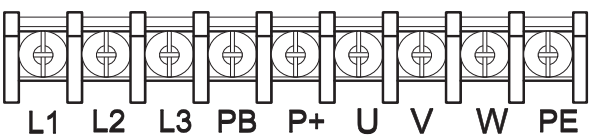
3.1 Main Circuit Terminals

Terminal marks	Designation and function of terminals
R/L、S/L2、T/L3	Single / Three-phase AC input terminals (Connect R/L1, T/L3 when use single phase input)
⊕ 、B1	Braking resistor connection terminals
U/T1、V/T2、W/T3	Three-phase AC output terminals
⏚	Ground terminal PE

✧ Main circuit terminal of three-phase 380V frequency converter



✧ Specification of three-phase / single-phase converter main circuit terminal 220V



3.2 Control Terminal Wiring

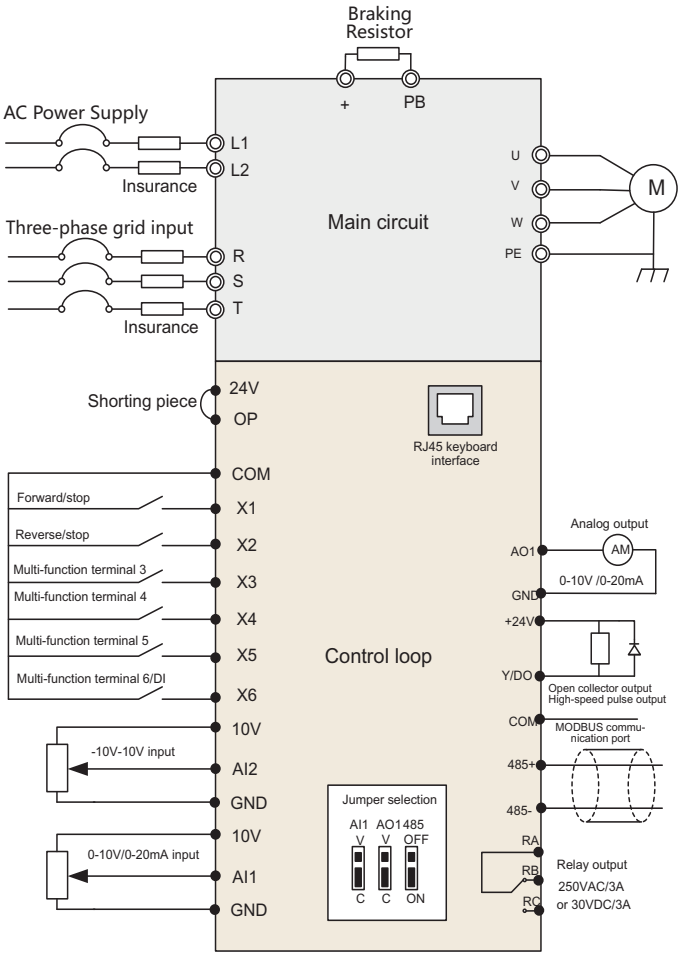
WARNING

- Only qualified personnel familiar with AC motor drives are allowed to implement wiring. Failure to comply may result in equipment damage and/or personnel injury even death.
- Wiring should be in strict accordance with this manual, otherwise hazard of electric shock or equipment damage exists.
- Make sure input power supply has been completely disconnected before wiring operation. Failure to comply will result in personnel injury even death.
- All wiring operations and lines should comply with EMC and national and local industrial safety regulations and/or electrical codes. The conductor diameter should be in accordance with recommendations of this manual. Otherwise, hazard of equipment damage, fire, and/or personnel injury exists.
- Screws or bolts for terminal wiring must be screwed tightly.
- AC 220V signal is prohibited from connecting to terminals other than control terminals RA, RB and RC.

ATTENTION

- Signal wires should be away from main power lines to the best of possibility. If this cannot be ensured, vertical cross arrangement should be adopted, reducing EMI interference to the signal wires as much as possible.
- The encoder must be provided with shielded cables whose shielded layer must be properly grounded.

3.3 Wiring Diagram



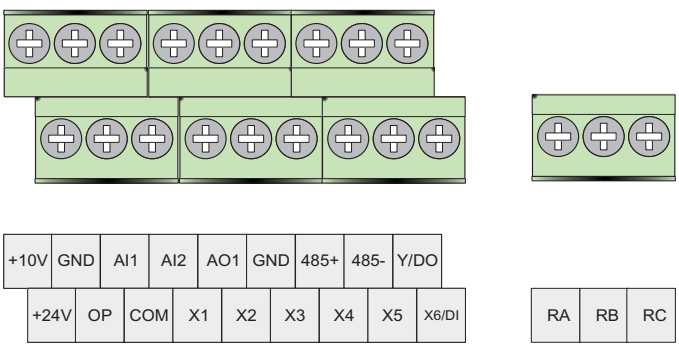
3.4 Control Terminal Specification

Category	Terminal	Terminal designation	Description
Analog input	+10V	Analog input reference voltage	10.1V ±3%
			Maximum output current 25mA The resistance of external potentiometer should be larger than 400Ω
	GND	Analog ground	Isolated from COM interiorly
	AI1	Analog input 1	0~20mA: input impedance -500Ω, maximum input current - 25mA
			0~10V: input impedance -22kΩ, maximum input voltage -12.5V
			Switch AI1 on control board for jumping from 0~20mA and 0~10V, factory default: 0~10V
	AI2	Analog input 2	–10V~10V: input impedance - 25kΩ
			Range: -12.5V~+ 12.5V
Analog output	AO1	Analog output 1	0~20mA: impedance - 200Ω~500Ω
			0~10V: impedance ⩾ 10k
			Switch AO1 on control board for jumping between 0~20mA and 0~10V, factory default: 0~10V
	GND	Analog ground	Isolated from COM interiorly
Digital input	+24V	+24V	24V±10%, Isolated from GND interiorly
			Maximum load - 200mA
	PLC	Digital input Common terminal	Used for switching between high and low levels, short-circuited with +24V when delivery, i.e. low value of digital input valid
			External power input
	COM	+24V ground	Isolated from GND interiorly
	X1~X5	Digital input Terminals 1~5	Input: 24VDC, 5mA
			Range of frequency: 0~200Hz
			Range of voltage: 10V~30V
	X6/DI	Digital input/pulse input	Digital input: same as X1~X5
			Pulse input: 0.1Hz~50kHz; range of voltage: 10-30V

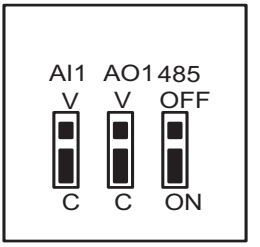
Category	Terminal	Terminal designation	Description
Digital output	Y	Open collector output	Range of voltage: 0~24V
			Range of current: 0~50mA
	Y/DO	Open collector out / Pulse out	Open collector output: same as Y
			Pulse output: 0~50kHz
Relay output	RA/RB /RC	Control board relay output	RA-RB: NC; RA-RC: NO
			Contact capacity: 250VAC/3A, 30VDC/3A
Terminal 485 Interface	485+	485 differential signal +	Rate: 4800/9600/19200/38400/57600/115200bps
	485−	485 differential signal -	Maximum distance - 500m (standard network cable used)
	GND	485 commun-ication shield grounding	Isolated from COM interiorly
Control panel		Control panel SPI interface	Maximum communication distance is 3m when connected to Control panel
			Use standard network cable

3.5 Control Terminal Usage

✧ Lay-out of Control Terminals



✧ Instruction of Signal Switches



Chapter 4

Operation and Display Interface

4.1 Introduction to Operation and Display Interface

The operation panel can be used to modify the function parameters of the product, monitor the working status of the product and control the operation of the product (start and stop). The appearance and function area are shown in the following figure:

4.1.1 Introduction to Indicators

Name	Function Description					
Status indicator	FWD/ REV	When the machine is stopped, when the Fwd lamp is on, it indicates that the product forward rotation command is valid; when the machine is running, it indicates that the product is running in the forward rotation state; when Fwd flashes, it shows that the product is switching from the forward rotation state to the reverse rotation state. When the machine is stopped, the rev lamp is on, indicating that the reverse rotation command of the product is valid, or the reverse operation state. When the rev lamp flashes, indicating that the product is switching from the reverse rotation state to the forward rotation state.				
Unit indicator	Hz	Frequency unit	A	Current unit	V	Voltage unit
	RMP	(Hz +A) units	%	(A + V) percent		
Digital display	5-digit led display, which can display the set frequency, output frequency, various monitoring data and alarm code, etc.					

4.1.2 Key Description

Key	Key Name	Function
ESC	Programming key	Level 1 Menu Entry or Exit
SET	Confirm key	Enter the menu screen step by step, and confirm the parameter settings
Λ	Incremental Key	Increment of data or function code
V	Decreasing key	Decrement of data or function code
SHIFT	Shift key	Under the shutdown display interface and the operation display interface, the display parameters can be cyclically selected;When modifying a parameter, you can select the modification bit of the parameter
RUN	Run Key	In the keyboard mode of operation, used to run the operation
STOP	Stop/Reset	In running status, press this key to stop running operation;In fault alarm state, it can be used for reset operation, and the characteristics of this key are governed by function code F7-16.
MK.F	Multifunction selection key	Select function switch according to F7-00

4.2 Description of function code viewing and modification method

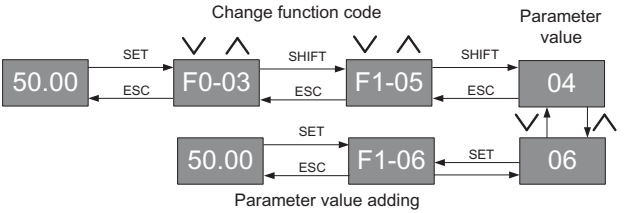
The operation panel of MS10 product adopts secondary menu structure to set parameters and other operations.

4.2.1 Parameter modification/setting steps:

The operation panel of MS10 product adopts secondary menu structure to set parameters and other operations.

- In the monitoring state, press ESC to enter the function code parameter display state.

- When the parameter code is displayed, the current flashing bit data can be modified by pressing the "shift" key and flashing the parameter bit of parameter function code.
- Modif that flashing paramete group to the modified target function code group by pressing the/key.
- Press "set" to enter the parameter function code.
- Modify to the target parameter value, press set, and confirm to modify the parameter value.
- Aft that parameter modification is finis, the current display function code automatically jumps to the next effective display function code to finish the parameter modification.



