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Chapter 1 Safety Information and Precautions

1.1 Electrical Safety

Extreme care must be taken at all times when working with the AC Drive or within the area of the AC Drive. The voltages used in the AC Drive can cause severe electrical shock or burns and is potentially lethal. Only authorized and qualified personnel should be allowed to work on AC Drives.

1.2 Machine/System Design and Safety of Personnel

- Machine/system design, installation, commissioning startups and maintenance must be carried out by personnel who have the necessary training and experience. They must read this safety information and the contents of this manual. If incorrectly installed, the AC Drive may present a safety hazard.
- The AC Drive uses high voltages and currents (including DC), carries a high level of stored electrical energy in the DC bus capacitors even after power OFF. These high voltages are potentially lethal.
- The AC Drive is NOT intended to be used for safety related applications/functions. The electronic “STOP & START” control circuits within the AC Drive must not be relied upon for the safety of personnel. Such control circuits do not isolate mains power voltages from the output of the AC Drive. The mains power supply must be disconnected by a electrical safety isolation device before accessing the internal parts of the AC Drive.
- Safety risk assessments of the machine or process system which uses an AC Drive must be undertaken by the user and or by their systems integrator/designer. In particular the safety assessment/design must take into consideration the consequences of the AC Drive failing or tripping out during normal operation and whether this leads to a safe stop position without damaging machine, adjacent equipment and machine operators/users. This responsibility lies with the user or their machine/process system integrator.
- The system integrator/designer must ensure the complete system is safe and designed according to the relevant safety standards. Authorized Distributors can provide recommendations related to the AC drive to ensure long term safe operation.

1.3 Working Environment and Handling

- Matters related to transport, storage, installation, IP rating, working environment and AC Drive tolerance limits (temperature, ambient, voltage, pollution, vibration etc) can be found within this manual. The guidelines and recommendations should be followed in order to gain long term trouble free operation as the lifetime of the AC Drive is dependent on the working environment and correct handling of the product in the initial installation stage.

1.4 Electrical Installation - Safety

- Electrical shock risk is always present within an AC Drive including the output cable leading to the motor terminals. Where dynamic brake resistors are fitted external to the AC Drive, care must be taken with regards to live contact with the brake resistors, terminals which are at high DC voltage and potentially lethal. Cables from the AC Drive to the dynamic brake resistors should be double insulated as DC voltages are typically 600 to 700 VDC.

- Mains power supply isolation switch should be fitted to the AC Drive. The mains power supply must be disconnected via the isolation switch before any cover of the AC Drive can be removed or before any servicing work is undertaken.
- Stored charge in the DC bus capacitors of the PWM AC Drive is potentially lethal after the AC supply has been disconnected. The AC supply must be isolated at least 10 minutes before any work can be undertaken as the stored charge will have been discharged through the internal bleed resistor fitted across the DC bus capacitors.
- Whenever possible, it is good practice to check the DC bus voltage with a VDC meter before accessing the AC Drive bridge. Where the AC Drive input is connected to the mains supply with a plug and socket, then upon disconnecting the plug and socket, be aware that the plug pins may be exposed and internally connected to the DC bus capacitors (via the internal bridge rectifier in reversed bias). Wait 10 minutes to allow stored charge in the DC bus capacitors to be dissipated by the bleed resistors before commencing work on the AC Drive.
- When using an earth leakage circuit breaker, use a residual current operated protective device (RCD) of type B (breaker which can detect both AC and DC). Leakage current can cause unprotected components to operate incorrectly. If this is a problem, lower the carrier frequency, replace the components in question with parts protected against harmonic current, or increase the sensitivity amperage of the leakage breaker to at least 200 mA per drive.

  Factors in determining leakage current:

  • Size of the AC drive
  • AC drive carrier frequency
  • Motor cable type and length
  • EMI/RFI filter

  For more information, contact us.

1.5 AC Motor (Induction/Asynchronous)

- AC induction motors are designed to run at fixed speed at the 50 or 60 Hz supply frequency and therefore it's cooling capability is dependent on the axial driven fan mounted at the non drive end.
- When the motor is operated at variable speed with the AC Drive, it is necessary to consider the reduced cooling rate especially when running at low speed for considerable period of time. Please consult with the motor manufacturer who can provide cooling solutions such as a electric force ventilated fan or an "AC Drive" rated AC motor designed to handle reduced speed running with AC Drives.
- It is also necessary to consult with the motor manufacturer when above base speed (> 50/60 Hz) running is required and or when high speed operations are required. Motor suppliers also provide solutions for encoder feedback devices for close loop operation with an AC Drive.

1.6 Adjusting AC Drive Parameters

- The AC Drive when it leaves the factory with default settings should enable the user to get started quickly to check on the basic mechanical running conditions. At a later time, fine tuning to optimize the operation/ performance can be undertaken.
- Such parameter tuning should be done by qualified personnel who have prior training on AC Drives. Some parameter settings if manipulated incorrectly can have adverse reactions and

care should be taken especially during the commissioning startup stages to prevent personnel from engaging the machine.

- This manual provides a complete list of the parameters with functional description and care should always be taken whenever parameters are adjusted during a live running startup. Authorized Distributors can provide product training and if in doubt seek advice.

Chapter 2 Product Information

2.1 Naming Rules

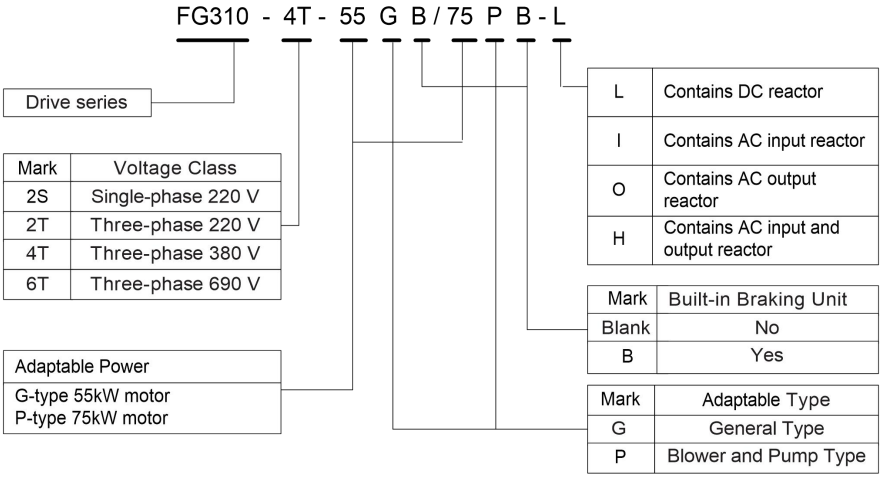


Fig.2.1-1 Naming Rules

2.2 Nameplate

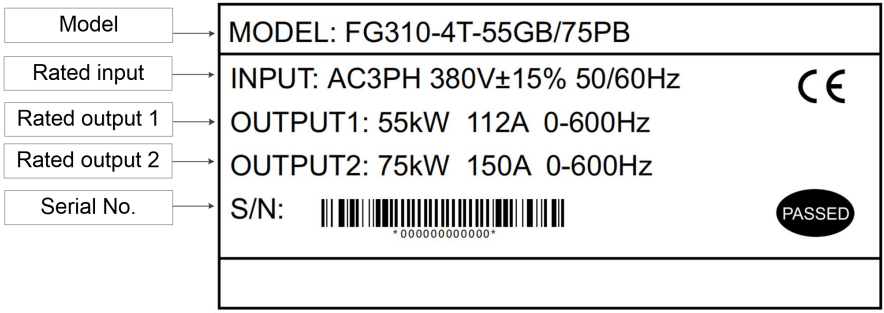


Fig. 2.2-1 Nameplate instructions

2.3 Information of Product Model

Table 2.3-1 Product model and technical data(three-phase 380V)

Model		Power rating (kW)	Output current (A)	Input current (A)	Matched motor (kW)	Brake unit	DC reactor
FG310-4T-0.75B/1.5PB	0.75GB	0.75	2.5	3.5	0.75	Inbuilt	None
	1.5PB	1.5	3.8	4.6	1.5		
FG310-4T-1.5GB/2.2PB	1.5GB	1.5	3.8	4.6	1.5		
	2.2PB	2.2	5.1	6.3	2.2		
FG310-4T-2.2GB/4.0PB	2.2GB	2.2	5.1	6.3	2.2		
	4.0PB	4.0	9.0	11.5	4.0		
FG310-4T-4.0GB/5.5PB	4.0GB	4.0	9.0	11.5	4.0		
	5.5PB	5.5	13	16.8	5.5		
FG310-4T-5.5GB/7.5PB	5.5GB	5.5	13	16.8	5.5		
	7.5PB	7.5	17	22	7.5		
FG310-4T-7.5GB/11PB	7.5GB	7.5	17	22	7.5		
	11PB	11	25	32.5	11		
FG310-4T-11GB/15PB	11GB	11	25	32.5	11		
	15PB	15	32	41.5	15		
FG310-4T-15GB/18.5PB	15GB	15	32	41.5	15		
	18.5PB	18.5	37	49.6	18.5		
FG310-4T-18.5GB/22PB	18.5GB	18.5	37	49.6	18.5		
	22PB	22	45	59	22		
FG310-4T-22GB/30PB	22GB	22	45	59	22		
	30PB	30	60	65	30		
FG310-4T-30G/37P	30G	30	60	65	30	Inbuilt optional	Inbuilt optional
	37P	37	75	80	37		
FG310-4T-37G/45P	37G	37	75	80	37		
	45P	45	91	95	45		
FG310-4T-45G/55P	45G	45	91	95	45		
	55P	55	112	118	55		
FG310-4T-55G/75P	55G	55	112	118	55		
	75P	75	150	157	75		
FG310-4T-75G/90P	75G	75	150	157	75		
	90P	90	176	180	90		
FG310-4T-90G/110P	90G	90	176	180	90		
	110P	110	210	214	110		
FG310-4T-110G/132P	110G	110	210	214	110		
	132P	132	253	256	132		
FG310-4T-132G/160P-L	132G	132	253	240	132	Externally mounted when needed	Inbuilt
	160P	160	304	287	160		

Model		Power rating (kW)	Output current (A)	Input current (A)	Matched motor (kW)	Brake unit	DC reactor
FG310-4T-160G/185P-L	160G	160	304	287	160	Externally mounted when needed	Inbuilt
	185P	185	326	306	185		
FG310-4T-185G/200P-L	185G	185	326	306	185		
	200P	200	377	365	200		
FG310-4T-200G/220P-L	200G	200	377	365	200		
	220P	220	426	410	220		
FG310-4T-220G/250P-L	220G	220	426	410	220		
	250P	250	465	441	250		
FG310-4T-250G/280P-L	250G	250	465	441	250		
	280P	280	520	495	280		
FG310-4T-280G/315P-L	280G	280	520	495	280		
	315P	315	585	565	315		
FG310-4T-315G/355P-L	315G	315	585	565	315		
	355P	355	650	617	355		
FG310-4T-355G/400P-L	355G	355	650	617	355		
	400P	400	725	687	400		
FG310-4T-400G/450P-L	400G	400	725	687	400		
	450P	450	820	782	450		
FG310-4T-450G/500P-L	450G	450	820	790	450		
	500P	500	860	835	500		
FG310-4T-500G/560P-L	500G	500	860	835	500		
	560P	560	950	920	560		
FG310-4T-560G/630P-L	560G	560	950	920	560		
	630P	630	1100	1050	630		
FG310-4T-630G/710P-I	630G	630	1100	1050	630	/	Standard input reactor
	710P	710	1260	1198	710		
FG310-4T-710G/800P-I	710G	710	1260	1198	710		
	800P	800	1500	1426	800		

Table 2.3-2 Product model and technical data(three-phase 220V)

Model	Power rating (kW)	Output current (A)	Input current (A)	Matched motor (kW)	Brake unit	DC reactor
FG310-2T-0.75GB	0.75	4.0	4.8	0.75	Inbuilt	None
FG310-2T-1.5GB	1.5	7.0	8.8	1.5		
FG310-2T-2.2GB	2.2	9.6	12	2.2		
FG310-2T-4.0GB	4.0	16	21	4.0		
FG310-2T-5.5GB	5.5	20	26	5.5		
FG310-2T-7.5GB	7.5	30	39	7.5		
FG310-2T-11GB	11	42	55	11		
FG310-2T-15G	15	55	60	15	Inbuilt optional	Inbuilt optional
FG310-2T-18.5G	18.5	70	75	18.5		

Table 2.3-3 Product model and technical data(single-phase 220V)

Model	Power rating (kW)	Output current (A)	Input current (A)	Matched motor (kW)	Brake unit	DC reactor
FG310-2S-0.75GB	0.75	4.0	8.2	0.75	Inbuilt	None
FG310-2S-1.5GB	1.5	7.0	14	1.5		
FG310-2S-2.2GB	2.2	9.6	23	2.2		
FG310-2S-4.0GB	4.0	16	33	4.0		
FG310-2S-5.5GB	5.5	20	40	5.5		
FG310-2S-7.5GB	7.5	30	58	7.5		
FG310-2S-11GB	11	42	84	11		
FG310-2S-15G	15	55	110	15	Inbuilt optional	Inbuilt optional
FG310-2S-18.5G	18.5	70	140	18.5		

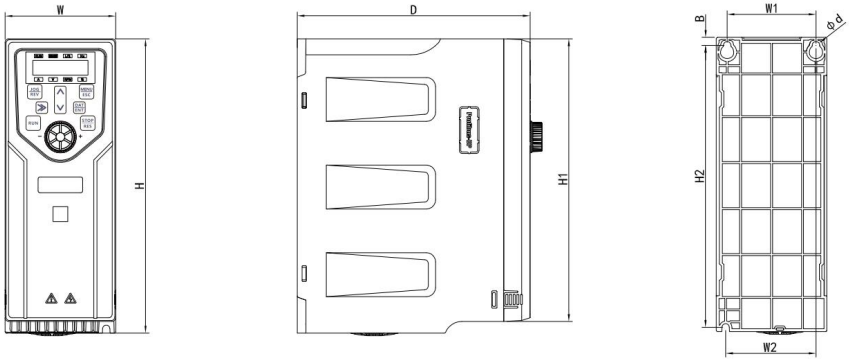
2.3.1 Technical Specification

Table 2.3-4 Technical Features of FG310

Power input	Rated input voltage	200V Voltage Class:single/three-phase 200V ~ 240V
		400V Voltage Class:Three-phase 380V~440V
		690V Voltage Class:Three-phase 660V~690V
	Frequency	50Hz/60Hz, tolerance ±5%
	Voltage range	-15%~+15%
		Voltage out-of-balance rate<3%, distortion rate as per the requirements of IEC61800-2
	Rated input current	See Section 2.3
Power output	Applicable motor (kW)	See Section 2.3
	Rated current (A)	See Section 2.3
	Output voltage (V)	3-phase:0%~rated input voltage, error < ±3%
	Output frequency (Hz)	0.00%~600.00Hz; unit:0.01Hz
	Overload capacity	G type:150% - 60 seconds, P type:120% - 60 seconds
Control characteristics	Control mode	V/f control Sensorless vector control (SVC) Feedback vector control(FVC)
	Range of speed regulation	1:200 (Sensor-less vector control) 1:1000 (Feedback vector control)
	Speed accuracy	±0.5% (Sensor-less vector control) ±0.02% (Feedback vector control)
	Torque control accuracy	5%(SVC)，3%(FVC)
	Torque increase	Automatic torque lifting; Manual torque increased by 0.1-30.0%
	Starting torque	0.25Hz:150% (Sensor-less vector control) 0Hz:200% (Feedback vector control)
Basic functions	Output frequency	0.00~599.00Hz
	ACC/DEC time	0.00~650.00s
	Carrier frequency	1.0kHz~16.0kHz
	Frequency setting	Digital setting + control panel Communication Analog setting Terminal pulse setting
	Motor start-up methods	Started from starting frequency DC brake start-up Speed tracking start
	Motor stop methods	Ramp to stop Free stop
	Dynamic braking capacity	Brake unit working voltage: 200V level:325-375V / 400V level:650V-810V / 690V level:1000~1200V Service time:0-100.0s; brake unit for PD350-110kW and below can be inbuilt optionally. See table 2.3-1

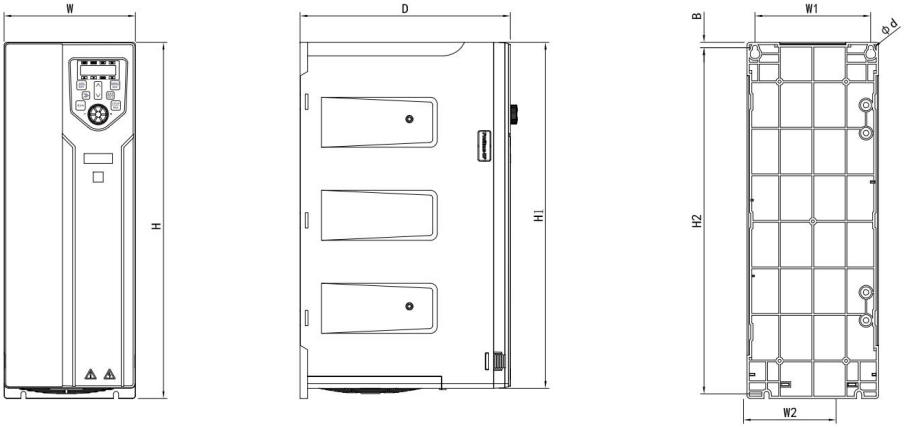
Basic functions	DC brake capacity	DC brake start frequency:0.00~600.00Hz DC brake current:0.0~100.0% DC brake time:0.0~100.00s
	Input terminals	5 digital inputs, one of which can be used for high-speed pulse input 2 analog inputs, which is voltage/current optional
	Output terminals	1 digital output terminal, optional as high-speed pulse output terminal, can support 0.01 ~ 100kHz square wave signal output
		1 analog output , voltage/current output optional，can output signals such as frequency setting, or output frequency, etc.
		1 Relay output terminal,drive capability:AC250V，3A；DC30V，5A.
	Communication terminal	1 channel RS485 communication , can support up to 38400bps communication rate
Extensions	Supports multiple I/O, resolver, differential and open collector photoelectric encoders, ModbusTCP, ProfibusDP, CANopen, Profinet, EtherCAT, PT1000, PT100,KTY84....	
Featured functions	Parameter copy, parameter backup, common DC bus, free switchover between two motors' parameters, various master & auxiliary setting and switchover, flying start, a variety of Accel/Decel curves optional, brake control, 15-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, high-precision torque restraint, V/f separatedcontrol	
Protection functions	Refer to Chapter 6-Trouble Shooting	
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℃~50℃, The rated output current should be derated 1% for every 1℃ when the ambient is 40℃~50℃
	Relative humidity	5~95%, no condensation
	Vibration	Less than 5.9m/s² (0.6g)
	Storage temperature	-20℃~+60℃
Others	Efficiency at rated Amps	Rated power 7.5kW and below:≥93% 11~45kW:≥ 95% 55kW and above:≥98%
	Installation	110kW and below support wall-mounted and embedded installation (optional) 185kW and above support wall-mounted installation and cabinet installation (optional)
	IP grade	IP20
	Cooling method	Forced air cooling

2.4 Appearance, Mounting Dimensions



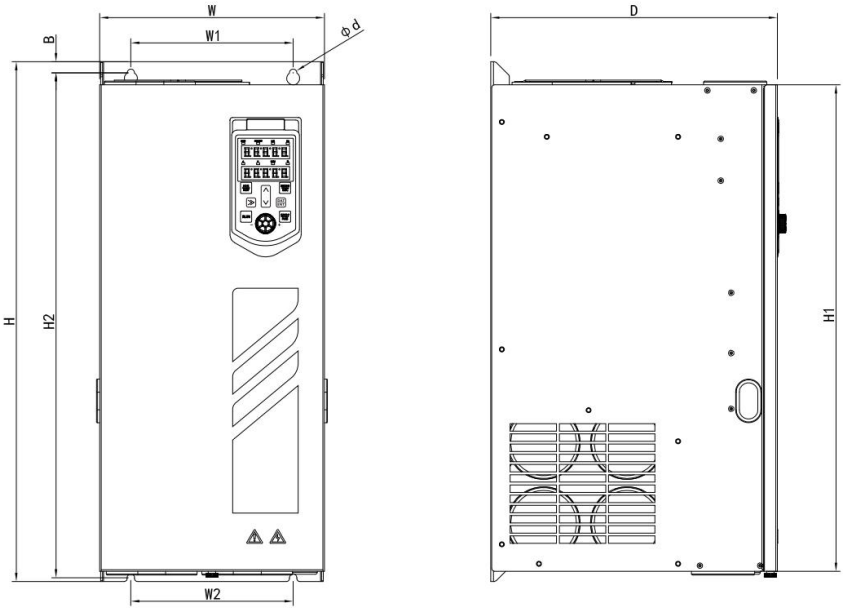
Plastic housing

Fig. 2.4-1 Overall dimensions of FG310-2S、2T(0.75kW~2.2kW)、FG310-4T(0.75kW~4.0kW)



Plastic housing

Fig. 2.4-2 Overall dimensions of FG310-2S、2T(4.0kW~11kW)、FG310-4T(5.5kW~22kW)



Sheet metal housing

Fig. 2.4-3 Overall dimensions of FG310-2S、2T(15kW~18.5kW)、
FG310-4T(30kW~560kW)

Table 2.4-1 Appearance, mounting dimensions and weight (single-phase 220V)

Model	External and installation dimensions (mm)									NW (Kg)	GW (Kg)
	W	H	H1	D	W1	W2	H2	B	d		
FG310-2S-0.75GB	76	200	193	160	61	62	193	5.5	3-Φ5	1.2	1.5
FG310-2S-1.5GB											
FG310-2S-2.2GB											
FG310-2S-4.0GB	100	242	232	165	84	85	231	5.5	3-Φ5	2.3	2.6
FG310-2S-5.5GB											
FG310-2S-7.5GB	142	383	372	227	125	100	372	6	4-Φ6	5.5	7.0
FG310-2S-11GB											
FG310-2S-15G	173	430	408	230	150	150	416	8	4-Φ7	13.3	14.3
FG310-2S-18.5G											

Table 2.4-2 Appearance, mounting dimensions and weight(three-phase 220V)

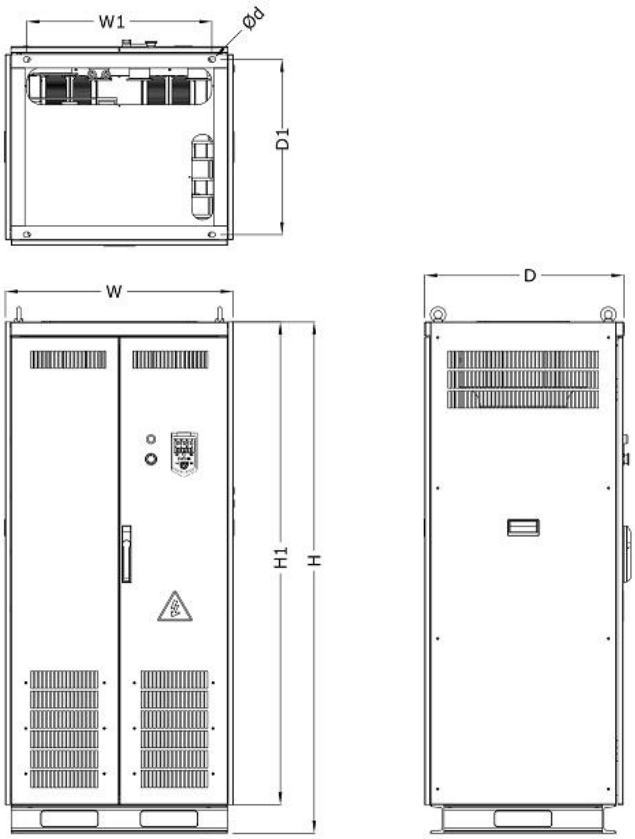
Model	External and installation dimensions (mm)									NW (Kg)	GW (Kg)
	W	H	H1	D	W1	W2	H2	B	d		
FG310-2T-0.75GB	76	200	193	160	61	62	193	5.5	3-Φ5	1.2	1.5
FG310-2T-1.5GB											
FG310-2T-2.2GB											
FG310-2T-4.0GB	100	242	232	165	84	85	231	5.5	3-Φ5	2.3	2.6
FG310-2T-5.5GB											
FG310-2T-7.5GB	142	383	372	227	125	100	372	6	4-Φ6	5.5	7.0
FG310-2T-11GB											
FG310-2T-15G	173	430	408	230	150	150	416	8	4-Φ7	13.3	14.3
FG310-2T-18.5G											

Note: 2S, 2T 7.5kW power (including 7.5kW) and above are modular models.

