Preface

Thank you for choosing GTAKE **GK310 Series General Purpose AC Motor Drives**. This user manual presents a detailed description of GK310 series with respect to product features, structural characteristics, functions, installation, parameter setting, troubleshooting, commissioning and daily maintenance, etc.

IMPORTANT NOTES
● Please assure the intactness of product enclosure and all safety covers before installation. Operation must conform to the requirements of this manual and local industrial safety regulations and/or electrical codes. ● Contents of this manual may be subject to appropriate modification as a result of product upgrade, specification change and update of the manual. ● In the event of damage or loss of user manual, users may ask local distributors, offices or our Technical Service Department for a new one. ● If any item as stated in this manual is not clear, please contact our Technical Service Department. ● If any anomaly occurs after power up or during the operation, it is essential to stop the machine and identify the fault or seek technical services as soon as possible. ● Telephone number of our Technical Service Department: (+86) 0755-86392601.

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Chapter 1 Safety Precautions

Safety Precautions

Safety signs in this manual:

⚠**WARNING**: indicates the situation in which the failure to follow operating requirements may result in fire or serious personal injury or even death.

⚠**ATTENTION:** indicates the situation in which the failure to follow operating requirements may cause moderate or slight injury and damage to equipment.

Users are requested to read this chapter carefully when installing, commissioning and repairing this product and perform the operation according to safety precautions as set forth in this chapter without violation. GTAKE bears no responsibility for any injury and loss as a result of any violation operation.

1.1 Safety Considerations

1.1.1 Prior to Installation

⚠**WARNING**
● Do not touch control terminals, circuit boards and any other electronic parts and components with bare hands. ● Do not use the drive whose component(s) is/are missing or damaged. Failure to comply may result in more faults and/or personal injury even death.

⚠**ATTENTION**
● Check if the product information indicated on the nameplate is consistent with the order requirements. If not, do not install it. ● Do not install the drive in the event that the packing list does not match with real equipment.

1.1.2 Installation

⚠**WARNING**
● Only qualified personnel familiar with drives and associated machinery should plan or implement the installation. Failure to comply may result in equipment damage and/or personnel injury even death.

- This equipment must be mounted on metal or other flame retardant objects. Failure to comply may result in fire.
- This equipment must be mounted in an area which is away from combustibles and heat sources. Failure to comply may result in fire.
- This equipment must in no case be mounted in the environment exposed to explosive gases. Failure to comply may result in explosion.
- Never adjust mounting bolts of this equipment, especially the ones with red markers. Failure to comply may result in equipment damage.

⚠ ATTENTION

- Handle the equipment gently and take hold of its sole plate so as to avoid foot injury or equipment damage.
- Mount the equipment where its weight can be withstood. Failure to comply may result in equipment damage and/or personnel injury if falling happens.
- Make sure the installation environment conforms to the requirements as stated in Section 2.4. If not, de-rating is necessary. Failure to comply may result in equipment damage.
- Prevent drilling residues, wire ends and screws from falling into the equipment during installation. Failure to comply may result in faults or equipment damage.
- When mounted in a cabinet, this equipment should be provided with appropriate heat dissipation. Failure to comply may result in faults or equipment damage.

1.1.3 Wiring

⚠ WARNING

- Only qualified personnel familiar with drives and associated machinery should plan or implement the wiring. Failure to comply may result in personnel injury and/or equipment damage.
- Wiring must strictly conform to this manual. Failure to comply may result in personnel injury and/or equipment damage.
- Make sure the input power supply has been completely disconnected before wiring. Failure to comply may result in personnel injury and/or equipment damage.
- All wiring operations must comply with EMC and safety regulations and/or electrical codes, and the conductor diameter should conform to recommendations of this manual. Failure to comply may result in personnel injury and/or equipment damage.
- Since overall leakage current of this equipment may be bigger than 3.5mA, for safety's sake, this equipment and its associated motor must be well grounded so as to avoid risk of electric shock.

- Be sure to implement wiring in strict accordance with the marks on this equipment's terminals. Never connect three-phase power supply to output terminals U/T1, V/T2 and W/T3. Failure to comply may result in equipment damage.
- Install braking resistors at terminals ⊕/ B1, and B2 only. Failure to comply may result in equipment damage.
- Wiring screws and bolts for main circuit terminals must be screwed tightly. Failure to comply may result in equipment damage.
- AC 220V signal is prohibited from connecting to other terminals than control terminals RA, RB, RC and TA, TB, TC. Failure to comply may result in equipment damage.

⚠ ATTENTION

- Since all drives from GTAKE have been subjected to hi-pot test before delivery, users are prohibited from implementing such a test on this equipment. Failure to comply may result in equipment damage.
- Signal wires should to the best of the possibility be away from main power lines. If this cannot be ensured, vertical cross-arrangement shall be implemented, otherwise interference noise to control signal may occur.
- If motor cables are longer than 100m, it is recommended output AC reactor be used. Failure to comply may result in faults.
- The encoder must be provided with shielded cables whose shielded layer must be well grounded.

1.1.4 Run

⚠ WARNING

- Drives which have been stored for more than 2 years should be used with voltage regulator to gradually boost the voltage when applying power to the drives. Failure to comply may result in equipment damage.
- Be sure to implement the wiring as per Section 3.5 before applying power to the drive. Failure to comply may result in equipment damage and/or electric shock hazard.
- Be sure to confirm the completion and correctness of the drive wiring and close the cover before applying power to the drive. Do not open the cover after applying power. Failure to comply may result in electric shock hazard.
- After applying the power, never touch the drive and peripheral circuits no matter what state the drive is under, otherwise there will be electric shock hazard.
- Prior to the running of the drive, check there is no person in surrounding area who can reach the motor so as to prevent personal injury.
- During the running of the drive, foreign bodies should be prevented dropping into the equipment. Failure to comply may result in faults and/or equipment damage.

- Only qualified technicians familiar with drives are allowed to perform signal test during operation. Failure to comply may result in equipment damage and/or personal injury.
- Never change the drive parameters at will. Failure to comply may result in equipment damage.

⚠ ATTENTION

- Make sure the number of phases of power supply and rated voltage are consistent with product nameplate. If not, contact the seller or GTAKE.
- Check there are no short circuits in peripheral circuits connected with the drive, and make sure the connection is tight. Failure to comply may result in equipment damage.
- Make sure the motor and associated machinery are within allowable range of service prior to operation. Failure to comply may result in equipment damage.
- Never touch fans, heat sink and braking resistor with bare hands. Failure to comply may result in equipment damage and/or personal injury.
- It is not allowed to start & stop the driver frequently via direct switching power on or off. Failure to comply may result in equipment damage.
- Make sure the drive is in a non-output status before switch-on/switch-off of the drive output and/or contactor. Failure to comply may result in equipment damage.

1.1.5 Maintenance

⚠ WARNING

- Only qualified technicians are allowed to implement the maintenance, and troubleshooting.
- Never implement the maintenance, and troubleshooting before power supply has been turned off and discharged completely. Failure to comply may result in equipment damage and/or personal injury.
- To avoid an electric shock hazard, wait at least 10 minutes after the power has been turned off and make sure the residual voltage of the bus capacitors has discharged to 0V before performing any work on the drive.
- After the replacement of the drive, be sure to perform the same procedures in strict accordance with above-noted rules.

⚠ ATTENTION

- Do not touch the electric components with bare hands during maintenance, and troubleshooting. Failure to do this may result in component damage due to ESD.
- All pluggable components can be inserted or pulled out only when power has been turned off.

1.2 Other Considerations

1.2.1 Input Power Supply

This series of drives are not applicable to applications out the range of operating voltage as set forth in this manual. If necessary, please use booster to rise or drop the voltage to regulated voltage range.

This series of drives support common DC bus input. Users are suggested to consult GTAKE technical personnel before use.

1.2.2 Surge Protection

This series of drives are furnished with surge suppressor that has certain resistance to lightning induction. However, users in areas with frequent occurrence of lightning need to mount an external surge suppressor in front of the drive power input side.

1.2.3 Operation of Contactor

As to the configuration of peripheral devices recommended by this manual, it is necessary to mount a contactor between the power supply and this drive input side. Such a contactor should not be used as a control device for start and stop of the drive, as frequent charging & discharging shall reduce the service life of internal electrolytic capacitors.

When it is necessary to mount a contactor between the drive output and the motor, it should be ensured the drive is in a non-output status before switch-on/switch-off of such a contactor. Failure to comply may result in drive damage.

1.2.4 Output Filter

Since the drive output is PWM high frequency chopping voltage, mounting filter devices such as an output filter and an output AC reactor between the motor and the drive shall effectively reduce output noise, avoiding interference to other surrounding equipments.

If the length of cable between the drive and the motor exceeds 100m, an output AC reactor is recommended to use with the purpose of preventing drive fault as a result of overcurrent caused by excessive distributed capacitance. An output filter is optional depending on field requirements.

Be sure not to mount phase-shifting capacitor or surge absorber at output side of the drive since this may result in drive damage as a result of over-temperature.

1.2.5 Motor Heating & Noise

If the motor does not match the rated capacity of the drive, especially when the rated power of the drive is greater than that of the motor, make sure to adjust the related parameter values of the motor in the drive or install a thermal relay in front of the motor to protect the motor. As the output voltage of the drive is PWM wave, which contains harmonics, so the motor's temperature rise, noise, and vibration will increase slightly compared with the operation in grid frequency.

1.2.6 Insulation of the Motor

In view of the fact that the drive output is PWM high frequency chopping voltage accompanied by higher harmonics, the noise, temperature rise and vibration of the motor is higher compared with sinusoidal voltage. Particularly this debases motor insulation. Therefore, the motor should be subjected to insulation inspection before initial use or reuse after being stored for a long period of time. The motor in regular service should also be subjected to regular insulation inspection so as to avoid the drive damage as a result of motor insulation damage. A 500V voltage mode mega-ohmmeter is recommended to use for the measurement of the motor insulation, during which, it is essential to disconnect the motor from the drive. Normally, the insulation resistance of the motor should be bigger than 5MΩ.

1.2.7 Derating

Due to the thin air in high-altitude areas, the radiating performance of the drive with forced air cooling may degrade while the electrolyte of electrolytic capacitors is more volatile, which can result in reduction in product life. Drive should be derated when used in an area at the altitude above 1000 meters. It is recommended to derate 1% for every 100m when the altitude is above 1000 meters.

1.2.8 Mechanical Vibration

This drive provides an output frequency ranging from 0Hz to 600Hz. If more than 50Hz is needed at site, the mechanical load-bearing capacity of the equipment must be taken into consideration. At some output frequencies, the drive may encounter mechanical resonance points of the load equipment, which can be avoided by setting the parameter of skip frequency.

1.2.9 Precautions for the disposal of drives

Electrolytic capacitors on the main circuit and PCB may explode when they are burnt. Toxic gases may be produced when plastic parts are burned. Please dispose of them as industrial waste.