4.2.2 Monitoring status display

4.2.2.1 Monitoring parameter switching in shutdown state

When the machine is stopped, the preset frequency is displayed by default.

When the preset frequency is displayed, the display value flashes. You can switch to display other parameters by pressing the shift key. In addition to setting the frequency in the shutdown state, we also need to check the bus voltage, and switch to the display content in the shutdown state through the shift button.

4.2.2.2 Monitoring parameter switching in running state

In the running status, the running frequency is displayed by default, and other parameters can be switched and displayed by the Shift key. For example, in the shutdown state, besides setting the frequency, we also need to check the bus voltage and output current, and switch to the display content in the shutdown state through the shift key.

4.2.2.3 Monitoring parameter switching in running state

If the digital function terminal up/down is valid or/on the operation panel under the shutdown, fault or operation state, directly enter the digital frequency parameter modification state, and directly write the modified frequency into the F0.07 parameter group.

Chapter 5

Parameter Table

fault or operation state, directly enter the digital frequency parameter modification state, and directly write the modified frequency into the F0.07 parameter group. ∧∨

Par.	Designation	Scope	Default	Attr
Group F0: Basic function group				
F0-01	Motor control technique	0: V/f control 1: Sensor-less vector control	0	×
F0-02	Run command	0: Operator Panel 1: Terminal 2: Communication	0	△
F0-03	Master FREQ set	0: Digital setting (F0-04) + ∧/∨ adjustment on Operator panel. 1: Digital setting (F0-04) + UP/DW adjustment on Operator panel. 2: Analog input AI1 3: Analog input AI2 4: VP (Operator panel) 5: X6/DI pulse input 6: Process PID output 7: PLC 8: Multi-step speed 9: Communication	4	△
F0-04	FREQ digital setting	0.00~Fmax	50.00Hz	◎
F0-05	Auxiliary FREQ set	0: No setting 1: Digital setting (F0-04) + ∧/∨ adjustment on Operator panel 2: Digital setting (F0-04) + terminal UP/DOWN adjustment 3: Analog input Ai1 4: Analog input Ai2 5: VP (Operator panel) 6: X6/DI pulse input 7: Process PID output 8: PLC 9: Multi-step speed 10: Communication	0	△

Par.	Designation	Scope	Default	Attr
F0-06	Auxiliary FREQ digital setting	Lower limit FREQ ~ upper limit FREQ	0	×
F0-07	Auxiliary FREQ range	0: Relative to maximum FREQ 1: Relative to master FREQ	0	△
F0-08	Auxiliary FREQ coeff	0.0%~100.0%	4	△
F0-09	FREQ set mode	0: Master FREQ set 1: Master & auxiliary computation result 2: Switch between master and auxiliary set 3: Switch between master FREQ set, and master & auxiliary computation result 4: Switch between auxiliary FREQ set, and master & auxiliary computation result	50.00Hz	◎
F0-10	Computation of master and auxiliary FREQ	0: Master + auxiliary 1: Master - auxiliary 2: Max {master, auxiliary} 3: Min {master, auxiliary}	0	△
F0-11	Run direction	0: Forward 1: Reverse	0	△
F0-12	Maximum FREQ	Upper limit FREQ ~600.00Hz	50.00Hz	×
F0-13	Upper limit FREQ	Lower limit FREQ ~ maximum FREQ	50.00Hz	×
F0-14	Lower limit FREQ	0.00Hz~upper limit FREQ	0.00Hz	×
F0-15	Switching FREQ	0.7kHz~16.0kHz, factory default	Model dependent	△
F0-16	PWM optimization	Switching FREQ relation with temperature 0: Self-adaption 1: No adaptio	0	×

Par.	Designation	Scope	Default	Attr
F0-17	Accel time 1	0s~600.00s/6000.0s/60000s	Model dependent	△
F0-18	Decel time 1	0s~600.00s/6000.0s/60000s	Model dependent	△
F0-19	Accel/Decel time resolution	0: 0.01s 1: 0.1s 2: 1s	4	△
F0-20	Binding of run command and frequency set	Frequency set bundled under Operator panel control: 0: No binding 1: Digital setting (F0-04) + ∧/∨ adjustment on Operator panel 2: Digital setting (F0-04) + terminal UP/DOWN adjustment 3: Analog input AI1 4: Analog input AI2 5: VP(Operator panel) 6: X6/DI pulse input 7: Process PID output 8: Simple PLC 9: Multi-step FREQ A: Communication input Tens place: FREQ set bundled under terminal control (same as ones place) Hundreds place: FREQ set bundled under communication control (same as ones place)	000	×
Group F1 Motor Parameters				
F1-00	Type of motor	0: Ordinary motor 1: Variable frequency motor	1	×
F1-01	Power rating of motor	0.4kW~6553.5kW	Model dependent	×

Par.	Designation	Scope	Default	Attr
F1-02	Rated voltage of motor	0V~480V (for drives 400V level)	380V	×
F1-03	Rated current of motor	0.0A~6553.5A	Model dependent	×
F1-04	Rated frequency of motor	0.00Hz~upper limit frequency	50.00Hz	×
F1-05	Pole number of motor	1~80	4	×
F1-06	Rated speed of motor	0~65535r/min	Model dependent	×
F1-07	Stator resistance R1 of motor	0.001Ω~65.535Ω	Model dependent	×
F1-08	Leakage inductance L1 of motor	0.1mH~6553.5mH	Model dependent	×
F1-09	Rotor resistance R2 of motor	0.001Ω~65.535Ω	Model dependent	×
F1-10	Mutual inductance L2 of motor	0.1mH~6553.5mH	Model dependent	×
F1-11	No-load current of motor	0.0A~6553.5A	Model dependent	×
F1-12	Flux weakening coeff 1 of motor	0.0000~1.0000	Model dependent	×
F1-28	Autotuning of motor	0: No autotuning 1: Static autotuning 2: Rotary autotuning	0	×
Group F2 Vector Control Parameters of Motor				
F2-00	ASR low-speed proportional gain	0.0~20.0	2.0	△
F2-01	ASR low-speed integration time	0.000s~8.000s	0.200	△
F2-02	ASR switching FREQ 1	0.00Hz~F2-05	5.00Hz	△
F2-03	ASR high-speed proportional gain	0.0~20.0	2.0	△
F2-04	ASR high-speed integration time	0.000s~8.000s	0.200	△

Par.	Designation	Scope	Default	Attr
F2-05	ASR switching FREQ 2	F2-02~upper limit FREQ	10.00Hz	△
F2-06	ACR proportion coeff	0.000~4.000	1.000	△
F2-07	ACR integration coeff	0.000~4.000	1.000	△
F2-08	Pre-excitation time	0.000s~5.000s	0.200s	△
F2-09	ASR input filtering time	0.0ms~500.0ms	0.3ms	△
F2-10	ASR output filtering time	0.0ms~500.0ms	0.3ms	△
Group F3 V/f Control Parameters of Motor				
F3-00	V/f curve setting	0: Linear V/f 1: Multi-stage V/f (F3-01 ~ F3-08) 2-6: 1.2th - 2.0nd power 7: V/f separated mode 1	0	×
F3-01	V/f FREQ value 3	0.00Hz~motor rated FREQ	50.00Hz	×
F3-02	V/f voltage value V3	0.0%~100.0%	100.0%	×
F3-03	V/f FREQ value f2	F3-05 ~ F3-01	0.00Hz	×
F3-04	V/f voltage value V2	0.0%~100.0%	0.0%	×
F3-05	V/f FREQ value f1	F3-07 ~ F3-03	0.00Hz	×
F3-06	V/f voltage value V1	0.0%~100.0%	0.0%	×
F3-07	V/f FREQ value f0	0.00Hz ~ F3-05	0.00Hz	×
F3-08	V/f voltage value V0	0.0%~100.0%	0.0%	×
F3-09	Torque boost	0.0%~30.0%	0.0%	△
F3-10	Slip compensation gain	0.0%~400.0%	100.0%	△
F3-11	V/f oscillation suppression gain 1	0~3000	38	△
F3-13	Voltage setting on V/f separated pattern	0: F3-14 digital setting 1: Set by AI1 2: Set by AI2 3: VP(Operator panel) 4: Process PID output 5: AI1 + process PID output	0	×

Par.	Designation	Scope	Default	Attr
F3-14	Digital set voltage on V/f separated pattern	0.0%~100.0%	0.0%	△
F3-15	Voltage variation time on V/f separated pattern	0.00s~600.00s	0.01s	△
F3-17	Current limitation source	0: Disabled 1: Set by F3-18 2: Set by AI1 3: Set by AI2 4: Set by VP(Operator panel) 5: Set by X6/DI	1	×
F3-18	Digital setting of current limit value	20.0%~200.0%	160.0%	×
F3-19	Flux weakening current limit coeff	0.001~1.000	0.500	△
Group F4 Analog and Pulse Input				
F4-00	Function of terminal X1	0: No function 1: JOG forward 2: JOG reverse 3: Run forward (FWD) 4: Run reverse (REV) 5: Three-wire control 6: Run suspended 7: External stop 8: Emergency stop 9: Reserved 10: DC brake stop 11: Coast to stop 12: Terminal UP 13: Terminal DOWN 14: Clear UP/DOWN (including ∧/∨ key) adjustment 15: Multi-step FREQ terminal 1 16: Multi-step FREQ terminal 2	3	×
F4-01	Function of terminal X2		4	×
F4-02	Function of terminal X3		0	×
F4-03	Function of terminal X4		0	×
F4-04	Function of terminal X5		0	×
F4-05	Function of terminal X6/DI		0	×
F4-07	Function of terminal AI1 (Digital enabled)		1	×
F4-08	Function of terminal AI2 (Digital enabled)		1	×

Par.	Designation	Scope	Default	Attr
		17: Multi-step FREQ terminal 3 18: Multi-step FREQ terminal 4 19: Accel/Decel time determinant 1 20: Accel/Decel time determinant 2 21: Accel/Decel disabled(ramp stop not inclusive) 22: External fault input 23: Fault reset (RESET) 24: Pulse input (valid only for X6/DI) 25-26: Reserved 27: Run command switched to control panel 28: Run command switched to terminal control 29: Run command switched to communication control 30: Frequency set mode shift 31: Master FREQ set switched to digital setting F0-04 32: Auxiliary FREQ set switched to digital setting F0-06 33: PID adjustment direction 34: PID paused 35: PID integration paused 36: PID parameter switch 37: Count input 38: Count clear 39: Length count 40: Length clear 41: Simple PLC paused 42: Simple PLC disabled 43: Simple PLC stop memory clear 44: Start wobble frequency 45: Clear wobble frequency status 46: Run prohibited 47: DC brake in run 48: Reserved		