Table 2.4-3 Appearance, mounting dimensions and weight(three-phase 380V)

Model	External and installation dimensions (mm)									NW (Kg)	GW (Kg)
	W	H	H1	D	W1	W2	H2	B	d		
FG310-4T-0.75GB/1.5PB	76	200	193	160	61	62	193	5.5	3-Φ5	1.2	1.5
FG310-4T-1.5GB/2.2PB											
FG310-4T-2.2GB/4.0PB											
FG310-4T-4.0GB/5.5PB											
FG310-4T-5.5GB/7.5PB	100	242	232	165	84	85	231	5.5	3-Φ5	2.3	2.6
FG310-4T-7.5GB/11PB											
FG310-4T-11GB/15PB	116	320	306	185	98	98	307	5	3-Φ5	3.5	5
FG310-4T-15GB/18.5PB	142	383	372	227	125	100	372	6	4-Φ6	5.5	7.0
FG310-4T-18.5GB/22PB											
FG310-4T-22GB/30PB											
FG310-4T-30G/37P	173	430	408	230	150	150	416	8	4-Φ7	13.3	14.3
FG310-4T-37G/45P											
FG310-4T-45G/55P	242	560	524	310	175	175	544	12	4-Φ8	26.0	27.0
FG310-4T-55G/75P											
FG310-4T-75G/90P											
FG310-4T-90G/110P	270	638	595	350	195	195	615	15	4-Φ8	36.0	40.0
FG310-4T-110G/132P											
FG310-4T-132G/160P-L	349	738	681	403	220	220	715	13	4-Φ10	65.0	72.0
FG310-4T-160G/185P-L											
FG310-4T-185G/200P-L	360	940	851	480	200	200	910	21	4-Φ18	90.0	102.0
FG310-4T-200G/220P-L											
FG310-4T-220G/250P-L											
FG310-4T-250G/280P-L	369	1141	1050	550	200	200	1110	20	4-Φ18	130.0	150.0
FG310-4T-280G/315P-L											
FG310-4T-315G/355P-L	400	1250	1160	550	240	240	1213	24	4-Φ18	209.0	225.0
FG310-4T-355G/400P-L											
FG310-4T-400G/450P-L											
FG310-4T-450G/500P-L	460	1400	1294	544	300	300	1360	24	4-Φ18	230.0	255.0
FG310-4T-500G/560P-L											
FG310-4T-560G/630P-L											

Note: 4T 15kW power (including 15kW) and above are modular models.



Sheet metal housing

Fig. 2.4-4 Overall dimensions of FG310-4T(630kW~710kW)

Table 2.4-4 Appearance, mounting dimensions and weight(630kW~710kW)

Model	External and installation dimensions (mm)							NW (Kg)	GW (Kg)
	W	H	H1	D	D1	W1	d		
FG310-4T-630G/710P-I	800	1800	1700	700	617	650	4-φ18	475	500
FG310-4T-710G/800P-I									

2.5 External Dimensions of Control Panel

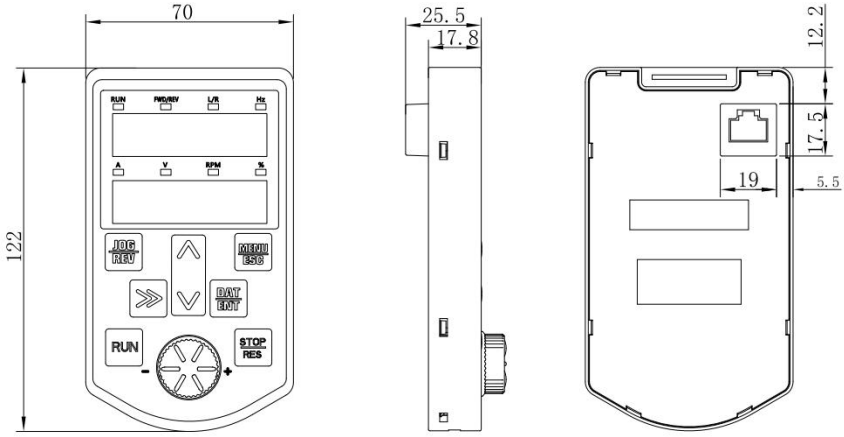


Fig. 2.5-1 External dimensions of LED Control Panel

2.6 External Dimensions of Control Panel Bracket

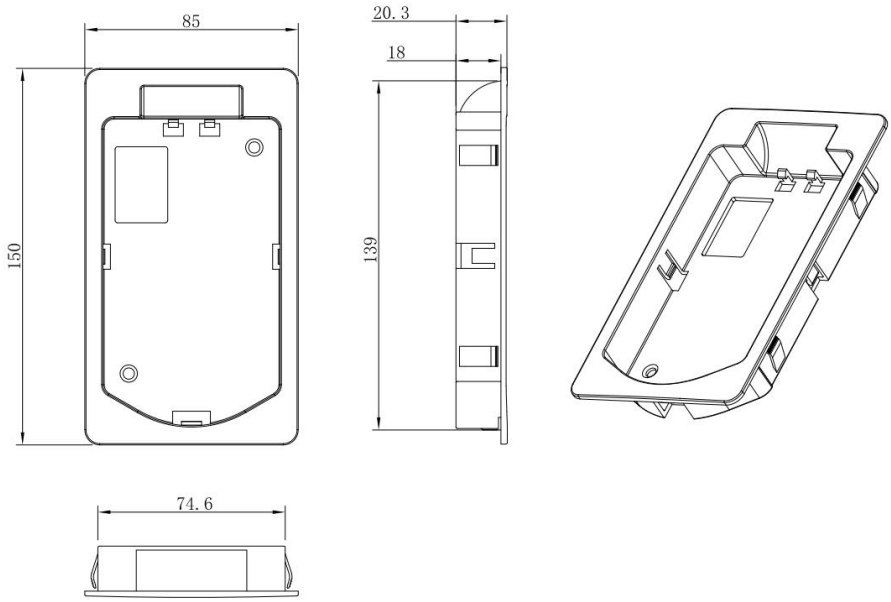


Fig. 2.6-1 External Dimensions of Control Panel Bracket

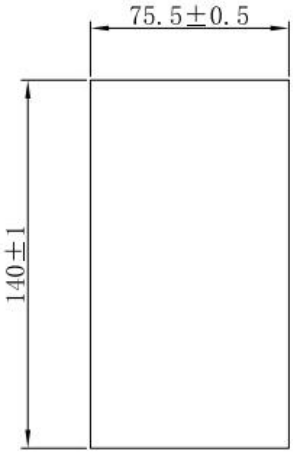


Fig. 2.6-2 Hole dimensions in the cabinet

2.7 Guide to Select Brake Components

Table 2.7-1 Selection of FG310 drive brake components

Model	Recommended power for brake resistance	Recommended brake resistance	Brake unit
FG310-2S-0.75GB	80W	≥150Ω	Inbuilt
FG310-2S-1.5GB	100W	≥100Ω	
FG310-2S-2.2GB	100W	≥70Ω	
FG310-2S-4.0GB	200W	≥40Ω	
FG310-2S-5.5GB	300W	≥26Ω	
FG310-2S-7.5GB	500W	≥16Ω	
FG310-2S-11GB	800W	≥11Ω	
FG310-2S-15G	1000W	≥10Ω	Inbuilt optional
FG310-2S-18.5G	1400W	≥8Ω	
FG310-2T-0.75GB	80W	≥150Ω	Inbuilt
FG310-2T-1.5GB	100W	≥100Ω	
FG310-2T-2.2GB	100W	≥70Ω	
FG310-2T-4.0GB	200W	≥40Ω	
FG310-2T-5.5GB	300W	≥25Ω	
FG310-2T-7.5GB	500W	≥16Ω	
FG310-2T-11GB	800W	≥11Ω	
FG310-2T-15G	1000W	≥10Ω	
FG310-2T-18.5G	1400W	≥8Ω	
FG310-4T-0.75GB/1.5PB	150W	≥150Ω	
FG310-4T-1.5GB/2.2PB	150W	≥150Ω	
FG310-4T-2.2GB/4.0PB	300W	≥100Ω	
FG310-4T-4.0GB/5.5PB	300W	≥76Ω	
FG310-4T-5.5GB/7.5PB	400W	≥76Ω	
FG310-4T-7.5GB/11PB	500W	≥76Ω	
FG310-4T-11GB/15PB	800W	≥40Ω	
FG310-4T-15GB/18.5PB	1000W	≥27Ω	
FG310-4T-18.5GB/22PB	4.0kW	≥27Ω	
FG310-4T-22GB/30PB	4.5kW	≥27Ω	
FG310-4T-30G/37P	6kW	≥16Ω	Inbuilt optional
FG310-4T-37G/45P	7.4kW	≥16Ω	
FG310-4T-45G/55P	9kW	≥14Ω	

Model	Recommended power for brake resistance	Recommended brake resistance	Brake unit
FG310-4T-55G/75P	11kW	≥10Ω	Inbuilt optional
FG310-4T-75G/90P	15kW	≥8Ω	
FG310-4T-90G/110P	18kW	≥6.8Ω	
FG310-4T-110G/132P	22kW	≥6.8Ω	
FG310-4T-132G/160P-L	27kW	≥4.5Ω	Brake unit should be externally mounted when needed
FG310-4T-160G/185P-L	32kW	≥3.6Ω	
FG310-4T-185G/200P-L	37kW	≥3.3Ω	
FG310-4T-200G/220P-L	40kW	≥3.3Ω	
FG310-4T-220G/250P-L	44kW	≥2.7Ω	
FG310-4T-250G/280P-L	50kW	≥2.7Ω	
FG310-4T-280G/315P-L	56kW	≥2.2Ω	
FG310-4T-315G/355P-L	63kW	≥1.9Ω	
FG310-4T-355G/400P-L	70kW	≥1.7Ω	
FG310-4T-400G/450P-L	80kW	≥1.6Ω	
FG310-4T-450G/500P-L	90kW	≥1.3Ω	
FG310-4T-500G/560P-L	100kW	≥1.2Ω	
FG310-4T-560G/630P-L	120kW	≥1.2Ω	
FG310-4T-630G/710P-I	/	/	No brake

Description:

- When brake unit is built in, the power and resistance value of brake resistor should meet the requirement as stated in the table. When brake unit is mounted externally, the power and resistance value of brake resistor should be in accordance with brake unit.
- On the premise of fulfilling brake requirement, brake resistance value might be bigger than the minimum value as stated in the table. Failure to comply may result in damage to the drive. Brake resistors are not built in and need to be sourced additionally.

Chapter 3 Installation and Wiring

3.1 Installation Environment

1)Ambient temperature is in the range of -10℃~ 40℃.
2)Drive should be installed on surface of flame retardant object, with adequate surrounding space for heat dissipation.
3)Installation should be performed where vibration is less than 5.9m/s² (0.6g).
4)Protect from moisture and direct sunlight.
5)Protect the cooling fan by avoiding oil, dust and metal particles.
6)Do not expose to an atmosphere with flammable gases, corrosive gases, explosive gases or other harmful gases.
7)Prevent drilling residues, wire ends and screws falling into drive.
8)Ventilation part of the drive should be installed outside from harsh environment (e.g. textile facilities with fiber particles and chemical facilities filled with corrosive gases).

3.2 Minimum Mounting Clearances

To ensure favorable heat dissipation, mount the drive upright on a flat, vertical and level surface as per Fig. 3.2-1. For installation inside cabinet, the product shall be mounted side by side to the greatest extent while adequate surrounding space shall be preserved for favorable heat dissipation.

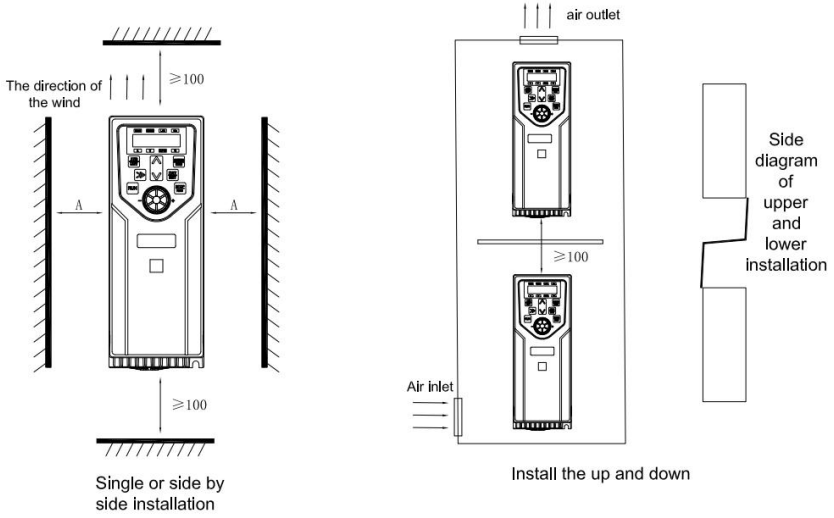


Fig. 3.2-1 Installation of frequency converter

Single installation:when the power of the converter is not greater than 22kW, the size of A can be ignored. When greater than 22kW, A should be greater than 45mm.

Upper and lower installation:When installing the drives up and down, please install the Air Guide Plate shown in the figure.

Power level	Mounting dimensions for upper and lower installation	A
≤22kW	≥100mm	≥8mm
30kW~37kW	≥200mm	≥45mm
≥45kW	≥300mm	

3.3 Remove & Mount Control Panel and Cover

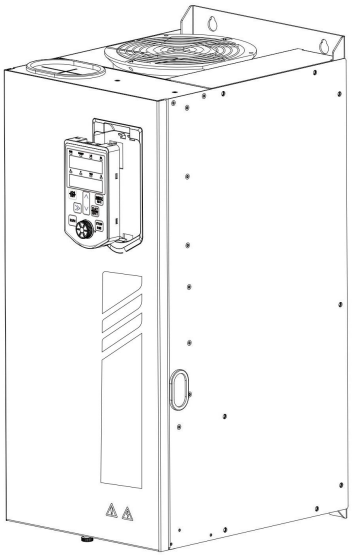


Fig. 3.3-1 Remove and Mount Control Panel

- **Remove control panel:**
  Place your middle finger on the finger insertion hole above the control panel, gently press and hold the top shrapnel and pull outward.
- **Mount control panel:**
  First the bottom of the control panel fixed buckle docking in the operation panel installation slot below the installation claw, with the middle finger press the top of the shrapnel pushed in, in place after the release of the middle finger can be.

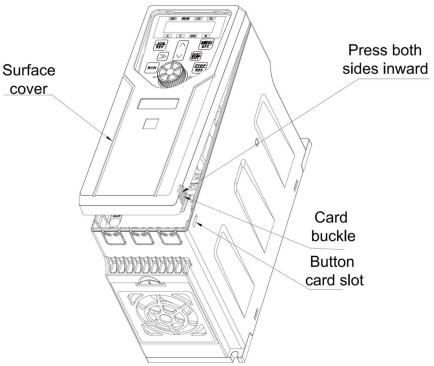


Fig. 3.3-2 Schematic diagram of removal and installation of plastic shell cover plate

- **Removal of plastic shell cover plate:**
  Use a finger or a tool to hook the lower end of the cover plate to the inside.
- **Installation of plastic shell cover plate:**
  First push the upper hook of the cover into the outer box, and then press the lower hook of the cover into the outer box.

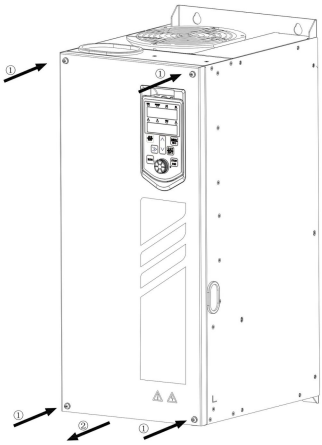


Fig. 3.3-3 Schematic diagram of disassembly and installation of sheet metal housing cover plate

Remove and install the sheet metal cover:Use a Phillips screwdriver to remove the four screws shown in ① and remove the cover in the direction shown in ②.

3.4 Wiring Diagram

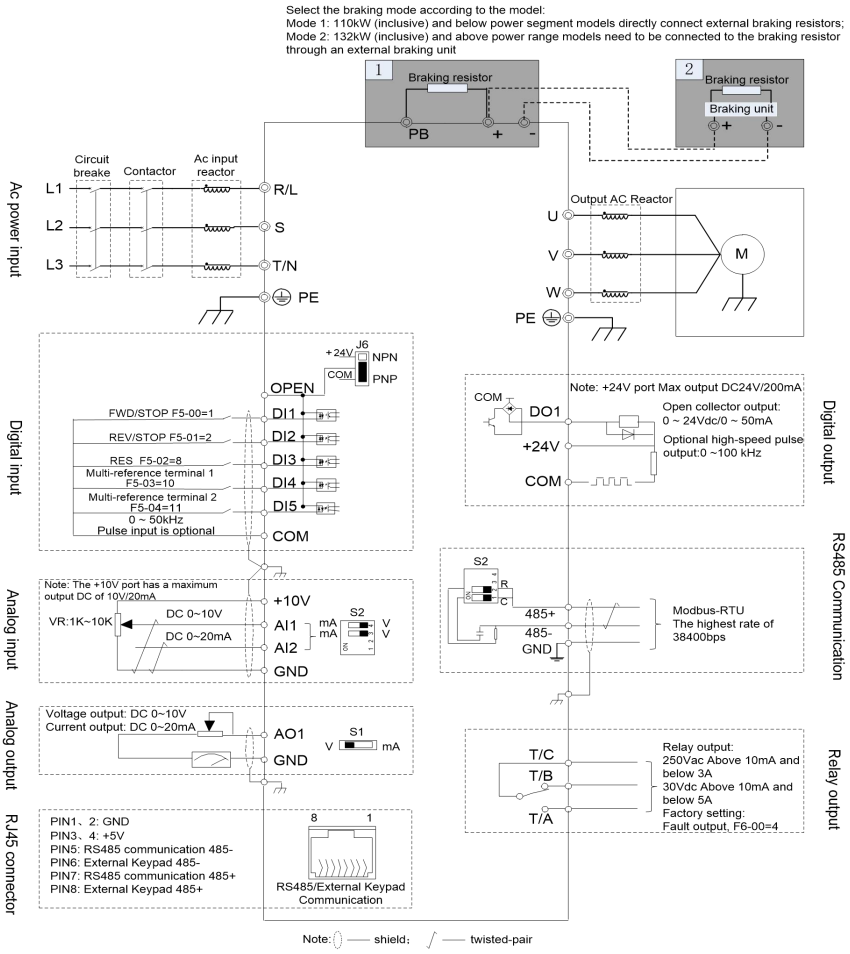


Fig. 3.4-1 Wiring diagram

Notice:

① Terminal ◎ Indicates the main loop terminal, ○ indicates the control loop terminal;

② The "B" at the back of the product model means the inbuilt brake unit of the standard model, and the "L" means the inbuilt DC reactor of the standard chassis;

③ The brake resistance can be selected according to the user's needs. See Table 2.7-1 Brake assembly selection guide;

④ Signal cables and power cables must be routed separately, and the control cables and power cables should be crossed at a 90-degree Angle as far as possible.The analog signal line reference diagram describes the selection of linear, power cable is the best choice of shielded three core cable;

⑤ Single-phase 220V model power terminals are L and N.