Chapter 2 Product Information

2.1 Model Explanation

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

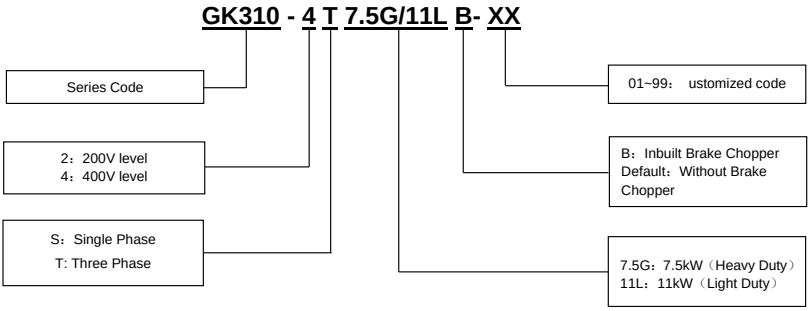

Fig. 2-1 Product model explanation

2.2 Information of Product Model

■ GK310-2T□□□B, single/ three-phase 220V input, heavy duty

Drive model	Power rating (kW)	3-phase rated output current (A)	1-phase rated input current (A)	3-phase rated input current (A)	Applicable motor (kW)	Brake chopper
GK310-2T0.4B	0.4	2.3	5.1	3	0.4	Inbuilt
GK310-2T0.75B	0.75	4.5	8	4.6	0.75	
GK310-2T1.5B	1.5	7	15.2	8.8	1.5	
GK310-2T2.2B	2.2	9.6	22	12.8	2.2	
GK310-2T3B	3	13	28.7	16.6	3	
GK310-2T4B	4	17	35.6	20.6	4	
GK310-2T5.5B	5.5	25	44	32	5.5	
GK310-2T7.5B	7.5	32	55	42	7.5	

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■ GK310-4T□□□G/□□□L□, three-phase 400V input, heavy duty/ light duty

Drive model		Power rating (kW)	Rated output current (A)	Rated input current (A)	Applicable motor (kW)	Brake chopper
GK310-4T0.75G/1.5LB	0.75G	0.75	2.1	3.8	0.75	Inbuilt
	1.5L	1.5	3.8	5.0	1.5	
GK310-4T1.5G/2.2LB	1.5G	1.5	3.8	5.0	1.5	
	2.2L	2.2	5.1	6.2	2.2	
GK310-4T2.2G/3.7LB	2.2G	2.2	5.1	6.2	2.2	
	3.7L	3.7	9.0	10.8	3.7	
GK310-4T3.7G/5.5LB	3.7G	3.7	9.0	10.8	3.7	
	5.5L	5.5	13	15.7	5.5	
GK310-4T5.5G/7.5LB	5.5G	5.5	13	15.7	5.5	
	7.5L	7.5	17	21	7.5	
GK310-4T7.5G/11LB	7.5G	7.5	17	21	7.5	
	11L	11	25	27.6	11	
GK310-4T11G/15LB	11G	11	25	27.6	11	
	15L	15	32	37.2	15	
GK310-4T15G/18.5LB	15G	15	32	37.2	15	
	18.5L	18.5	37	41.5	18.5	
GK310-4T18.5G/22LB	18.5G	18.5	37	41.5	18.5	
	22L	22	45	49.5	22	
GK310-4T22G/30LB	22G	22	45	49.5	22	
	30L	30	60	65	30	
GK310-4T30G/37LB	30G	30	60	65	30	
	37L	37	75	81	37	
GK310-4T37G/45LB	37G	37	75	81	37	
	45L	45	91	96	45	
GK310-4T45G/55L(B)*	45G	45	91	96	45	Inbuilt optional
	55L	55	112	118	55	
GK310-4T55G/75L(B)*	55G	55	112	118	55	
	75L	75	150	168	75	
GK310-4T75G/90L	75G	75	150	168	75	External when needed
	90L	90	176	189	90	
GK310-4T90G/110L	90G	90	176	189	90	
	110L	110	210	228	110	

Drive model		Power rating (kW)	Rated output current (A)	Rated input current (A)	Applicable motor (kW)	Brake chopper
GK310-4T110G/132L	110G	110	210	228	110	
	132L	132	253	271	132	
GK310-4T132G/160L	132G	132	253	271	132	
	160L	160	304	329	160	
GK310-4T160G/185L	160G	160	304	329	160	
	185L	185	350	326	185	
GK310-4T185G/200L	185G	185	350	326	185	
	200L	200	380	410	200	
GK310-4T200G/220L	200G	200	380	410	200	
	220L	220	430	452	220	
GK310-4T220G/250L	220G	220	430	452	220	
	250L	250	470	505	250	
GK310-4T250G/280L	250G	250	470	505	250	
	280L	280	520	560	280	
GK310-4T280G/315L	280G	280	520	560	280	
	315L	315	590	645	315	
GK310-4T315G/355L	315G	315	590	645	315	
	355L	355	650	756	355	
GK310-4T355G/400L	355G	355	650	756	355	
	400L	400	725	799	400	
GK310-4T400G/450L	400G	400	725	799	400	
	450L	450	820	876	450	

2.3 Technical Features of GK310

Table 2-2 Technical features of GK310

Power input	Rated input voltage	220V level: Single / Three phase 220V AC
		400V level: three phase 380V~440V
	Frequency	50Hz/60Hz, tolerance ±5%
	Voltage range	Continuous voltage fluctuation ±10%, short fluctuation -15%~+10%, i.e. 400V: 323V~484V;
		Voltage out-of-balance rate <3%, distortion rate as per the requirements of IEC61800-2
	Allowable frequency fluctuation	±5%
	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~ 500.00Hz; unit: 0.01Hz
	Overload capacity	150% - 1min 180% - 10s 200% - 0.5s
Control characteristics	Control Method	V/f control SVC FOC
	Range of speed regulation	1:100 (V/f control) 1:200 (SVC) 1:1000 (FOC)
	Speed accuracy	±0.5% (V/f control) ±0.2% (SVC) ±0.02% (FOC)
	Speed fluctuation	±0.3%
	Torque response	< 10ms
	Torque control accuracy	±7.5% (sensor-less vector control 2) ±5% (closed-loop vector control)
	Starting torque	0.5Hz:180% (V/f) 0.25Hz: 180% (SVC) 0Hz: 200% (FOC)

	Start frequency	0.00~ 500.00Hz
Basic functions	Accel/Decel time	0.00~60000s
	V/F curve	Three ways: linear; multi-point; Nth order V/F curve
	V/F separation	2 ways: full separation, semi-separation
	Acceleration and deceleration curves	Straight line or S curve acceleration and deceleration mode; four acceleration and deceleration times; acceleration and deceleration time range 0.0~60000s
	DC brake	DC braking frequency: 0.00Hz~maximum frequency, braking time: 0.0s~30.0s, braking action current value: 0.0%~100.0%
	Pointing control	Pointing frequency range: 0.00Hz~50.00Hz; pointing acceleration and deceleration time 0.0s~60000s
	Simple PLC, multi-segment operation	Up to 16-speed operation via built-in PLC or control terminal
	Built-in PID	Easy to implement closed-loop control system for process control
	Automatic Voltage Regulation (AVR)	When the grid voltage changes, it can automatically maintain the output voltage constant
	Over-pressure and over-drain speed control	Automatic limitation of current and voltage during operation to prevent frequent over-current and over-voltage tripping
	Fast current limiting function	Minimize overcurrent faults and protect products from normal operation
	Input terminals	6 digital input terminals, including X6 for high-speed pulse input. Support active open collector NPN, PNP and dry contact input mode, 2 analog input terminals, one for voltage and current input optional, one for voltage input
	Output terminals	A high-speed pulse output terminal, 0 ~ 50kHz square wave signal output, can realize the set frequency, output frequency and other physical

		quantity output, a switch output terminal, a set of relay output terminal
		One analog output terminal, voltage and current output can be selected to realize the output of physical quantities such as set frequency and output frequency
Featured functions	Various main and auxiliary feed and switch, speed search, multiple acceleration and deceleration curves selection, holding brake control, up to 16-segment speed operation (two-segment speed support flexible frequency feed), swing frequency control operation, fixed length control, counting function, over-excitation braking, over-voltage stall, under-voltage stall, power failure restart, jump frequency, frequency binding, four-segment acceleration and deceleration time free switching, motor temperature protection, flexible fan control, process PID control, simple PLC, sag control, parameter recognition, weak magnetic control, high precision torque limiting, V/f separation control	
Protection functions	Power-on motor short-circuit detection, over-current protection, overvoltage protection, undervoltage protection, overheat protection, overload protection, etc.	
Environment	Place of use	Indoor, not exposed to direct sunlight, no dust, corrosive gases, flammable gases, oil mist, water vapor, dripping water or salt, etc.
	Ambient temperature	-10℃~40℃. The rated output current should be derated 1.5% for every 1℃ when the ambient temperature is 40℃~50℃
	Relative humidity	5%~95%, no condensation
	Vibration	Less than 5.9m/s2 (0.6g)
	Storage temperature	-20℃~+60℃
Others	Installation	Wall-mounted
	IP grade	IP20
	Cooling method	Forced air cooling

2.4 Parts Drawing

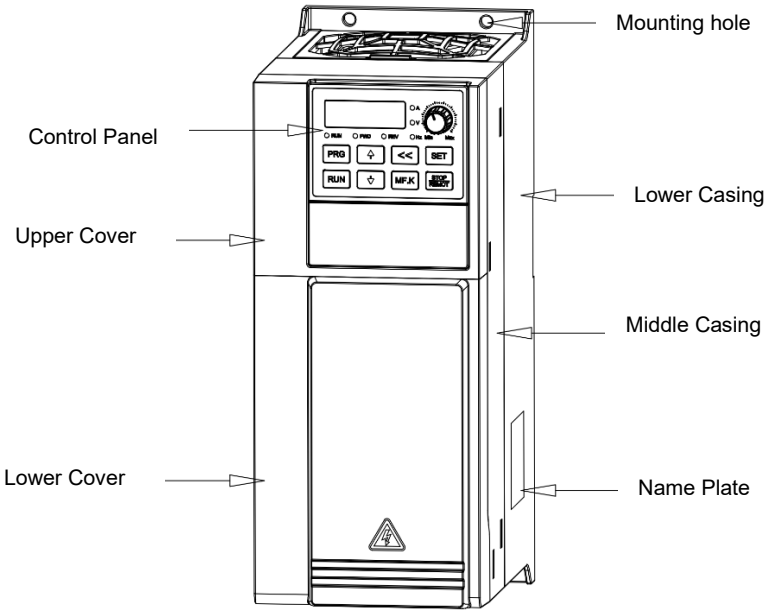
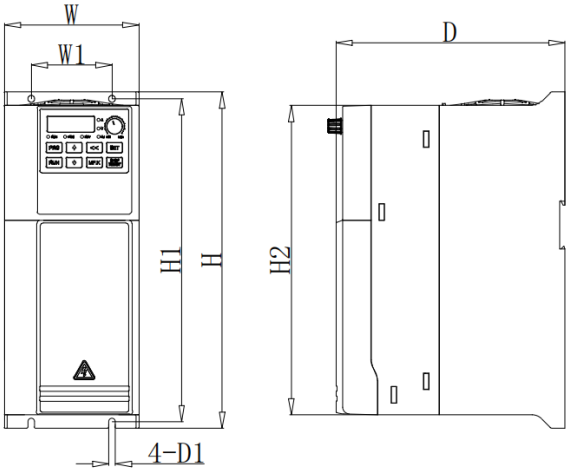


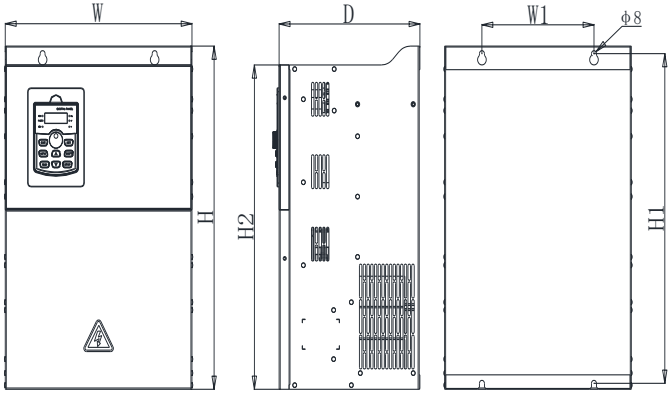
Fig. 2-2 Darwing

2.5 Appearance, Mounting Dimensions and Weight



a) GK310-2T0.4B~GK310-2T7.5B

GK310-4T0.75G/1.5LB~GK310-4T15G/18.5LB



b) GK310-4T18.5G/22LB and Above

Figure 2-3 External dimensions

Table 2-2 Appearance, mounting dimensions and weight

■ GK310-2T□□□B, single/ three-phase 220V input, heavy duty

Series	External and installation dimensions (mm)						Hole	Weight kg
	W1	H1	H	H2	W	D		
GK310-2T0.4B	60	200	210	190	80	150	Ø5	1
GK310-2T0.75B								
GK310-2T1.5B								
GK310-2T2.2B								
GK310-2T3B	60	240	250	230	100	170	Ø5	1.4
GK310-2T4B								
GK310-2T5.5B	85	273	285	260	120	185	Ø6	2.5
GK310-2T7.5B								

■ GK310-4T□□□G/□□□L□, three-phase 400V input, heavy duty/ light duty

Series	External and installation dimensions (mm)						Hole	Weight kg
	W1	H1	H	H2	W	D		
GK310-4T0.75G/1.5LB	60	200	210	190	80	150	Ø5	1
GK310-4T1.5G/2.2LB								
GK310-4T2.2G/3.7LB								
GK310-4T3.7G/5.5LB								
GK310-4T5.5G/7.5LB	60	240	250	230	100	170	Ø5	1.4
GK310-4T7.5G/11LB								
GK310-4T11G/15LB	85	273	285	260	120	185	Ø6	2.5
GK310-4T15G/18.5LB								
GK310-4T18.5G/22LB	120	322	340		180	181.2	Ø8	8.4
GK310-4T22G/30LB								
GK310-4T30G/37LB	150	372	390		240	196	Ø8	14.8
GK310-4T37G/45LB								
GK310-4T45G/55L(B)*	180	437	455		300	226	ø8	20
GK310-4T55G/75L(B)*								