Par.	Designation	Scope	Default	Attr
F4-10	Filtering time of digital input terminal	0.000s~1.000s	0.010s	△
F4-11	Delay time of terminal X1	0.0s~3600.0s	0.0s	△
F4-12	Delay time of terminal X2	0.0s~3600.0s	0.0s	△
F4-13	FWD/REV terminal control mode	0: Two-wire mode 1 （FWD terminal inputs forward run command, while REV terminal inputs reverse run command.） 1: Two-wire mode 2 （FWD terminal inputs run command, while REV terminal inputs run direction） 2: Three-wire mode 1 （Same as mode0, digital input terminal "three-wire run" controls the stop，Input signals of all these three terminals take effect when trigger edge is detected.） 3: Three-wire mode 2 （Same as mode1,digital input terminal "three-wire run" controls the stop，Input signals of all these three terminals take effect when trigger edge is detected.）	0	×
F4-14	Terminal UP/DOWN frequency change step size	0.00Hz/s~100.00Hz/s	0.03 Hz/s	△
F4-15	Terminal UP/DOWN FREQ adjustment action	Ones place: at stop 0: Cleared 1: Maintained Tens place: on power loss 0: Cleared	0000	△

Par.	Designation	Scope	Default	Attr
		1: Maintained Hundreds place: integral function 0: No integral function 1: Integral function enabled Thousands place: run direction 0: Changing run direction prohibited 1: Changing run direction allowed		
F4-16	Option of virtual input terminal	000~77F 0: Actual terminal in effect 1: Virtual terminal in effect Ones place: BIT0~BIT3: X1~X4 Tens place: BIT4~BIT6: X5~X6 Hundreds place: BIT8~BIT10: AI1~AI2	0000	×
F4-17	Enabled condition of run command terminal after fault reset (RESET)	0: Trigger edge detected + ON detected 1: ON detected	0	△
F4-18	Digital input terminal enabled status setting 1	Ones place: X1 0: Positive logic 1: Negative logic Tens place: X2 (same as ones place) Hundreds place: X3 (same) Thousands place: X4 (same)	0000	×
F4-19	Digital input terminal enabled status setting 2	Ones place: X5 0: Positive logic 1: Negative logic Tens place: X6 (valid as ordinary terminal, same as ones place) Hundreds place: (same as ones place) Thousands place: reserved	0000	0000

Par.	Designation	Scope	Default	Attr
F4-20	Digital input terminal enabled status setting 3	Ones place: AI1 0: Positive logic 1: Negative logic Tens place: AI2 (same as ones place)	0000	×
F4-21	Analog input curve	Ones place: AI1 input curve 0: Curve 1 (2 points) 1: Curve 2 (4 points) 2: Curve 3 (4 points) 3: Curve 2 and curve 3 switchover Tens place: AI2 input curve (same as ones place)	0010	×
F4-22	Curve 1 maximum input	Curve 1 minimum input~110.0%	100.0%	△
F4-23	Corresponding set value of curve 1 maximum input	-100.0%~100.0%	100.0%	△
F4-24	Curve 1 minimum input	-110.0%~curve 1 maximum input	0.0%	△
F4-25	Corresponding set value of curve 1 minimum input	-100.0%~100.0%	0.0%	△
F4-26	Ai1 terminal filtering time	0.000s~10.000s	0.1s	△
F4-27	Ai2 terminal filtering time	0.000s~10.000s	0.1s	△
F4-28	Curve 2 maximum input	Range: input of curve 2 inflection point A~110.0%	100.0%	△
F4-29	Set value corresponding to curve 2 maximum input	Range: -100.0%~100.0%	100.0%	△
F4-30	Input of curve 2 inflection point A	Input of curve 2 inflection point B ~curve 2 maximum input	0.0%	△

Par.	Designation	Scope	Default	Attr
F4-31	Set value Cor. to input of curve 2 inflection point A	Range: -100.0%~100.0%	0.0%	△
F4-32	Input of curve 2 inflection point B	Range: Curve 2 minimum input ~ Input of curve 2 inflection point A	0.0%	△
F4-33	Set value corresponding to input of curve 2 inflection point B	Range: -100.0%~100.0%	0.0%	△
F4-34	Curve 2 minimum input	Range: -110.0%~ input of curve 2 inflection point B	0.0%	△
F4-35	Set value corresponding to curve 2 minimum input	Range: -100.0%~100.0%	0.0%	△
F4-36	Curve 3 maximum input	Range: input of curve 3 inflection point A ~110.0%	100.0%	△
F4-37	Set value corresponding to curve 3 maximum input	Range: -100.0%~100.0%	100.0%	△
F4-38	Input of curve 3 inflection point A	Range: input of curve 3 inflection point B ~ curve 3 maximum input	0.0%	△
F4-39	Set value corresponding to input of curve 3 inflection point A	Range: -100.0%~100.0%	0.0%	△
F4-40	Input of curve 3 inflection point B	Range: curve 3 minimum input~ input of curve 3 inflection point A	0.0%	△
F4-41	Set value corresponding to input of curve 3 inflection point B	Range: -100.0%~100.0%	0.0%	△
F4-42	Curve 3 minimum input	Range: -110.0%~ input of curve 3 inflection point B	0.0%	△

Par.	Designation	Scope	Default	Attr
F4-43	Set value corresponding to curve 3 maximum input	Range: -100.0%~100.0%	100.0%	△
F4-44	DI maximum input	Range: F4-46~50.0kHz	50.0kHz	△
F4-45	Set value corresponding to DI maximum input	Range: -100.0%~100.0%	100.0%	△
F4-46	DI minimum input	Range: 0.0kHz~F4-44	0.0kHz	△
F4-47	Set value corresponding to DI minimum input	Range: -100.0%~100.0%	0.0%	△
F4-48	DI filtering time	0.000s~1.000s	0.001s	△
Group F5 Analog and Pulse Output				
F5-00	Y/DO output function (when used as Y)	0: No output 1: Drive undervoltage 2: Drive run preparation completed 3: Drive is running 4: Drive running at 0Hz (there is no output at stop) 5: Drive running at 0Hz (there is output at stop) 6: Run direction 7: FREQ attained 8: Upper limit FREQ attained 9: Lower limit FREQ attained 10: Frequency detection FDT1 11: Frequency detection FDT2 12-13: Reserved 14: Fault output 15: Alarm output 16: Drive (motor) overloaded alarm	0~32	△

Par.	Designation	Scope	Default	Attr
		17: Drive overheat alarm 18: Zero current detection 19: X1 20: X2 21: Reserved 22: Set count value attained 23: Designated count value attained 24: Length attained 25: Consecutive run time attained 26: Accumulative run time attained 27-29: Reserved 30: PLC step completed 31: PLC cycle completed 32: Wobble frequency attains to upper or lower limit frequency		
F5-01	Y output time delay	0.0s~3600.0s	0.0s	△
F5-04	Control board relay output time delay	0.0s~3600.0s	0.0s	△
F5-05	Option board relay output time delay	0.0s~3600.0s	0.0s	△
F5-09	Enabled state of digital output	Ones place: Y1 0: Positive logic 1: Negative logic Hundreds place: control board relay output (same as ones place)	0000	×

Par.	Designation	Scope	Default	Attr
F5-10	AO output function	0: No output 1: Set FREQ 2: Output FREQ 3: Output current (to drive rated) 4: Output torque (absolute value) 5: Output voltage 6: Output power 7: Bus voltage 8-9: Reserved 10: Magnetic flux current 11:AI1 12:AI2	2	△
F5-11	AO offset	-100.0%~100.0%	0.0%	×
F5-12	AO gain	-2.000~2.000	1.000	×
F5-13	AO filtering time	0.0s~10.0s	0.0s	△
F5-14	Y/DO output function (when used as DO)	Same as F5-10	0	△
F5-15	DO maximum output pulse FREQ	0.1kHz~50.0kHz	50.0kHz	△
F5-16	DO output center point	0: No center point 1: Center point is (F5-15)/2, and the corresponding parameter value is positive when FREQ is higher than center point 2: Center point is (F5-15)/2, and the corresponding parameter value is positive when FREQ is lower than center point	0	×
F5-17	DO output filtering time	0.00s~10.00s	0.00s	△
F5-18	Detection width of FREQ attained	0.00Hz~maximum FREQ	2.50Hz	△
F5-19	Zero current detection value	0.0%~50.0%	5.0%	△

Par.	Designation	Scope	Default	Attr
F5-20	Zero current detection time	0.01s~50.00s	0.50s	△
Group F6 Start/Stop Control				
F6-00	Start method	0: From start FREQ 1: DC braking start 2: Flying start	0	×
F6-01	Flying start 1 current	0.0~200.0%	100.0%	×
F6-02	Flying start 1 Decel time	0.1s~20.0s	2.0s	×
F6-03	Flying start 1 adjustment coeff	0.0 ~ 100.0%	1.0%	×
F6-04	Start FREQ	0.00Hz~upper limit FREQ	0.00Hz	×
F6-05	Holding time of start FREQ	0.0s~3600.0s	0.0s	△
F6-06	DC braking current at start	0.0% ~ 200.0%	0.0%	△
F6-07	DC braking time at start	0.00s~30.00s	0.0s	△
F6-08	Accel/Decel curve	0: Linear Accel/Decel 1: Broken-line Accel/Decel 2-3: S-curve Accel/Decel	0	×
F6-09	Time of Accel S-curve first segment	0.00s~60.00s (S-curve A)	0.20s	△
F6-10	Time of Accel S-curve last segment	0.00s~60.00s (S-curve A)	0.20s	△
F6-11	Time of Decel S-curve first segment	0.00s~60.00s (S-curve A)	0.20s	△
F6-12	Time of Decel S-curve last segment	0.00s~60.00s (S-curve A)	0.20s	△
F6-13	Proportion of Accel S-curve first segment	0.0%~100.0% (S-curve B)	20.0%	△
F6-14	Proportion of Accel S-curve last segment	0.0%~100.0% (S-curve B)	20.0%	△
F6-15	Proportion of Decel S-curve first segment	0.0%~100.0% (S-curve B)	20.0%	△
F6-16	Proportion of Decel S-curve last segment	0.0%~100.0% (S-curve B)	20.0%	△