3.5 Control Terminal Specification

3.5.1 Schematic diagram of control board layout

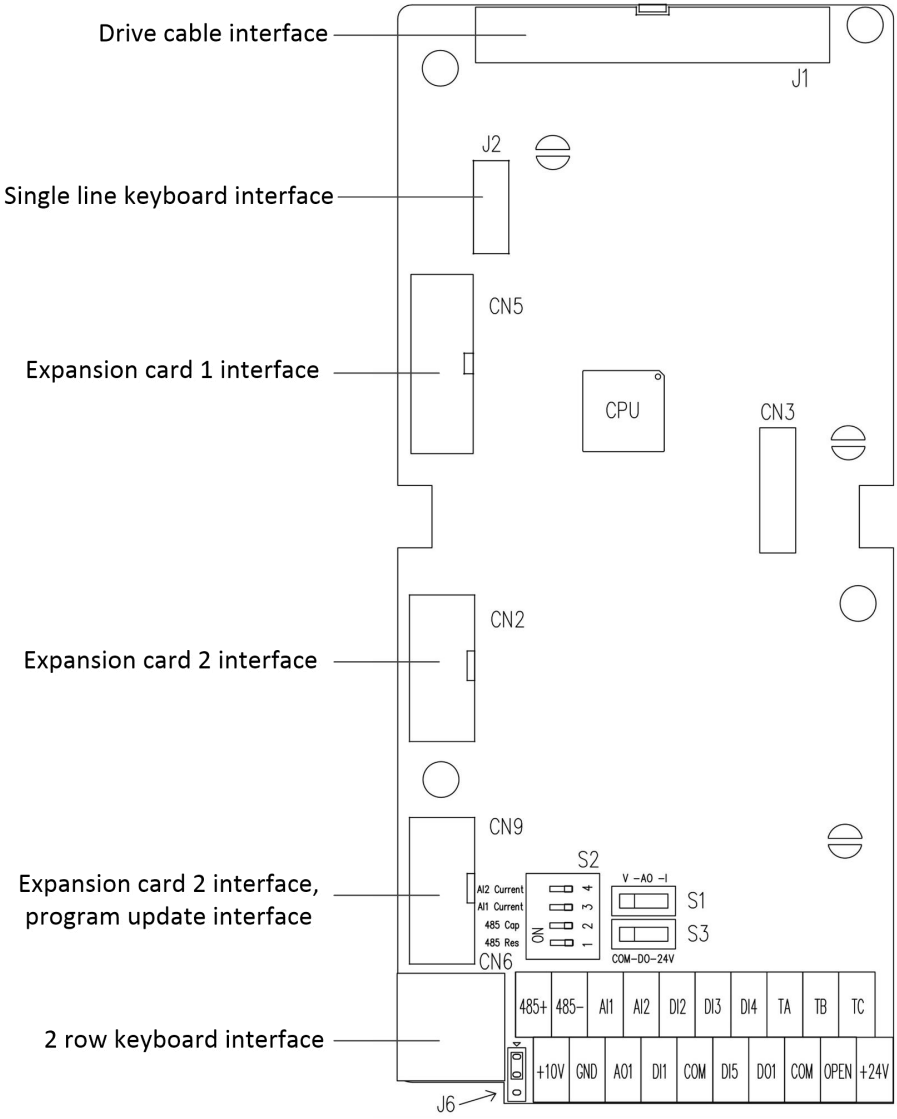


Fig. 3.5-1 Schematic diagram of control board layout

3.5.2 Function description of the control terminals

Table 3.5-1 Functions of control terminals

Category	Terminal	Terminal Name	Function Description
Power source	+10V	Analog input reference voltage	1、Provide +10 V power supply to external unit. 2、it provides power supply to external potentiometer with resistance range of 1kΩ–10kΩ. 3、Maximum output current:20mA.
	GND	Analog ground	Isolated from COM interiorly
	+24V	External +24 V power supply	1、Provide +24 V power supply to external unit. Generally, it provides power supply to DI/DO terminals and external sensors. 2、Maximum output current:200 mA
	COM	+24V ground	Isolated from GND interiorly
	OPEN	External power input terminal	Connect to +24V or COM via the J6 pin (DI) on the control board: 1）  +24V connection (default), external support for NPN input connection type. 2）  With COM connection, external support for PNP input connection type.
Analog input	AI1	Analog input 1	1、Input range:DC 0V~10V or 0/4mA~20mA, through the S2 switch on the control panel to select the third gear (AI1) : 1）  Indicates DC 0V to 10V signals (default). 2）  Indicates a signal from 0/4 mA to 20mA. 2、Input impedance:22 kΩ (voltage input),500 Ω (current input).
	AI2	Analog input 2	1、Input range:DC 0V~10V or 0/4mA~20mA, through the S2 switch on the control panel to select the fourth gear (AI2): 1）  Indicates DC 0V to 10V signals (default). 2）  Indicates a signal from 0/4 mA to 20mA. 2、Input impedance:22 kΩ (voltage input), 500Ω (current input).

Category	Terminal	Terminal Name	Function Description
	GND	Analog ground	Isolated from COM interiorly
Digital input	DI1	Digital input Terminals 1~4	1、Optical coupling isolation, compatible with bipolar input, internal impedance 3.6 kΩ . 2、Multi-function digital input, through F5-00 to F5-04 to set the function. 3、Driver default for the internal supply of +24V power, COM for the common end. 4、When the external power supply is used, the cable connection mode see Figure 3.5-4 and 3.5-5. The voltage range of the external power supply is +24V±10%.
	DI2		
	DI3		
	DI4		
	DI5	Digital input Terminals 5	Same as DI1 to DI4
		High-speed pulse input terminal (optional)	1、Can be combined with the OPEN terminal as a bipolar high-speed pulse input terminal, the highest input frequency is 50kHz. 2、When using external power supply, the input voltage range is +24V±10%.
	COM	+24V ground	Isolated from GND interiorly
Analog output	AO1	Analog output	Supports 0V to 10V voltage or 0/4mA to 20mA current output, selected by S1 dip switch (AO) : 1）  0V to 10V output (default). 2）  Indicates the current output from 0/4 mA to 20mA.
	GND	Analog ground	Isolated from COM interiorly
Digital output	DO1	Digital output	1、Optical coupling isolation, bipolar OC (open collector) output. 2、Pull up voltage range: 5V~24V (pull up resistance range: 0.48 kΩ~10 kΩ). 3、Output current range: 2mA~50mA. 4、Can select the power supply by using the DIP switch (DO) of S3: 1）  Choose the internal power supply NPN connection type. 2）  Choose the internal power supply PNP connection type.
		High-speed pulse output terminal (optional)	1、The highest output frequency is 100kHz. 2、Pull-up voltage range: 5V to 24V (pull-up resistance range is the same as above). 3、Output current range: 2mA to 50mA.
	COM	+24V ground	Isolated from GND interiorly
Relay output	TC-TA	Relay T1 normally open terminal	Contact drive capability:AC250V,3A；DC30V,5A.

Category	Terminal	Terminal Name	Function Description
	TC-TB	Relay T1 normally closed terminal	
485 Communication interface	485+	485 differential signal +	Use a twisted-pair shielded cable for the standard RS-485 communication terminal.
	485-	485 differential signal -	
	GND	485 communication shield grounding	
Dial switches	485-R	OFF the port	When dialed to this port, the 485 communication 120 Ω terminal resistance is disconnected.
		ON the port	When dialed to the port 485 communication 120 Ω terminal resistance is connected.
	485-C	OFF the port	When the terminal is dialed, the 485 communication filter capacitor is disconnected.
		ON the port	When dialed to the port, 485 communication filter capacitor is connected.
	AI1	V the port	When the AI1 terminal is switched to this terminal, select the input DC 0 to 10V voltage signal.
		mA the port	When the terminal is switched to this terminal, select the input DC 0/4 mA to 20mA current signal for the AI1 terminal.
	AI2	V the port	When the AI2 terminal is switched to this terminal, select the input DC 0 to 10V voltage signal.
		mA the port	When the terminal is switched to this terminal, select the input DC 0/4 mA to 20mA current signal for the AI2 terminal.
	AO	V the port	When the terminal is switched to this terminal, the AO1 terminal outputs DC 0 to 10V voltage signals.
		mA the port	When the terminal is switched to this port, the AO1 terminal outputs DC 0/4 mA to 20mA current signals.
	DI	24V the port	When the OPEN terminal is connected to 24V, the DI and COM short input are valid. Can also use the NPN input type.
		COM the port	When you dial this end, the OPEN terminal is connected to COM. In this case, the DI and 24V short input are valid. PNP input type is also supported.
	DO	COM the port	When dialed to this end, the DO output is selected as the internal power NPN connection type output.
		24V the port	When dialed to this end, DO output is selected internal power PNP connection type output.
Shielding earthing	GND	Shielded cable grounding	1、It is used for shielding and grounding of control cables. When the field interference is large or the control line is long, it must be well grounded to reduce the electromagnetic interference to comply with EMC specifications. 2、Do not connect this terminal to the PE cable of the power supply.

3.5.3 Cable Connections to Main control board terminals

3.5.3.1 Digital input terminal

Multifunctional digital input terminals support NPN or PNP connection type. DI1 to DI5 terminals are flexibly connected to external devices. You can select the NPN or PNP mode through the jump cap at J6 on the control board (the factory default mode is NPN). Figure 3.5-2 to 3.5-2 shows the jumping caps and cabling modes of the multi-function digital input terminals in different modes.

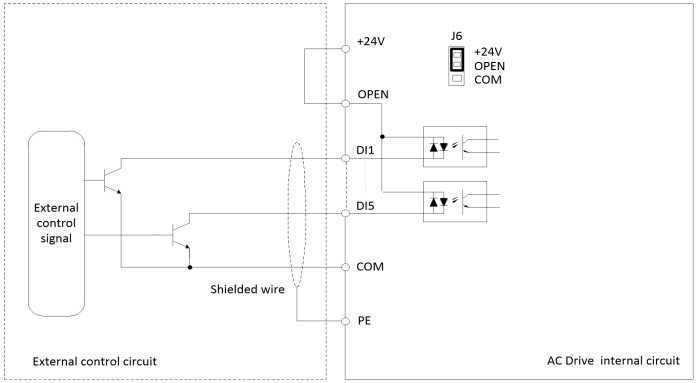


Fig. 3.5-2 NPN mode Uses the internal power supply

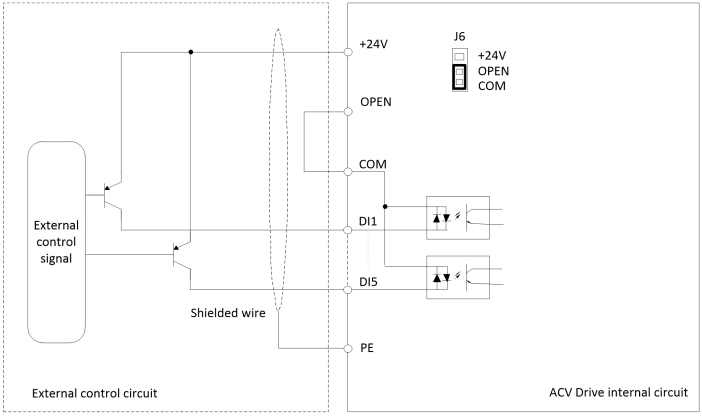


Fig. 3.5-3 PNP mode uses an internal power supply

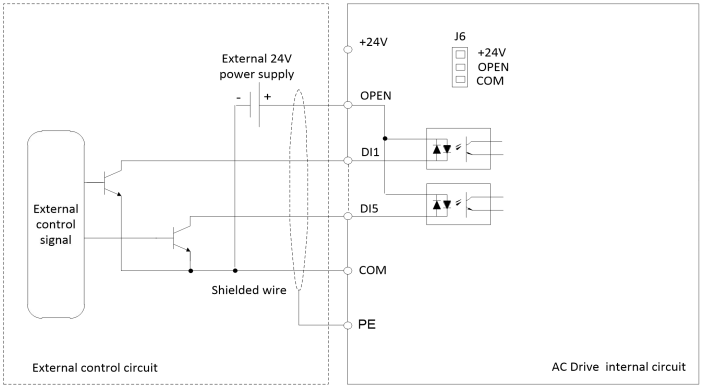


Fig. 3.5-4 NPN mode Uses external power supplies

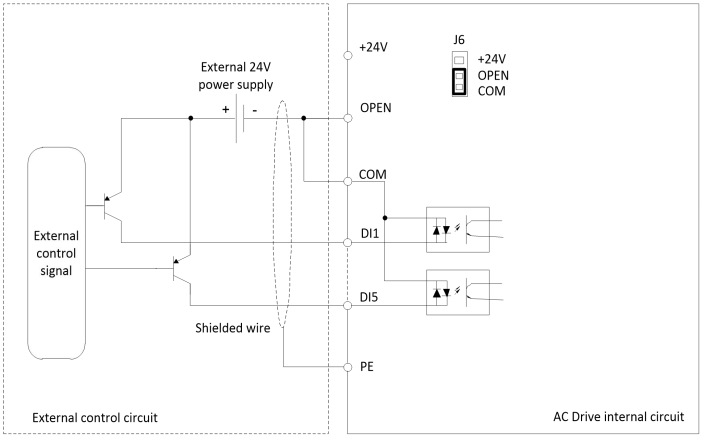


Fig. 3.5-5 PNP mode uses an external power supply

Precautions:

If the external power supply is connected in NPN mode, remove the jump cap in position J6.

3.5.3.2 Analog input terminal

Because weak analog voltage signal is particularly vulnerable to external interference, it is generally necessary to use shielded twisted-pair cable, and the wiring distance is as short as possible, not more than 20m, according to different analog signal input types can be adjusted by adjusting the S2 dip switch inside the AC drive third (AI1) and fourth (AI2) to select the corresponding input signal type. Figure 3.5-6 and 3.5-7 show dip switches and cabling methods. When some analog signals are seriously interfered, filter capacitors or ferrite magnetic rings need to be added to the source side of the analog signal, as shown in Fig. 3.5-8.

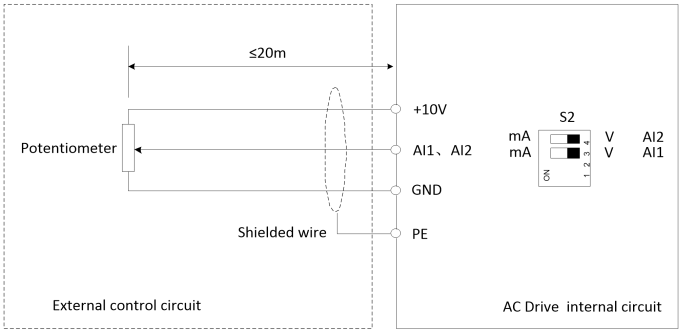


Fig. 3.5-6 Analog input terminal input voltage signal wiring diagram

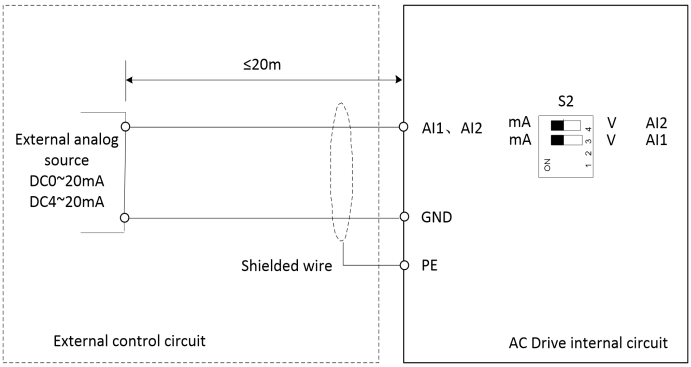


Fig. 3.5-7 Analog input terminal Input current signal wiring diagram

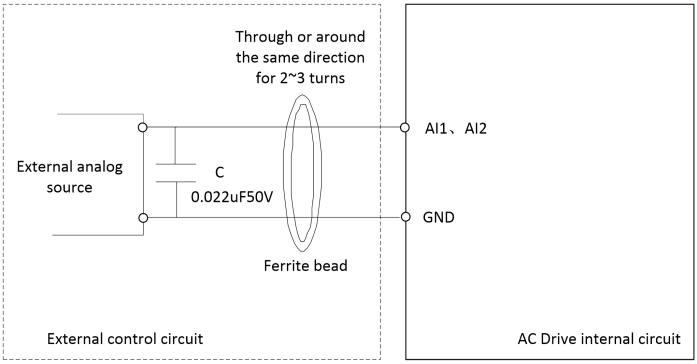


Fig. 3.5-8 Analog input terminal cable coat ferrite magnetic ring wiring diagram

3.5.3.3 Digital Output terminal

When the digital output terminal DO1 needs to drive the relay, the absorption diode should be installed on both sides of the relay coil, otherwise it may cause damage to DC +24V power supply,

and the driving capacity of DO1 is not greater than 50mA. The DO1 output can choose the wiring mode of NPN and PNP by adjusting the dip switch S3. Figure 3.5-9 and 3.5-10 show dip switches and cable distribution modes.

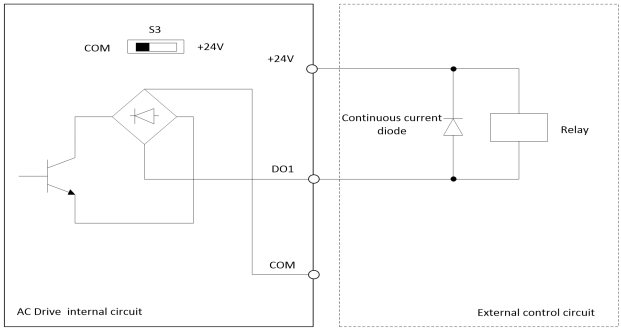


Fig. 3.5-9 Digital output terminal using the driver internal power NPN mode wiring diagram

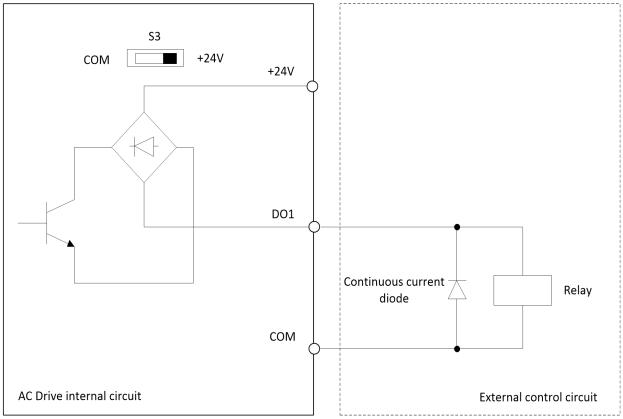


Fig. 3.5-10 Digital output terminal using the driver internal power PNP mode wiring diagram

3.5.3.4 Analog output terminal

The analog output terminal AO1 external analog quantity can represent a variety of physical quantities. You can select the output current (0/4 ~ 20mA) or (0 ~ 10V) through DIP S1. Figure 3.5-11 and 3.5-12 show dip switches and terminal wiring methods.

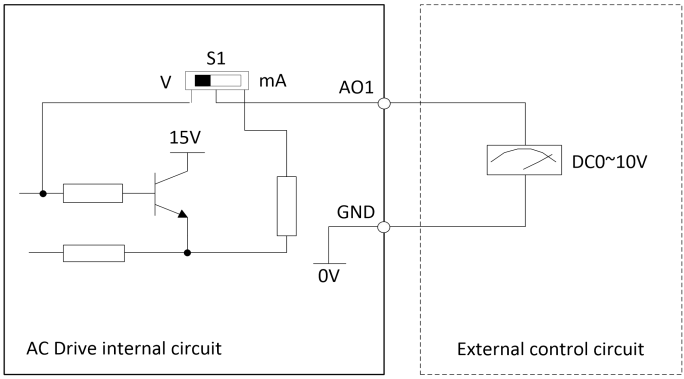


Fig. 3.5-11 Analog output terminal output voltage signal wiring diagram

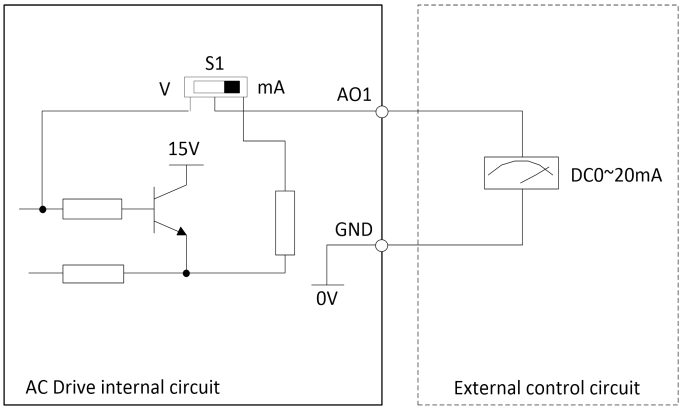
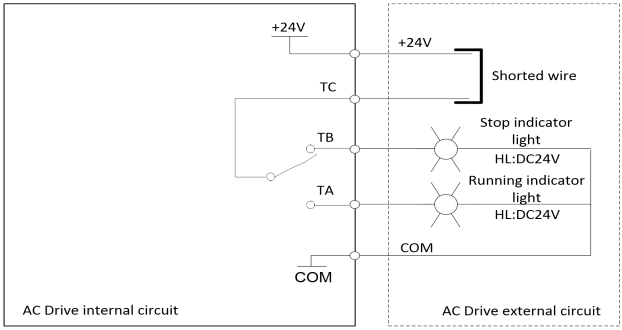


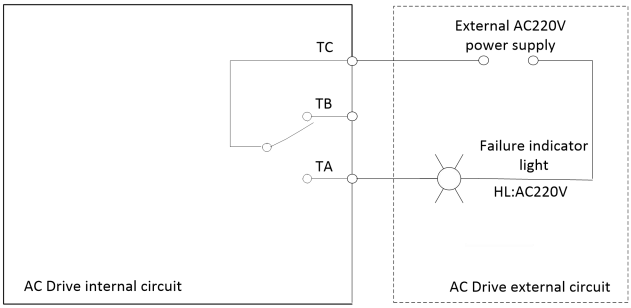
Fig. 3.5-12 Analog output terminal output current signal wiring diagram

3.5.3.5 Relay Output terminal

The wiring of relay output terminals is shown in Fig. 3.5-13, where TC is the common end of relay contacts, TB is the normally closed terminal, TA is the normally open terminal, and the driving load of relay does not exceed AC 250V3A and DC 30V 5A.