Series	External and installation dimensions (mm)						Hole	Weight kg
	W1	H1	H	H2	W	D		
GK310-4T75G/90L	260	510	530		330	260	ø 10	30
GK310-4T90G/110L								
GK310-4T110G/132L	260	750	785		395	285	ø 12	50
GK310-4T132G/160L	340	711	735		440	320	ø 12	75
GK310-4T160G/185L								
GK310-4T185G/200L								
GK310-4T200G/220L	400	830	855		510	350	ø 12	120
GK310-4T220G/250L								
GK310-4T250G/280L								
GK310-4T280G/315L								
GK310-4T315G/355L	600	1017	1050		750	365	ø 14	165
GK310-4T355G/400L								
GK310-4T400G/450L								

2.6 External Dimensions of Control Panel

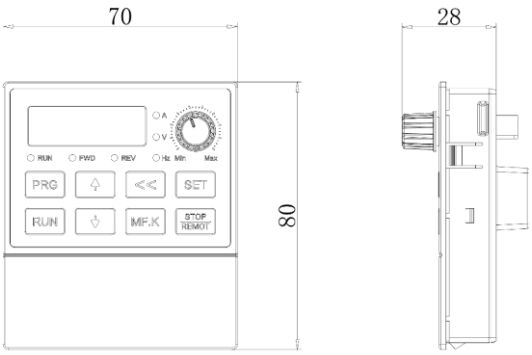


Figure 2-3 Dimensions of Control Panel

Chapter 3 Installation and Wiring

3.1 Installation Environment

1) Ambient temperature is in the range of -10℃ to 50℃.
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/s^2 (0.6g).
4) Avoid installation in places exposed to direct sunlight, moisture, condensation, or water droplets.
5) Avoid installation in areas with oil contamination, heavy metal dust, excessive dust, or high salt content.
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 Configuration of Peripheral Devices

3.2.1 Standard Configuration of Peripheral Devices

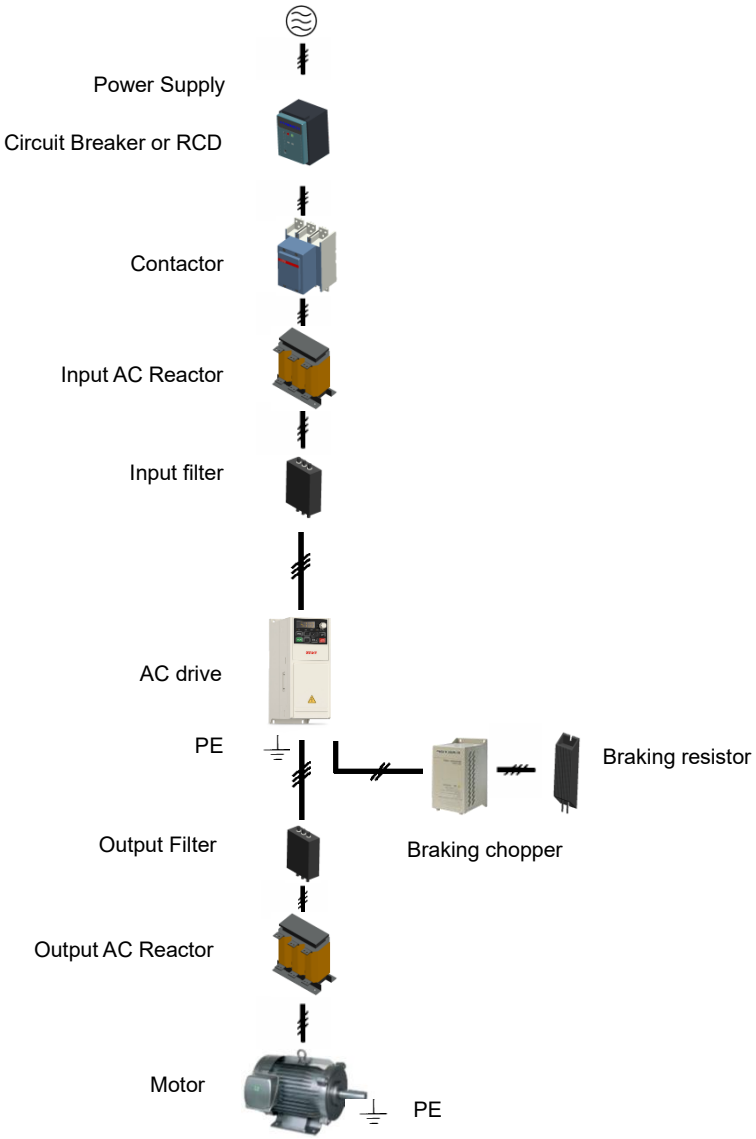


Fig. 3-1 Standard configuration of peripheral devices

3.2.2 Instructions of Peripheral Devices

Table 3-1 Instructions of peripheral devices

Device	Instructions
Power supply	Input three-phase AC power supply should be in the range as specified in this manual
Circuit breaker	Purpose: disconnect power supply and protect the equipment in case of abnormal overcurrent occurs Type selection: breaking current of circuit breaker is defined to be 1.5~2 times the rated current of the drive Breaking time characteristic of circuit breaker should be selected based on overload protection time characteristic of the drive
RCD	Purpose: since the drive outputs PWM HF chopping voltage, HF leakage current is inevitable Type selection: To prevent electric shock accidents and the occurrence of electrical fires, please select a suitable residual current protective device according to the site conditions. Type B dedicated RCD is recommended.
Contactor	For safety's sake, do not frequently close and break the contactor since this may bring about equipment faults Do not control the start & stop of the drive directly through switch on and off the contactor since this will result in a reduction on the product life
Input AC reactor or DC choke	Improve power factor Reduce the impact of imbalanced three-phase input AC power supply on the system Suppress higher harmonics and reduce the conducted and radiated interference to peripheral devices Restrict the impact of impulse current on rectifier bridges
Input filter	Reduce conducted interference from power supply to the drive, improve the immunity of the drive from noise Reduce conducted and radiated interference of the drive to peripheral devices
Brake chopper and braking resistor	Purpose: consume motor feedback energy to attain quick brake Type selection: Contact GTAKE technical personnel for type selection of brake chopper. Refer to type selection of braking resistor in Table 3.5.3 Selection of Peripheral Devices for the drive model with B at the end.
Output filter	Reduce conducted and radiated interference of the drive to peripheral devices
Output AC reactor	Avoid the motor insulation damage result from harmonic voltage Reduce frequent protection from the drive caused by leakage current The cable between the drive and the motor should not be too long. If the cable is too long, its distributed capacitance will be high, which can easily generate high harmonic currents. Generally, when the distance between the drive and the motor exceeds 100m, it is recommended to install an output AC reactor.
Motor	Should match the drive
External keypads	Support external LED and LCD keypads

3.2.3 Selection of Peripheral Devices

Table 3-2 Selection of peripheral devices

Drive model	Braking resistor/Brake chopper *	
	Resistor configuration	Min. Resistance value (Ω)
220V; Single/Three Phase input		
GK310-2T0.4B	80W	≥200Ω
GK310-2T0.75B	80W	≥150Ω
GK310-2T1.5B	100W	≥100Ω
GK310-2T2.2B	100W	≥70Ω
GK310-2T3B	1100W	≥100Ω
GK310-2T4B	1500W	≥75Ω
GK310-2T5.5B	2200W	≥50Ω
GK310-2T7.5B	3000W	≥38Ω
380V; Three phase input		
GK310-4T0.75G/1.5LB	150W	≥800Ω
GK310-4T1.5G/2.2LB	300W	≥380Ω
GK310-4T2.2G/3.7LB	440W	≥260Ω
GK310-4T3.7G/5.5LB	750W	≥150Ω
GK310-4T5.5G/7.5LB	1100W	≥100Ω
GK310-4T7.5G/11LB	1500W	≥75Ω
GK310-4T11G/15LB	2200W	≥50Ω
GK310-4T15G/18.5LB	3000W	≥38Ω
GK310-4T18.5G/22LB	4000W	≥32Ω
GK310-4T22G/30LB	4500W	≥27Ω
GK310-4T30G/37LB	6000W	≥20Ω
GK310-4T37G/45LB	7000W	≥16Ω
GK310-4T45G/55L(B)*	9000W	≥13Ω
GK310-4T55G/75L(B)*	11000W	≥10.5Ω

3.3 Main Circuit Terminals and Wiring

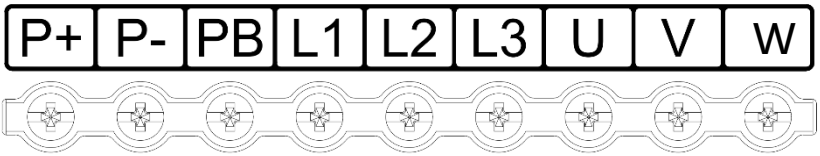
WARNING

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

ATTENTION

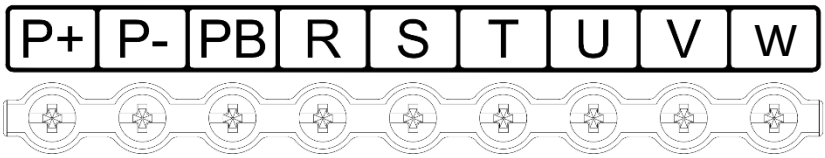
- Signal wires should be away from main power lines to the best of possibility. In the event that this cannot be ensured, vertical cross arrangement should be adopted, reducing EMI interference to the signal wires as much as possible.
- In case the motor cable exceeds 100m, an appropriate output reactor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

3.3.1 Main Circuit Terminals of Single Phase/Three Phase 220V Machine



Terminal marks	Designation and function of terminals
L1, L2, L3	Three-phase AC input terminals
P+、PB	Braking resistor connection terminals when brake unit is inbuilt*
P+、P-	DC power supply input terminals
U, V, W	Three-phase AC output terminals
PE	Ground terminal PE

3.3.2 Main Circuit Terminals of GK310-4T0.75G/1.5LB~GK310-4T15G/18.5LB



Terminal marks	Designation and function of terminals
R, S, T	Three-phase AC input terminals
P+、PB	Braking resistor connection terminals when brake unit is inbuilt*
P+、P-	DC power supply input terminals
U, V, W	Three-phase AC output terminals
PE	Ground terminal PE

3.4 Control Terminal Wiring

⚠ WARNING

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

⚠ ATTENTION

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

Wiring Diagram

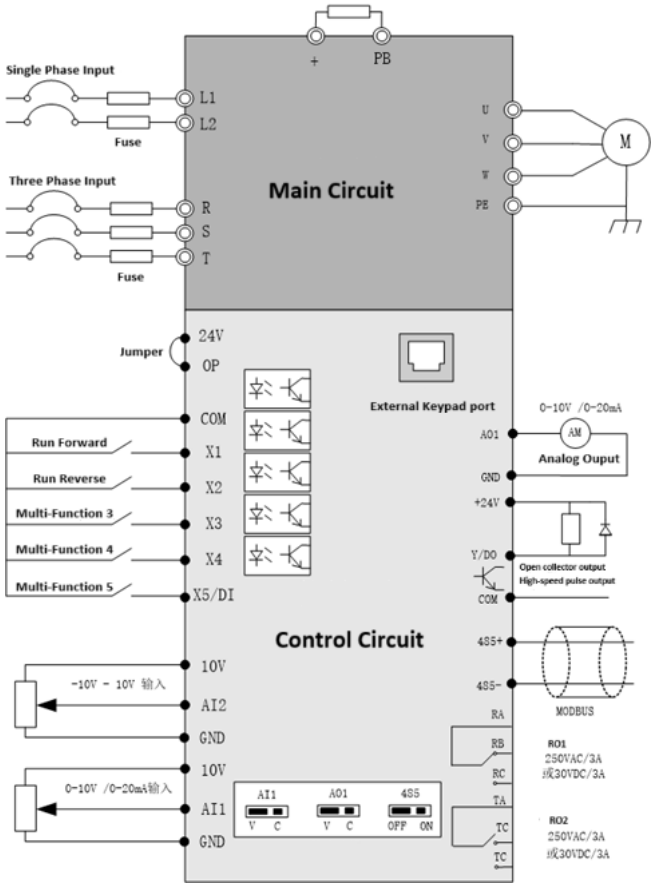


Fig. 3-2 Wiring Diagram

3.5 Control Terminal Specification

Table 3-3 Control board terminal specification

Category	Terminal	Terminal designation	Specification
Power supply	+10V-GND	External +10V power supply	Provide +10V power supply to the outside, maximum output current: 10mA Used as an external potentiometer working power supply, resistance range: 1kΩ~50kΩ
	+24V-COM	External +24V power supply	Provide +24V power supply to the outside, generally used as the working power of digital input and output terminals and external sensor power supply, maximum output current: 200mA
	OP	External power input terminal	By using a metal jumper on the control board terminals, connection to either +24V or COM can be selected. The factory default is connected to +24V. When using an external signal to drive terminals X1~X6, OP must be connected to the external power supply, and the jumper must be removed.
Analog input	AI1-GND	Analog input terminal 1	Input voltage range: DC 0V~10V/4mA~20mA, jumper decision. Input impedance: 100kΩ for voltage input and 500Ω for current input.
	AI2-GND	Analog input terminal 2	Input range: DC -10V~10V Input impedance: 100kΩ
Digital input	X1- COM	Digital input 1	Optical coupled isolation, compatible with bipolar input Input impedance：4.7kΩ Voltage range at level input: 9V~30V
	X2- COM	Digital input 2	
	X3- COM	Digital input 3	
	X4- COM	Digital input 4	
	X5-COM	Digital input 5	
	X6-COM	High-speed pulse input terminal	In addition to having the functions of X1~X5, it can also be used as a high-speed pulse input channel. Maximum input frequency: 50kHz
Analog output	AO1-GND	Analog output 1	The voltage or current output is determined by the AO1 jumper selection on the control board. Output voltage range: 0V~10V Output current range: 0mA~20mA
Digital Output	Y/DO-COM	Digital output 1 (compatible with high-speed output)	Optically isolated, bipolar open collector output Output voltage range: 0V~24V Output current range: 0mA~50mA

Category	Terminal	Terminal designation	Specification
Relay Output	RA-RB	NC	Contact drive capability. AC250V, 3A; DC 30V, 3A.
	RA-RC	NO	
COM Terminal	485+/485-	Communication Interface	Transmission rate: 4.8K/9.6K/19.2K/38.4K/57.6K/115.2Kbps Maximum distance of 500 meters (using standard network cable)
Keypad	CN3	External keypad interface	The maximum communication distance is 3 meters when connecting the operation panel with standard network cable.