Par.	Designation	Scope	Default	Attr
F6-17	Stop method	0: Ramp to stop 1: Coast to stop 2: Ramp to stop + DC brake	0	×
F6-18	Start FREQ of DC brake stop	0.00Hz~upper limit FREQ	0.00Hz	×
F6-19	DC brake current	0.0%~200.0%	0.0%	△
F6-20	DC brake time	0.00s~30.00s	0.00s	△
F6-21	Overexcitation brake	0: Disabled 1: Enabled	1	×
F6-22	Dynamic brake	0: Disabled 1: Enabled	0	×
F6-23	Dynamic brake threshold voltage	650V~750V	650V	×
F6-24	Auto restart when power up again after power loss	0: Disabled 1: Enabled	0	×
F6-25	Time delay of auto restart when power up again	0.0s~10.0s	0.0s	△
F6-26	Reverse disabled	0: Reverse enabled 1: Reverse disabled	0	×
F6-27	Dead time between forward and reverse	0.0s~3600.0s	0.0s	△
F6-28	Accel time switching FREQ of broken-line Accel/ Decel	0.00Hz~upper limit FREQ	0.00Hz	△
F6-29	Decel time switching FREQ of broken-line Accel/Decel	0.00Hz~upper limit FREQ	0.00Hz	△

Par.	Designation	Scope	Default	Attr
Group F7 Keys of Control panel				
F7-00	MF key setting	0: No function 1: Forward jog 2: Reverse jog 3: Forward/reverse switchover 4: Emergency stop 1 (set Decel time by F8-09) 5: Emergency stop 2 (coast to stop) 6: Run command sources shifted	0	△
F7-01	Keys locked option	0: Not locked 1: All locked 2: Keys locked except RUN, STOP/RESET 3: Keys locked except STOP/RESET 4: Keys locked other than <<SHIFT>>	0	△
F7-02	Function of STOP key	0: STOP key active only at control panel control 1: STOP key deactivated under any command source	0	△
F7-03	FREQ adjustment through keys ∧/∨	Ones place: option at stop 0: Clear at stop 1: Holding at stop Tens place: option at power loss 0: Clear at power loss 1: Holding at power loss	0100	△
F7-04	Step size of FREQ adjustment through keys ∧/∨	0.00Hz/s~10.00Hz/s	0.03 Hz/s	△
F7-05	Display parameter setting 1 on run status	Binary system setting: 0: No display 1: Display Ones place:	080F	△

Par.	Designation	Scope	Default	Attr
		BIT0: Run FREQ (Hz) BIT1: Set FREQ (Hz) BIT2: Bus voltage (V) BIT3: Output current (A) Tens place: BIT0: Output torque (%) BIT1: Output power (kW) BIT2: Output voltage (V) BIT3: Motor speed (r/min) Hundreds place: BIT0: AI1 (V) BIT1: AI2 (V) BIT3: Output sync FREQ (Hz) Thousands place: BIT0: DI BIT1: External count value BIT2: Reserved BIT3: Reserved Note: when this parameter value is set to 0000, run FREQ (Hz) would be displayed as default		
F7-06	Display parameter setting 2 on run status	Binary system setting: 0: No display 1: Display Ones place: BIT0: Run linear speed (m/s) BIT1: Set linear speed (m/s) BIT2: Input terminal status BIT3: Output terminal status Tens place: BIT0: PID setting (%) BIT1: PID feedback (%) BIT2: Set length (m) BIT3: Actual length (m) Hundreds place: reserved Thousands place: reserved	0000	△

Par.	Designation	Scope	Default	Attr
F7-07	Display parameter setting on stop status	Binary system setting: 0: No display 1: Display Ones place: BIT0: FREQ setting (Hz) BIT1: Bus voltage (V) BIT2: Input terminal status BIT3: Output terminal status Tens place: BIT0: AI1 (V) BIT1: AI2 (V) BIT2-3: Reserved Hundreds place: BIT0: PID setting (%) BIT1: PID feedback (%) BIT2: Set length (m) BIT3: Actual length (m) Thousands place: BIT0: Run linear speed (m/s) BIT1: Set linear speed (m/s) BIT2: External count value BIT3: DI Note: when this parameter value is set to 0000, the set FREQ would be displayed as default (Hz)	0000	△
F7-08	Linear speed COEFF	0.1%~999.9%	100.0%	△
Group F8 Auxiliary setting of operating frequency				
F8-00	Jog FREQ	0.00Hz~upper limit FREQ	5.00Hz	△
F8-01	Jog Accel time	0s~600.00s/6000.0s/60000s	6.0s	△
F8-02	Jog Decel time	0s~600.00s/6000.0s/60000s	6.0s	△
F8-03	Accel time 2	0s~600.00s/6000.0s/60000s	6.0s	△
F8-04	Decel time 2	0s~600.00s/6000.0s/60000s	6.0s	△

Par.	Designation	Scope	Default	Attr
F8-05	Accel time 3	0s~600.00s/6000.0s/60000s	6.0s	△
F8-06	Decel time 3	0s~600.00s/6000.0s/60000s	6.0s	△
F8-07	Accel time 4	0s~600.00s/6000.0s/60000s	6.0s	△
F8-08	Decel time 4	0s~600.00s/6000.0s/60000s	6.0s	△
F8-09	Decel time for emergency stop	0s~600.00s/6000.0s/60000s	6.0s	△
F8-10	Lower limit of skip FREQ band 1	0.00Hz~upper limit FREQ	0.00Hz	×
F8-11	Upper limit of skip FREQ band 1	0.00Hz~upper limit FREQ	0.00Hz	×
F8-12	Lower limit of skip FREQ band 2	0.00Hz~upper limit FREQ	0.00Hz	×
F8-13	Upper limit of skip FREQ band 2	0.00Hz~upper limit FREQ	0.00Hz	×
F8-14	Lower limit of skip FREQ band 3	0.00Hz~upper limit FREQ	0.00Hz	×
F8-15	Upper limit of skip FREQ band 3	0.00Hz~upper limit FREQ	0.00Hz	×
F8-16	Operation when set FREQ lower than lower limit FREQ	0: Run at lower limit FREQ 1: Run at 0 Hz 2: Stop	0	×
F8-17	Time-delay of stop when set FREQ lower than lower limit FREQ	0.0s ~ 6553.5s	0.0s	×
F8-18	Reserved	----	----	
F8-19	Cooling fan control	0: Auto run 1: Always run after power up	0	△

Par.	Designation	Scope	Default	Attr
F8-20	Action when run time attained	Ones place: action when consecutive run time attained: 0: Run continued 1: Stop and fault reported Tens place: action when accumulative run time attained: 0: Run continued 1: Stop and fault reported Hundreds place: unit of run time 0: Second 1: Hour	000	×
F8-21	Consecutive run time setting	0.0s(h)~6000.0s(h)	0.0 s(h)	×
F8-22	Accumulative run time setting	0.0s(h)~6000.0s(h)	0.0 s(h)	×
F8-24	Detected object of FREQ detection (FDT)	Ones place: FDT1 detected object 0: Speed set value (FREQ after Accel/Decel) 1: Detected speed value Tens place: FDT2 detected object Same to FDT1	00	△
F8-25	FDT1 upper value	0.00Hz~maximum FREQ	50.00Hz	△
F8-26	FDT1 lower value	0.00Hz~maximum FREQ	49.00Hz	△
F8-27	FDT2 upper value	0.00Hz~maximum FREQ	25.00Hz	△
F8-28	FDT2 loer value	0.00Hz~maximum FREQ	24.00Hz	△
Group F9 Protection Parameters				
F9-00	Overload alarm	Ones place: detection option: 0: Always detect 1: Detect at constant speed only Tens place: compared with: 0: Motor rated current	000	×

Par.	Designation	Scope	Default	Attr
		1: Drive rated current Hundreds place: drive action 0: Alarm but run continued 1: Alarm and coast to stop		
F9-01	Overload alarm threshold	20.0%~200.0%	180.0%	△
F9-02	Overload alarm activation time	0.1s~60.0s	5.0s	△
F9-03	Overvoltage stall	0: Prohibited 1: Allowed	1	×
F9-04	Overvoltage stall protection voltage	120%~150%	135%	×
F9-05	Fault auto-reset times	0~20	0	×
F9-06	Auto-reset interval	2.0s~20.0s	2.0s	×
F9-07	Drive overheat alarm threshold	0.0℃~100.0℃	85.0℃	△
F9-08	Undervoltage stall	0: Disabled 1: Enabled	0	×
F9-09	Protection action 1	Ones place: reserved Tens place: action at IGBT temperature measurement circuit fault (E-OH3): 0: Coast to stop 1: Alarm but run continued Hundreds place: reserved Thousands place: abnormal terminal communication: 0: Coast to stop 1: Alarm but run continued	0000	×
F9-10	Protection action 2	Ones place: abnormal power supply when running : 0: Coast to stop 1: Alarm but run continued	3000	×

Par.	Designation	Scope	Default	Attr
F9-10	Protection action 2	Tens place: current detection circuit failed 0: Coast to stop 1: Alarm but run continued Hundreds place: abnormal contactor 0: Coast to stop 1: Alarm but run continued Thousands place: input supply fault /output phase loss: 0: Protection for neither input supply fault nor output phase loss 1: No protection for input supply fault, protection enabled for output phase loss 2: Protection enabled for input supply fault, no protection for output phase loss 3: Protection enabled both for input supply fault and output phase loss	3000	×
F9-11	Relay action on drive fault	Ones place: when undervoltage fault occurs 0: No action 1: Action enabled Tens place: when fault locked 0: No action 1: Action enabled Hundreds place: at interval of auto- reset 0: No action 1: Action enabled	10	×
F9-12	Fault memory after power loss	0: Not memorized after power loss 1: Memorized after power loss	0	×