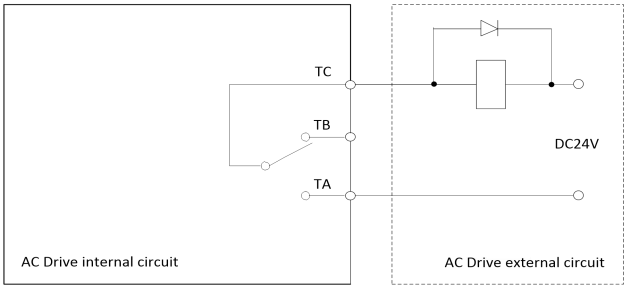
Use internal DC24V power supply



Use external AC220V power supply

Fig. 3.5-13 Wiring diagram of relay output terminal

When the relay output is connected to the inductive load (such as relay, contactor or motor), voltage peak will be caused when the current is cut off. Therefore, it is better to add varistor to the relay contact for protection, and install absorbent circuit, such as varistor, RC absorbent circuit or diode, on the inductive load to ensure the minimum interference during shutdown. For details, see Fig. 3.5-14:



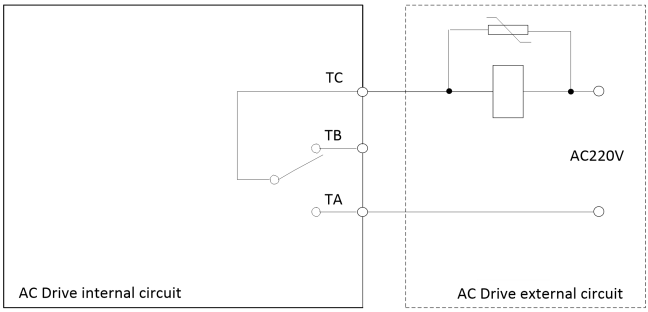


Fig. 3.5-14 Relay output terminal anti-interference processing

3.5.3.6 RS485 Communication Terminal

Communication terminals 485+ and 485- are the RS485 communication interfaces of the Driver. 485+ is connected to the positive end of the communication of the host computer, and 485- is connected to the negative end of the host computer, realizing the networking control between the host computer (PC or PLC controller) and the Driver. The connection between RS485 and the Driver is shown in Fig. 3.5-15 below:

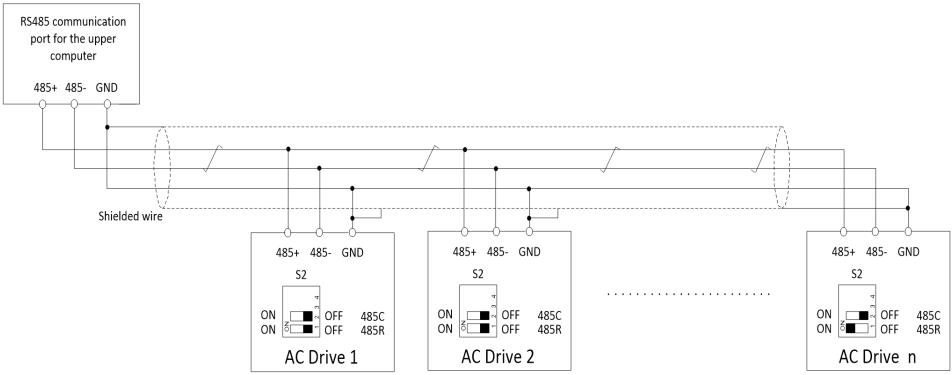


Fig. 3.5-15 RS485 communication terminal wiring diagram of one or multiple drive

Precautions:

RS485 communication should use twisted-pair shielded wires as far as possible, and short-connect all communication GND. In multi-machine communication, switch the first gear of dip switch of the most terminal drive S2 to ON (connect the terminal resistor).

Chapter 4 Operation and Run Instructions

4.1 Operation of Control Panel

As a human-machine interface, control panel is the main part for the drive to receive command and display parameters.

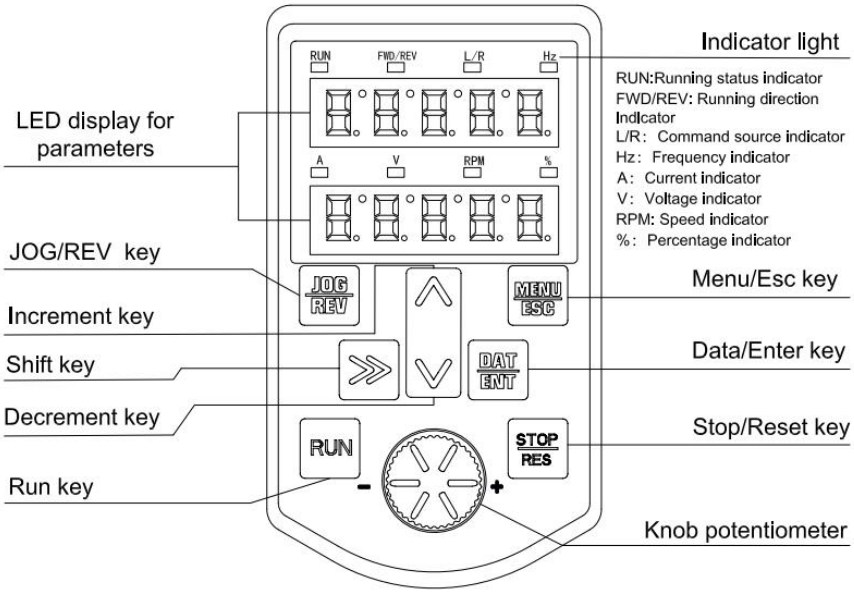


Fig.4.1-1 Control panel

4.1.1 Key Functions on Control Panel

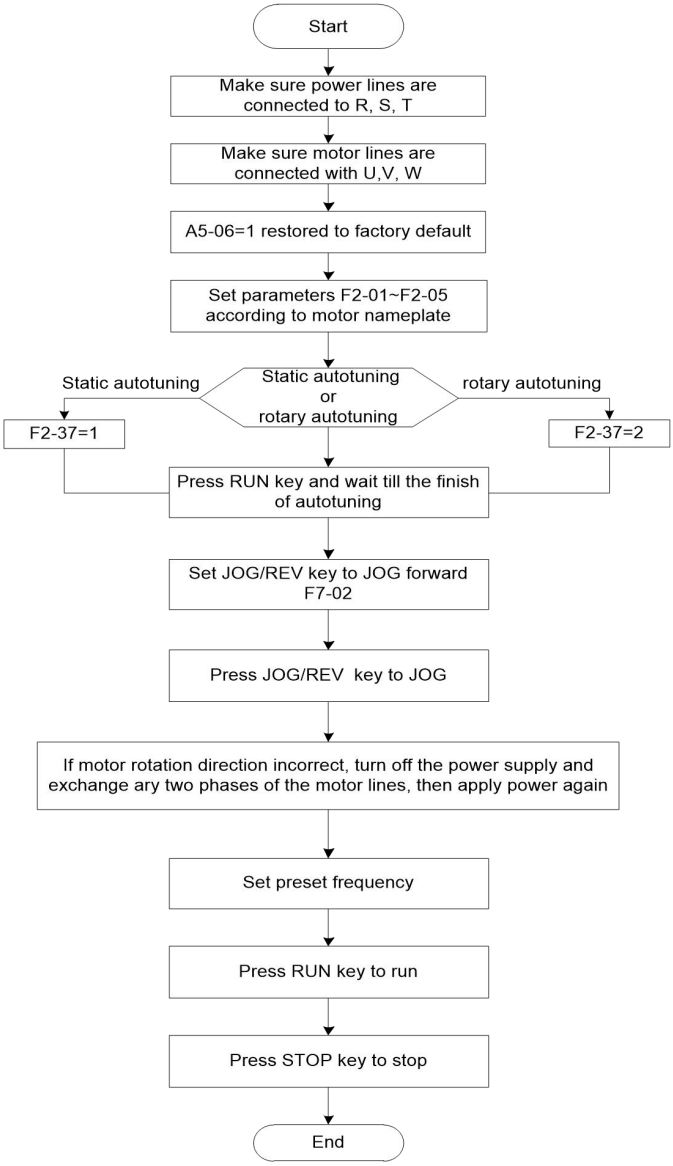
Symbol	Key name	Meaning
JOG REV	JOG/REV	Perform a function switchover as defined by the setting of F7-01, for example to quickly switch command source or direction.
MENU ESC	MENU/ESC	1) Enter or exit Level 1 menu. 2) Return to the previous menu.
∧	Increment	1) When navigating a menu, it moves the selection up through the screens available. 2) When editing a parameter value, it increases the displayed value. 3) When the AC drive is in RUN mode, it increases the speed.

	Decrement	1) When navigating a menu, it moves the selection down through the screens available. 2) When editing a parameter value, it decreases the displayed value. 3) When the AC drive is in RUNNING mode, it decreases the speed.
	Shift	1) Select the displayed parameter in the STOP or RUNNING status. 2) Select the digit to be modified when modifying a parameter value.
	DAT/ENT	1) Enter each level of menu interface. 2) Confirm displayed parameter setting.
	Potentiometer	Clockwise rotation increases the operation value, and counterclockwise rotation decreases the operation value.
	RUN	Start the AC drive when using the operating panel control mode. It is inactive when using the terminal or communication control mode.
	STOP/RES	1) Stop the AC drive when the drive is in the RUNNING status. 2) Perform a reset operation when the drive is in the FAULT status.

4.1.2 Status Indicators

Status Indicators	Indication
RUN	ON indicates the RUNNING status. OFF indicates the STOP status.
FWD/REV	ON indicates forward motor rotation. OFF indicates reverse motor rotation.
L/R	ON indicates under terminal control OFF indicates under operating panel control. FLASHING indicates under serial communication control
Hz	Hz for frequency
A	A for current
V	V for voltage
RPM	RPM for motor speed
%	Percentage

4.2 Quick setup



Chapter 5 List of Parameters

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

"☆":The parameter can be modified when the AC drive is in either stop or running state

"★":The parameter cannot be modified when the AC drive is in the running state

"○":The parameter is the actually measured value and cannot be modified

"●":The parameter is factory parameter and can be set only by the manufacturer

5.1 Fundamental group of parameters

Function Code	Parameter Name	Setting Range	Default	Property
Group F0:Basic Function Parameters				
F0-00	Running command source selection	0:Operation Keyboard control (LED "L/R" off) 1:Terminal control (LED "L/R" on) 2:Communication control (LED "L/R" blinking) 3:Control word	0	★
F0-01	Frequency source selection	0:Main frequency source X 1:Auxiliary frequency source Y 2:Main frequency source X+Auxiliary frequency source Y 3:Main frequency source X-Auxiliary frequency source Y 4:Max(X,Y) 5:Min(X,Y)	0	☆
F0-02	Main frequency source X selection	0:Digital Setting by F0-07 1:Keyboard potentiometer setting 2:AI1 3:AI2 4:AI3 5:Multi-segment setting 6:PLC setting 7:PID 8:Communication setting 9:Pulse setting by DI5 10:Terminal UP/ DOWN setting	1	☆
F0-03	Coefficient of Main frequency X	0~10.000	1.000	☆

F0-04	Auxiliary frequency source Y selection	0:Digital Setting by F0-07 1:Keyboard potentiometer setting 2:AI1 3:AI2 4:AI3 5:Multi-segment setting 6:PLC setting 7:PID control 8:Communication setting 9:Pulse setting by DI5 10:Terminal UP/ DOWN setting	0	☆
F0-05	Auxiliary frequency source Y range selection Y	0:Relative to maximum frequency 1:Relative to main frequency X	0	☆
F0-06	Coefficient of auxiliary frequency Y	0~10.000	1.000	☆
F0-07	Digital frequency	0.00~Frequency upper limit(F0-09)	50.00Hz	☆
F0-08	Forward Frequency source upper limit	0:Digital Setting by F0-10 1:Keyboard potentiometer setting 2:AI1 3:AI2 4:AI3 5: Communication setting 6: Pulse setting by DI5	0	☆
F0-09	Forward Frequency upper limit	Frequency lower limit F0-11~Frequency max limit A0-00	50.00Hz	☆
F0-10	Reverse Frequency upper limit	Frequency lower limit F0-11~Frequency max limit A0-00	50.00Hz	☆
F0-11	Frequency lower limit	0.00Hz~Frequency upper limit A0-00	0.00Hz	☆
F0-12	Rotation direction	Unit's digit :Motor direction selection 0:Same direction 1:Reverse direction Ten's digit:Running direction prohibited 0:Invalid 1:Reverse prohibited 2:Forward prohibited Hundred's digit: Frequency control direction command 0:Invalid 1:Valid Thousand's:Torque control direction command 0:Invalid 1:Valid	0x1100	★

F0-13	Command source binding select	Unit's digit:Binding operation Keyboard command to frequency source Ten's digit:Binding operation terminal command to frequency source Hundred's digit:Binding operation communication command to frequency source 0:No Binding 1:Digital setting 2:Keyboard potentiometer setting 3:AI1 4:AI2 5:AI3 6:Multi -peed setting 7:PLC setting 8:PID setting 9:Communication setting A:Pulse setting by DI5 B:Terminal UP/DW setting	0x0000	☆
F0-14	Reserved			
F0-15	Acceleration/Deceleration time base frequency	0:Maximum frequency (A0-00) 1:Fixed frequency 50.00Hz 2:Set frequency	0	☆
F0-16	Acceleration time 1	0.01~650.00s	Model dependent	☆
F0-17	Deceleration time 1	0.01~650.00s	Model dependent	☆
F0-18	Acceleration time 2	0.01~650.00s	Model dependent	☆
F0-19	Deceleration time 2	0.01~650.00s	Model dependent	☆
F0-20	Acceleration time 3	0.01~650.00s	Model dependent	☆
F0-21	Deceleration time 3	0.01~650.00s	Model dependent	☆
F0-22	Acceleration time 4	0.01~650.00s	Model dependent	☆
F0-23	Deceleration time 4	0.01~650.00s	Model dependent	☆
F0-24	Frequency switchover point between acceleration time 1 and acceleration time 2	0.00 Hz to maximum frequency(A0-00)	0.00Hz	☆
F0-25	Frequency switchover point between deceleration time 1 and deceleration time 2	0.00 Hz to maximum frequency(A0-00)	0.00Hz	☆
F0-26	Acceleration/Deceleration mode	0:Linear Acceleration/Deceleration mode 1:S-curve Acceleration/Deceleration mode	0	★

F0-27	Acceleration time proportion of S-curve start segment	0.01~650.00s	Model dependent	☆
F0-28	Acceleration time proportion of S-curve end segment	0.01~650.00s	Model dependent	☆
F0-29	Deceleration time proportion of S-curve start segment	0.01~650.00s	Model dependent	☆
F0-30	Deceleration time proportion of S-curve end segment	0.01~650.00s	Model dependent	☆
F0-31	Jump frequency during acceleration and deceleration	0:Disable 1:Enable	0	☆
F0-32	Jump frequency 1	0.00 Hz to maximum frequency (A0-00)	0.00Hz	☆
F0-33	Jump frequency 1 amplitude.	0.00 Hz to maximum frequency (A0-00)	0.00Hz	☆
F0-34	Jump frequency 2	0.00 Hz to maximum frequency (A0-00)	0.00Hz	☆
F0-35	Jump frequency 2 amplitude.	0.00 Hz to maximum frequency (A0-00)	0.00Hz	☆
F0-36	JOG preferred Mode	0：Linear Acceleration/Deceleration mode 1：S-curve Acceleration/Deceleration mode	1	★
F0-37	JOG running frequency	0.00 Hz to maximum frequency(A0-00)	5.00Hz	☆
F0-38	JOG acceleration time	0.01~650.00s	10.00s	☆
F0-39	JOG deceleration time	0.01~650.00s	10.00s	☆
F0-40	Speed setting method selection	0:Frequency 1:Rotation speed	0	★
F0-41	Rotation speed setting value	0~65000rpm	0rpm	☆
Group F1:Start/ Stop Control				
F1-00	Start mode	0:Direct start 1: Rotational speed tracking restart 2:Start after DC current injection	0	★
F1-01	Startup frequency	0.00~60.00Hz	0.50Hz	★
F1-02	Startup frequency holding time	0.0~50.0s	0.0s	★

F1-03	Startup DC braking current/ Pre-excited current	0.0~150.0%	60.0%	★
F1-04	Startup DC braking time/ Pre-excited time	0.0~60.0s	0.0s	★
F1-05	Stop mode	0:Decelerate to stop 1:Free stop	0	☆
F1-06	Stop frequency	0.00 Hz to maximum frequency(A0-00)	0.50Hz	☆
F1-07	Initial frequency of stop DC braking	0.00~50.00Hz	1.00Hz	★
F1-08	DC braking waiting time when stop	0.0~60.0s	0.0s	★
F1-09	DC braking current when stop	0.0~150.0%	60.0%	★
F1-10	DC braking time when stop	0.0~60.0s	0.0s	★
F1-11	Restart selection after power down	0:Invalid 1:Valid	0	★
F1-12	Restart waiting time after power down	0.00~60.00s	0.50s	★
F1-13	Rotational speed tracking mode	Unit's digit:Software frequency tracking selection 0:Search from maximum frequency 1:Search from stop frequency Ten's digit:Software frequency tracking selection 0:Bidirectional search 1:Unidirectional search	0x0010	★
F1-14	Reserved			
F1-15	RPM tracking speed	0.00~60.00s	0.50s	★
F1-16	RPM tracking stop delay	0.00~60.00s	1.00s	★
Group F2:Motor 1 Parameters				
F2-00	Motor 1 Control mode	1:Sensorless vector control (SVC)-AM 2:VF control-AM 3:Feedback vector control(FVC)-AM 4:Sensorless vector control (SVC)-PM 5:Reserved 6:Feedback vector control(FVC)-PM 7:Voltage/Frequency separate control(V/F)	2	★
F2-01	Motor 1 rated power	0.1~1000.0kW	Model dependent	★
F2-02	Motor 1 rated voltage	0~1500V	Model dependent	★

F2-03	Motor 1 rated current	0.1~2000.0A	Model dependent	★
F2-04	Motor 1 rated frequency	0.01~Max frequency(A0-00)	Model dependent	★
F2-05	Motor 1 rated rpm	1~65000rpm	Model dependent	★
F2-06	Motor 1 poles	2~98	Model dependent	★
F2-07	Asynchronous motor stator resistance	0.01~50.00%	Model dependent	★
F2-08	Asynchronous motor rotor resistance	0.01~50.00%	Model dependent	★
F2-09	Asynchronous motor mutual inductance	0.01~50.00%	Model dependent	★
F2-10	Asynchronous motor leakage inductance	0.1~2000.0%	Model dependent	★
F2-11	Asynchronous motor no-load current	0.1~650.0A	Model dependent	★
F2-12	Synchronous motor stator resistance	0.01~50.00%	Model dependent	★
F2-13	Synchronous motor D-axis inductance	0.01~200.00%	Model dependent	★
F2-14	Synchronous motor Q-axis inductance	0.01~200.00%	Model dependent	★
F2-15	Synchronous motor back electromotive force	1~1500V	Model dependent	★
F2-16	Installation angle of synchronous motor encoder	0.0°～360.0°	0.0°	★
F2-17	Reserved			
F2-18	Selection of initial magnetic pole identification for synchronous motors	Unit's digit :Closed loop vector 0:Disable 1:Enable 2:On at the first startup Ten's digit: Open loop vector 0:Disable 1:Enable 2:On at the first startup	0x0012	★
F2-19~ F2-25	Reserved			

F2-26	Encoder type selection	Unit's digit:Encoder type 0:ABZ 1:Resolver Ten's digit:Encoder direction 0:Same direction 1:Reverse direction Hundred's digit:Wire loss detection 0:Disable 1:Enable Thousand's digit:Reserved	0x0000	★
F2-27	Number of encoder pulses (before 4th harmonic)	1~10000	1024	★
F2-28	Resolver poles	2~128	2	★
F2-29	Encoder disconnection detection time	0.100~60.000s	2.000s	☆
F2-30	Encoder transmission ratio numerator	1-32767	1	☆
F2-31	Encoder transmission ratio denominator	1-32767	1	☆
F2-32	Encoder speed measurement filtering	0.0~100.0ms	1.0ms	☆
F2-33~ F2-36	Reserved			
F2-37	Motor tuning method	0:No operation 1:Static self-learning 2:Rotating self-learning 3:Static integrity self-learning	0	★
Group F3:Motor 1 Vector Control Parameters				
F3-00	Speed loop switchover frequency 1	0.00~[F3-04]	0.00Hz	☆
F3-01	Speed loop proportional gain at low frequency	0.01~100.00	10.00	☆
F3-02	Speed loop integral time at low frequency	0.000~6.000s	0.200s	☆
F3-03	Low frequency feedback filtering time	0.0~100.0ms	0.0ms	☆
F3-04	Speed loop switchover frequency 2	[F3-00]~Frequency upper limit	0.00Hz	☆
F3-05	Speed loop proportional gain at high frequency	0.01~100.00	10.00	☆
F3-06	Speed loop integral time at high frequency	0.000~6.000s	0.200s	☆
F3-07	High frequency feedback filtering time	0.0~100.0ms	0.0ms	☆
F3-08	D-axis current proportional gain	0.001~4.000	1.000	☆

F3-09	D-axis current integration time	0.001~4.000	1.000	☆
F3-10	Q-axis current proportional gain	0.001~4.000	1.000	☆
F3-11	Q-axis current integration time	0.001~4.000	1.000	☆
F3-12	Electric torque limit source	0:Digital Setting by F3-13 1:Keyboard potentiometer setting 2:AI1 3:AI2 4:AI3 5:Pulse setting by DI5 6:Communication setting	0	☆
F3-13	Electric torque limit	0.0~400.0%	250.00%	☆
F3-14	Power generating torque limit source	0:Digital Setting by F3-15 1:Keyboard potentiometer setting 2:AI1 3:AI2 4:AI3 5:Pulse setting by DI5 6:Communication setting	0	☆
F3-15	Power generating torque limit	0.0~400.0%	250.00%	☆
F3-16	Overexcitation braking gain	0.0~500.0%	100.00%	☆
F3-17	Overexcitation braking limit	0.0~250.0%	100.00%	☆
F3-18	Output power limitation	0.0~400.0%	250.00%	☆
F3-19	Motor field weakening current upper limit	0.0~250.0%	60.00%	☆
F3-20	Motor field weakening feedforward gain	0.0~200.0%	10.00%	☆
F3-21	Motor field weakening gain	0.0~500.0%	10.00%	☆
F3-22	Field weakening voltage coefficient	0.0~120.0%	97.00%	☆
F3-23	Vector electric driving slip compensation	0.0~250.0%	100.0%	☆
F3-24~ F3-26	Reserved			☆
F3-27	Synchronous machine pull-in current at low frequency	0.0~50.0%	10.00%	☆

F3-28	Synchronous machine pull-in current at high frequency	0.0~50.0%	10.00%	☆
F3-29	Synchronous machine pull-in current frequency	0.0~100.0%	10.00%	☆
F3-30	Vector control energy saving function	0:Disable 1:Enable	0	★
F3-31	Energy saving control gain	0.0~80.0%	50.00%	☆
F3-32	Energy saving control low pass filter	0.000~6.000s	0.010s	☆
F3-33	Reserved			
F3-34	MTPA gain	0.0~400.0%	100.00%	☆
F3-35	MTPA filter time	0.0~100.0ms	1.0ms	☆
Group F4:Motor 1 V/F Control Parameters				
F4-00	V/F curve setting	0:Linear V/F ; 1~9:1.1-power ~1.9-power V/F; 10:2nd power V/F; 11:Multi-point V/F(F4-17~F4-26);	0	★
F4-01	Torque boost	0.0~30.0%	Model dependent	☆
F4-02	Cut-off frequency of torque boost	0.0~100.0%	50.00%	☆
F4-03	VF slip compensation gain	0.0~200.0%	100.00%	☆
F4-04	VF slip compensation limit	0.0~300.0%	100.00%	☆
F4-05	VF slip compensation filter	0.000~6.000s	0.200s	☆
F4-06	Reserved			
F4-07	VF flux braking gain	1~128	64	★
F4-08	Reserved			
F4-09	VF oscillation suppression gain	0.0~900.0%	1	☆
F4-10	VF oscillation suppression filter time	0.0~100.0s	1.0s	☆
F4-11	VF output voltage percentage	25.0~120.0%	100.00%	★