3.6 Control Terminal Usage

3.6.1 Lay-out of Control Terminals

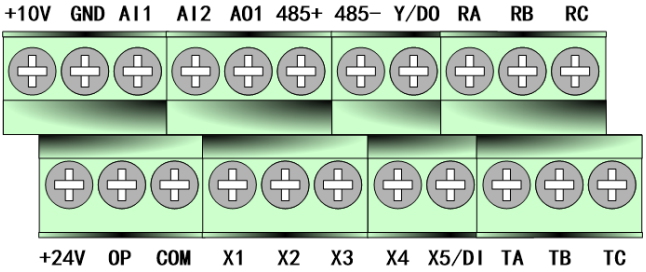


Fig. 3-3 Lay-out of control terminals

3.6.2 Control Terminal Screw and Wiring Requirement

Table 3-4 Terminal screw and wiring specification

Cable type	Cable requirement (mm^2)	Screw	Torque (kgf.cm)
Shielded cable	1.0	M3	5±0.5

3.6.3 Instructions of Analog Input/Output Terminals

Being particularly vulnerable to noise, analog input & output signals cables should be as short as possible, shielded, and their shielded layers should be properly grounded, close to the side of drive. The cables should not exceed 20m.

Control cables shall be kept no less than 20cm away from main circuit and strong current lines (e.g. power lines, motor lines, relay lines and contactor lines) and should not be arranged in

parallel with strong current lines. In case it is inevitable to intersect strong current line, vertical wiring is recommended so as to avoid drive faults as the result of noise.
Where analog input & output signals are severely interfered, the side of analog signal source should be provided with filter capacitor or ferrite core.

3.6.4 Instructions of Digital Input/Output Terminals

Digital input & output signals cables should be as short as possible, shielded, and their shielded layers should be properly grounded close to the side of drive. The cables should not exceed 20m. When active drive is selected, take necessary filtering measures against power crosstalk, for which dry contact control is recommended.
Control cables shall be kept no less than 20cm away from main circuit and strong current lines (e.g. power lines, motor lines, relay lines and contactor lines) and should not be arranged in parallel with strong current lines. In case it is inevitable to intersect strong current line, vertical wiring is recommended to avoid drive faults as a result of noise.

- **Instructions of digital input terminal**

◆ **Dry contact**

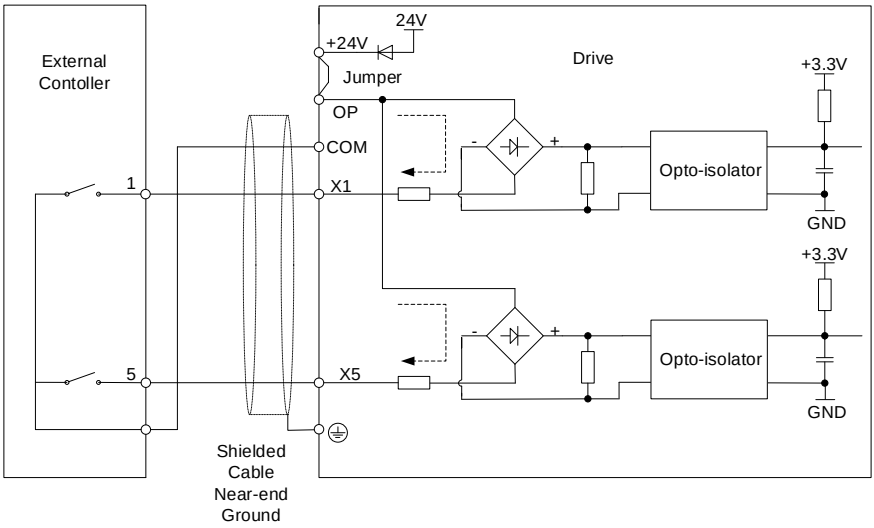


Fig. 3-4 Internal power supply dry contact

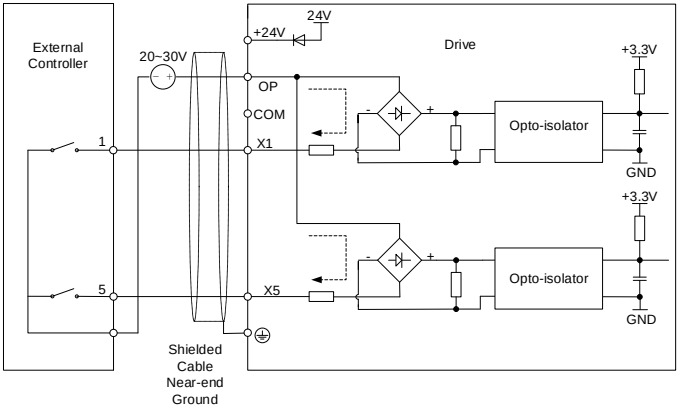


Fig. 3-5 External power supply dry contact

ATTENTION:

When X5 terminal is set to pulse input, it can accept a pulse signal from 0 to 50kHz.

When external power supply is used, the jumper between +24V and OP must be removed. Otherwise, it may result in equipment damage.

For wiring methods of the power supply of extension IO board and NPN, the jumper between +24V and OP must be removed. Otherwise, it may result in equipment damage.

The voltage range of external power supply should be within the range of DC20~30V. Otherwise, normal operation could not be assured and/or result in equipment damage.

◆ Open collector NPN connection

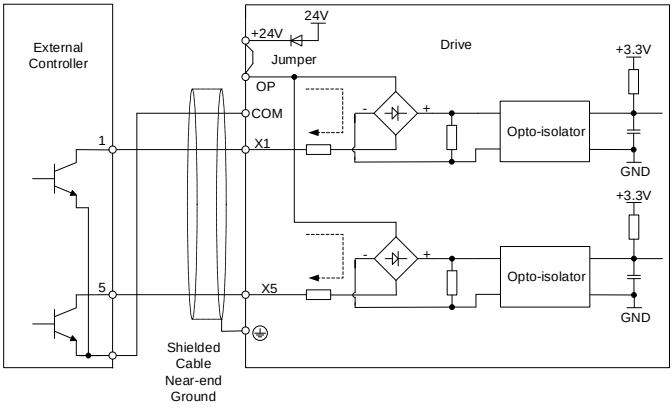


Fig. 3-6 Internal power supply open collector NPN connection

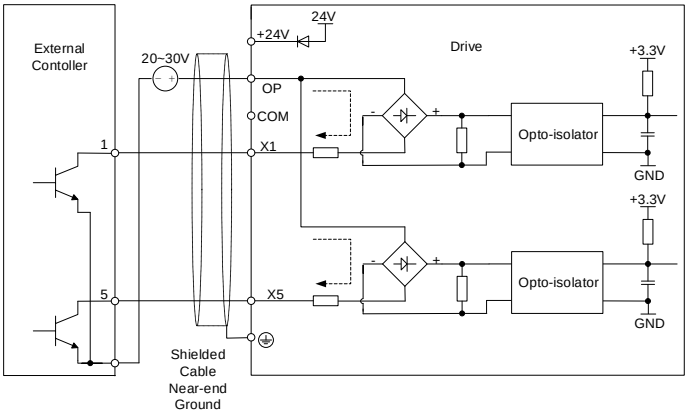


Fig. 3-7 External power supply open collector NPN connection

ATTENTION:

When X5 terminal is set to pulse input, it can accept a pulse signal from 0 to 50kHz.

When external power supply is used, the jumper between +24V and OP must be removed. Otherwise, it may result in equipment damage.

For wiring of the power supply of extension IO board and NPN, the jumper between +24V and OP must be removed. Besides, the voltage range of external power supply should be within the range of DC20~30V. Otherwise normal operation could not be assured and/or hazard of equipment damage exists.

◆ **Open collector PNP connection**

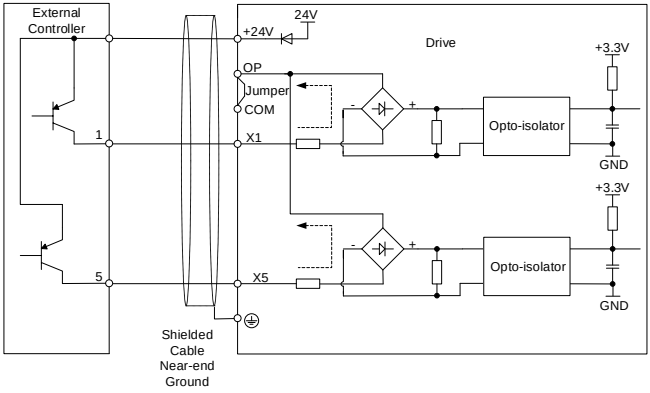


Fig. 3-8 Internal power supply open collector PNP connection

ATTENTION:

When PNP wiring is selected, the jumper between +24V and OP must be switched to between OP and COM. Otherwise normal operation could not be assured and/or hazard of equipment damage exists.

The PNP wiring for the extension IO board is the same as method of the default IO board.

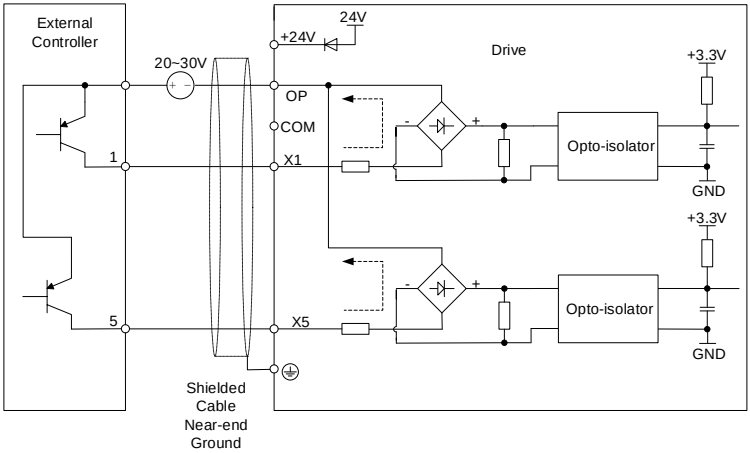


Fig. 3-9 External power supply open collector PNP connection

ATTENTION:

When X5 terminal is set to pulse input, it can accept a pulse signal from 0 to 50kHz.

When external power supply is used, the jumper between +24V and OP must be removed. Otherwise, it may result in equipment damage.

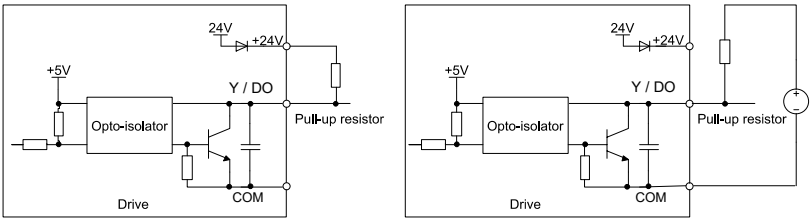
The PNP wiring for the extension IO board is the same as the method of default board.