Par.	Designation	Scope	Default	Attr
F9-13	Motor overload Protection	0：no action 1：action at motor rated current 2：action at motor temperature measurement		
F9-14	Overload alarm activation time	0.1～15.0min		
F9-15	motor temperature measurement	0：AI1 1：AI2 2：reserved		
F9-16	motor temperature by Protection	0.00V～10.00V		
Group FA Process PID				
FA-00	PID setting	0: FA-01 digital setting 1: AI1 2: AI2 3: VP(Operator panel) 4: X6/DI pulse input 5: Communication	0	×
FA-01	PID digital setting	0.0%~100.0%	50.0%	△
FA-02	PID feedback	0: AI1 1: AI2 2: VP(Operator panel) 3: AI1+AI2 4: AI1-AI2 5: Max {AI1, AI2} 6: Min {AI1, AI2} 7: X6/DI pulse input 8: Communication	0	×
FA-03	PID positive and negative adjustment	0: Positive adjustment 1: Negative adjustment	0	×
FA-04	PID adjustment	Ones place: output FREQ 0: Must be the same direction as the set run direction	11	×

Par.	Designation	Scope	Default	Attr
		1: Opposite direction allowed Tens place: integration selection 0: Integral continued when FREQ attains upper/lower limit 1: Integral stopped when FREQ attains upper/lower limit		
FA-05	Proportional gain Kp1	0.0~100.0	50.0	△
FA-06	Integration time Ti1	0.000s~50.000s	0.500s	△
FA-07	Derivative time Td1	0.000s~50.000s	0.000s	△
FA-08	Cutoff FREQ when opposite to rotary set direction	0.00Hz~maximum FREQ	50.00Hz	△
FA-09	PID offset limit	0.0%~100.0%	0.0%	△
FA-10	PID derivative limit	0.0%~100.0%	0.5%	△
FA-11	Filtering time of PID setting	0.00s~60.00s	0.00s	△
FA-12	Filtering time of PID feedback	0.00s~60.00s	0.00s	△
FA-13	Filtering time of PID output	0.00s~60.00s	0.00s	△
FA-14	Proportional gain Kp2	0.0~100.0	50.0	△
FA-15	Integration time Ti2	0.000s~50.000s	0.500s	△
FA-16	Derivative time Td2	0.000s~50.000s	0.000s	△
FA-17	PID parameter switch	0: No switch, determined by parameters Kp1, Ti1 and Td1 1: Auto-switched on the basis of input offset 2: Switched by terminal	0	×
FA-18	Input offset under PID auto-switch	0.0%~100.0%	20.0%	△
FA-19	Reserved	–	–	

Par.	Designation	Scope	Default	Attr
FA-20	PID initial value	0.0%~100.0%	0.0%	×
FA-21	PID initial value holding time	0.0s~3600.0s	0.0s	△
FA-22	Sampling period T	0.001s~50.000s	0.002s	△
FA-23	PID feedback loss detection value	0.0%~100.0%	0.0%	△
FA-24	PID feedback loss detection time	0.0s~30.0s	1.0s	△
FA-25	PID computation option	0: No computation in stop status 1: Computation continued in stop status	0	△
Group Fb：Fixed length counting parameter				
Fb-00	Length setting	0~65535	1000	△
Fb-01	Length unit	0: m 1: 10m	0	△
Fb-02	Pulse number per meter	0.1~6553.5	100.0	△
Fb-03	Action when the length attained	0: Not stop 1: Stop	0	△
Fb-04	Set count value	1~65535	1000	△
Fb-05	Designated count value	1~65535	1000	△
Group Fc Simple PLC				
Fc-00	FREQ set source of multi-step 0	0: Digital setting Fc-02 1: Digital setting F0-04 + control panel ∧/∨ adjustment 2: Digital setting F0-04 + terminal UP/DOWN adjustment 3: AI1 4: AI2 5: VP(Operator panel) 6: X6/DI pulse input 7: Process PID output 8: Communication	0	×

Par.	Designation	Scope	Default	Attr
Fc-01	FREQ set source of multi-step 1	0: Digital setting FC-03 1: Digital setting F0-04 + control panel ∧/∨ adjustment 2: Digital setting F0-04 + terminal UP/DOWN 3: AI1 4: AI2 5: VP(Operator panel) 6: X6/DI pulse input 7: Process PID output 8: Communication	0	×
Fc-02	Multi-step FREQ 0	Lower limit FREQ ~ upper limit FREQ	0.00Hz	△
Fc-03	Multi-step FREQ 1	Lower limit FREQ ~ upper limit FREQ	0.00Hz	△
Fc-04	Multi-step FREQ 2	Lower limit FREQ ~ upper limit FREQ	0.00Hz	△
Fc-05	Multi-step FREQ 3	Lower limit FREQ ~ upper limit FREQ	0.00Hz	△
Fc-06	Multi-step FREQ 4	Lower limit FREQ ~ upper limit FREQ	0.00Hz	△
Fc-07	Multi-step FREQ 5	Lower limit FREQ ~ upper limit FREQ	0.00Hz	△
Fc-08	Multi-step FREQ 6	Lower limit FREQ ~ upper limit FREQ	0.00Hz	△
Fc-09	Multi-step FREQ 7	Lower limit FREQ ~ upper limit FREQ	0.00Hz	△
Fc-10	Multi-step FREQ 8	Lower limit FREQ ~ upper limit FREQ	0.00Hz	△
Fc-11	Multi-step FREQ 9	Lower limit FREQ ~ upper limit FREQ	0.00Hz	△
Fc-12	Multi-step FREQ 10	Lower limit FREQ ~ upper limit FREQ	0.00Hz	△
Fc-13	Multi-step FREQ 11	Lower limit FREQ ~ upper limit FREQ	0.00Hz	△
Fc-14	Multi-step FREQ 12	Lower limit FREQ ~ upper limit FREQ	0.00Hz	△
Fc-15	Multi-step FREQ 13	Lower limit FREQ ~ upper limit FREQ	0.00Hz	△
Fc-16	Multi-step FREQ 14	Lower limit FREQ ~ upper limit FREQ	0.00Hz	△
Fc-17	Multi-step FREQ 15	Lower limit FREQ ~ upper limit FREQ	0.00Hz	△

Par.	Designation	Scope	Default	Attr
Fc-18	Simple PLC run mode	Ones place: PLC run mode 0: Stop after a single cycle 1: Continue to run in the last FREQ after a single cycle 2: Cycle repeated Tens place: power loss memory 0: No memory on power loss 1: Memorized on power loss Hundreds place: starting mode 0: Run from the first step “multi-step frequency 0” 1: Continue to run from the step of stop (or fault) 2: Continue to run from the step and FREQ at which run stopped (or fault occurred) Thousands place: unit of simple PLC run time 0: Second (s) 1: Minute (min)	0	×
Fc-19	Setting of multi-step 0	Ones place: FREQ setting 0: Multi-step FREQ 0 (FC-02) 1: AI1 2: AI2 3: VP(Operator panel) 4: X6/DI pulse input 5: Process PID output 6: Multi-step FREQ 7: Communication Tens place: run direction 0: Forward 1: Reverse 2: Determined by run command Hundreds place: Accel/Decel time	0.00Hz	△

Par.	Designation	Scope	Default	Attr
		0: Accel/Decel time 1 1: Accel/Decel time 2 2: Accel/Decel time 3 3: Accel/Decel time 4		
Fc-20	Run time of step 0	0.0s(min)~6000.0s(min)	0.0s	△
Fc-21	Setting of step 1	Ones place: FREQ setting 0: Multi-step FREQ 1 (Fc-03) 1~7: Same as Fc-19 Tens place: run direction (same as Fc-19) Hundreds place: Accel/Decel time option (same as Fc-19)	000	×
Fc-22	Run time of step 1	0.0s(min)~6000.0s(min)	0.0s	△
Fc-23	Setting of step 2	Ones place: FREQ setting 0: Multi-step FREQ 2 (Fc-04) 1~7: Same as Fc-19 Tens place: run direction (same as Fc-19) Hundreds place: Accel/Decel time option (same as Fc-19)	000	×
Fc-24	Run time of step 2	0.0s(min)~6000.0s(min)	0.0s	△
Fc-25	Setting of step 3	Ones place: FREQ setting 0: Multi-step FREQ 3 (Fc-05) 1~7: Same as Fc-19 Tens place: run direction (same as Fc-19) Hundreds place: Accel/Decel time option (same as Fc-19)	000	×
Fc-26	Run time of step 3	0.0s(min)~6000.0s(min)	0.0s	△

Par.	Designation	Scope	Default	Attr
Fc-27	Setting of step 4	Ones place: FREQ setting 0: Multi-step FREQ 4 (Fc-06) 1~7: Same as Fc-19 Tens place: run direction (same as Fc-19) Hundreds place: Accel/Decel time option (same as Fc-19)	000	×
Fc-28	Run time of step 4	0.0s(min)~6000.0s(min)	0.0s	△
Fc-29	Setting of step 5	Ones place: FREQ setting 0: Multi-step FREQ 5 (Fc-07) 1~7: Same as Fc-19 Tens place: run direction (same as Fc-19) Hundreds place: Accel/Decel time option (same as Fc-19)	000	×
Fc-30	Run time of step 5	0.0s(min)~6000.0s(min)	0.0s	△
Fc-31	Setting of step 6	Ones place: FREQ setting 0: Multi-step FREQ 6 (Fc-08) 1~7: Same as Fc-19 Tens place: run direction (same as Fc-19) Hundreds place: Accel/Decel time option (same as Fc-19)	000	×
Fc-32	Run time of step 6	0.0s(min)~6000.0s(min)	0.0s	△
Fc-33	Setting of step 7	Ones place: FREQ setting 0: Multi-step FREQ 7 (Fc-09) 1~7: Same as Fc-19 Tens place: run direction (same as Fc-19) Hundreds place: Accel/Decel time option (same as Fc-19)	000	×

Par.	Designation	Scope	Default	Attr
Fc-34	Run time of step 7	0.0s(min)~6000.0s(min)	0.0s	△
Fc-35	Setting of step 8	Ones place: FREQ setting 0: Multi-step FREQ 8 (Fc-10) 1~7: Same as Fc-19 Tens place: run direction (same as Fc-19) Hundreds place: Accel/Decel time option (same as Fc-19)	000	×
Fc-36	Run time of step 8	0.0s(min)~6000.0s(min)	0.0s	△
Fc-37	Setting of step 9	Ones place: FREQ setting 0: Multi-step FREQ 9 (Fc-11) 1~7: Same as Fc-19 Tens place: run direction (same as Fc-19) Hundreds place: Accel/Decel time option (same as Fc-19)	000	×
Fc-38	Run time of step 9	0.0s(min)~6000.0s(min)	0.0s	△
Fc-39	Setting of step 10	Ones place: FREQ setting 0: multi-step FREQ 10 (Fc-12) 1~7: Same as Fc-19 Tens place: run direction (same as Fc-19) Hundreds place: Accel/Decel time option (same as Fc-19)	000	×
Fc-40	Run time of step 10	0.0s(min)~6000.0s(min)	0.0s	△
Fc-41	Setting of step 11	Ones place: FREQ setting 0: Multi-step FREQ 11 (Fc-13) 1~7: Same as Fc-19 Tens place: run direction (same as Fc-19) Hundreds place: Accel/Decel time option (same as Fc-19)	000	×