F4-12	Output voltage source for voltage and frequency separation	0:Digital Setting by F4-13 1:Keyboard potentiometer setting 2:AI1 3:AI2 4:AI3 5:PID output setting 6:Communication setting 7:Pulse setting by DI5	0	☆
F4-13	Voltage digital setting for V/F separation	0.0% - 100.0%	0.00%	☆
F4-14	Voltage rise time of V/F separation	0.00-100.00sec	10.00s	☆
F4-15	Voltage decline time of V/F separation	0.00-100.00sec	10.00s	☆
F4-16	Stop mode selection upon V/F separation	0:Frequency and voltage rising and declining independently 1:Frequency declining after voltage declines to 0	0	☆
F4-17	VF voltage point V1	0.0~100.0%	3.00%	★
F4-18	VF frequency point F1	0.00~maximum frequency	1.00Hz	★
F4-19	VF voltage point V2	0.0~100.0%	28.00%	★
F4-20	VF frequency point F2	0.00~maximum frequency	10.00Hz	★
F4-21	VF voltage point V3	0.0~100.0%	55.00%	★
F4-22	VF frequency point F3	0.00~maximum frequency	25.00Hz	★
F4-23	VF voltage point V4	0.0~100.0%	78.00%	★
F4-24	VF frequency point F4	0.00~maximum frequency	37.50Hz	★
F4-25	VF voltage point V5	0.0~100.0%	100.00%	★
F4-26	VF frequency point F5	0.00~maximum frequency	50.00Hz	★
F4-27	VF automatic energy saving control	0:Off 1:On	0	★
F4-28	Frequency lower limit of energy saving and voltage reduction	0.0~50.00Hz	15.00Hz	★
F4-29	Voltage lower limit of energy saving and voltage reduction	20.0~100.0%	50.00%	★
F4-30	Voltage reducing rate of energy saving and voltage reduction rate	0.000~0.200V/ms	0.010V/ms	☆

F4-31	Voltage recovering rate of energy saving and voltage reduction rate	0.000~2.000V/ms	0.200V/ms	☆
Group F5:Input Terminals				
F5-00	DI1 terminal function selection	See 5.2 DI terminal function selection	1	★
F5-01	DI2 terminal function selection		2	★
F5-02	DI3 terminal function selection		3	★
F5-03	DI4 terminal function selection		4	★
F5-04	DI5 terminal function selection		5	★
F5-05	DI6 terminal function selection (Expansion card)		0	★
F5-06	DI7 terminal function selection (Expansion card)		0	★
F5-07	DI8 terminal function selection (Expansion card)		0	★
F5-08	DI9 terminal function selection (Expansion card)		0	★
F5-09	Reserved			
F5-10	DI terminal filter time	0.000s~1.000s	0.010s	☆
F5-11	Terminal control operation mode	0:Two-wire control mode 1 1:Two-wire control mode 2 2:Three-wire control mode 1 3:Three-wire control mode 2	0	★
F5-12	DI1~DI4 terminal effective mode selection	0:Close Enable 1:Disconnect Enable Unit's:DI1 Ten's:DI2 Hundred's:DI3 Kilobit:DI4	0000	☆
F5-13	DI5~DI8 terminal effective mode selection	0:Close Enable 1:Disconnect Enable Unit's:DI5 Ten's:DI6 Hundred's:DI7 Kilobit:DI8	0000	☆
F5-14	DI9~DI10 terminal effective mode selection	0:Close Enable 1:Disconnect Enable Unit's:DI9 Ten's:Reserved	0000	☆
F5-15	DI1 On delay time	0.000~6.000s	0.010S	☆
F5-16	DI1 Off delay time	0.000~6.000s	0.010S	☆
F5-17	DI2 On delay time	0.000~6.000s	0.010S	☆

F5-18	DI2 Off delay time	0.000~6.000s	0.010S	☆
F5-19	DI3 On delay time	0.000~6.000s	0.010S	☆
F5-20	DI3 Off delay time	0.000~6.000s	0.010S	☆
F5-21	DI4 On delay time	0.000~6.000s	0.010S	☆
F5-22	DI4 Off delay time	0.000~6.000s	0.010S	☆
F5-23	DI5 On delay time	0.000~6.000s	0.010S	☆
F5-24	DI5 Off delay time	0.000~6.000s	0.010S	☆
F5-25	DI6 On delay time	0.000~6.000s	0.010S	☆
F5-26	DI6 Off delay time	0.000~6.000s	0.010S	☆
F5-27	DI7 On delay time	0.000~6.000s	0.010S	☆
F5-28	DI7 Off delay time	0.000~6.000s	0.010S	☆
F5-29	DI8 On delay time	0.000~6.000s	0.010S	☆
F5-30	DI8 Off delay time	0.000~6.000s	0.010S	☆
F5-31	DI9 On delay time	0.000~6.000s	0.010S	☆
F5-32	DI9 Off delay time	0.000~6.000s	0.010S	☆
F5-33~ F5-34	Reserved			
F5-35	AI1 voltage lower limit value	0.00~10.00V	0.00V	☆
F5-36	AI1 voltage lower limit corresponding setting	-100.0~100.0%	0.0%	☆
F5-37	AI1 voltage upper limit value	0.00~10.00V	10.00V	☆
F5-38	AI1 voltage upper limit corresponding setting	-100.0~100.0%	100%	☆
F5-39	AI1 voltage filter time	0.000~6.000s	0.010S	☆
F5-40	AI2 voltage lower limit value	0.00~10.00V	0.00V	☆
F5-41	AI2 voltage lower limit corresponding setting	-100.0~100.0%	0.0%	☆
F5-42	AI2 voltage upper limit value	0.00~10.00V	10.00V	☆
F5-43	AI2 voltage upper limit corresponding setting	-100.0~100.0%	100.0%	☆
F5-44	AI2 voltage filter time	0.000~6.000s	0.010S	☆

F5-45	AI3 voltage lower limit value (Expansion card)	0.00~10.00V	0.00V	☆
F5-46	AI3 voltage lower limit corresponding setting (Expansion card)	-100.0~100.0%	0.0%	☆
F5-47	AI3 voltage upper limit value (Expansion card)	0.00~10.00V	10.00V	☆
F5-48	AI3 voltage upper limit corresponding setting (Expansion card)	-100.0~100.0%	100.0%	☆
F5-49	AI3 voltage filter time (Expansion card)	0.000~6.000s	0.010S	☆
F5-50	AI signal input type selection	0:Voltage(0~10V) 1:Current(0~20mA) 2:Current(4~20mA) Unit's digit:AI1 Ten's digit:AI2 Hundred's digit:AI3 (Expansion card) Thousand's digit:Reserved	0000	☆
F5-51	AI disconnection protection function selection	0:Off 1:Turn on the Alarm 2:Turn on the Fault Unit's digit:AI1 Ten's digit:AI2 Hundred's digit:AI3 Thousand's digit:Reserved Valid only when AI input type is set to 4~20mA.	0000	☆
F5-52	AI1 function selection as DI terminal	See 5.2 DI terminal function selection	0	★
F5-53	AI1 high level setting	0.00~100.00%	70.00%	☆
F5-54	AI1 low level setting	0.00~100.00%	30.00%	☆
F5-55	AI2 function selection as DI terminal	See 5.2 DI terminal function selection	0	★
F5-56	AI2 high level setting	0.00~100.00%	70.00%	☆
F5-57	AI2 low level setting	0.00~100.00%	30.00%	☆
F5-58	AI3 function selection as DI terminal (Expansion card)	See 5.2 DI terminal function selection	0	★
F5-59	AI3 high level setting (Expansion card)	0.00~100.00%	70.00%	☆
F5-60	AI3 low level setting (Expansion card)	0.00~100.00%	30.00%	☆

F5-61	AI effective mode selection as DI terminal	0:Low level effective 1:High level effective Unit's digit:AI1 Ten's digit:AI2 Hundred's digit:AI3 Thousand's digit:Reserved	0000	★
F5-62	AI curve selection	0:Line 1:Curve 1 2:Curve 2 Unit's digit:AI1 Ten's digit:AI2 Hundred's digit:AI3 Thousand's digit:Reserved	0000	★
F5-63	Curve 1 lower limit	0.00~10.00V	0.00V	☆
F5-64	Curve 1 lower limit corresponding setting	0.00~100.00%	0.00V	☆
F5-65	Curve 1 inflection point 1 input voltage	0.00~10.00V	3.00V	☆
F5-66	Curve 1 inflection point 1 corresponding setting	0.00~100.00%	30.00%	☆
F5-67	Curve 1 inflection point 2 input voltage	0.00~10.00V	6.00V	☆
F5-68	Curve 1 inflection point 2 corresponding setting	0.00~100.00%	60.00%	☆
F5-69	Curve 1 upper limit	0.00~10.00V	10.00V	☆
F5-70	Curve 1 upper limit corresponding setting	0.00~100.00%	100.00%	☆
F5-71	Curve 2 lower limit	0.00~10.00V	0.00V	☆
F5-72	Curve 2 lower limit corresponding setting	0.00~100.00%	0.00V	☆
F5-73	Curve 2 inflection point 1 input voltage	0.00~10.00V	3.00V	☆
F5-74	Curve 2 inflection point 1 corresponding setting	0.00~100.00%	30.00%	☆
F5-75	Curve 2 inflection point 2 input voltage	0.00~10.00V	6.00V	☆
F5-76	Curve 2 inflection point 2 corresponding setting	0.00~100.00%	60.00%	☆
F5-77	Curve 2 upper limit	0.00~10.00V	10.00V	☆
F5-78	Curve 2 upper limit corresponding setting	0.00~100.00%	100.00%	☆
F5-79	HDI input minimum frequency	0.00~50.00kHz	0.00Hz	☆

F5-80	HDI input minimum frequency corresponding setting	0.00~100.00%	0.00%	☆
F5-81	HDI input maximum frequency	0.00~50.00kHz	50.00KHz	☆
F5-82	HDI input maximum frequency corresponding setting	0.00~100.00%	100.00%	☆
F5-83	HDI filter time	0.000~9.000s	0.100s	☆
F5-84	HDI cutoff frequency	0.000~1.000kHz	0.010KHz	☆
F5-85	UP/DOWN terminal control selection	0:Frequency will be stored after power-off 1:Frequency will not be stored after power-off 2:Adjustable during operation, cleared when shutdown	0	★
F5-86	UP/DOWN terminal adjusting speed	0.01~50.00Hz/s	0.50Hz/s	☆
Group F6:Output Terminals				
F6-00	Relay 1 function selection	See 5.3 DO terminal function selection	1	☆
F6-01	Relay 2 function selection (Expansion card)		1	☆
F6-02	Relay 3 function selection (Expansion card)		1	☆
F6-03	DO1 function selection		1	☆
F6-04	DO2 function selection (Expansion card)		1	☆
F6-05	Output terminal effective logic selection 1	0:High level 1:Low level Unit's digit:T1 Ten's digit:T2 Hundred's digit:T3 Thousand's digit:DO1	0000	☆
F6-06	Output terminal effective logic selection 2	0:High level 1:Low level Unit's digit:DO2 Ten's digit:Reserved Hundred's digit:Reserved Thousand's digit:Reserved	0000	☆
F6-07	Relay T1 on delay	0.000~6.000s	0.010S	☆
F6-08	Relay T1 off delay	0.000~6.000s	0.010S	☆
F6-09	Relay T2 on delay	0.000~6.000s	0.010S	☆
F6-10	Relay T2 off delay	0.000~6.000s	0.010S	☆
F6-11	Relay T3 on delay	0.000~6.000s	0.010S	☆

F6-12	Relay T3 off delay	0.000~6.000s	0.010S	☆
F6-13	Relay DO1 on delay	0.000~6.000s	0.010S	☆
F6-14	Relay DO1 off delay	0.000~6.000s	0.010S	☆
F6-15	Relay DO2 on delay	0.000~6.000s	0.010S	☆
F6-16	Relay DO2 off delay	0.000~6.000s	0.010S	☆
F6-17	AO1 output function selection	See 5.4 AO & HDO terminal function selection	0	☆
F6-18	AO2 output function Selection (Expansion card)		1	☆
F6-19	HDO1 output function selection		0	☆
F6-20	Output signal selection	Unit's digit: AO1 0:0~10V 1:4~20mA 2:0~20mA Ten's digit:AO2 0:0~10V 1:4~20mA 2:0~20mA Hundred's digit:DO1 0:Switching signals 1:Pulse signal Thousand's:Reserved	0000	☆
F6-21	AO1 output gain	25.0~200.0%	100.0%	☆
F6-22	AO1 output signal bias	-10.0~10.0%	0.0%	☆
F6-23	AO1 output filter	0.010～6.000s	0.010s	☆
F6-24	AO2 output gain	25.0~200.0%	100.0%	☆
F6-25	AO2 output signal bias	-10.0~10.0%	0.0%	☆
F6-26	AO2 output filter	0.010～6.000s	0.010s	☆
F6-27	HDO1 output frequency lower limit	0.00~100.00kHz	0.20KHz	☆
F6-28	HDO1 output frequency upper limit	0.00~100.00kHz	50.00KHz	☆
Group F7:Keypad Display				
F7-00	Keyboard key lock selection	0:Not locked 1:Reserved 2:Partial function key lock (except RUN/STOP/JOG/MENU) 3:All function keys locked (except MENU)	0	☆
F7-01	STOP/RES function	0:Non-keyboard control, invalid 1:Non-keyboard control, stop according to stop mode 2:Non-keyboard control, stop in free mode	1	★

F7-02	JOG/REV button function selection	0:No function 1:Reverse running 2:JOG	0	★
F7-03	UP/DOWN button function selection	Unit's digit:UP/DOWN key modifying function selection 0:Invalid 1:Modify frequency setting in F0-07 2:Modify PID setting in FA-01 Ten's digit:Storage selection after modification by UP/DOWN key 0:No storage when power off 1:Stored after power-off Hundred's:UP/DOWN key resolution selection 0:0.01Hz 1:0.10Hz 2:0.50Hz 3:1.00Hz 4:2.00Hz 5:5.00Hz 6:8.00Hz 7:10.00Hz Thousand's digit:Reserved	0x0011	★
F7-04	LED first line display parameter 1 when running	Unit's,ten's digit:the first group shows 00~63 Hundred's,thousand's digit:the second group shows 00~63	0x0400	☆
F7-05	LED first line display parameter 2 when running		0x0302	☆
F7-06	LED first line display parameter 1 when stop		0x0001	☆
F7-07	LED first line display parameter 2 when stop		0x1002	☆
F7-08	LED second line display parameter 1 when running		0x0304	☆
F7-09	LED second line display parameter 2 when running		0x0509	☆
F7-10	LED second line display parameter 1 when stop		0x0402	☆
F7-11	LED second line display parameter 2 when stop		0x0611	☆
F7-12	Keyboard potentiometer lower limit value	0.00~5.00V	0.65V	☆
F7-13	Keyboard potentiometer lower limit value corresponding setting	0.00~100.00%	0.00%	☆
F7-14	Keyboard potentiometer lower upper value	0.00~5.00V	4.50V	☆
F7-15	Keyboard potentiometer lower upper value corresponding setting	0.00~100.00%	100.00%	☆

F7-16	Keyboard Potentiometer Selection	Unit's digit:Reserved Ten's digit:Keyboard Potentiometer Selection 0:Built-in Keyboard potentiometer 1:External Keyboard Potentiometer Hundred's digit:Reserved Thousand's digit:Reserved	Model dependent	★
F7-17	Reserved			
F7-18	Keyboard display selection	Unit's digit:Output frequency display selection 0:Target frequencies 1:Operating frequency Ten's digit:Reserved Hundred's digit:Power display scale 0:% 1:kw Thousand's digit:Reserved	0	☆
F7-19~ F7-21	Reserved			
F7-22	Keyboard Version Display	*****	Model dependent	○
Group F8:Auxiliary Functions				
F8-00	User Password	0~65535	0	★
F8-01~ F8-02	Reserved			
F8-03	Timer time unit	0:Sec 1:Min 2:Hour	0	☆
F8-04	Timer Setting Value	0~65000	0	☆
F8-05	Module Temperature Reaches	0.0℃~100.0℃	75.0℃	☆
F8-06	Light load detection current value	0.0%~300.0%	10.00%	☆
F8-07	Light load detection delay time	0.00s～600.00s	1.00s	☆
F8-08	Reserved			
F8-09	Count Maximum Value	0~65000	1000	☆
F8-10	Count Set Value	0~65000	500	☆
F8-11	Current reaches detection value 1	0.0%~300.0%	100.0%	☆
F8-12	Current detection value 1 arrival amplitude	0.0%~F8-11	0.0%	☆
F8-13	Current reaches detection value 2	20.0%~300.0%	100.0%	☆
F8-14	Current detection value 2 arrival amplitude	0.0%~F8-13	0.0%	☆

F8-15	Fan running control	0:The fan runs after the AC drive is powered on. 1:The fan is stopped related to temperature, it runs when AC drive starts. 2:The fan is stopped when the AC drive is stopped,it is running related to the temperature	1	☆
F8-16	Frequency reaches detection value1	0.00Hz~A0-00	50.00Hz	☆
F8-17	Frequency reach detection 1 amplitude	0.0%~100.0%	0.0%	☆
F8-18	Frequency reaches detection value 2	0.00Hz~maximum frequency（A0-00）	50.00Hz	☆
F8-19	Frequency reach detection 2 amplitude	0.0%~100.0%	0.0%	☆
F8-20	Output frequency detection value 1 (FDT1)	0.00~maximum frequency	30.00Hz	☆
F8-21	FDT1 hysteresis	0.00~maximum frequency	1.00Hz	☆
F8-22	Output frequency detection value 2 (FDT2)	0.00~maximum frequency	50.00Hz	☆
F8-23	FDT2 hysteresis	0.00~maximum frequency	1.00Hz	☆
F8-24	Setting frequency to reach detection amplitude	0.00~maximum frequency	2.00Hz	☆
F8-25	Lower limit frequency operation mode selection	0:Stop output 1:Operate at lower limit frequency	0	★
F8-26	Reserved			
F8-27	Forward and reverse running dead time	0.0~120.0s	0.0s	★
F8-28	Terminal function start protection	0: Disable 1:Enable Unit's digit:Terminal start protection when exiting abnormally Ten's digit:JOG terminal start protection when exiting abnormality Hundred's digit:Start protection when the command channel is switched to the terminal Thousand's digit:Reserved	0x0111	★
F8-29	Emergency stop deceleration time	0.01~650.00s	Model dependent	☆
F8-30	Swing frequency function selection	0:Disable 1:Enable	0	☆
F8-31	Swing frequency setting mode	0:Relative to the center frequency 1:Relative to the maximum frequency	0	☆

F8-32	Reserved			☆
F8-33	Swing frequency amplitude	0.0~100.0%	10.0%	☆
F8-34	Frequency jump amplitude	0.0~50.0%	10.0%	☆
F8-35	Swing frequency acceleration time	0.00~650.00s	5.00s	☆
F8-36	Swing frequency deceleration time	0.00~650.00s	5.00s	☆
F8-37	Zero speed torque frequency threshold	0.00~10.00Hz	0.50HZ	☆
F8-38	Zero speed torque holding coefficient	0.0~150.0%	60.0%	☆
F8-39	Zero speed torque holding time	0.0~6000.0s（when set 6000.0s, it is running all the time）	0	☆
F8-40	Speed display coefficient	0.0~500.0%	100.0%	☆
F8-41	Power display coefficient	0.0~500.0%	100.0%	☆
Group F9:Protection Parameter				
F9-00	Undervoltage setting	AB、A2:160.0V~240.0V A4:300.0V~400.0V A7:480.0V~720.0V	Model dependent	★
F9-01	Braking setting	AB、A2:350.0V~390.0V A4:650.0V~880.0V A7:1060.0V~1180.0V	Model dependent	☆
F9-02	Energy consumption braking function selection	0: Disable 1: Enable	1	☆
F9-03	Reserved			
F9-04	Bus overvoltage suppression function selection	Unit's digit:Overvoltage suppression control 0:Disabled 1:Enabled in deceleration 2:Enabled during acceleration or deceleration Ten's digit:Overexcitation control（All control modes valid） 0:Disable 1:Enable Hundred's, thousand's digit:Reserved	0x0012	★
F9-05	Bus overvoltage suppression value	AB、A2:340.0V~380.0V A4:650.0V~860.0V A7:1020.0V~1140.0V	Model dependent	★
F9-06	Bus overvoltage suppression gain	0.0 ~ 500.0%	100.0%	☆
F9-07	Reserved			

F9-08	Bus undervoltage suppression function selection	0:Disabled 1:Enabled	0	★
F9-09	Bus undervoltage suppression value	AB、A2:180.0V~260.0V A4:350.0V~450.0V A7:540.0V~780.0V	Model dependent	★
F9-10	Bus undervoltage suppression gain	0.0 ~ 500.0%	100.0%	☆
F9-11~ F9-12	Reserved			
F9-13	Overcurrent suppression function selection	0:Suppression is always effective 1:Effective when in acceleration and deceleration, invalid in constant speed	0	☆
F9-14	Overcurrent suppression value	0.0 ~ 300.0%	160.0%	☆
F9-15	Overcurrent suppression gain	0.0 ~ 500.0%	100.0%	☆
F9-16	Hardware overcurrent protection selection	Unit's digit: Wave-by-wave current limiting (CBC) 0:Disable 1:Enable Ten's digit:Reserved Hundred's digit:SC protection interference suppression 0:Disable 1:Level 1 interference suppression 2:Level 2 interference suppression(Pulse width time greater than 1 level) Thousand's digit:Reserved	0x0001	★
F9-17	Reserved			
F9-18	Short circuit to ground detection selection after power-on	0:Disable 1:Enable Unit's digit:Short circuit to ground fault Ten's digit:Reserved	0x0001	★
F9-19	Phase loss protection selection	Unit's digit:Output phase loss protection 0:Disable 1:Enable Ten's digit:Input phase loss protection 0:Disable 1:Turn on the Alarm 2:Turn on the Fault Hundred's, thousand's:Reserved	0x0011	☆
F9-20	Reserved			
F9-21	Motor overload protection coefficient	0.0~250.0%	100.0%	★