The voltage range of external power supply should be DC20~30V. Otherwise, normal operation could not be assured and/or result in equipment damage.

For PNP wiring method of the external power supply to the extension IO board, the jumper between +24V and OP must be removed. Besides, the voltage range of external power supply should be within the range of DC20~30V. Otherwise normal operation could not be assured and/or hazard of equipment damage exists.

- **Instructions of digital output terminal**

◆ **Instructions of HDO and DO output terminals**

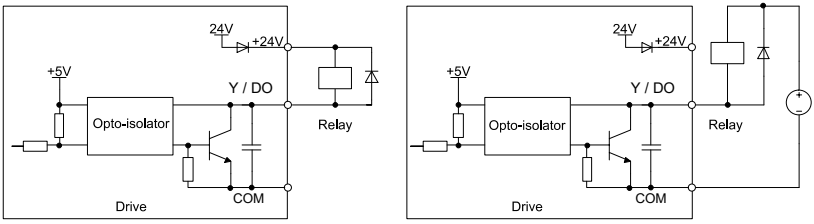


a) Internal power supply b) External power supply

Fig. 3-10 Wiring when HDO and DO1 output with pull-up resistors

ATTENTION:

When set to pulse output, Y / DO terminal shall output 0~50kHz pulse signal.



a) Internal power supply b) External power supply

Fig. 3-11 Wiring diagram when HDO and DO1 drive relay

ATTENTION:

When relay coil voltage is lower than 24V, a resistor as voltage divider should be mounted between relay and output terminal, based on coil impedance.

In addition, a freewheeling diode must be installed with correct polarity according to the diagram. The driving capacity should not exceed 50mA.

◆ **Wiring instruction of relay output terminal**

- GK310 series inverter control board has a set of programmable relay dry contact outputs.
- The relay contacts are RA/RB/RC, where RA and RB are normally closed contacts and RA and RC are normally open contacts, whose function is defined in the function code.

ATTENTION:

In case inductive load (e.g. electromagnetic relay or contactor) is to be driven, a surge voltage absorbing circuit such as RC absorbing circuit (note that its leakage current shall be less than holding current of controlled contactor or relay), piezo-resistor or fly-wheel diode etc. shall be mounted (be sure to pay close attention to polarity in case of DC electromagnetic circuit). Absorbing devices should be mounted close to the ends of relay or contactor.

3.6.5 Instruction of IO board jumper signal switch

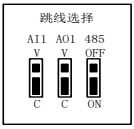


Fig. 3-12 Jumper diagram of signal switching

Designation	Function	Default setting
485	485 Terminating resistor selection: ON for 100Ω terminating resistor, OFF for no terminating resistor	OFF: No resistance
AI1	AI1 analog type selection: C is current input (0~20mA), V is voltage input (0~10V)	V: 0~10V

3.7 EMC Solutions

Due to its working principle, the drive will inevitably produce certain noise that may influence and disturb other equipment. Moreover, since the internal weak electric signal of drive is also susceptible to the interference of drive itself and other equipment, EMC problems shall be inevitable. In order to reduce or avoid the interference of drive to external environment and protect drive against interference from external environment, this section makes a brief

description of noise abatement, ground handling, leakage current suppression and the application of power line filters.

3.7.1 Noise Abatement

- When peripheral equipment and drive share the power supply of one system, noise from drive may be transmitted to other equipment in this system via power lines and result in misoperation and/or faults. In such a case, the following measures could be taken:
  1) Mount input noise filter at input terminal of the drive;
  2) Mount power supply filter at power input terminal of affected equipment;
  3) Use isolation transformer to isolate the noise transmission path between other equipment and the drive.
- As the wiring of peripheral equipment and drive constitutes a circuit, the unavoidable earthing leakage current of inverter will cause equipment misoperation and/or faults. Disconnect the grounding connection of equipment may avoid this misoperation and/or faults.
- Sensitive equipment and signal lines shall be mounted as far away from drive as possible.
- Signal lines should be provided with shielded layer and well grounded. Alternatively, signal cable could be put into metallic conduits between which the distance shall be no less than 20cm, and shall be kept as far away from drive and its peripheral devices and cables as possible. Never make signal lines in parallel with power lines or bundle them.
- Signal lines must orthogonally cross power lines if this cross is inevitable. Motor cables shall be placed in thick protective screen like more than 2mm-thick pipelines or buried cement groove, also, power lines can be put into metallic conduit and grounded well with shielded cables.
- Use 4-core motor cables of which one is grounded at close side of the drive and the other side is connected to motor enclosure. Input and output terminals of drive are respectively equipped with radio noise filter and linear noise filter. For example, ferrite common mode choke can restrain radiation noise of power lines.

3.7.2 Grounding

Recommended ground electrode is shown in the figure below:

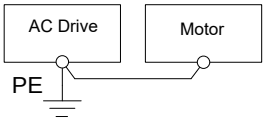


Fig. 3-13 Grounding

- Use to the fullest extent the maximum standard size of grounding cables to reduce the impedance of grounding system.
- Grounding wires should be as short as possible. Grounding point shall be as close to the drive as possible.

- One wire of 4-core motor cables shall be grounded at the drive side and connected to grounding terminal of motor at the other side. Better effect will be achieved if motor and drive are provided with dedicated ground electrodes.
- When grounding terminals of various parts of system are linked together, leakage current turns into a noise source that may influence other equipment in the system, thus, grounding terminals of the drive and other vulnerable equipment should be separated. Grounding cable shall be kept away from input & output of noise-sensitive equipment.

3.7.3 Leakage Current Suppression

- Leakage current passes through the line-to-line and ground distributed capacitors at input & output sides of drive, and its size is associated with the capacitance of distributed capacitor and the switching frequency. Leakage current is classified into ground leakage current and line-to-line leakage current.

- Ground leakage current not only circulates inside drive system, but may also influence other equipment via ground loop. Such a leakage current may result in malfunction of RCD and other equipment. The higher the switching frequency of drive is, the bigger the ground leakage current would be. The longer the motor cables and the bigger the parasitic capacitance are, the bigger the ground leakage current would be. Therefore, the most immediate and effective method for suppression of ground leakage current is to reduce switching frequency and minimize the length of motor cables.
- The higher harmonics of line-to-line leakage current that passes through between cables at output side of drive will Accel the aging of cables and may bring about malfunction of other equipment. The higher the switching frequency of drive is, the bigger the line-to-line leakage current would be. The longer the motor cables and the bigger the parasitic capacitance are, the bigger the line-to-line leakage current would be. Therefore, the most immediate and effective method for suppression of ground leakage current is to reduce switching frequency and minimize the length of motor cable. Line-to-line leakage current can also be effectively suppressed by mounting additional output reactors.

3.7.4 Use of Power Supply Filter

Since drives may generate strong interference and are also sensitive to outside interference, power supply filters are recommended. Pay close attention to the following instructions during the use:

- Enclosure of the filter needs to be well grounded;
- Input lines of the filter shall be kept as far away from output lines as possible so as to avoid mutual coupling;
- Filter shall be as close to the drive side as possible;
- Filter and drive must be connected to the same common ground.

Chapter 4 Operation and Display

4.1 Introduction of Control Panel

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

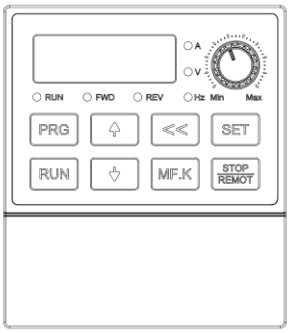


Fig. 4-1 Control panel

4.1.1 Key Functions on Control Panel

On the control panel there are 8 keys whose functions are as shown in Table 4-1.

Symbol	Key name	Meaning
PRG	Programming	1) Enter the programming interface 2) Return to the previous menu
SET	Confirm	1) Enter the next-level menu screen 2) Confirm parameter settings
△	Increase key	1) Increase of selected bit of parameter 2) Increase of selected bit of parameter value 3) Increase of set frequency
▽	Decrease key	1) Decrease of selected bit of parameter 2) Decrease of selected bit of parameter value 3) Decrease of set frequency
<<	Shift key	1) Selection of parameter bit 2) Selection of parameter value bit 3) Selection of stop/run status display parameter value 4) Fault status switches to parameter value display status
RUN	Run key	Run
STOP	Stop/reset key	1) Stop 2) Fault reset

MF.K	Multi-function key	See parameter F7-00 " MF key function definition"

4.1.2 Control Panel Indicators

Control panel is furnished with 5 indicators whose descriptions are as below

Table 4-2 Description of indicators

Indicator	Designation	Meaning
Hz	Frequency indicator	ON: currently displayed parameter value is running frequency or the current parameter unit is frequency Flash: currently displayed parameter value is set frequency
A	Current indicator	ON: currently displayed parameter value is current
V	Voltage indicator	ON: currently displayed parameter value is voltage
Hz+A	Running speed indicator	ON: currently displayed parameter value is running speed Flash: currently displayed parameter value is setting speed
A+V	Percentage indicator	ON: currently displayed parameter value is a percentage value
All OFF	No unit	No unit
RUN	Run status indicator	ON: Run OFF: Stop Flash: Stopping
FWD/REV	Forward / Reverse indicator	ON: If the drive is in stop status, forward command is enabled. If the drive is in run status, the drive is running forward. OFF: If the drive is in stop status, reverse command is enabled. If the drive is in run status, the drive is running reversely. Flash: Forward is being transferred to reverse. Reverse is being transferring to forward.

4.2 Operation of Control Panel

The parameter group of GK310 series inverter contains a secondary menu structure, which can be modified and set through the operation panel. The steps for setting and modifying the parameters are as follows.

a) In the monitoring state, press the key "ESC/PRG" to enter the function code parameter display state.

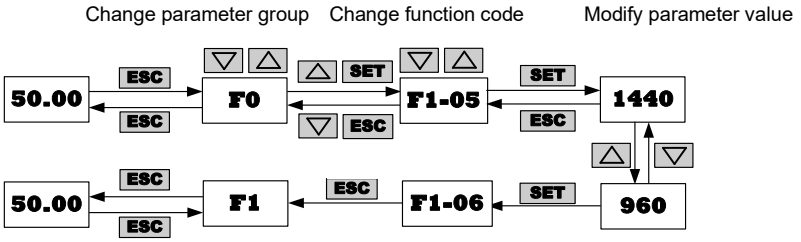
b) In the parameter code display state, by "SHIFT/>>" button, the parameter function code parameter bit flashes, then the current flashing bit data can be modified.

c) Modify the blink parameter group to modify the target function code by using the / △ ▽ button.

d) "SET" button to enter the parameter function code.

e) Modify to the target parameter value, "SET" button, confirm the modified parameter value.

f) After the parameter modification is completed, the current display function code automatically jumps to the next valid display function code to complete the parameter modification.



Chapter 5 Basic operation and commissioning

The basic commissioning of the inverter mainly includes the frequency command setting of the inverter, the control of start and stop, and the simple commissioning and operation of the inverter-controlled motor can be realized according to the following contents.

5.1 Rapid commissioning process

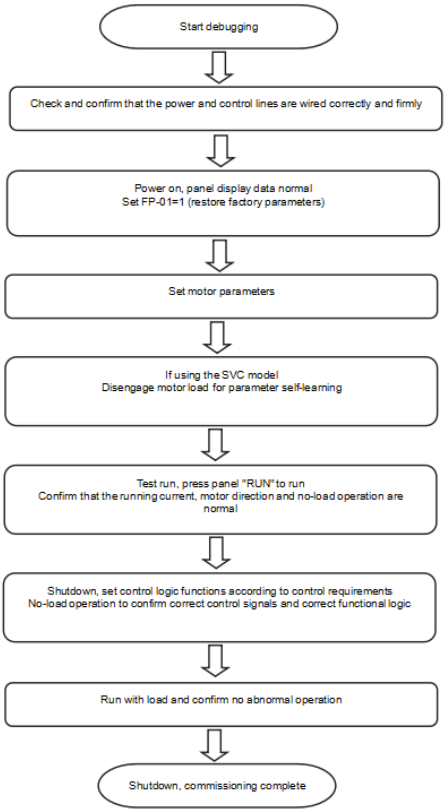


Fig 5.1 Flow chat of first commissioning

5.2 Introduction to common functions

5.2.1 Confirmation before power on

Please be sure to check the following items before turning on the power.