Par.	Designation	Scope	Default	Attr
Fc-42	Run time of step 11	0.0s(min)~6000.0s(min)	0.0s	△
Fc-43	Setting of step 12	Ones place: FREQ setting 0: Multi-step FREQ 12 (Fc-14) 1~7: Same as Fc-19 Tens place: run direction (same as Fc-19) Hundreds place: Accel/Decel time option (same as Fc-19)	000	×
Fc-44	Run time of step 12	0.0s(min)~6000.0s(min)	0.0s	△
Fc-45	Setting of step 13	Ones place: FREQ setting 0: Multi-step FREQ 12 (Fc-15) 1~7: Same as Fc-19 Tens place: run direction (same as Fc-19) Hundreds place: Accel/Decel time option (same as Fc-19)	000	×
Fc-46	Run time of step 13	0.0s(min)~6000.0s(min)	0.0s	△
Fc-47	Setting of step 14	Ones place: FREQ setting 0: Multi-step FREQ 12 (Fc-16) 1~7: Same as Fc-19 Tens place: run direction (same as Fc-19) Hundreds place: Accel/Decel time option (same as Fc-19)	000	×
Fc-48	Run time of step 14	0.0s(min)~6000.0s(min)	0.0s	△
Fc-49	Setting of step 15	Ones place: FREQ setting 0: Multi-step FREQ 15 (Fc-17) 1~7: Same as Fc-19 Tens place: run direction (same as Fc-19) Hundreds place: Accel/Decel time option (same as Fc-19)	000	×
Fc-50	Run time of step 15	0.0s(min)~6000.0s(min)	0.0s	△

Par.	Designation	Scope	Default	Attr
		Group Fd MODBUS Communication Parameters		
Fd-00	SCI port selection	0: Local 485 port 1: Optional 232 port	0	×
Fd-01	SCI port communication configuration	Ones place: baud rate 0: 4800bps 1: 9600bps 2: 19200bps 3: 38400bps 4: 57600bps 5: 115200bps Tens place: data format 0: 1-8-2-N format, RTU 1: 1-8-1-E format, RTU 2: 1-8-1-O Format, RTU 3: 1-7-2-N format, ASCII 4: 1-7-1-E format, ASCII 5: 1-7-1-O format, ASCII Hundreds place: connection type 0: Direct cable connection (232/485) 1: MODEM (232) Thousands place: communication data handling at power loss 0: Saved at power loss 1: Not saved at power loss	0001	×
Fd-02	Local address of SCI port communication	0~247, 0 is broadcast address	1	×
Fd-03	Time out detection of SCI port communication	0.0s~1000.0s	0.0s	×
Fd-04	Time delay of SCI port communication	0ms~1000ms	0ms	×
Fd-05	Master/Slave option	0: PC controls this drive 1: As master 2: As slave	0	×

Par.	Designation	Scope	Default	Attr
Fd-06	Parameter store address when this drive working as master	0:F0-04 1:FA-01	0	×
Fd-07	Proportional factor of received FREQ	0.0 ~ 1000.0%	100.0%	△
Group FE: User-defined Display Parameters				
Fe-00	User-defined display parameter 1	Setting range of thousands place: A, b, C, d, E, F, H, L, U Setting range of hundreds place: 0~9 Setting range of tens place: 0~9 Setting range of ones place: 0~9	FE-00	×
Fe-01	User-defined display parameter 2	Same as FE-00	FE-00	×
Fe-02	User-defined display parameter 3	Same as FE-00	FE-00	×
Fe-03	User-defined display parameter 4	Same as FE-00	FE-00	×
Fe-04	User-defined display parameter 5	Same as FE-00	FE-00	×
Fe-05	User-defined display parameter 6	Same as FE-00	FE-00	×
Fe-06	User-defined display parameter 7	Same as FE-00	FE-00	×
Fe-07	User-defined display parameter 8	Same as FE-00	FE-00	×
Fe-08	User-defined display parameter 9	Same as FE-00	FE-00	×
Fe-09	User-defined display parameter 10	Same as FE-00	FE-00	×
Fe-10	User-defined display parameter 11	Same as FE-00	FE-00	×
Fe-11	User-defined display parameter 12	Same as FE-00	FE-00	×

Par.	Designation	Scope	Default	Attr
Fe-12	User-defined display parameter 13	Same as FE-00	FE-00	×
Fe-13	User-defined display parameter 14	Same as FE-00	FE-00	×
Fe-14	User-defined display parameter 15	Same as FE-00	FE-00	×
Fe-15	User-defined display parameter 16	Same as FE-00	FE-00	×
Fe-16	User-defined display parameter 17	Same as FE-00	FE-00	×
Fe-17	User-defined display parameter 18	Same as FE-00	FE-00	×
Fe-18	User-defined display parameter 19	Same as FE-00	FE-00	×
Fe-19	User-defined display parameter 20	Same as FE-00	FE-00	×
Group FE: Password parameter setting group				
FF-00	Setting of user password	0~FFFF	0000	△
FF-01	Parameter display	0: Display all parameters 1: Only display FF-00 and FF-01 2: Only display FF-00, FF-01 and user-defined FE-00~FE-19	0	×
FF-02	Parameter protection	0: All parameter programming allowed 1: Only FF-00 and this parameter programming allowed	0	×
FF-03	Parameter restoration	0: No operation 1: Clear fault record 2: Restore all parameters to factory default (excluding motor parameters) 3: Restore all parameters to factory default (including motor parameters) 4: Restore all parameters to backup parameters	0	×

Par.	Designation	Scope	Default	Attr
FF-04	Parameter backup	0: No operation 1: Backup all parameters	0	×
FF-05	Parameter copy	0: No operation 1: Reserved 2: Parameter copied (excluding motor parameters) to control board 3: Parameter copied (including motor parameters) to control board	0	×
Group A1 Wobble Frequency				
A1-00	Wobble FREQ function setting	0: Wobble FREQ function disabled 1: Wobble FREQ function enabled	0	×
A1-01	Wobble FREQ run setting	Ones place: started method 0: Automatically 1: Started by terminal Tens place: amplitude control 0: Relative to center FREQ 1: Relative to maximum FREQ Hundreds place: wobble FREQ memorized when stop 0: Memory enabled 1: Memory disabled Thousands place: wobble FREQ memorized on power loss 0: Memory enabled 1: Memory disabled	0000	×
A1-02	Pre-wobble FREQ	0.00Hz~600.00Hz	0.00Hz	△
A1-03	Pre-wobble FREQ holding time	0.0s~3600.0s	0.0s	△
A1-04	Wobble FREQ amplitude	0.0%~50.0%	0.0%	△
A1-05	Hop FREQ	0.0%~50.0% (relative to A1-04)	0.0%	△
A1-06	Cycle of wobble FREQ	0.1s~999.9s	0.0s	△

Par.	Designation	Scope	Default	Attr
A1-07	Triangular wave ramp-up time	0.0%~100.0% (of wobble FREQ cycle)	0.0%	△
Group U0 Status Monitoring				
U0-00	Run FREQ	0.00Hz~600.00Hz	0.00Hz	◎
U0-01	Set FREQ	0.00Hz~600.00Hz	0.00Hz	◎
U0-02	Bus voltage	0V~65535V	0V	◎
U0-03	Output voltage	0V~65535V	0V	◎
U0-04	Output current	0.0A~6553.5A	0.0A	◎
U0-05	Output torque	-300.0%~300.0%	0.0%	◎
U0-06	Output power	0.0%~300.0%	0.0%	◎
U0-07	Master FREQ setting	0.00Hz~600.00Hz	0.00Hz	◎
U0-08	Auxiliary FREQ setting	0.00Hz~600.00Hz	0.00Hz	◎
U0-09	Heat sink temperature 1	-40.0℃~100.0℃	0.0℃	◎
U0-10	Heat sink temperature 2	-40.0℃~100.0℃	0.0℃	◎
U0-11	FAL fault source	0: No fault 1: IGBT overcurrent 2: Reserved 3: Output grounding fault 4: Output overcurrent 5: DC bus overvoltage 6: Other sources	0	◎
U0-12	CtC fault source	0: No fault 1: U-phase current detection circuit fault 2: V-phase current detection circuit fault 3: W-phase current detection circuit fault	0	◎
U0-13	Digital input terminal status	00~7F	00	◎
U0-14	Digital output terminal status	0~7	0	◎

Par.	Designation	Scope	Default	Attr
U0-15	AI1 input voltage	0.00V~10.00V	0.00V	◎
U0-16	AI2 input voltage	-10.00V~10.00V	0.00V	◎
U0-17	AO1 output	0.0%~100.0%	0.0%	◎
U0-18	X6/DI HF pulse FREQ	0.0kHz~50.0kHz	0.0KHz	◎
U0-19	PID set	0.0%~100.0%	0.0%	◎
U0-20	PID feedback	0.0%~100.0%	0.0%	◎
U0-21	PID input offset	-100.0%~100.0%	0.0%	◎
U0-22	PLC step	0~15	0	◎
U0-23	V/f separated target voltage	0.0%~100.0%	0.0%	◎
U0-24	V/f separated actual output voltage	0.0%~100.0%	0.0%	◎
U0-25	Cumulative power-up time	0h~65535h	0H	◎
U0-26	Cumulative run time	0h~65535h	0H	◎
U0-27	Terminal count value	0~65535	0	◎
U0-28	Reserved	---	—	
U0-29	Reserved	—	—	
U0-30	Reserved	—	—	
U0-31	Higher-bit numbers of actual length	0~65	0	◎
U0-32	Lower-bit numbers of actual length	0~65535	0	◎
U0-33	Master FREQ set source	0: Digital setting + adjustment through ∧/∨ on control panel 1: Digital setting + terminal UP/DOWN adjustment 2: Analog input AI1 3: Analog input AI2 4: VP(Operator panel) 5: X6/DI pulse input	0	◎