F9-22	Load warning checkout settings	Unit's digit:Detection selection (protection 1) 0:No detection 1:The excessive load is detected 2:Only detect excessive load at constant speed 3:The insufficient load is detected 4:Only detects insufficient load at constant speed Ten's digit:alarm selection 0:Warning, continue running 1:Fault protection and free stop Hundred's digit: Detection selection (protection 2) 0:No detection 1:The excessive load is detected 2:Only detect excessive load at constant speed 3:The insufficient load is detected 4:Only detects insufficient load at constant speed Thousand's digit:Alarm selection 0:Warning, continue running 1:Fault protection and free stop	0x0000	★
F9-23	Load warning detection level 1	0.0~200.0%	130.0%	★
F9-24	Load warning detection time 1	0.0~60.0s	5.0S	★
F9-25	Load warning detection level 2	0.0~200.0%	30.0%	★
F9-26	Load warning detection time 2	0.0~60.0s	5.0S	★
F9-27	Excessive speed deviation protection action	Unit's digit:Detection selection 0:Do not detect 1:Only detected at constant speed 2:Always detect Ten's digit:Alarm selection 0:Free stop and report fault 1:Report Alarm and continue running Hundred's, thousand's digit:Reserved	0x0000	★
F9-28	Excessive speed deviation detection threshold	0.0~60.0%	10.0%	★
F9-29	Excessive speed deviation detection time	0.0~60.0s	2.0S	★
F9-30	Overspeed protection action	Unit's digit:Detection selection 0:Do not detect 1:Only detected at constant speed 2:Always detect Ten's digit:Alarm selection 0:Free stop and report fault 1:Report Alarm and continue running Hundred's, thousand's digit:Reserved	0x0000	★

F9-31	Overspeed detection threshold	0.0~150.0%	110.0%	★
F9-32	Over speed detection time	0.000~2.000s	0.010S	★
F9-33	Motor temperature sensor type selection	Unit's digit:Motor Temperature sensor type 0:Disable 1:PT100 2:PT1000 3:KTY84 Ten's digit:Motor overheating protection options 0:Disable 1:Turn on the overheat alarm only 2:Turn on the overheat fault only 3:Enable overheat alarm and overheat fault	0x0000	★
F9-34	Motor overheat protection temperature value	0℃~180℃	120.0℃	☆
F9-35	Motor overheating warning temperature value	0℃~F9-34	110.0℃	☆
F9-36~ F9-40	Reserved			
F9-41	Fault self-recovery times setting	0~5	0	★
F9-42	Failure self-recovery interval setting	0.1~100.0s	1.0s	★
F9-43	Fault relay action selection during automatic fault reset	0:No action 1:Action	0	★
Group FA:PID Function				
FA-00	PID reference setting channel	0:Digital setting by FA-01 1:Keyboard potentiometer setting 2:AI1 3:AI2 4:AI3 5:Pulse setting by DI5 6:Communication setting 7:Terminal selection	0	☆
FA-01	PID value digital setting	0.00~100.0%	50.0%	☆
FA-02	PID setting acceleration and deceleration time	0.00~60.00s	1.00S	☆
FA-03	PID setting initial value	0.0%~100.0%	0.0%	☆
FA-04	PID setting initial value holding time	0.0s～650.0s	0.0S	☆

FA-05	PID feedback source	0:Digital setting by FA-06 1:Keyboard potentiometer setting 2:AI1 3:AI2 4:AI3 5:Pulse setting by DI5 6:Communication setting 7:Terminal selection	2	☆
FA-06	PID feedback digital setting	0.0%~100.0%	0.0%	☆
FA-07	PID feedback filter time	0.000~6.000s	0.010S	☆
FA-08	PID feedback filter time	0.00~10.00	1.00	☆
FA-09	PID feedback limiting	0~100.0	100.0	☆
FA-10	PID control selection	Unit's digit: feedback characteristics selection 0:Positive 1:Negative Ten's digit:Closed-loop bypass holding output 0:Output cleared during closed loop bypass 1:Output maintained during closed loop bypass Hundred's place:Alignment selection 0:Non-center aligned 1:Center aligned Thousand's:Differential adjustment characteristics 0:Differentiate the deviation 1:Differentiate the feedback	0x0100	☆
FA-11	Proportional gain P1	0.000~8.000	0.100	☆
FA-12	Integration time I1	0.0~600.0s	1.0S	☆
FA-13	Differential gain D1	0.000~6.000s	0.000S	☆
FA-14	Proportional gain P2	0.000~8.000	0.100	☆
FA-15	Integration time I2	0.0~600.0s	1.0S	☆
FA-16	Differential gain D2	0.000~6.000s	0.000S	☆
FA-17	PID parameter switching condition	0:No switching 1:Switched by DI terminal 2:Switch by the deviation	0	☆
FA-18	PID parameter switching low value	0.0~100.0%	20.0%	☆
FA-19	PID parameter switching high value	0.0~100.0%	80.0%	☆
FA-20	PID deviation limit	0.0%~100.0%	0.0%	☆

FA-21	PID Integral Properties	Unit's digit:Integral Separation 0:Invalid 1:Valid Ten's digit:Output to the limit value, whether to stop integration 0:Continue to integrate 1:Stop integrating	0x00	☆
FA-22	PID differential limit	0.0~100.0%	5.0%	☆
FA-23	PID output upper limit	0.0~100.0%	100.0%	☆
FA-24	PID output lower limit	-100%~[FA-23]	0.0%	☆
FA-25	PID output filter time	0.000~6.000s	0.000S	☆
FA-26	PID disconnection action selection	0:Continue running without reporting a fault 1:Stop and report a fault 2:Continue running and output alarm 3:Run at the current frequency and alarm	0	☆
FA-27	PID disconnection detection time	0.0~120.0s	1.0S	☆
FA-28	PID disconnection alarm upper limit value	0.0~100.0%	100.0%	☆
FA-29	PID disconnection alarm lower limit value	0.0~100.0%	0.0%	☆
FA-30	Sleep function selection	0:Disable 1:Enable	0	☆
FA-31	Sleep frequency	0.00~50.00Hz	30.00Hz	☆
FA-32	Sleep delay	0.0~3600.0S	3.0S	☆
FA-33	Wake-up bias	0.0~50.0%	5.0S	☆
FA-34	Wake-up delay	0.0~60.0S	0.0S	☆
Group FB:Brake Logic Parameter				
FB-00	Braking control selection	0:Disable 1:Enable	0	★
FB-01	Reverse start positive torque enable	0:Disable 1:Enable	0	★
FB-02	Holding brake release over zero jump frequency	0.00Hz to 20.00 Hz（valid only if FB-01 = 1）	1.50Hz	★
FB-03	Holding brake release current detection value	0.0% ~200.0%	20.0%	★
FB-04	Brake closing frequency	0.00Hz~20.00 Hz	1.50Hz	★
FB-05	Brake closing delay time	0.0s~20.0s	0.0S	★
FB-06	Brake closing frequency maintenance time	0.0s~20.0s	0.0S	★

FB-07	Holding brake closed frequency value	0.00Hz~ 20.00 Hz	1.50Hz	★
FB-08	Delay time before holding brake closed	0.0s ~20.0s	0.0S	★
FB-09	Delay time after holding brake closed	0.0s ~20.0s	0.3S	★
FB-10	Brake pickup current limit value	0.0%~200.0%	120.0%	★
Group FC:Multi-Reference and Simple PLC Function				
FC-00	Multi-segment frequency 1	0.00~maximum frequency	0.00Hz	☆
FC-01	Multi-segment frequency 2	0.00~maximum frequency	0.00Hz	☆
FC-02	Multi-segment frequency 3	0.00~maximum frequency	0.00Hz	☆
FC-03	Multi-segment frequency 4	0.00~maximum frequency	0.00Hz	☆
FC-04	Multi-segment frequency 5	0.00~maximum frequency	0.00Hz	☆
FC-05	Multi-segment frequency 6	0.00~maximum frequency	0.00Hz	☆
FC-06	Multi-segment frequency 7	0.00~maximum frequency	0.00Hz	☆
FC-07	Multi-segment frequency 8	0.00~maximum frequency	0.00Hz	☆
FC-08	Multi-segment frequency 9	0.00~maximum frequency	0.00Hz	☆
FC-09	Multi-segment frequency 10	0.00~maximum frequency	0.00Hz	☆
FC-10	Multi-segment frequency 11	0.00~maximum frequency	0.00Hz	☆
FC-11	Multi-segment frequency 12	0.00~maximum frequency	0.00Hz	☆
FC-12	Multi-segment frequency 13	0.00~maximum frequency	0.00Hz	☆
FC-13	Multi-segment frequency 14	0.00~maximum frequency	0.00Hz	☆
FC-14	Multi-segment frequency 15	0.00~maximum frequency	0.00Hz	☆

FC-15	Multi-segment operation mode selection	Unit's digit: circular mode 0:Single cycle 1:Continuous cycle 2:Keep the final value after a single cycle Ten's digit:timing unit 0:Seconds 1:Minutes 2:Hours Hundred's digit:power-off storage method 0:Do not store 1:Store Thousand's digit:startup mode 0:Rerun from the first stage 1:Restart from the stage of downtime 2:Continue operation with the remaining time of the shutdown stage	0x0000	☆
FC-16	Running time of PLC reference 1	0.0~6500.0(s/m/h)	0.0(s/m/h)	☆
FC-17	Running time of PLC reference 2	0.0~6500.0(s/m/h)	0.0(s/m/h)	☆
FC-18	Running time of PLC reference 3	0.0~6500.0(s/m/h)	0.0(s/m/h)	☆
FC-19	Running time of PLC reference 4	0.0~6500.0(s/m/h)	0.0(s/m/h)	☆
FC-20	Running time of PLC reference 5	0.0~6500.0(s/m/h)	0.0(s/m/h)	☆
FC-21	Running time of PLC reference 6	0.0~6500.0(s/m/h)	0.0(s/m/h)	☆
FC-22	Running time of PLC reference 7	0.0~6500.0(s/m/h)	0.0(s/m/h)	☆
FC-23	Running time of PLC reference 8	0.0~6500.0(s/m/h)	0.0(s/m/h)	☆
FC-24	Running time of PLC reference 9	0.0~6500.0(s/m/h)	0.0(s/m/h)	☆
FC-25	Running time of PLC reference 10	0.0~6500.0(s/m/h)	0.0(s/m/h)	☆
FC-26	Running time of PLC reference 11	0.0~6500.0(s/m/h)	0.0(s/m/h)	☆
FC-27	Running time of PLC reference 12	0.0~6500.0(s/m/h)	0.0(s/m/h)	☆
FC-28	Running time of PLC reference 13	0.0~6500.0(s/m/h)	0.0(s/m/h)	☆
FC-29	Running time of PLC reference 14	0.0~6500.0(s/m/h)	0.0(s/m/h)	☆
FC-30	Running time of PLC reference 15	0.0~6500.0(s/m/h)	0.0(s/m/h)	☆

FC-31	Acceleration/deceleration time of PLC reference 1	Unit's digit: running direction of this stage 0:Forward 1:Reverse Ten's digit: acceleration and deceleration time of this stage 0:Acceleration and deceleration time 0 1:Acceleration and deceleration time 1 2:Acceleration and deceleration time 2 3:Acceleration and deceleration time 3 Hundred's,thousand's: Reserved	0x0000	☆
FC-32	Acceleration/deceleration time of PLC reference 2		0x0000	☆
FC-33	Acceleration/deceleration time of PLC reference 3		0x0000	☆
FC-34	Acceleration/deceleration time of PLC reference 4		0x0000	☆
FC-35	Acceleration/deceleration time of PLC reference 5		0x0000	☆
FC-36	Acceleration/deceleration time of PLC reference 6		0x0000	☆
FC-37	Acceleration/deceleration time of PLC reference 7		0x0000	☆
FC-38	Acceleration/deceleration time of PLC reference 8		0x0000	☆
FC-39	Acceleration/deceleration time of PLC reference 9		0x0000	☆
FC-40	Acceleration/deceleration time of PLC reference 10		0x0000	☆
FC-41	Acceleration/deceleration time of PLC reference 11		0x0000	☆
FC-42	Acceleration/deceleration time of PLC reference 12		0x0000	☆
FC-43	Acceleration/deceleration time of PLC reference 13		0x0000	☆
FC-44	Acceleration/deceleration time of PLC reference 14		0x0000	☆
FC-45	Acceleration/deceleration time of PLC reference 15		0x0000	☆
Group FD:Communication Parameters				
FD-00	Baud rate	Unit's digit:Modbus baud rate 0:1200bps 1:2400bps 2:4800bps 3:9600bps 4:19200bps 5:38400bps Ten's digit: CAN baud rate 0:125kbps 1:250kbps 2:500kbps 3:800kbps 4:1Mbps	0x0023	★
FD-01	Modbus data format	0:(N,8,1) 1:(E,8,1) 2:(O,8,1) 3:(N,8,2) 4:(E,8,2) 5:(O,8,2)	0	★
FD-02	Local address	1~247	1	★
FD-03	Response delay	0~500ms	0ms	☆

FD-04	Modbus communication function selection	Unit's digit: 0:Slave 1:Master Ten's digit: 0: Responded 1:No response Hundred's digit: Reserved	0000	☆
FD-05	Host sends selection	Unit's digit:Selection of data to be sent of the first group 0:Invalid 1:Run command 2:Given frequency 3:Output frequency 4:Upper limit frequency 5:Given torque 6:Output torque 7:Reserved 8:Reserved 9:PID given value A:PID feedback value Ten's digit:Selection of transmission frames to be sent of the second group Same as above Hundred's digit:Selection of transmission frames to be sent of the third group Same as above Thousand's digit:Selection of transmission frames to be sent of the fouth group Same as above	0031	☆
FD-06	Communication protocol selection	0:Modbus RTU 1:Profibus-DP 2:CANopen 3:Profinet 4:Modbus TCP 5:EtherCat	0	★
FD-07	Communication ratio setting	0.00~5.00	1.00	☆
FD-08	Communication response timeout	0~500ms	1.0ms	☆
FD-09	Communication failure action selection	0:Do not detect 1:Free stop and report fault 2:Report alarm and continue running 3:Forced shutdown	0	☆
FD-10	Receive PZD3	0~65535	0	☆
FD-11	Receive PZD4	0~65535	0	☆
FD-12	Receive PZD5	0~65535	0	☆
FD-13	Receive PZD6	0~65535	0	☆
FD-14	Receive PZD7	0~65535	0	☆
FD-15	Receive PZD8	0~65535	0	☆
FD-16	Receive PZD9	0~65535	0	☆
FD-17	Receive PZD10	0~65535	0	☆

FD-18	Receive PZD11	0~65535	0	☆
FD-19	Receive PZD12	0~65535	0	☆
FD-20	Send PZD3	0~65535	0	☆
FD-21	Send PZD4	0~65535	0	☆
FD-22	Send PZD5	0~65535	0	☆
FD-23	Send PZD6	0~65535	0	☆
FD-24	Send PZD7	0~65535	0	☆
FD-25	Send PZD8	0~65535	0	☆
FD-26	Send PZD9	0~65535	0	☆
FD-27	Send PZD10	0~65535	0	☆
FD-28	Send PZD11	0~65535	0	☆
FD-29	Send PZD12	0~65535	0	☆
FD-30	Highest byte of IP address	0~255	192	☆
FD-31	Second byte of IP address	0~255	168	☆
FD-32	Third byte of IP address	0~255	1	☆
FD-33	Lowest byte of IP address	0~255	123	☆
FD-34	Highest byte of Subnet mask	0~255	255	☆
FD-35	Second byte of Subnet mask	0~255	255	☆
FD-36	Third byte of Subnet mask	0~255	255	☆
FD-37	Lowest byte of subnet mask	0~255	0	☆
FD-38	Highest byte of gateway address	0~255	192	☆
FD-39	Second byte of gateway address	0~255	168	☆
FD-40	Third byte of gateway address	0~255	1	☆
FD-41	Lowest byte of gateway address	0~255	1	☆
Group FE:Torque Control Parameters				
FE-00	Speed/Torque control mode	0:Speed control 1:Torque control	0	☆

FE-01	Torque setting source in torque control	0:Digital setting by FE-02 1:Keyboard potentiometer setting 2:AI1 3:AI2 4:AI3 5:Pulse setting by DI5 6:Communication setting	0	☆
FE-02	Torque digital setting	0~100.0%	0.0%	☆
FE-03	Torque input lower limit value	0.0~100.0%	0.0%	☆
FE-04	Lower limit value corresponding setting	-200.0~200.0%	0.0%	☆
FE-05	Torque input upper limit value	0.0~100.0%	100.0%	☆
FE-06	Upper limit value corresponding setting	-200.0~200.0%	100.0%	☆
FE-07	Torque setting filter time	0.000~6.000s	0.100S	☆
FE-08	Output torque upper limit	0~200.0%	150.0%	☆
FE-09	Output torque lower limit	0~200.0%	0.0%	☆
FE-10	Torque control forward speed source selection	0:Digital setting by FE-11 1:Keyboard potentiometer setting 2:AI1 3:AI2 4:AI3 5:Pulse setting by DI5 6:Communication setting	0	☆
FE-11	Torque control forward speed digital setting	0.0~100.0%	100.0%	☆
FE-12	Torque control reverse speed source selection	0:Digital setting by FE-13 1:Keyboard potentiometer setting 2:AI1 3:AI2 4:AI3 5:Pulse setting by DI5 6:Communication setting	0	☆
FE-13	Torque control reverse speed digital setting	0.0~100.0%	100.0%	☆
Group A0:Optimization of the control Parameter Set				
A0-00	Max output frequency	Frequency upper limit~599.00Hz	50.00Hz	★
A0-01	Carrier frequency setting	1.0~16.0kHz	Model dependent	☆

A0-02	PWM control mode 1	Unit's digit:Carrier-Temperature Correlation 0:Unrelated 1:Related Ten's digit:Carrier to output frequency correlation 0:Unrelated 1:Related Hundred's digit:Random PWM enable 0:Unrelated 1:Related Thousand's digit:PWM modulation 0:Three phase modulation 1:Automatic switching	0x1011	☆
A0-03	Reserved			
Group A1:Virtual Terminal Parameters				
A1-00	VDI1 terminal function selection	See 5.2 DI terminal function table	0	★
A1-01	VDI2 terminal function selection		0	★
A1-02	VDI3 terminal function selection		0	★
A1-03	VDI4 terminal function selection		0	★
A1-04	VDI terminal valid status source selection	0:Internally connected to virtual VDOx 1:Connected to physical terminal DIx 2:Function code setting valid or not Unit's digit:VDI1 Ten's digit:VDI2 Hundred's digit:VDI3 Thousand's digit:VDI4	0x0000	☆
A1-05	VDI terminal function status setting	0:Invalid 1:Valid Unit's digit:VDI1 Ten's digit: VDI2 Hundred's digit:VDI3 Thousand's digit:VDI4	0x0000	☆
A1-06	VDO1 terminal function selection	See 5.3 DO terminal function table	0	☆
A1-07	VDO2 terminal function selection		0	☆
A1-08	VDO3 terminal function selection		0	☆
A1-09	VDO4 terminal function selection		0	☆
A1-10	VDO1 output delay	0.000~6.000s	0.010S	☆
A1-11	VDO2 output delay	0.000~6.000s	0.010S	☆
A1-12	VDO3 output delay	0.000~6.000s	0.010S	☆
A1-13	VDO4 output delay	0.000~6.000s	0.010S	☆
Group A2:-Motor2 Parameters				

A2-00	Control mode selection	1:Sensorless vector control (SVC)-AM 2:VF control-AM 3:Feedback vector control(FVC)-AM 4:Sensorless vector control (SVC)-PM 5:Reserved 6:Feedback vector control(FVC)-PM 6:Voltage/Frequency separate control(V/F)	2	★
A2-01	Motor 2 rated power	0.1~1000.0kW	Model dependent	★
A2-02	Motor 2 rated voltatge	0~1500V	Model dependent	★
A2-03	Motor 2 rated current	0.1~2000.0A	Model dependent	★
A2-04	Motor 2 rated frequency	0.01~Max frequency	Model dependent	★
A2-05	Motor 2 rated rpm	1~65000rpm	Model dependent	★
A2-06	Motor 2 poles	2~98	Model dependent	★
A2-07	Asynchronous motor stator resistance	0.01~50.00%	Model dependent	★
A2-08	Asynchronous motor rotor resistance	0.01~50.00%	Model dependent	★
A2-09	Asynchronous motor mutual inductance	0.01~50.00%	Model dependent	★
A2-10	Asynchronous motor leakage inductance	0.1~2000.0%	Model dependent	★
A2-11	Asynchronous motor no-load current	0.1~650.0A	Model dependent	★
A2-12	Synchronous motor stator resistance	0.01~50.00%	Model dependent	★
A2-13	Synchronous motor D-axis inductance	0.01~200.00%	Model dependent	★
A2-14	Synchronous motor Q-axis inductance	0.01~200.00%	Model dependent	★
A2-15	Synchronous motor back electromotive force	1~1500V	Model dependent	★
A2-16	Installation angle of synchronous motor encoder	0.0°~360.0°	0.0°	★
A2-17	Reserved			

A2-18	Selection of initial magnetic pole identification for synchronous motors	Unit's digit :Closed loop vector 0:Disable 1:Enable 2:On at the first startup Ten's digit: Open loop vector 0:Disable 1:Enable 2:On at the first startup	0x0012	★
A2-19~ A2-25	Reserved			
A2-26	Encoder type selection	Unit's digit:Encoder type 0:ABZ 1:Resolver Ten's digit:Encoder direction 0:Same direction 1:Reverse direction Hundred's digit:Wire loss detection 0:Disable 1:Enable Thousand's digit: Reserved	0x0000	★
A2-27	Number of encoder pulses (before 4th harmonic)	1~10000	1024	★
A2~28	Resolver poles	2~128	2	★
A2-29	Encoder disconnection detection time	0.100~60.000s	2.000s	☆
A2-30	Encoder transmission ratio numerator	1~32767	1	☆
A2-31	Encoder transmission ratio denominator	1~32767	1	☆
A2-32	Encoder speed measurement filtering	0.0~100.0ms	1.0ms	☆
A2-33~ A2-36	Reserved			
A2-37	Motor tuning method	0:No operation 1:Static self-learning 2:Rotating self-learning 3:Static integrity self-learning	0	★
A2-38~ A2-49	Reserved			
A2-50	Motor selection	1:Motor 1 2:Motor 2	1	★
A2-51	Motor 2 acceleration and deceleration time selection	0:Consistent with the motor 1 1:Acceleration/deceleration time 1 2:Acceleration/deceleration time 2 3:Acceleration/deceleration time 3 4:Acceleration/deceleration time 4	0	★
Group A3:Group Motor2 Vector Control Parameters				
A3-00	Speed loop switchover frequency 1	0.00~[A3-04]	0.00Hz	☆