Projects	Content
Confirmation of power supply voltage	Please confirm if the power supply voltage is correct: single-phase AC220V 50/60Hz Three-phase AC380V~480V 50/60Hz
	Please wire the power input terminals (R/S/T) (L1/L2/L3) reliably.
	Confirm that the inverter and motor are properly grounded
Connection confirmation of inverter output terminal and motor terminal	Make sure the connection between the output terminal (U/V/W) and the motor terminal is secure.
Confirmation of connection with inverter control circuit terminals	Make sure that the control circuit terminals and other control devices are securely connected.
Status confirmation of inverter control terminals	Make sure that the control circuit terminals are all OFF.
Load Confirmation	Please make sure that the motor is not connected to the mechanical system because it is not in the no-load condition

5.2.2 Display status confirmation after power on

When the power is turned on, the operator in the normal state is displayed as shown below.

Status	Display	Description
Normal time	50.00	Factory default display is digital setting 50.00Hz

In case of failure	Er.XX	The inverter is shut down when the fault occurs, and the type of fault is displayed

5.2.3 Parameter initialization

Parameter values are automatically zeroed.

Parameter initialization		Factory value: 0	Description
FP-01	0	No operation	
	1	Restore factory parameters Motor parameters are not included	Inverter function parameters are restored to factory values, but not including motor parameters
	2	Clear Recorded Information	Clear the inverter fault log information.

5.2.4 Selecting the motor control method

Function Code	Description	Applications
F0-01. Select motor control method	0	SVC
	1	FVC
	2	V/f

5.2.5 Selecting the start/stop command channel

Select the input channel for inverter control commands. The control commands include: start, stop, forward, reverse, and jog, etc.

Command selection		Factory value: 0	Description
F0-02	0	Operation Panel	Operation command control by RUN, STOP/RES keys on the operation panel
	1	Connector	Operation command control by multi-function input terminal functions FWD, REV, JOGF, JOGR, etc.
	2	Communication	Operation commands are given by the host computer via communication

Chapter 6 Functional parameters table

GK900 parameter groups are listed below:

Category	Parameter Group
Group F: Operation parameter setting	F0: Basic function group
	F1: Motor parameter setting group
	F2: Control performance parameter setting group
	F3: V/F control curve parameter setting group
	F4: Analog/digital signal input setting group
	F5: Analog/digital signal output setting group
	F6: Start/stop parameter setting group
	F7: Display parameter setting group
	F8: Frequency auxiliary setting parameter group
	F9: Protection function parameter group
	FA: PID closed-loop function parameter group
	FC: Multi-step speed, PLC function setting group
	Fd: Communication parameter group
	FF: Password parameter setting group
	FP: Function code management parameter group
Group P: industry non-standard parameter setting	P0: Torque control parameter group
	P5: Control optimization parameter set
Group U: Monitoring	U0: Status monitoring parameter group

Change the attribute description.

☆Parameters can be changed during operation, shutdown state, not by the keypad and in case of parameter lock.

★Parameters can be changed in the shutdown state, not by the keypad and in the case of parameter locking, and cannot be changed in the running state.

● Monitoring parameters, which cannot be changed.

Param.	Designation	Scope	Factory Default	Attr
Group F0 Basic Function Group				
F0-00	G/P Type Selection	1: G type (constant torque load model) 2: P type (fan, pump type load)	1	●
F0-01	Motor 1 control method	0: Vector control without speed sensor (SVC) 1: Vector control with speed sensor (FVC) 2: V/F control	2	★
F0-02	Run command selection	0: Operator panel 1: Terminal 2: Communication	0	☆
F0-03	Master FREQ set	0: Digital setting (no memory for power down) 1: Digital setting (power-down memory) 2: AI1 3: AI2 4: Panel Potentiometer 5: Pulse setting (X6) 6: Multi-segment command 7: Simple PLC 8: PID 9: Communication given	4	★
F0-04	Auxiliary FREQ set	Same definition as F0-03 (main frequency command input selection)	0	★
F0-05	Auxiliary FREQ range	0: relative to the maximum frequency 1: Relative to the main frequency command	0	☆
F0-06	Auxiliary FREQ range	0%~150%	100%	☆

Param.	Designation	Scope	Factory Default	Attr
F0-07	FREQ set mode	Ones Place: Frequency command selection 0: Master frequency reference 1: Master & auxiliary computation result 2: Switch between master and auxiliary frequency reference 3: Switch between master frequency reference, and master & auxiliary computation result 4: Switch between auxiliary frequency reference, and master & auxiliary computation result	0	☆
		Tens Place: Frequency command primary and secondary operation relationship 0: Master + auxiliary 1: Master - auxiliary 2: Max {master, auxiliary} 3: Min {master, auxiliary}		
F0-08	Digital frequency setting	0.00Hz~maximum frequency (F0-10)	50.00Hz	☆
F0-09	Running direction	0: Positive rotation operation	0	☆
		1: Reverse operation		
F0-10	Maximum frequency	Upper limit frequency ~500.00Hz	50.00Hz	★
F0-11	Upper limit frequency command selection	0: F0-12 setting	0	★
		1: AI1		
		2: AI2		
		3: Panel Potentiometer		
		4: Pulse setting		
		5: Communication given		
F0-12	Upper limit frequency	Lower limit frequency F0-14~Maximum frequency F0-10	50.00Hz	☆
F0-13	Upper frequency offset	0.00Hz~maximum frequency F0-10	0.00Hz	☆

Param.	Designation	Scope	Factory Default	Attr
F0-14	Lower limit frequency	0.00Hz~upper limit frequency F0-12	0.00Hz	☆
F0-15	Switching frequency	0.5kHz~16.0kHz	Model	☆
F0-16	Switching frequency adjusts with load	0: No 1: Yes	1	☆
F0-17	Acceleration time 1	0.0~6500.0	Model	☆
F0-18	Deceleration time 1	0.0~6500.0	Model	☆
F0-19	Acceleration and deceleration time units	0: 1 second 1: 0.1 second 2: 0.01 seconds	1	★
F0-21	Auxiliary frequency command bias frequency during superposition	0.00Hz~maximum frequency F0-10	0.00Hz	☆
F0-22	frequency resolution	1： 0.1Hz 2： 0.01Hz	2	★
F0-23	Digital set frequency stop memory selection	0: No memory 1: Memory	0	☆
F0-25	Acceleration and deceleration time reference frequency	0: Maximum frequency (F0-10) 1: Set frequency	0	★
F0-26	Runtime frequency	0: Operating frequency 1: Set frequency	0	★

Param.	Designation	Scope	Factory Default	Attr
	command UP/DOWN reference			
F0-27	Run command bundle master frequency command selection	Individual position: operation panel binding frequency source selection	0	☆
Group F1: Motor parameters				
F1-00	Motor type selection	0: Ordinary asynchronous motor 1: Inverter asynchronous motor	0	★
F1-01	Motor rated power	0.4KW～630KW	Model	★
F1-02	Motor rated voltage	1V ~ 1000V	Model	★
F1-03	Motor rated current	0.01A ~ 6553.5A	Model	★
F1-04	Motor rated frequency	0.01Hz ~ Maximum Frequency	Model	★
F1-05	Motor rated speed	1rpm ~ 65535rpm	Model	★
F1-06	Motor stator resistance	0.001Ω ~ 65.535Ω (Inverter power ≤ 55kW) 0.0001Ω ~ 6.5535Ω (Inverter power >55kW)		★
F1-07	Motor rotor resistance	0.001Ω ~ 65.535Ω (Inverter power ≤ 55kW) 0.0001Ω ~ 6.5535Ω (Inverter power >55kW)		★
F1-08	Motor leakage inductance resistance	0.01mH ~ 655.35mH (Inverter power ≤ 55kW) 0.001mH ~ 65.535mH (Inverter power >55kW)		★
F1-09	Motor mutual inductance resistance	0.1mH ~ 6553.5mH (Inverter power ≤ 55kW) 0.01mH ~ 655.35mH (Inverter power >55kW)		★

Param.	Designation	Scope	Factory Default	Attr
F1-10	Motor no-load current	0.01A ~ F1-03 (Inverter power ≤ 55kW) 0.1A ~ F1-03 (Inverter power >55kW)		★
F1-27	Number of encoder lines	1 ~ 65535	1024	★
F1-28	Encoder type	0: ABZ incremental encoder 2: Rotary transformer	0	★
F1-30	ABZ incremental encoder AB phase sequence	0: Positive 1: Reverse	0	★
F1-34	Number of pole pairs of resolver	1 ~ 65535	1	★
F1-36	Speed Feedback PG Disconnection Detection Time	0.0s: no action 0.1s ~ 10.0s	0.0s	★
F1-37	Tuning options	0: No operation 1: Asynchronous machine stationary part parameter tuning 2: Asynchronous machine dynamic complete tuning 3: Asynchronous machine stationary complete tuning	0	★
Group F2 Motor vector control parameters				
F2-00	Speed loop low speed proportional gain	1 ~ 100	30	☆
F2-01	Speed loop low speed integration time	0.01s ~ 10.00s	0.50s	☆

Param.	Designation	Scope	Factory Default	Attr
F2-02	Speed loop low speed switching frequency	0.00 ~ F2-05	5.00Hz	☆
F2-03	Speed loop high speed proportional gain	1 ~ 100	20	☆
F2-04	Speed loop high speed integration time	0.01s ~ 10.00s	1.00s	☆
F2-05	Speed loop high speed switching frequency	F2-02 ~ Maximum frequency	10.00Hz	☆
F2-06	Vector control differential gain	50% ~ 200%	100%	☆
F2-07	SVC speed feedback filtering time	0.000s ~ 0.100s	0.015s	☆
F2-08	Vector mode overexcitation gain	0-200	100	☆
F2-09	Torque limit command selection in speed control mode	0: Function code F2-10 Setting 1: AI1 2: AI2 3: Panel Potentiometer 4: Pulse (X6) 5: Communication given 6: MIN(AI1,AI2) 7: MAX(AI1,AI2) The full-scale range of options 1-7 corresponds to F2-10	0	☆
F2-10	Digital setting of upper	0.0% ~ 200.0%	140%	☆

Param.	Designation	Scope	Factory Default	Attr
	torque limit in speed control mode			
F2-11	Torque upper limit command selection in speed control mode (power generation)	0: Function code F2-12 setting (does not distinguish between electric and power generation) 1: AI1 2: AI2 3: Panel Potentiometer 4: Pulse (X6) 5: Communication given 6: MIN(AI1,AI2) 7: MAX(AI1,AI2) 8: Function code F2-12 Setting The full-scale range of options 1-7 corresponds to F2-12	0	☆
F2-12	Digital setting of upper torque limit in speed control mode (power generation)	0.0% ~ 200.0%	150%	☆
F2-13	Excitation adjustment proportional gain	0 ~ 60000	2000	☆
F2-14	Excitation regulation integral gain	0 ~ 60000	1300	☆
F2-17	Speed Ring Points Properties	Ones Place: Integral separation 0: Invalid 1: Effective	0	☆
F2-18	Vector mode overexcitation action selection	0: No enable 1: Deceleration enable only 2: Constant speed and deceleration enable	1	☆
F2-19	Overmodulation	0: Disabled 1: Enabled	0	☆

Param.	Designation	Scope	Factory Default	Attr
F2-20	Voltage over modulation factor	100-110%	105	☆
F2-21	Maximum torque coefficient in Field Weakening	50-200	100	☆
F2-22	Regeneration torque in speed mode	0: Invalid 1: Valid	0	☆
Group F3 V/F control parameters				
F3-00	V/F curve setting	0: Straight line V/F		
		1: Multi-point V/F		★
		2~9: Reserved	0	
		10: V/F fully separated mode		
		11: V/F semi-separate mode		
F3-01	Torque boost	0.0%: (no torque boost) 0.1% ~ 30.0%	Model	☆
F3-02	Torque boost cut-off frequency	0.00Hz ~ Maximum Frequency	50.00Hz	★
F3-03	Multi-point V/F frequency point 1	0.00Hz ~ F3-05	0.00Hz	★
F3-04	Multi-point V/F voltage point 1	0.0% ~ 100.0%	0.00%	★
F3-05	Multi-point V/F frequency point 2	F3-03 ~ F3-07	0.00Hz	★
F3-06	Multi-point V/F voltage point 2	0.0% ~ 100.0%	0.00%	★
F3-07	Multi-point V/F	F3-05 ~ Motor rated frequency (F1-04)	0.00Hz	★

Param.	Designation	Scope	Factory Default	Attr
	frequency point 3			
F3-08	Multi-point V/F voltage point 3	0.0% ~ 100.0%	0.00%	★
F3-10	V/F Overexcitation gain	0 ~ 200	100	☆
F3-11	V/F Oscillation rejection factor	0 ~ 100	40	☆
F3-13	V/F separated voltage source	0: Digital setting (F3-14)		
		1: AI1		
		2: AI2		
		4: PULSE pulse setting (X6)		
		5: Multi-segment command	0	☆
		6: Simple PLC		
		7: PID		
		8: Communication given		
		Note: 100.0% corresponds to the rated voltage of the motor		
F3-14	V/F separated voltage digital setting	0V ~ Motor rated voltage	0V	☆
F3-15	Voltage acceleration time for V/F separation	0.0s ~ 1000.0s Note: indicates the time to change from 0V to the rated motor voltage	0.0s	☆
F3-16	Voltage deceleration time for V/F separation	0.0s ~ 1000.0s Note: indicates the time to change from 0V to the rated motor voltage	0.0s	☆
F3-17	V/F separation stop method selection	0: Frequency/voltage independently reduced to 0 1: Voltage is reduced to 0 and then frequency is reduced	0	☆