Par.	Designation	Scope	Default	Attr
U0-33	Master FREQ set source	6: Process PID output 7: PLC 8: Multi-step FREQ 9: Communication	0	◎
U0-34	Auxiliary FREQ set source	0: No set 1: Digital setting + adjustment through ∧/∨ on control panel 2: Digital setting + terminal UP/DOWN adjustment 3: Analog input AI1 4: Analog input AI2 5: VP(Operator panel) 6: X6/DI pulse input 7: Process PID output 8: PLC 9: Multi-step FREQ 10: Communication	0	◎
U0-35	Drive status	Ones place: run status 0: Accelerating 1: Decelerating 2: Constant speed run Tens place: drive status 0: Stop 1: Running 2: Autotuning	00	◎
U0-36	Run command log at LoU	0~1	0	◎
U0-37	Fault code log at LoU	0~100	0	◎
U0-39	Higher-bit numbers of Operator panel ∧/∨ stored value	-1~1	0	◎
U0-40	Lower-bit numbers of Operator panel ∧/∨ stored value	0.00~655.35 Hz	0.00Hz	◎

Par.	Designation	Scope	Default	Attr
U0-41	Higher-bit numbers of terminal UP/DOWN stored value	-1~1	0	◎
U0-42	Lower-bit numbers of terminal UP/DOWN stored value	0.00~655.35 Hz	0.00Hz	◎
Group U1 History Fault				
U1-00	History fault 1 (latest)	0: No fault 1: Accel overcurrent (E-oC1) 2: Constant-speed overcurrent (E-Oc2) 3: Decel overcurrent (E-oC3) 4: Accel overvoltage (E-oV1) 5: Constant-speed overvoltage (E-oV2) 6: Decel overvoltage (E-oV3) 7: Drive overloaded (E-oL1) 8: Motor overloaded (E-oL2) 9: Inverter module overloaded (E-oL3) 10: Module protection (E-FAL) 11: Module overheated (E-oH1) 12: Motor overheated (PTC) (E-oH2) 13: Autotuning failed (E-tUN) 14: Current detection abnormal (E-CtC) 15: Ground short-circuit protection at output side (E-GdP) 16: Input power supply fault (E-ISF) 17: Phase loss at output side (E-oPL) 18: Analog terminal functional mutex (E-TEr) 19: External equipment malfunction (E-PEr)	0	◎

Par.	Designation	Scope	Default	Attr
		20: Continuous run time attained (E-to2) 21: Accumulative run time attained (E-to3) 22: Power supply abnormal in running (E-SUE) 23: EEPROM read/write fault (E-EPr) 24: Port communication abnormal (E-TrC) 25: CPU interference as a fault (E-CPU) 26: 5V power supply out-of-limit (E-SP1) 27: 10V power supply out-of-limit (E-SP2) 28: AI input out-of-limit (E-AIP) 29: Undervoltage protection (E-LoU) 30: PID feedback loss (E-PIo) 31-45: Reserved		
U1-01	Run frequency at fault 1	0.00Hz~600.00Hz	0.00Hz	◎
U1-02	Output current at fault 1	0.0A~6553.5A	0.0A	◎
U1-03	Bus voltage at fault 1	0V~10000V	0V	◎
U1-04	Temperature 1 of heat sink at fault 1	-40.0℃~100.0℃	0.0℃	◎
U1-05	Temperature 2 of heat sink at fault 1	-40.0℃~100.0℃	0.0℃	◎
U1-06	Input terminal status at fault 1	0~FFFF	0000	◎
U1-07	Output terminal status at fault 1	0~FFFF	0000	◎
U1-08	Cumulative run time at fault 1	0h~65535h	0h	◎

Par.	Designation	Scope	Default	Attr
U1-09	Code of fault 2	Same as U1-00	0	◎
U1-10	Run frequency at fault 2	0.00Hz~600.00Hz	0.00Hz	◎
U1-11	Output current at fault 2	0.0A~6553.5A	0.0A	◎
U1-12	Bus voltage at fault 2	0V~10000V	0V	◎
U1-13	Temperature 1 of heat sink at fault 2	-40.0℃~100.0℃	0.0℃	◎
U1-14	Temperature 2 of heat sink at fault 2	-40.0℃~100.0℃	0.0℃	◎
U1-15	Input terminal status at fault 2	0~FFFF	0000	◎
U1-16	Output terminal status at fault 2	0~FFFF	0000	◎
U1-17	Cumulative run time at fault 2	0h~65535h	0h	◎
U1-18	Code of fault 3	Same as U1-00	0	◎
U1-19	Run frequency at fault 3	0.00Hz~600.00Hz	0.00Hz	◎
U1-20	Output current at fault 3	0.0A~6553.5A	0.0A	◎
U1-21	Bus voltage at fault 3	0V~1000V	0V	◎
U1-22	Temperature 1 of heat sink at fault 3	-40.0℃~100.0℃	0.0℃	◎
U1-23	Temperature 2 of heat sink at fault 3	-40.0℃~100.0℃	0.0℃	◎
U1-24	Input terminal status at fault 3	0~FFFF	0000	◎
U1-25	Output terminal status at fault 3	0~FFFF	0000	◎
U1-26	Cumulative run time at fault 3	0h~65535h	0h	◎

Chapter 6

EMC attention

6.1 EMC Definition

Electromagnetic compatibility refers to the ability of electrical equipment to operate in an environment of electromagnetic interference, not to interfere with the electromagnetic environment and to achieve its functions steadily.

6.2 Introduction to EMC standards

According to the national standard GB/T12668.3 requirements, products need to meet the requirements of electromagnetic interference and anti-electromagnetic interference. Our existing products implement the latest international standards: IEC/EN61800-3:2004 (Adjustable speed power drive systems part 3: EMC requirements and specific test methods), equivalent to the national standard GB/T12 668.3.

IEC/EN61800-3 mainly from the electromagnetic interference and anti-electromagnetic interference two aspects of the product inspection, electromagnetic interference mainly on the product radiation interference, conduction interference and harmonic interference testing (for civilian products have this requirement). Anti-electromagnetic interference mainly on the product's conduction immunity, radiation immunity, surge immunity, rapid mutation pulse group immunity, ESD immunity and power supply low-frequency end immunity (specific test items are: 1. input voltage drop, Immunity test of interruption and change; 2. phase gap immunity test; 3. harmonic input immunity test; 4. input frequency change test; 5. input voltage imbalance test; 6. input voltage fluctuation test) test. In accordance with the above-mentioned IEC/EN61800-3 strict requirements for testing, our products in accordance with the guidance of 6.3 for installation and use, in thegeneral industrial environment will have good electromagnetic compatibility.

6.3 EMC Guidance

6.3.1 Electromagnetic interference and installation precautions:

There are two kinds of electromagnetic interference, one is the interference of the surrounding environment electromagnetic noise to the product, the other is the interference of the product to the surrounding equipment, for the interference is relatively large occasions, it is recommended to add input reactors.

Installation considerations:

❶ The ground wire of products and other electrical products should be well grounded;

❷ Product power input and output power lines and weak electrical signal lines (e.g. control lines) as far as possible do not parallel arrangement, when conditions vertical arrangement;

❸ The output power line of the product is recommended to use shielded cable, or steel pipe to shield the power line, and the shield layer should be reliably grounded, for the lead of the disturbed equipment is recommended to use twisted pair shielding control line, and the shielding layer is reliably grounded;

❹ For motor cables longer than 100m, an output filter or reactor is required.

6.3.2 The treatment method by which the surrounding electromagnetic equipment interferes with the product:

The general cause of the electromagnetic effect on the product is the large number of relays, contactors or electromagnetic brakes installed near the product. When the product is disturbed by the wrong action, it is recommended to use the following methods to resolve:

❶ Add surge suppressors to devices that cause interference;

❷ The product input is filled with filters, specifically reference 6.3. 5 to operate;

❸ The product controls the signal line and the lead of the detection line with a shielded cable and securely grounds the shield.

6.3.3 How the product interferes with peripheral equipment:

There are two types of noise in this part: one is the product radiation interference, and the other is the product conduction interference. These two types of interference cause the surrounding electrical equipment to be induced by electromagnetic or static electricity. In turn, the device produced a mis-action. For several different interference situations, refer to the following methods to resolve:

❶ For measuring instruments, receivers and sensors, etc., the general signal is relatively weak, if the product is closer or in the same control cabinet, vulnerable to interference and wrong action, it is recommended to use the following methods to solve: as far away from interference sources as possible; Equally tied together, the signal line and the power line with shielded cables, and well grounded, in the output side of the product with ferric oxygen magnetic ring (select the suppression frequency in the range of 30 to 1000MHz), and around 2 to 3, For the bad situation, you can choose to add EMC output filter;

❷ Interference equipment and products using the same power supply, resulting in conduction interference, if the above methods can not eliminate interference, should be installed between the product and the power supply EMC filter (specific reference 6.3 5 to carry out the selection operation);

❸ Peripherals are grounded separately to eliminate interference from leakage currents in the product ground wire when co-grounding.

6.3.4 Leakage current and handling:

There are two forms of leakage current when using a product: one is a ground-to-ground leakage current, and the other is a leakage current between a line and a line.

❶ Factors and solutions that affect the ground leakage current:

There is a distribution capacitor between the wire and the earth, the greater the distribution capacitor, the greater the leakage current, effectively reducing the distance between the product and the motor to reduce the distribution capacitance. The higher the carrier frequency, the greater the leakage current. The carrier frequency can be reduced to reduce leakage current. However, reducing the carrier frequency can lead to increased motor noise, please note that adding an reactor is also an effective solution to leakage current.

The leakage current increases with the increase of the circuit current, so when the motor is high, the corresponding leakage current is large.

❷ Factors and solutions that cause current leakage between lines:

There is a distribution capacitance between the product output wiring, and if the current passing through the line contains a high number of harmonics, it may cause resonance and leakage current. Using a thermal relay at this point may cause it to move incorrectly.

The solution is to reduce the carrier frequency or install the output reactor. It is recommended that the motor is not installed before the use of the appliance, using the electronic overflow protection function of the product.