A3-01	Speed loop proportional gain at low frequency	0.01~100.00	10.00	☆
A3-02	Speed loop integral time at low frequency	0.000~6.000s	0.200s	☆
A3-03	Low frequency feedback filtering time	0.0~100.0ms	0.0ms	☆
A3-04	Speed loop switchover frequency 2	[A3-00] ~Frequency upper limit	0.00Hz	☆
A3-05	Speed loop proportional gain at high frequency	0.01~100.00	10.00	☆
A3-06	Speed loop integral time at high frequency	0.000~6.000s	0.200s	☆
A3-07	High frequency feedback filtering time	0.0~100.0ms	0.0ms	☆
A3-08	D-axis current proportional gain	0.001~4.000	1.000	☆
A3-09	D-axis current integration time	0.001~4.000	1.000	☆
A3-10	Q-axis current proportional gain	0.001~4.000	1.000	☆
A3-11	Q-axis current integration time	0.001~4.000	1.000	☆
A3-12	Electric torque limit source	0:Digital Setting by A3-13 1:Keyboard potentiometer setting 2:AI1 3:AI2 4:AI3 5:Pulse setting by DI5 6:Communication setting	0	☆
A3-13	Electric torque limit	0.0~400.0%	250.00%	☆
A3-14	Power generating torque limit source	0:Digital Setting by A3-15 1:Keyboard potentiometer setting 2:AI1 3:AI2 4:AI3 5:Pulse setting by DI5 6:Communication setting	0	☆
A3-15	Power generating torque limit	0.0~400.0%	250.00%	☆
A3-16	Overexcitation braking gain	0.0~500.0%	100.00%	☆
A3-17	Overexcitation braking limit	0.0~250.0%	100.00%	☆
A3-18	Output power limitation	0.0~400.0%	250.00%	☆
A3-19	Motor field weakening current upper limit	0.0~250.0%	60.00%	☆
A3-20	Motor field weakening feedforward gain	0.0~200.0%	10.00%	☆

A3-21	Motor field weakening gain	0.0~500.0%	10.00%	☆
A3-22	Field weakening voltage coefficient	0.0~120.0%	97.00%	☆
A3-23	Vector electric driving slip compensation	0.0~250.0%	100.00%	☆
A3-24~ A3-26	Reserved			
A3-27	Synchronous machine pull-in current at low frequency	0.0~50.0%	10.00%	☆
A3-28	Synchronous machine pull-in current at high frequency	0.0~50.0%	10.00%	☆
A3-29	Synchronous machine pull-in current frequency	0.0~100.0%	10.00%	☆
A3-30	Vector control energy saving function	0:Disable 1:Enable	0	★
A3-31	Energy saving control gain	0.0~80.0%	50.00%	☆
A3-32	Energy saving control low pass filter	0.000~6.000s	0.010s	☆
A3-33	Reserved			☆
A3-34	MTPA gain	0.0~400.0%	100.00%	☆
A3-35	MTPA filter time	0.0~100.0ms	1.0ms	☆
Group A4:Group Motor2 V/F Control Parameters				
A4-00	V/F curve setting	0:Linear V/F ； 1~9:1.1-power ~1.9-power V/F； 10:2nd power V/F； 11:Multi-point V/F(A4-17~A4-26)；	0	★
A4-01	Torque boost	0.0~30.0%	0.00%	☆
A4-02	Cut-off frequency of torque boost	0.0~100.0%	50.00%	☆
A4-03	VF slip compensation gain	0.0~200.0%	100.00%	☆
A4-04	VF slip compensation limit	0.0~300.0%	100.00%	☆
A4-05	VF slip compensation filter	0.000~6.000s	0.200s	☆
A4-06	VF flux braking enable	0~1	0	★
A4-07	VF flux braking gain	1~128	64	★
A4-08	Reserved			
A4-09	VF oscillation suppression gain	0.0~900.0%	100.00%	☆

A4-10	VF oscillation suppression filter time	0.0~100.0s	1.0s	☆
A4-11	VF output voltage percentage	25.0~120.0%	100.00%	★
A4-12	Output voltage source for voltage and frequency separation	0:Digital Setting by A4-13 1:Keyboard potentiometer setting 2:AI1 3:AI2 4:AI3 5:PID output setting 6:Communication setting 7:Pulse setting by DI5	0	☆
A4-13	Voltage digital setting for V/F separation	0.0% - 100.0%	0.00%	☆
A4-14	Voltage rise time of V/F separation	0.00-100.00s	10.00s	☆
A4-15	Voltage decline time of V/F separation	0.00-100.00s	10.00s	☆
A4-16	Stop mode selection upon V/F separation	0:Frequency and voltage rising and declining independently 1:Frequency declining after voltage declines to 0	0	☆
A4-17	VF voltage point V1	0.0~100.0%	3.00%	★
A4-18	VF frequency point F1	0.00~maximum frequency	1.00Hz	★
A4-19	VF voltage point V2	0.0~100.0%	28.00%	★
A4-20	VF frequency point F2	0.00~maximum frequency	10.00Hz	★
A4-21	VF voltage point V3	0.0~100.0%	55.00%	★
A4-22	VF frequency point F3	0.00~maximum frequency	25.00Hz	★
A4-23	VF voltage point V4	0.0~100.0%	78.00%	★
A4-24	VF frequency point F4	0.00~maximum frequency	37.50Hz	★
A4-25	VF voltage point V5	0.0~100.0%	100.00%	★
A4-26	VF frequency point F5	0.00~Max frequency	50.00Hz	★
A4-27	VF automatic energy saving control	0:Disable 1:Enable	0	★
A4-28	Frequency lower limit of energy saving and voltage reduction	0.0~50.00Hz	15.00Hz	★
A4-29	Voltage lower limit of energy saving and voltage reduction	20.0~100.0%	50.00%	★

A4-30	Voltage reducing rate of energy saving and voltage reduction rate	0.000~0.200V/ms	0.010V/ms	☆
A4-31	Voltage recovering rate of energy saving and voltage reduction rate	0.000~2.000V/ms	0.200V/ms	☆
GroupA5:System Parameters				
A5-00	Performance software version	*****	Model dependent	●
A5-01	Function software version	*****	Model dependent	●
A5-02	G/P type select	0:G type 1:P type	0	★
A5-03	Rated drive current	0.1A~3000.0A	Model dependent	●
A5-04	Rated drive voltage	220V~690V	Model dependent	●
A5-05	Product model	*****	Model dependent	●
A5-06	Initialization parameters	0:No operation 1:Restore factory parameters（except motor parameters） 2:Restore factory parameters （Includes motor parameters） 3:Clear the record information 067:Parameter upload 087:Parameters download	0	★
Group A6:AI/AO Correction Parameters				
A6-00	AI1 displayed voltage 1	0.000V~10.000V	3.000V	☆
A6-01	AI1 measured voltage 1	0.000V~10.000V	3.000V	☆
A6-02	AI1 displayed voltage 2	0.000V~10.000V	8.000V	☆
A6-03	AI1 measured voltage 2	0.000V~10.000V	8.000V	☆
A6-04	AI2 displayed voltage 1	0.000V~10.000V	3.000V	☆
A6-05	AI2 measured voltage 1	0.000V~10.000V	3.000V	☆
A6-06	AI2 displayed voltage 2	0.000V~10.000V	8.000V	☆
A6-07	AI2 measured voltage 2	0.000V~10.000V	8.000V	☆
A6-08	AI3 displayed voltage 1	0.000V~10.000V	3.000V	☆
A6-09	AI3 measured voltage 1	0.000V~10.000V	3.000V	☆
A6-10	AI3 displayed voltage 2	0.000V~10.000V	8.000V	☆
A6-11	AI3 measured voltage 2	0.000V~10.000V	8.000V	☆

A6-12	AO1 target voltage 1	0.000V~10.000V	3.000V	☆
A6-13	AO1 measured voltage 1	0.000V~10.000V	3.000V	☆
A6-14	AO1 target voltage 2	0.000V~10.000V	8.000V	☆
A6-15	AO1 measured voltage 2	0.000V~10.000V	8.000V	☆
A6-16	AO2 target voltage 1	0.000V~10.000V	3.000V	☆
A6-17	AO2 measured voltage 1	0.000V~10.000V	3.000V	☆
A6-18	AO2 target voltage 2	0.000V~10.000V	8.000V	☆
A6-19	AO2 measured voltage 2	0.000V~10.000V	8.000V	☆
A6-20	AI1 displayed current 1	0.000mA~20.000mA	6.000mA	☆
A6-21	AI1 measured current 1	0.000mA~20.000mA	6.000mA	☆
A6-22	AI1 displayed current 2	0.000mA~20.000mA	16.000mA	☆
A6-26	AI1 measured current 2	0.000mA~20.000mA	16.000mA	☆
A6-24	AI2 displayed current 1	0.000mA~20.000mA	6.000mA	☆
A6-25	AI2 measured current 1	0.000mA~20.000mA	6.000mA	☆
A6-26	AI2 displayed current 2	0.000mA~20.000mA	16.000mA	☆
A6-27	AI2 measured current 2	0.000mA~20.000mA	16.000mA	☆
A6-28	AI3 displayed current 1	0.000mA~20.000mA	6.000mA	☆
A6-29	AI3 measured current 1	0.000mA~20.000mA	6.000mA	☆
A6-30	AI3 displayed current 2	0.000mA~20.000mA	16.000mA	☆
A6-31	AI3 measured current 2	0.000mA~20.000mA	16.000mA	☆
A6-32	AO1 target current 1	0.000mA~20.000mA	6.000mA	☆
A6-33	AO1 measured current 1	0.000mA~20.000mA	6.000mA	☆
A6-34	AO1 target current 2	0.000mA~20.000mA	16.000mA	☆
A6-35	AO1 measured current 2	0.000mA~20.000mA	16.000mA	☆
A6-36	AO2 target current 1	0.000mA~20.000mA	6.000mA	☆
A6-37	AO2 measured current 1	0.000mA~20.000mA	6.000mA	☆
A6-38	AO2 target current 2	0.000mA~20.000mA	16.000mA	☆
A6-39	AO2 measured current 2	0.000mA~20.000mA	16.000mA	☆

Function Code	Parameter Name		Unit	Property
Group U0:Error Recording Parameters				
U0-00	Fault diagnosis information			
U0-01	Type of last fault	00:No fault Err01:AC drive unit protection Err02:Overcurrent during acceleration Err03:Overcurrent during deceleration Err04:Over current at constant speed Err08:Overvoltage during acceleration Err09:Overvoltage during deceleration Err10:Overvoltage at constant speed Err11:Under voltage Err12:Power input phase loss Err13:Power output phase loss Err14:Drive overload Err15:Motor overload Err16:Current detection fault Err17:Drive overheat Err18:Load becoming 0 Err19:Too large speed deviation Err20:Short circuit to ground Err21:External fault 1 Err22:Fast current limit fault Err23:Communication fault Err24:Master slave control communication disconnection Err25:EEPROM read-write fault Err26:PID feedback lost during running Err27:EEPROM storage fault Err28:Control power supply fault Err29:Motor switchover error during running Err30:Current running time reached Err31:Reserved Err32:Motor auto-tuning fault Err33:Motor over-speed Err34:Load Protection 1 Err35:Load Protection 2 Err36:Encoder Failure Err37:Position Detection Fault Err38:Motor Over Temperature Failure Err39:Synchronous machine out-of-step faults Err46:External fault 2 Err47:External fault 3 Err48:AI 1 signal loss fault Err49:AI 2 signal loss fault Err50:AI 3 signal loss fault ALA64:Main contactor fault ALA65:Input phase loss ALA66:PID feedback disconnection ALA67:Load protection 1 ALA68:Load protection 2	——	•

		ALA69:Parameter storage warning ALA70:Speed deviation too large ALA71:Flying speed warning ALA72:Controller error warning ALA74:Communication disconnection warning ALA80:AI 1 signal loss warning ALA81:AI 2 signal loss warning ALA82:AI 3 signal loss warning		
U0-02	Frequency at last fault	0.00~Max Frequency	0.01Hz	●
U0-03	Output voltage at last fault	0.0~1500.0V	0.1V	●
U0-04	Current at last fault	0.1~2000.0A	0.1A	●
U0-05	DC voltage at last fault	0~3000V	0.1V	●
U0-06	Radiator temperature	0.0~150.0℃	0.0℃	●
U0-07	status at last fault	Unit:running direction 0:FWD 1:REV Ten:running status 0:Stop 1:Constant speed 2:Acceleration 3:Deceleration	——	●
U0-08	DI status at last fault	See 5.4.1 input terminal status diagram	——	●
U0-09	DO status at last fault	See 5.1.2 output terminal status diagram	——	●
U0-10	Type of previous fault	Reference to U0-01	——	●
U0-11	Frequency at previous fault	0.00~Max Frequency	0.01Hz	●
U0-12	Output voltage at previous fault	0.0~1500.0V	0.1V	●
U0-13	Current at previous fault	0.1~2000.0A	0.1A	●
U0-14	DC voltage at previous fault	0~3000V	0.1V	●
U0-15	Radiator temperature	0.0~150.0℃	0.0℃	●
U0-16	status at previous fault	Unit:running direction 0:FWD 1:REV Ten:running status 0:Stop 1:Constant speed 2:Acceleration 3:Deceleration	——	●
U0-17	DI status at previous fault	See 5.5.1 input terminal status diagram	——	●

U0-18	DO status at previous fault	See 5.5.2 output terminal status diagram	——	●
U0-19	First two failure types	Reference to U0-01	——	●
U0-20	First three failure types	Reference to U0-01	——	●
Group U1:Application Monitoring Parameters				
U1-00	Running frequency（Hz）		0.01Hz	●
U1-01	Setting frequency（Hz）		0.01Hz	●
U1-02	Bus voltage（V）		0.1V	●
U1-03	Output voltage（V）		0.1V	●
U1-04	Output current（A）		0.1A	●
U1-05	Output power（kW）		0.1	●
U1-06	Intermediate value for a given frequency		0.01Hz	●
U1-07	DI input status, hexadecimal		nnnnn	●
U1-08	DO output status, hexadecimal		nnnnn	●
U1-09	Given Id		0.1A	●
U1-10	Feedback Id		0.1A	●
U1-11	Given Iq		0.1A	●
U1-12	Feedback Iq		0.1A	●
U1-13	AC input voltage		0.1V	●
U1-14	AI1 voltage after correction		0.00V	●
U1-15	AI2 voltage after correction		0.00V	●
U1-16	AI3 voltage after correction		0.00V	●
U1-17	PID setting		0.1%	●
U1-18	PID feedback		0.1%	●
U1-19	Count value		1	●
U1-20	Motor speed		rpm	●
U1-21	Feedback speed		0.1Hz	●
U1-22	PLC stage		1	●
U1-23	Communication setting value		0.1Hz	●
U1-24	Main frequency X		0.1Hz	●
U1-25	Auxiliary frequency Y		0.1Hz	●
U1-26	Input pulse frequency		0.01KHz	●
U1-27	AI1 voltage before correction		0.001V	●

U1-28	AI2 voltage before correction	0.001V	●
U1-29	AI3 voltage before correction	0.001V	●
U1-30	AO1 target voltage	0.01V	●
U1-31	AO2 target voltage	0.01V	●
U1-32	HDO target frequency	0.01KHz	●
U1-33	Currently used motor serial number(0:Motor 1 1:Motor 2)	1	●
U1-34	AC drive operation status (Bit0 0: Stop 1: Run Bit1 0: non-accelerated state 1: accelerated state Bit2 0: non-deceleration state 1: deceleration state Bit3 0: Forward operation 1:Reverse operation)	——	●
U1-35	AC drive current fault	——	●
U1-36	Running time of this power-up	0.1hour	●
U1-37	PLC current stage remaining time1	1	●
U1-38	PLC current stage remaining time2	1	●
U1-39	Accumulative running time 1(Hour)	1hour	●
U1-40	Accumulative running time 2 (Min)	1min	●
U1-41	Motor temperature	0.1℃	●
U1-42	Radiator temperature	0.1℃	●
U1-43	Control word display value	——	●
Group U2:Status word Parameters			
U2-00	Status word 1		●
U2-01	Status word 2		●
U2-02	Drive healthy/Ready to work		●
U2-03	Ready to run		●
U2-04	Inverter/drive active		●
U2-05	Stop command		●
U2-06	Fault is active		●
U2-07	Undervoltage state		●
U2-08	Working at set speed		●
U2-09	Current limit active		●
U2-10	Regeneration		●
U2-11	Braking IGBT active		●
U2-12	Zero speed		●
U2-13	Reverse direction command		●

U2-14	Reverse direction operation		●
U2-15	Frequency upper limit reached		●
U2-16	Warning is active		●
U2-17	Watchdog		●
U2-18	Watchdog timer		●
U2-19	Supply Loss		●
U2-20	Output phase loss		●
U2-21	Low Load Detected		●
U2-22	Mech.Brake is closed		●
U2-23	Motor overload pre-warning		●
U2-24	AC drive overload pre-warning		●
U2-25	Frequency lower limit reached		●
U2-26	Drive temperature reached		●
U2-27	Zero current state		●
U2-28	Motor 1/2 indication		●

5.2 DI terminal function selection

DI Setting Value	Function	DI Setting Value	Function	DI Setting Value	Function
0	No function	20	Frequency UP	40	Swing input
1	Forward RUN (FWD)	21	Frequency DW	41	Swing pause
2	Reverse RUN (REV)	22	Frequency UP/DW/reset	42	Swing reset
3	3-wire control (DI	23	Command channel switches to keyboard	43	Speed control/Torque control switchover
4	Forward JOG (FJOG)	24	Changeover of the command channel to terminal	44	Pulse Input
5	Reverse JOG (RJOG)	25	Changeover of the command channel to communication	45	Timer trigger terminal
6	Free stop	26	Changeover of the command channel to Control Word	46	Timer Zero Terminal
7	Emergency stop	27	Program run (PLC) pause	47	Counter clock input terminal
8	Fault reset	28	Program run (PLC) restart	48	Counter Zero Terminal
9	External fault input	29	PID control cancel	49	DC brake command
10	Multi-reference terminal 1	30	PID control pause	50	Pre-excitation command terminal
11	Multi-reference terminal 2	31	PID characteristic switching	51	Run prohibited
12	Multi-reference terminal 3	32	PID gain switching	52	Forward run prohibited
13	Multi-reference terminal 4	33	PID Integral Pause	53	Reverse run prohibited
14	Terminal 1 for acceleration/deceleration time selection	34	PID given switching 1	54	RUN pause
15	Terminal 2 for acceleration/deceleration time selection	35	PID given switching 2	55	Switching between motor 1 and motor 2
16	acceleration/deceleration pause	36	PID given switching 3	56	External fault 2
17	Frequency source X switches to frequency source Y	37	PID feedback switching 1	57	External fault 3
18	Frequency channel switches to X	38	PID feedback switching 2		
19	Frequency channel switches to Y	39	PID feedback switching 3		

5.3 DO terminal function selection

DO Setting Value	Function	DO Setting Value	Function
0	No output.	19	Light load output
1	AC drive running	20	Load pre-alarm output 1
2	AC drive forward running	21	Load pre-alarm output 2
3	AC drive reverse running	22	PID feedback sensor wire broken
4	Fault trip alert 1 (alert during fault self-recovery)	23	PID feedback upper limit reached
5	Fault trip alert 2 (no alert during fault self-recovery)	24	PID feedback lower limit unreached
6	External fault stop(All external fault outputs)	25	PLC cycle period completed
7	AC drive undervoltage	26	PLC run phase completed
8	AC drive running preparation completed	27	RS485 Communication given
9	Set frequency reached	28	Timer's set time reached
10	Frequency reached 1	29	Counter's setting value reached
11	Frequency reached 2	30	Counter's maximum reached
12	Output frequency detection test 1 (FDT1)	31	Dynamic braking
13	Output frequency detection test 2 (FDT2)	32	Emergency stopping
14	Zero-speed running	33	PG card feedback disconnected
15	Upper frequency limit reached	34	Brake control output
16	Lower frequency limit reached	35	Module temperature reached
17	Current reached 1	36	Motor temperature reached
18	Current reached 2		

5.4 AO & HDO terminal function selection

Terminal Setting Value	Function	Terminal Setting Value	Function
0	Output frequency	9	Given torque
1	Given frequency	10	Mechanical speed
2	Output current	11	PID given value
3	Output power	12	PID feedback value
4	Output voltage	13	Pulses input value DI5
5	AI1 input value	14	Bus voltage
6	AI2 input value	15	Input voltage (0~10V corresponds to 0~1.5 times the nominal voltage)
7	485 communication given	16	AC Driver temperature (0~10V corresponds to 0~100.0°C)
8	Output torque	17	Motor temperature (0~10V corresponds to 0~200.0°C)

5.5 Input and output terminal status diagram

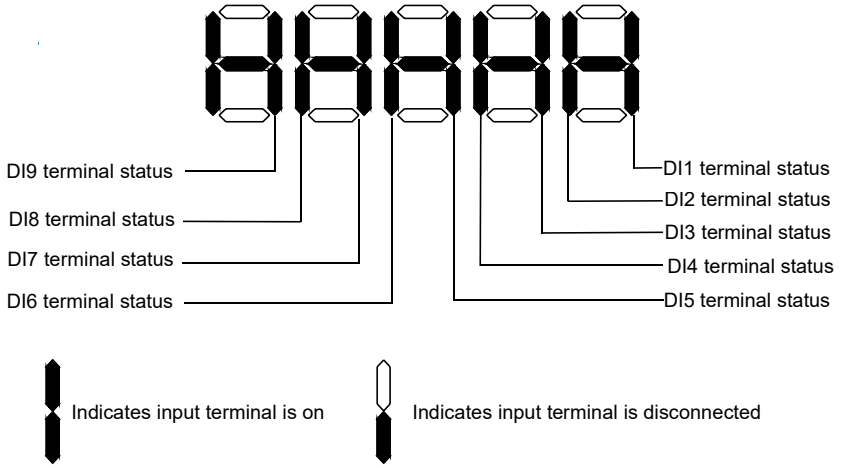


Fig. 5.5-1 Input terminal ON/OFF status diagram

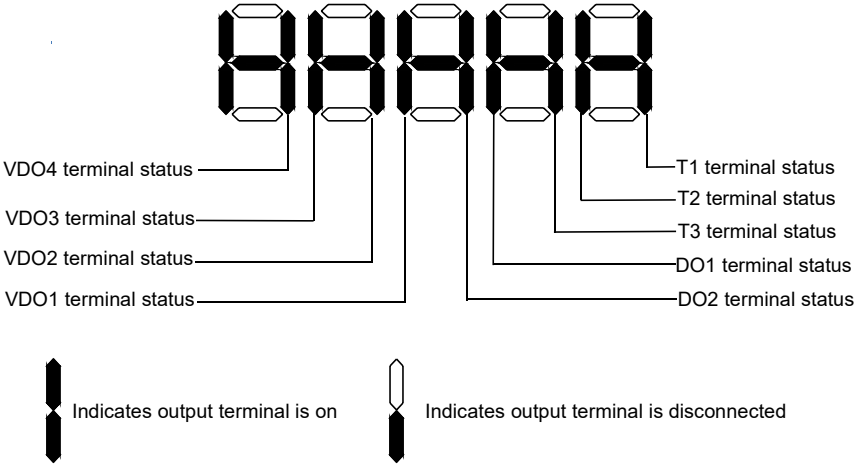


Fig. 5.5-2 Output terminal ON/OFF status diagram

Chapter 6 Trouble Shooting

If a fault occurs during the system operation, the drive will immediately protect the motor to stop the output, and the corresponding drive fault relay contact will act. The drive panel displays the fault code. The fault type and common solution corresponding to the fault code are shown in the following table. The list in the table is for reference only, please do not repair or modify it without authorization. If the fault cannot be eliminated, please seek technical support from our company or the product agent.