Param.	Designation	Scope	Factory Default	Attr
F3-18	Overcurrent suppression level	50~200%	150%	★
F3-19	Overcurrent suppression effectiveness selection	0: Invalid 1: Valid	1	★
F3-20	Overcurrent suppression gain	0~100	20	☆
F3-21	Over loss of speed action current compensation factor	50~200%	50%	★
F3-22	Overvoltage stall action voltage	650.0V~800.0V	720	★
F3-23	Overvoltage stall enable	0: Invalid 1: Effective	1	★
F3-24	Overvoltage stall suppression frequency gain	0~100	30	☆
F3-25	Overvoltage stall suppression voltage gain	0~100	30	☆
F3-26	Overvoltage stall speed maximum rise frequency limit	0~50Hz	5Hz	★
Group F4 Input terminals				
F4-00		0: No function 1: Forward rotation operation FWD	1	★

Param.	Designation	Scope	Factory Default	Attr
	X1 terminal function selection	2: Reverse run REV		
		3: Three-wire operation control		
		4: Positive rotation point movement (FJOG)		
		5: Reverse Jogging (RJOG)		
		6: Terminal UP		
		7: Terminal DOWN		
		8: Free parking		
		9: Fault reset (RESET)		
		10: Run Suspension		
		11: External fault normally open input		
		12: Multi-segment command terminal 1		
		13: Multi-segment command terminal 2		
		14: Multi-segment command terminal 3		
		15: Multi-segment command terminal 4		
		16: Acceleration and deceleration time selection terminal 1		
		17: Acceleration and deceleration time selection terminal 2		
		18: Frequency command switching		
		19: UP/DOWN setting clear		
		20: Control command switching terminal 1		
		21: Acceleration and deceleration prohibited		
		22: PID suspension		
		23: Simple PLC status reset		
		24: Pendulum frequency pause		
		25: Counter input		
		26: Counter reset		
		27: Length count input		
		28: Length reset		
		29: Torque control prohibition		
		30: Pulse frequency input (valid for X6 only)		
		32: Immediate DC braking		
		33: External fault normally closed input		

Param.	Designation	Scope	Factory Default	Attr
		34: Frequency modification enable		
		35: PID action direction is reversed		
		36: External parking terminal 1		
		37: Control command switching terminal 2		
		38: PID points suspended		
		39: Master frequency and preset frequency switching		
		40: Auxiliary frequency and preset frequency switching		
		41: Motor terminal selection function		
		42: Retention		
		43: PID parameter switching		
		44: User-defined faults 1		
F4-01	X2 terminal function selection	45: User-defined fault 2	4	★
F4-02	X3 terminal function selection	46: Speed control/torque control switching	9	★
F4-03	X4 terminal function selection	47: Emergency stop	12	★
F4-04	X5 terminal function selection	48: External parking terminal 2	13	★
F4-05	X6 terminal function selection	49: Deceleration DC brake	0	★
		50: This run time is cleared		
		51: Two-wire/three-wire switching		
		52: Prohibition of reversal		
		53-59: Functional retention		
F4-10	DI filtering time	0.000s~1.000s	0.010s	☆
F4-11	Terminal command method	0: Two-line type 1	0	★
		1: Two-line type 2		
		2: Three-wire type 1		
		3: Three line type 2		

Param.	Designation	Scope	Factory Default	Attr
F4-12	Terminal UP/DOWN change rate	0.001Hz/s~65.535Hz/s	1.00Hz/s	☆
F4-13	AI curve 1 minimum input	0.00V~F4-15	0.00V	☆
F4-14	AI curve 1 minimum input corresponding setting	-100.0%~+100.0%	0.00%	☆
F4-15	AI curve 1 maximum input	F4-13~+10.00V	10.00V	☆
F4-16	AI curve 1 maximum input corresponding setting	-100.0%~+100.0%	100.00%	☆
F4-17	AI1 filtering time	0.00s~10.00s	0.10s	☆
F4-18	AI curve 2 minimum input	0.00V~F4-20	0.00V	☆
F4-19	AI curve 2 minimum input corresponding setting	-100.0%~+100.0%	0.00%	☆
F4-20	AI curve 2 maximum input	F4-18~+10.00V	10.00V	☆
F4-21	AI curve 2 maximum input corresponding setting	-100.0%~+100.0%	100.00%	☆

Param.	Designation	Scope	Factory Default	Attr
F4-22	AI2 filtering time	0.00s~10.00s	0.10s	☆
F4-23	AI curve 3 minimum input	-10.00V~F4-25	-10.00V	☆
F4-24	AI curve 3 minimum input correspondence setting	-100.0%~+100.0%	-100.00%	☆
F4-25	AI curve 3 maximum input	F4-23~+10.00V	10.00V	☆
F4-26	AI curve 3 maximum input corresponding setting	-100.0%~+100.0%	100.00%	☆
F4-27	AI3 filtering time	0.00s~10.00s	0.10s	☆
F4-28	Minimum pulse input frequency	0.00kHz~F4-30	0.00kHz	☆
F4-29	Minimum pulse input frequency setting	-100.0%~100.0%	0.00%	☆
F4-30	Maximum pulse input frequency	F4-28~100.00kHz	50.00kHz	☆
F4-31	The maximum pulse input frequency corresponds to the setting	-100.0%~100.0%	100.00%	☆
F4-32	Pulse filtering time	0.00s~10.00s	0.10s	☆

Param.	Designation	Scope	Factory Default	Attr
F4-33	AI curve selection	Individual position: AI1 curve selection 1: Curve 1 (2 points, see F4-13~F4-16) 2: Curve 2 (2 points, see F4-18~F4-21) 3: Curve 3 (2 points, see F4-23~F4-26) Ten bits: AI2 curve selection, same as above	321	☆
F4-34	AI below minimum input setting selection	Individual position: AI1 is below the minimum input setting selection 0: Corresponds to the minimum input setting 1: 0.0% Ten bits: AI2 is below the minimum input setting selection, as above	0	☆
F4-35	X1 delay time	0.0s~3600.0s	0.0s	★
F4-36	X2 delay time	0.0s~3600.0s	0.0s	★
F4-37	X3 Delay Time	0.0s~3600.0s	0.0s	★
F4-38	Digital input terminal X active mode selection 1	0: High level active 1: Active low Individual position: X1 Tenth position: X2 Hundred: X3 Thousands of bits: X4 10,000 positions: X5	0	★
F4-39	Digital input terminal X active mode selection 2	0: High level active	0	★
Group F5 Output terminals				
F5-00	Y/DO output function selection	0: Pulse output (DO) 1: Switching output (Y)	0	☆
F5-01	Y terminal function selection (open collector	0: No output 1：Inverter running 2: Fault output (for the fault of free stop) 3: Frequency level detection1 4: Frequency arrival	0	☆

Param.	Designation	Scope	Factory Default	Attr
	output terminal)	5: In zero-speed operation (no output at shutdown)		
		6: Motor overload pre-warning		
		7: Inverter overload pre-alarm		
		8: Set the value of the note to reach		
		9: Specify the value of the notation to arrive		
		10: Length arrival		
		11: Simple PLC cycle completion		
		12: Cumulative running time reached		
		13: Frequency limited in		
		14: Torque limited in		
		15: Ready to run		
		16: AI1>AI2		
		17: Upper limit frequency reached		
		18: Lower limit frequency reached (no output at shutdown)		
		19: Undervoltage status		
		20: Communication settings		
		21: Reserved		
		22: Reservation		
		23: Zero speed operation in 2 (output also when stopped)		
		24: Cumulative power-up time reached		
		25: Frequency level detection 2		
		26: Frequency 1 arrives		
		27: Frequency 2 arrives		
		28: Current 1 arrives		
		29: Current 2 arrives		
		30: Timed arrival		
		31: AI1 input overrun		
		32: Dropping load		
		33: Reverse running in		
		34: Zero current state		
		35: Module temperature reaches		
		36: Output current over limit		

Param.	Designation	Scope	Factory Default	Attr
		37: Lower limit frequency reached (shutdown also output)		
		38: Alarm (all faults)		
F5-02	Control board relay2 function selection (RA-RB-TC)	Same as F5-01	0	☆
F5-05	Control board relay1 function selection (TA--TB-TC)	Same as F5-01	0	☆
F5-06	DO output function selection	0: Operating frequency	0	☆
		1: Set frequency		
		2: Output current		
		3: Motor output torque (absolute value, percentage relative to the motor)		
		4: Output power		
		5: Output voltage		
		6: Pulse input (100.0% corresponds to 100.0kHz)		
		7: AI1		
		8: AI2		
		9: Reserved		
		10: Length		
		11: Remember the value		
		12: Communication settings		
		13: Motor speed		
		14: Output current (100.0% corresponds to 1000.0A)		
F5-07	AO output function selection	15: Output voltage (100.0% corresponds to 1000.0V)	0	☆
F5-08	Reserved	16: Motor output torque (actual value, percentage relative to motor)	1	☆

Param.	Designation	Scope	Factory Default	Attr
F5-09	DO output maximum frequency	0.01kHz~100.00kHz	50.00kHz	☆
F5-10	AO zero bias factor	0	0.00%	☆
F5-11	AO Gain	-10.00~+10.00	1	☆
F5-17	DO output delay time	0.0s~3600.0s	0.0s	☆
F5-18	Relay output delay time	0.0s~3600.0s	0.0s	☆
F5-20	DO output delay time	0.0s~3600.0s	0.0s	☆
F5-22	DO/ Relay/Youtput terminal active state selection	0: positive logic	00000	☆
Group F6 Start/Stop Control				
F6-00	Start-up method	0: Direct start 1: Speed tracking restart 2: Pre-excitation start (AC asynchronous machine) 3: SVC Quick Start	0	☆
F6-01	Rotational speed tracking method	0: From stopping frequency 1: Start with IFB 2: Start from the maximum frequency	0	★
F6-02	Rotational speed tracking fast and slow	1~100	20	☆
F6-03	Start-up frequency	0.00Hz~10.00Hz	0.00Hz	☆
F6-04	Start frequency hold time	0.0s~100.0s	0.0s	★
F6-05	Start DC braking	0%~100%	50%	★

Param.	Designation	Scope	Factory Default	Attr
	current/pre-excitation current			
F6-06	Start DC braking time/pre-excitation time	0.0s~100.0s	0.0s	★
F6-07	Acceleration and deceleration mode	0: Linear acceleration and deceleration 1, 2: Dynamic S-curve acceleration and deceleration	0	★
F6-08	S-curve start time ratio	0.0%~(100.0%-F6-09)	30.00%	★
F6-09	S-curve end time ratio	0.0%~(100.0%-F6-08)	30.00%	★
F6-10	Shutdown method	0: Slow down and stop 1: Free stop	0	☆
F6-11	Stop DC braking starting frequency	0.00Hz~maximum frequency	0.00Hz	☆
F6-12	Stop DC brake waiting time	0.0s~100.0s	0.0s	☆
F6-13	Stopping DC braking current	0%~100%	50%	☆
F6-14	Stopping DC braking time	0.0s~100.0s	0.0s	☆
F6-15	Brake usage ratio	0%~100%	100%	☆
F6-18	Rotational speed tracking current size	30%~200%	Model	★

Param.	Designation	Scope	Factory Default	Attr
F6-21	Demagnetization time (SVC valid)	0.00~5.00s	Model	☆
Group F7 Keyboard and Display				
F7-01	MF.K key function selection	0: MF.K invalid 1：Operating panel command channel and remote command channel (terminal command channel or communication command channel) switching 2: Forward and reverse switching 3: Positive rotation point movement 4: Reversal of point movement 5: Panel PID setting is valid	0	★
F7-02	STOP/RESET key function	0: STOP/RES key stop function is only valid in the keyboard operation mode 1: STOP/RES key stop function is effective for any operating channel	1	☆
F7-03	Operation display parameter 1	0000~FFFF Binary setting. Individual selection XXXXXX (BIT 3-2-1-0) Bit00: Operating frequency 1(Hz) Bit01: Set frequency (Hz) Bit02: Busbar voltage (V) Bit03: Output voltage (V) Decimal selection XXXXXX (BIT 3-2-1-0) Bit04: Output current (A) Bit05: Output power (kW) Bit06: Output torque (%) Bit07: X terminal input status Hundred selection XXXXXX (BIT 3-2-1-0) Bit08: DO output status Bit09: AI1 voltage (V) Bit10: AI2 voltage (V) Bit11: Reserved	1F	☆

Param.	Designation	Scope	Factory Default	Attr
		Thousand bit selection XXXXXX (BIT 3-2-1-0)		
		Bit12: Counting value		
		Bit13: Length value		
		Bit14: Load speed display		
		Bit15: PID setting		
F7-04	Operation display parameter 2	0000~FFFF	0	☆
		Binary setting.		
		Individual selection XXXXXX (BIT 3-2-1-0)		
		Bit00: PID feedback		
		Bit01: PLC Stage		
		Bit02: PULSE input pulse frequency (kHz)		
		Bit03: Operating frequency 2 (Hz)		
		Decimal selection XXXXXX (BIT 3-2-1-0)		
		Bit04: Remaining runtime		
		Bit05: AI1 voltage before correction (V)		
		Bit06: AI2 voltage before correction (V)		
		Bit07: Reserved		
		Hundred selection XXXXXX (BIT 3-2-1-0)		
		Bit08: Line Speed		
		Bit09: Current power-on time (Hour)		
		Bit10: Current running time (Min)		
		Bit11: PULSE input pulse frequency (Hz)		
		Thousand bit selection XXXXXX (BIT 3-2-1-0)		
		Bit12: Communication setting value		
		Bit13: Encoder feedback speed (Hz)		
		Bit14: Master frequency X display (Hz)		
		Bit15: Auxiliary frequency Y display (Hz)		
F7-05		0000~FFFF	3	☆
		Binary setting.		