6.3.4 Note that the EMC input filter is added to the power input:

❶ Use the filter strictly in accordance with the rating, because the filter belongs to Class I electrical appliances, the filter metal shell should be a large area with the installation cabinet metal contact is good, and requires good conductivity, otherwise there will be a risk of electric shock and seriously affect the EMC effect;

❷ Through EMC testing, it is found that the filter must be on the same common ground as the product PE end, otherwise the EMC effect will be seriously affected.

❸ The filter is installed as close as possible to the power input of the appliance.

Chapter 7

Fault Causes and Troubleshooting

Once drive fault occurs, please identify the causes of fault carefully and make a detailed record of fault symptom. To seek services, please contact the dealer. Parameters U1-00, U1-09 and U1-18 are used to view the records of fault 1, fault 2 and fault 3. Faults are recorded with numeric codes (1~46), while the fault information that corresponds to each numeric fault code is specified in the table below.

7.1 Table of Fault Codes

Fault code	Fault display	Fault description	Causes	Solutions
1	E-oC1	Accel overcurrent	Torque boost is too big under V/f control	Reduce torque boost value
			Start frequency is too high	Drop start frequency
			Accel time is too short	Prolong the Accel time
			Motor parameters are improperly set	Set the parameters correctly according to motor nameplate
			Output short circuit (phase-to-phase short circuit or output ground short circuit)	Check motor connection and output ground impedance
			Overload is too heavy	Reduce the load
			Inappropriate V/f curve under V/f control	Set V/f curve correctly
			Restart the rotating motor	Reduce current limited value or flying start
2	E-oC2	Canst-speed overcurrent	Output short circuit (phase-to-phase short circuit or output ground short circuit)	Check motor connection and output ground impedance
			Overload is too heavy	Reduce the load
			Power rating of the drive is relatively small	Select appropriate drive power rating
			Input voltage is too low	Check power grid voltage
3	E-oC3	Canst-speed overcurrent	Output short circuit (phase-to-phase short circuit or output ground short circuit)	Check motor connection and output ground impedance
			Load inertia is too big	Use dynamic brake

Fault code	Fault display	Fault description	Causes	Solutions
3	E-oC3	Canst-speed overcurrent	Decel time is too short	Prolong the Decel time
			Input voltage is too low	Check power grid voltage
4	E-ov1	Accel overvoltage	Load inertia is too big	Use dynamic brake
			Abnormal input volt	Check power grid voltage
			Output short circuit (phase-to-phase short circuit or output ground short circuit)	Check motor connection and output ground impedance
5	E-ov2	Constant-speed overvoltage	Load variation is too big	Check the load
			Abnormal input voltage	Check power grid voltage
			Output short circuit (phase-to-phase short circuit or output ground short circuit)	Check motor connection and output ground impedance
			Improper parameter setting of regulator under SVC control	Properly set regulator parameters
6	E-ov3	Decel overvoltage	Load inertia is too big	Use dynamic braking
			Abnormal input voltage	Check power grid voltage
			Output short circuit (phase-to-phase short circuit or output ground short circuit)	Check motor connection and output ground impedance
			Improper parameter setting of regulator under SVC control	Properly set regulator parameters
			Decel time is too short	Prolong the Decel time
7	E-oL1	Drive overloaded	Torque boost is too big under V/f control	Reduce torque boost value
			Start FREQ is too high	Drop start frequency
			Accel/Decel time is too short	Prolong the Accel/Decel time
			Motor parameters are improperly set	Set the parameters correctly according to motor nameplate

Fault code	Fault display	Fault description	Causes	Solutions
7	E-oL1	Drive overloaded	Output short circuit (phase-to-phase short circuit and output ground short circuit)	Check motor connection and output ground impedance
			Load is too heavy	Reduce the load
			Inappropriate V/f curve under V/f control	Set V/f curve correctly
			Restart the rotary motor	Reduce current limited value or flying start
8	E-oL2	Motor overloaded	Torque boost is too big under V/f control	Reduce torque boost value
			Inappropriate V/f curve under V/f control	Set V/f curve correctly
			Motor parameters are improperly set	Set the parameters correctly according to motor nameplate
			Improper setting of motor overloaded protection time	Properly set the motor overloaded protection time
			Motor stalled or sharp variation of load	Identify the causes of motor stalling or check the load condition
			Long-time running of ordinary motor at low speed with heavy load	Select variable frequency motor
9	E-oL3	Inverter module overload protection	Overcurrent	Handle it with the methods for overcurrent
			Input power supply abnormal	Check input power grid voltage
			Motor output abnormal	Check the motor or motor connection
			Inverter module abnormal	Seek services
10	E-FAL	Module protection	Overvoltage or overcurrent	Refer to the solutions of overvoltage or overcurrent
			Output short circuit (phase-to-phase short circuit or output ground short circuit)	Check motor connection and output ground impedance
			Loose connection of control board	Pull out and reinsert the cables of control board

Fault code	Fault display	Fault description	Causes	Solutions
10	E-FAL	Module protection	Direct connection of inverter module	Seek services
			Control board abnormal	Seek services
			Switching power supply failed	Seek services
11	E-oH1	Module (IGBT) thermal protection	Ambient temperature is too high	Drop ambient temperature
			Fan failed	Replace the fan
			Air duct blocked	Clear air duct
			Temperature sensor abnormal	Seek services
			Inverter module mounting abnormal	Seek services
12	E-oH2	Motor (PTC) thermal protection	Ambient temperature is too high	Drop ambient temperature
			Improper setting of motor thermal protection point	Correctly set motor thermal protection point
			Thermal detection circuit failed	Seek services
13	E-tUN	Autotuning failed	Bad motor connection	Check motor connection
			Autotuning during rotation of the motor	Autotuning in stationary status of the motor
			Big error between real motor parameters and the setting	Set the parameters correctly according to motor nameplate
14	E-CtC	Current detection abnormal	Abnormal connection between control board and drive board	Check and re-connection
			Abnormal current detection circuit of control board	Seek services
			Abnormal current detection circuit of drive board	Seek services
			Current sensor failed	Seek services
			SMPS failed	Seek services

Fault code	Fault display	Fault description	Causes	Solutions
15	E-GdP	Output ground short-circuit protection	Output connection ground short circuit	Check motor connection and output ground impedance
			Motor insulation abnormal	Check the motor
			Inverter module abnormal	Seek services
			Output ground leakage current is too big	Seek services
16	E-ISF	Input power supply abnormal	Severe voltage imbalance among power supply phases	Check power grid voltage
			Abnormal input wiring of power supply	Check power supply input wiring
			Abnormal bus capacitance	Seek services
17	E-oPL	Output phase loss	Motor cable connection abnormal	Check motor connection
			Imbalance among motor three phases	Check or replace the motor
			Incorrect setting of vector control parameters	Correctly set vector control parameters
18	E-TEr	Function conflict between analog terminals	Analog input terminals are set to the same function	Do not set analog inputs to the same function
19	E-PEr	External equipment error	External fault terminal is enabled	Check the status of external fault terminal
			Stall condition lasts too long	Check if the load is abnormal
20	E-to2	Consecutive run time attained	″Consecutive run time attained" enabled	See specification of Group E0
21	E-to3	Cumulative run time attained	″Cumulative run time attained" enabled	See specification of Group E0
22	E-SUE	Power supply abnormal at run	DC bus voltage fluctuation is too big or the power is lost	Check input power grid voltage and load
23	E-EPr	EEPROM read/write fault	Parameter read/write abnormal at control board	Seek services

Fault code	Fault display	Fault description	Causes	Solutions
24	E-TrC	Port communication abnormal	Improper setting of baud rate	Set properly
			Communication port disconnected	Reconnected
			Upper computer/device does not work	Make upper computer/device work
			Drive communication parameter error	Set properly
25	E-CPU	Abnormal power loss	Abnormal power loss in last operation	RESET the fault
			Faulty control board	Seek services
26	E-SP1	5V supply out-of-limit	SMPS failed	Seek services
			Control board failed	Seek services
27	E-SP2	10V supply out-of-limit	SMPS failed	Seek services
			Control board failed	Seek services
28	E-AIP	AI input out-of-limit	Control board failed	Seek services
			AI input is too high or low	Set AI input within correct range
29	E-LoU	Undervoltage protection	DC bus voltage is too low	Check input voltage if it is too low or the drive is the process of power loss
30	E-Plo	PID feedback lost	Abnormal PID feedback channel abnormal	Check the feedback channel
			Inappropriate setting of PID parameters	Set properly

WARRANTY

❶ The company solemnly promises that users will enjoy the following warranty services from the date of purchase of products from our company (hereinafter referred to as the manufacturer).

❷ Since the product was purchased by the user from the manufacturer, enjoy the following three guarantee services:

- ⌑ Return, replacement and repair within 30 days of delivery:
- ⌑ Replacement and repair within 90 days of delivery:
- ⌑ Repair within 18 months of delivery:
- ⌑ Except when exporting abroad.

❸ This product enjoys lifetime paid service from the date of purchase by the user from the manufacturer.

❹ Disclaimer: Product failure caused by the following reasons is not covered by the manufacturer's free warranty service:

- ⌑ Failure caused by the user's use and operation in accordance with the requirements of the «Instruction Manual»:
- ⌑ Failure caused by the user to repair or modify the product without communicating with the manufacturer:
- ⌑ Failure caused by abnormal aging of the product due to poor user environment:
- ⌑ Failures caused by natural disasters such as earthquakes, fires, floods or abnormal voltages:
- ⌑ Damage to the product during transportation (the transportation method is specified by the customer, and the company assists in handling the cargo consignment procedures)

❺ Under the following conditions, manufacturers have the right not to provide warranty services:

- ⌑ When the manufacturer's product logo, trademark, nameplate, etc. are damaged or unrecognizable:
- ⌑ When the user fails to pay the purchase price in accordance with the signed contract:
- ⌑ The user intentionally conceals the manufacturer's after-sales service unit when the product is installed, wired, operated, maintained or otherwise improperly used

❻ For the service of return, replacement and repair, the company must return or return to the company, and it can only be returned or repaired after confirming the responsibility vested.

WARRANTY CARD

User information			
User name			
User address			
Postal code		Contact person	
Tel		Fax	
Machine type		Machine code	
Agent / Reseller Information			
Supplier			
Contact			
Tel		Delivery date	

CERTIFICATE OF QUALITY

QC test: _____

This product has been tested by our company's quality department, and its performance meets the standards, passes the inspection, and is approved to leave the factory.

Design date: March 13, 2022

Version 1.0