6.1 Faults and Solutions

Display	Fault Name	Possible Causes	Solutions
Err01	AC drive unit protection	1:Whether the motor connection terminals U, V, W have short-circuit or straight-through between phases or to ground 2:Whether the module is overheating 3:Whether the internal wiring of the drive is loose 4:Whether the main control board, driver board or module is normal	1:Check motor wiring and output impedance to ground 2:Check whether the fan and air duct are normal 3:Connect all loose wires 4:Seek technical support
Err02	Overcurrent during acceleration	1:The output circuit is grounded or short circuited 2:Motor parameter is not right 3:The acceleration time is too short 4:Manual torque boost or V/F curve is not appropriate 5:The voltage is too low 6:The startup operation is performed on the rotating motor 7:A sudden load is added during acceleration 8:The AC drive model is of too small	1:Eliminate external faults 2:Perform the motor auto-tuning 3:Increase the acceleration time 4:Correctly set the V/f curve 5:Check grid input power 6:Select rotational speed tracking restart or start the motor after it stops 7:Remove the added load 8:Select an AC drive of higher power class
Err03	Overcurrent during deceleration	1:The output circuit is grounded or short circuited 2:Motor parameter is not right 3:The deceleration time is too short 4:The voltage is too low 5:A sudden load is added during deceleration 6:The inertia of the load is too large 7:The magnetic flux braking gain is too large	1:Eliminate external faults 2:Perform the motor auto-tuning 3:Increase the deceleration time 4:Adjust the voltage to normal range 5:Remove the added load 6:Install the braking unit and braking resistor 7:decrease the over-excitation gain

Err04	Over current at constant speed	1:The output circuit is grounded or short circuited 2:Motor parameter is not right. 3:The voltage is too low 4:A sudden load is added during operation 5:The AC drive model is of too small	1:Eliminate external faults 2:Perform the motor auto-tuning 3:Adjust the voltage to normal range 4:Remove the added load 5:Select an AC drive of higher power class
Err08	Overvoltage during acceleration	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 inertia of the load is too large 5:Motor parameter is not right	1:Adjust the voltage to normal range 2:Cancel the external force or install a braking resistor 3:Extend the acceleration time 4:Use energy consumption braking 5:Auto-tune the parameters of the motor
Err09	Overvoltage during deceleration	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 inertia of the load is too large	1:Adjust the voltage to normal range 2:Cancel the external force or install a braking resistor 3:Increase the deceleration time 4:Install the braking unit and braking resistor
Err10	Overvoltage at constant speed	1:The input voltage is too high 2:An external force drives the motor during acceleration 3:When the vector control is running, the parameters of the regulator are not set properly 4:The load fluctuates too much	1:Adjust the voltage to normal range 2:Cancel the external force or install a braking resistor 3:Correctly set the regulator parameters 4:Check the load
Err11	Undervoltage	1:Instantaneous power failure occurs 2:The input voltage exceeds the allowed range 3:The DC bus voltage is too low 4:The rectifier bridge and buffer resistor are faulty 5:The drive board is faulty 6:The control board is faulty	1:Reset the fault 2:Adjust the input voltage to within the allowed range 3:Seek for maintenance
Err12	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:Seek for maintenance

Err13	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 the motor or replace the motor 3:Seek for maintenance
Err14	Drive overload	1:The torque boost value is too large during V/f control 2:The starting frequency is too high 3:The acceleration and deceleration time is too short 4:Improper setting of motor parameters 5:Overload 6:The V/f curve is not suitable for V/f control 7:Restart the rotating motor 8:Output phase-to-phase short-circuit or short-circuit to ground	1:Reduce the torque boost value 2:Reduce the starting frequency value 3:Extend the acceleration and deceleration time 4:Correctly set according to the motor nameplate 5:Lighten the load 6:Correctly set the V/f curve 7:Reduce the current limit value or start by speed search 8:Check the motor wiring and output impedance to ground
Err15	Motor overload	1:Whether the setting of motor protection parameter F9-01 is appropriate 2:Whether the load is too large or the motor is blocked 3:Drive selection is too small 4:The torque boost value is too large during V/f control 5:The V/f curve is not suitable for V/f control 6:Improper setting of motor parameters 7:Improper setting of motor overload protection time 8:Motor stall or load sudden change is too large	1:Set this parameter correctly 2:Reduce the load and check the motor and mechanical condition 3:Choose driver with larger power level 4:reduce the torque to increase the value 5:Set V/ F curve correctly 6:Set correctly according to the motor nameplate 7:Set the motor overload protection time correctly 8:Check the cause of motor blocking or check the load
Err16	Current detection fault	1:The internal connections become loose 2:Confirm whether the current detection device is normal 3:The control or drive board is faulty	1:Connect all cables properly. 2:Seek for maintenance

Err17	Drive overheat	1:The ambient temperature is too high 2:The air filter is blocked 3:The cooling fan is damaged 4:The thermally sensitive resistor of the module is damaged 5:The inverter module is damaged. 6:The temperature sensor is improperly connected	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 6:Seek service
Err18	Load becoming 0	The detection is reached, get more details form F9-33 to F9-35.	Reset the fault or reset F9-33 to F9-35 value
Err19	Too large speed deviation	1:The load is too heavy and the acceleration time is too short 2:F9-26 and F9-27 are set incorrectly 3:The set value of the deviation between the motor speed and the set speed is too small 4:The load fluctuates too much 5:The control parameter setting of vector control is unreasonable	1:Increase the acceleration and deceleration time 2:Set F9-26 and F9-27 correctly based on the actual situation 3:Correctly set the speed deviation point 4:Stable load 5:Correct settings
Err20	Short circuit to ground	1:The motor is short circuited to the ground 2:The output wiring is short-circuited to ground 3:Abnormal motor insulation 4:The inverter module is abnormal 5:The output leakage current to the ground is too large	1:Replace the cable or motor 2:Check the motor wiring and output impedance to ground 3:Check the motor 4:Seek service
Err21	External fault 1	External fault normally closed or normally open signal is input via DI	Reset the fault
Err22	Fast current limit fault	1:The load is too heavy or the rotor is locked 2:The acceleration time is too short	1:Reduce load or replace with higher power drive 2:Increase the acceleration time
Err23	Communication fault	1:The host computer is in abnormal state 2:The communication cable is faulty 3:The communication parameters in group Fd are set improperly	1:Check cabling of the host computer 2:Check the communication cabling 3:Check Fd group parameters
Err24	Master slave control communication disconnection	1:No master set but slave set 2:The communication cable is faulty or communication parameter setting not correct	1:Set host and reset the fault 2:Check the communication cabling and communication parameters Fd
Err25	EEPROM read-write fault	The EEPROM chip is damaged	Replace the main control board

Err26	PID feedback lost during running	1:The PID feedback is lower than the setting of FA-15 2:The PID feedback channel is abnormal 3:PID parameter setting is unreasonable	1:Check the PID feedback signal or set FA-15 to a proper value 2:Check the feedback channel 3:Correct settings
Err27	EEPROM storage fault	Communication between DSP and EEPROM fault	1:Replace the main control board 2:Seek service
Err28	Control power supply fault	1:The input voltage is not within the allowable range 2:The power on and off is too frequently	1:Adjust the input voltage to the allowable range 2:Extension of power on cycle
Err29	Motor switchover fault during running	Change the selection of the motor via terminal during running of the AC drive.	Perform motor switch over after the AC drive stops.
Err30	Accumulative running time reached	The accumulative running time reaches the setting value of F8-31.	Reset the fault
Err32	Motor auto-tuning fault	1:Motor parameters are not set according to the nameplate 2:Parameter identification process timeout 3:Encoder abnormality	1:According to the motor nameplate parameter setting 2:Check the AC drive and motor wiring 3:Check whether the encoder parameter setting is correct or not.
Err33	Motor overspeed	1:Is the encoder parameter setting correct 2:Is the parameter identification 3:Fault detection parameters F9-28, F9-29 set unreasonable	1:Correctly set the encoder parameters 2:Motor parameter identification 3:Reasonable setting of fault detection parameters
Err36	Encoder Failure	1:Mismatch of encoder model 2:Encoder connection error 3:PG card or encoder abnormality	1:Correctly set the encoder type according to the actual 2:Test PG card power supply and phase sequence 3:Replace the PG card or encoder
Err38	Motor Over Temperature Failure	Motor temperature U1-45 > F9-31 set value	Reset the fault
Err46	External fault 2	The user-defined fault 1 signal is input via DI	Reset the fault
Err47	External fault 3	The user-defined fault 2 signal is input via DI	Reset the fault

6.2 Common Symptoms and Diagnostics

The following fault conditions may be encountered during the use of the drive, please refer to the following methods for simple fault analysis.

NO.	Fault Name	Possible Causes	Solutions
1	There is no display at power-on.	1:There is no power supply or the power supply is too low 2:The switching power supply on the drive board is faulty 3:The rectifier bridge is damaged 4:The buffer resistor of the drive is damaged 5:The control board or the keypad is faulty 6:The cable between the control board and the drive board or keypad breaks	1:Check the power supply 2:Check the bus voltage 3:Re-connect the keypad and core cables 4:Seek service
2	"Err20" is displayed at power-on	1:The motor or the motor output cable is short-circuited to the ground 2:The AC drive is damage	1:Measure the insulation of the motor and the output cable with a megger. 2:Seek service
3	Err17 (Drive temperature exceeds the limit)	1:The setting of carrier frequency is too high 2:The cooling fan is damaged, or the air filter is blocked 3:Components inside the AC drive are damaged (thermal coupler or others)	1:Reduce the carrier frequency (F0-16). 2:Replace the fan and clean the air filter 3:Seek service
4	The motor does not rotate after the AC drive runs.	1:Check the motor and the motor cables 2:The AC drive parameters are set improperly (motor parameters) 3:The cable between the drive board and the control board is in poor contact 4:The drive board is faulty	1:Ensure the cable between the AC drive and the motor is normal 2:Replace the motor or clear mechanical faults 3:Check and re-set motor parameters
5	The DI terminals are disabled.	1:The parameters are set incorrectly 2:The external signal is incorrect 3:The DI DIP switch is in the wrong position 4:The control board is faulty	1:Check and reset the parameters in group F5 2:Re-connect the external signal cables 3:Re-confirm whether the position of the DI DIP switch is consistent with the wiring method 4:Seek service
6	The AC drive reports over-current and over-voltage frequently	1:The motor parameters are set improperly 2:The acceleration/deceleration time is improper 3:The load fluctuates	1:Re-set motor parameters or re-perform the motor auto-tuning 2:Set proper acceleration/ deceleration time 3:Seek service

Chapter 7 Maintenance

Affected by the ambient temperature, humidity, dust, vibration and the aging of the internal components of the drive, some potential problems may occur during the operation of the drive. The frequency converter conducts daily inspections and periodic inspections. Depending on the external environment of the drive, regular maintenance must be carried out every 3 to 6 months, so as to discover and deal with the problems that are difficult to find in the routine inspection process in time.

7.1 Daily inspection

To avoid damage to the drive and shorten its service life, please check the following items daily.

Inspection items	Check the content	Measures
Motor	● Whether the motor has abnormal vibration and abnormal sound	● Confirm whether the mechanical connection is abnormal ● Confirm whether the motor is out of phase ● Confirm that the motor fixing screws are secure
Fan	● Abnormal use of drive and motor cooling fan	● Confirm whether the cooling fan of the drive is running ● Confirm whether the cooling fan on the motor side is abnormal ● Confirm whether the ventilation channel is blocked ● Check that the ambient temperature is within the allowable range
Installation Environment	● Whether the electrical cabinet and cable trough are abnormal	● Check whether the insulation of the cables entering or leaving the drive is damaged ● Determine whether there is vibration on the mounting bracket ● Check whether the copper bars and connecting cable terminals are loose and corroded
Load	● Whether the drive running current exceeds the drive rating and motor rating for a certain period of time	● Confirm whether the motor parameters are set correctly ● Confirm whether the motor is overloaded ● Confirm whether the mechanical vibration is too large (normal condition <0.6g)
Power supply	● Whether the input voltage meets the requirements and whether there is a lack of phase power supply	● Confirm whether the voltage between any two phases of the input voltage is within the allowable range indicated on the nameplate ● Check if there is a large load around to start

7.2 Regular Maintenance

Under normal circumstances, it is advisable to conduct regular inspections every 3 months to 6 months, but in actual cases, please determine the actual inspection cycle based on the usage and working environment of each machine.

Inspection items	Check the content	Measures
Complete machine	● Whether there is garbage, dirt, dust accumulation on the surface	● Confirm whether the drive cabinet is powered off ● Use a vacuum cleaner to remove rubbish or dust to avoid touching the parts ● When the surface dirt cannot be removed, can use alcohol to wipe it and wait for it to dry and evaporate completely
Air duct vent	● Whether the air duct and heat sink are blocked ● Whether the fan is damaged	● Clean the air duct ● Replace the fan
Electrical connections	● Whether there is discoloration of wires and connection parts, and whether the insulation layer is damaged, cracked, discolored and aging ● Whether the connecting terminals are worn, damaged or loose ● Ground check	● Replace damaged cables ● Tighten loose terminals and replace damaged terminals ● Measure the grounding resistance and fasten the corresponding grounding terminal
Magnetic contactor periphery	● Whether the suction is not firm or makes abnormal noise during action ● Whether there are short-circuited, water-stained, swollen, or ruptured peripheral devices	● Replace defective components
Motor	● Whether the motor has abnormal vibration and abnormal noise	● Tighten mechanical and electrical connections and lubricate motor shaft
Electrolytic capacitor	● Whether the electrolytic capacitor has leakage、discoloration、cracks, and whether the safety valve leaks, expands, or ruptures	● Replace defective components
Circuit board	● Whether there is peculiar smell, discoloration, serious rust, and whether the connector connection is correct and reliable	● Fastener connection ● Clean the circuit board ● Replace damaged circuit board
Keyboard	● Whether the keyboard is damaged and the display is incomplete	● Replace damaged circuit board

ATTENTION

Do not perform related operations when the power is turned on, otherwise there is a danger of electric shock and death.Please make sure power supply of the drive has been cut off, and DC bus voltage has been discharged to 0V prior to maintenance.Never leave screws, gaskets, conductors, tools and other metal articles inside the drive. Failure to comply may result in equipment damage. Never modify the interior components of the drive in any condition. Failure to comply may result in equipment damage.

7.3 Replacement of Vulnerable Parts

Vulnerable parts of drive include cooling fan, electrolytic capacitor.The service lives of these parts are subject to environment and working conditions. To maintain a favorable operating environment is conducive to improving the service life of parts and components; routine inspection and maintenance also contributes to effective improvement of parts' service life. To prolong the service life of entire drive, the cooling fan, electrolytic capacitor or other vulnerable parts should be subjected to routine inspection according to the table below. Please replace the abnormal parts (if any) in time.

ATTENTION

- Normally, the cooling fan of the drive should be replaced every 2 to 3 years;
- Under normal circumstances, the large-capacity electrolytic capacitor of the drive should be replaced every 4 to 5 years;

7.4 Storage

When the inverter is not used temporarily or stored for a long time after purchase, the following matters should be paid attention to:

ATTENTION

- Avoid storing the drive in a place with high temperature, humidity or vibration and metal dust, and ensure that the storage place is well ventilated;
- If the drive has not been put into use for a long time, the internal filter capacitor characteristics will decline;
- If the drive is not used for a long time, it should be powered on once every two years to restore the characteristics of the large-capacity filter capacitor, and the function of the drive should be checked at the same time. When energized, the voltage should be gradually increased through an autotransformer, and the energization time should not be less than 5 hours.

Appendix: Modbus Communication Protocol

FG310series of frequency converters can provide RS232/RS485 communication interface, and use MODBUS communication protocol. The user can realize the central control through computer or PLC. Also it can set the running commands, modify or read the function code parameter, read the working status and fault information of the frequency converter according to the protocol.

RTU frame format:

Frame Header START	3.5 characters time
Slave Address ADR	Contact address:0~247
The command code CMD	03:Read the parameter of the slave machine 06:Write the parameters of the slave machine
The content of the data DATA(N-1)	The content of the DATA: The address of function code parameters; The quantity of function code parameters; The value of function code parameters;
The content of the data DATA(N-2)	
…….	
The content of the data DATA0	
CRC CHK Low order	detection value:CRC16 verified value. low byte is sent previous than High byte.
CRC CHK High order	
End	3.5-characters time

1. The Definition of Communication Parameter Address

This part is the content about communication, which used for controlling the running and working status of the frequency convert, and set relevant parameter.

Parameter of read and write function code (some function code can't be changed, only for supplier and monitor usage)

Labeling rule of function code address:
Use the group number and mark number of the function code as parameter address rule:
The high bytes:F0~FF (group F)、A0~AF(group A)、70~7F (group U)　the low byte:00~FF
For example:F0-11,the address indicated as F00B;

Attention:
Group FF:The parameter can neither be read nor be altered.
Group U:The parameter can only be read, but not be altered.

Some parameter can't be changed when the frequency convert is on running status; some parameter can't be changed regardless of any status of the frequency convert; please pay attention to the range, unit and relevant instruction when changing the function code parameter.

Group number of function code	access address of communication	Function code address of communication revise the RAM
Group F0~FE	0xF000~0xFEFE	0x0000~0x0EFE
Group A0~AF	0xA000~0xAFFF	0x4000~0x4FFF
Group U0、U1	0x70xx、0x71xx	

Pay attention that if the EEPROM is stored continuously, the service life will be reduced. So there is no need to store some function code on the communication mode, just need to change the value in RAM.

If it's group F of the parameter to realize this function, just need to change high byte from F to 0 on the function code address.

The relevant function code address indicated as below:High byte: 00~0F (group F)、40~4F (group A) the low byte: 00~FF

For example: function code F0-11 doesn't store in EEPROM, the address indicated as 000B; this address means that it only can write RAM, but can't use the read action, if it's being read, the address is ineffective.

Communication Control Parameter Group Address Description

Parameter Address (HEX)	**Parameter Description**	**Data description**	**Property**
0x1000	Communication frequency setting	0~1000 Correspondence 0~100.0%	R/W
0x1001	Running frequency	Unit:0.01hz	R
0x1002	Bus voltage	Unit:0.1V	R
0x1003	Output voltage	Unit:0.1V	R
0x1004	Output current	Unit:0.1A	R
0x1005	Output power	Unit:0.1kW	R
0x1006	Output torque	Unit:0.1%	R
0x1007	Motor speed	Unit:1rpm	R
0x1008	Communication command setting	0000H:No order 0001H:Forward operation 0002H:Reverse operation 0003H:Forward jog 0004H:Reverse jog 0005H:Slow-down stop 0006H:Free stop 0007H:Fault reset 0008H:Run the prohibit command 0009H:Run the permit command	R/W

0x1009	AC drive operation status	Bit0 0:Stop 1:Run Bit1 0:non-accelerated state 1:accelerated state Bit2 0:non-deceleration state 1:deceleration state Bit3 0:Forward operation 1:Reverse operation Bit4 0:True 1:False	R
0x100A	AC Drive Error Codes	AC Drive Current Error Codes	R
0x100B	Upper limit frequency communication given	0~32000 corresponds to 0~320.00hz	R/W
0x100C	VF Separate output voltage communication given	0~32000 corresponds to 0~320.00hz	R/W
0x100D	PID setting communication setting	0~1000 Correspondence 0~100.0%	R/W
0x100E	PID feedback communication settings	0~1000 Correspondence 0~100.0%	R/W
0x100F	Target torque communication given	0~1000 Correspondence 0~100.0%	R/W
0x1010	Torque control forward maximum frequency communication given	0~1000 Correspondence 0~100.0%	R/W
0x1011	Torque Control Reverse Maximum Frequency Communication Given	0~1000 Correspondence 0~100.0%	R/W
0x1012	Output terminal status	Bit0 0:T1 False 1:T1 True Bit1 0:T2 False 1:T2 True Bit2 0:T3 False 1:T3 True Bit3 0:DO1 False 1:DO1 True Bit4 0:DO2 False 1:DO2 True	R/W
0x1013	AO1 output given	0~1000 Correspondence 0~10.00V	R/W
0x1014	AO2 output given	0~1000 Correspondence 0~10.00V	R/W
0x1015	HDO output given	0~1000 Correspondence 0~100.0%	R/W
0x1016	Motor 1 electric torque upper limit given	0~1000 Correspondence 0~100.0%	R/W
0x1017	Motor 1 generating torque upper limit given	0~1000 Correspondence 0~100.0%	R/W
0x1018	Motor 2 electric torque upper limit given	0~1000 Correspondence 0~100.0%	R/W
0x1019	Motor 2 generating	0~1000 Correspondence 0~100.0%	R/W

	torque upper limit given		
0x101A	Control word	Bit0：Drive enable 0：False 1：enable Bit1：Ramp stop 0：False 1：enable Bit2：Run forward 0：False 1：enable Bit3：Forward Jog 0：False 1：enable Bit4：Run reverse 0：False 1：enable Bit5：Forward/Reverse 0：Reverse 1：Forward Bit6：Run 0：False 1：enable Bit7：Reverse Jog 0：False 1：enable Bit8：Drive reset 0：False 1：enable Bit9：Acceleration/Deceleration prohibited 0：False 1：enable Bit10：PID sleep 0：False 1：enable Bit11：Reverse forbidden 0：False 1：enable Bit12：Speed/Torque control 0：Speed control 1：Torque control Bit13：Motor 1/2 switchover 0：Motor 1 1：Motor 2 Bit14：External fault 0：False 1：enable Bit15：Watchdog enable 0：False 1：enable	R/W

Example 1:read the run frequency of the first machine: 0x01 0x03 0x10 0x01 0x00 0x01 0x21 0x0A 0x10 0x01 (1001) run frequency address, 0x00 0x01 (0001) one data 0x21 0x0A (0A21) CRC verified value.

Example 2:read the busbar voltage, output voltage, output current of the first machine at the same time: 0x01 0x03 0x10 0x02 0x00 0x03 CRC verified value, the meaning of the data is similar to example 1.