Param.	Designation	Scope	Factory Default	Attr
	Shutdown display parameters	Individual selection XXXXXX (BIT 3-2-1-0)		
		Bit00: Set frequency (Hz)		
		Bit01: Bus voltage (V)		
		Bit02: X input status		
		Bit03: DO output status		
		Decimal selection XXXXXX (BIT 3-2-1-0)		
		Bit04: AI1 voltage (V)		
		Bit05: AI2 voltage (V)		
		Bit06: Reserved		
		Bit07: Counting value		
		Hundred selection XXXXXX (BIT 3-2-1-0)		
		Bit08: Length value		
		Bit09: PLC Stage		
		Bit10: Load speed		
		Bit11: PID setting		
		Thousand bit selection XXXXXX (BIT 3-2-1-0)		
		Bit12: PULSE input pulse frequency (kHz)		
F7-06	Load speed display factor	0.0001~6.5000	1	☆
F7-07	Inverter module heat sink temperature	-20℃~120℃	-	●
F7-09	Cumulative running time	0h~65535h	-	●
F7-10	Enact user password.	0h~65535h	0	
F7-11	Function Version Number	Software Version Number	-	●
F7-12	Load speed display with	Digits: the number of decimal places from U0-14	21	☆
		0: 0 decimal places		

Param.	Designation	Scope	Factory Default	Attr
	fractional digits	1: 1 decimal place		
		2: 2 decimal places		
		3: 3 decimal places		
		Decimal places: U0-19/U0-29 decimal places		
		1: 1 decimal place		
		2: 2 decimal places		
F7-13	Cumulative power-up time	0~65535 hours	-	●
F7-14	Cumulative power consumption	0~65535 degrees	-	●
Group F8 Auxiliary functions				
F8-00	Pointing operation frequency	0.00Hz~maximum frequency	2.00Hz	☆
F8-01	Tap acceleration time	0.0s~6500.0s	20.0s	☆
F8-02	Tap deceleration time	0.0s~6500.0s	20.0s	☆
F8-03	Acceleration time 2	0.0s~6500.0s	Model determination	☆
F8-04	Deceleration time2	0.0s~6500.0s	Model determination	☆
F8-05	Acceleration time 3	0.0s~6500.0s	Model determination	☆
F8-06	Deceleration time3	0.0s~6500.0s	Model determination	☆
F8-07	Acceleration time 4	0.0s~6500.0s	0.0s	☆

Param.	Designation	Scope	Factory Default	Attr
F8-08	Deceleration time4	0.0s~6500.0s	0.0s	☆
F8-09	Jump frequency1	0.00Hz~maximum frequency	0.00Hz	☆
F8-10	Jump frequency 2	0.00Hz~maximum frequency	0.00Hz	☆
F8-11	Jump frequency amplitude	0.00Hz~maximum frequency	0.00Hz	☆
F8-12	Forward and reverse rotation dead time	0.0s~3000.0s	0.0s	☆
F8-13	Reverse Frequency Prohibition	0: Invalid 1: Valid	0	☆
F8-14	Set frequency below the lower limit frequency operation mode	0: Operates at the lower frequency limit 1: Shutdown 2: Zero speed operation	0	☆
F8-15	Sagging rate	0.00%~100.00%	0.00%	☆
F8-16	Set cumulative power-up arrival time	0h~65000h	0h	☆
F8-17	Set cumulative run arrival time	0h~65000h	0h	☆
F8-18	Startup protection selection	0: No protection 1: Protection	0	☆
F8-19	Frequency detection value1	0.00Hz~maximum frequency	50.00Hz	☆

Param.	Designation	Scope	Factory Default	Attr
F8-20	Frequency detection lag rate1	0.0%~100.0% (FDT1 level)	5.00%	☆
F8-21	Frequency arrival detection amplitude	0.0%~100.0% (maximum frequency)	0.00%	☆
F8-22	Whether the jump frequency is effective during acceleration and deceleration	0: Invalid	0	☆
F8-25	Acceleration time 1 and acceleration time 2 switching frequency points	0.00Hz~maximum frequency	0.00Hz	☆
F8-26	Deceleration time 1 and deceleration time 2 switching frequency points	0.00Hz~maximum frequency	0.00Hz	☆
F8-27	Terminal point-action priority	0: Invalid 1: Valid	0	☆
F8-28	Frequency detection value2	0.00Hz~maximum frequency	50.00Hz	☆
F8-29	Frequency detection lag rate2	0.0%~100.0% (FDT2 level)	5.00%	☆

Param.	Designation	Scope	Factory Default	Attr
F8-30	Arbitrary arrival frequency detection value 1	0.00Hz~maximum frequency	50.00Hz	☆
F8-31	Arbitrary arrival frequency detection amplitude1	0.0%~100.0% (maximum frequency)	0.00%	☆
F8-32	Arbitrary arrival frequency detection value 2	0.00Hz~maximum frequency	50.00Hz	☆
F8-33	Arbitrary arrival frequency detection amplitude 2	0.0%~100.0% (maximum frequency)	0.00%	☆
F8-34	Zero current detection level	0.0%~300.0% 100.0% corresponds to the rated motor current	5.00%	☆
F8-35	Zero current detection delay time	0.01s~600.00s	0.10s	☆
F8-36	Output current exceeds the limit value	0.0% (not tested) 0.1%~300.0% (motor rated current)	200.00%	☆
F8-37	Output current overrun detection delay time	0.00s~600.00s	0.00s	☆
F8-38	Arbitrary arrival current1	0.0%~300.0%(motor rated current)	100.00%	☆

Param.	Designation	Scope	Factory Default	Attr
F8-39	Arbitrary arrival current 1 amplitude	0.0%~300.0%(motor rated current)	0.00%	☆
F8-40	Arbitrary arrival current2	0.0%~300.0%(motor rated current)	100.00 %	☆
F8-41	Arbitrary arrival current 2 amplitude	0.0%~300.0%(motor rated current)	0.00%	☆
F8-42	Timing function selection	0: Invalid 1: Valid	0	★
F8-43	Timed run time selection	0: F8-44 setting 1: AI1 2: AI2 Analog input range corresponds to F8-44	0	★
F8-44	Timed run time	0.0Min~6500.0Min	0.0Min	★
F8-45	AI1 input voltage protection value lower limit	0.00V~F8-46	3.10V	☆
F8-46	AI1 input voltage protection value upper limit	F8-45~10.00V	6.80V	☆
F8-47	Module temperature reaches	0℃~100℃	90°C	☆
F8-48	Cooling fan control	0: Fan running during operation 1: The fan keeps running	0	☆
F8-49	Wake-up frequency	Dormant frequency (F8-51) ~ Maximum frequency (F0-10)	0.00Hz	☆

Param.	Designation	Scope	Factory Default	Attr
F8-50	Wake-up delay time	0.0s~6500.0s	0.0s	☆
F8-51	Sleep frequency	0.00Hz~Wakeup frequency (F8-49)	0.00Hz	☆
F8-52	Sleep delay time	0.0s~6500.0s	0.0s	☆
F8-53	Arrival time for this run	0.0~6500.0min	0.0Min	☆
F8-54	Output power correction factor	0.00%~200.0%	100.00 %	☆
Group F9 Fault and Protection				
F9-00	Motor overload protection options	0: Forbidden 1: Allowed	1	☆
F9-01	Motor overload protection gain	0.20~10.00	1	☆
F9-02	Motor overload warning factor	50%~100%	80%	☆
F9-03	Overvoltage stall gain	0~100	30	☆
F9-04	Overvoltage stall protection voltage	650V~800V	720V	☆
F9-07	Short circuit to ground protection options	Individual position: power-on to ground short circuit protection selection 0: Invalid 1: Valid Ten bits: pre-operation short-circuit protection to ground selection 0: Invalid 1: Valid	1	☆
F9-08	Brake unit operation	650V~800V	720V	★

Param.	Designation	Scope	Factory Default	Attr
	starting voltage			
F9-09	Fault automatic reset times	0~20	0	☆
F9-10	Fault DO action selection during automatic fault reset	0: No action 1: Action	0	☆
F9-11	Fault automatic reset waiting time	0.1s~100.0s	1.0s	☆
F9-12	Input phase loss \ contactor suction protection selection	Digit: Input phase loss protection selection Ten bits: contactor suction protection selection 0: Prohibited 1: Allowed	11	☆
F9-13	Output phase loss protection options	Digit: output phase loss protection selection 0: Prohibited 1: Allowed Ten bits: output phase loss protection selection before operation 0: Prohibited 1: Allowed	11	☆
F9-14	Type of first failure	0: No fault 1: Retention 2: Accelerated overcurrent 3: Deceleration overcurrent 4: Constant speed overcurrent 5: Accelerated overvoltage 6: Deceleration overvoltage 7: Constant speed overvoltage 8: Buffer power failure 9: Undervoltage 10: Inverter overload	-	●

Param.	Designation	Scope	Factory Default	Attr
		11: Motor overload		
		12: Input out of phase		
		13: Output out of phase		
		14: Module overheating		
		15: External failure		
		16: Communication anomaly		
		17: Contactor abnormalities		
		18: Abnormal current detection		
		19: Abnormal motor tuning		
		20: Encoder/PG card abnormality		
		21: Parameter read/write exception		
		22: Inverter hardware abnormalities		
		23: Motor short circuit to ground		
		24: Reserved		
		25: Reserved		
		26: Runtime arrival		
		27: User-defined faults 1		
		28: User-defined fault 2		
		29: Power-up time arrives		
		30: Drop Load		
		31: Loss of PID feedback at runtime		
		40: Fast flow limit timeout		
		41: Switching motors during operation		
		42: Excessive speed deviation		
		43: Motor over speed		
		45: Motor over temperature		
F9-15	Second failure type	51: Initial position error	-	●
F9-16	Third (most recent) failure type	55: Slave failure during master-slave control	-	●
F9-17	Frequency at the third (most recent) failure	-	-	●
F9-18	Current at the third	-	-	●

Param.	Designation	Scope	Factory Default	Attr
	(most recent) fault			
F9-19	Busbar voltage at the third (most recent) fault	-	-	●
F9-20	Input terminal status at the third (most recent) fault	-	-	●
F9-21	Output terminal status at the third (most recent) fault	-	-	●
F9-22	Inverter status at the time of the third (most recent) fault	-	-	●
F9-23	Power-up time at the third (most recent) failure	-	-	●
F9-24	Running time at the third (most recent) failure	-	-	●
F9-27	Frequency at second failure	-	-	●
F9-28	Current at second fault	-	-	●
F9-29	Busbar voltage at second fault	-	-	●

Param.	Designation	Scope	Factory Default	Attr
F9-30	Input terminal status at second fault	-	-	●
F9-31	Output terminal status at second fault	-	-	●
F9-32	Inverter status at second fault	-	-	●
F9-33	Power-up time at second failure	-	-	●
F9-34	Running time at second failure	-	-	●
F9-37	Frequency at first failure	-	-	●
F9-38	Current at first fault	-	-	●
F9-39	Busbar voltage at first fault	-	-	●
F9-40	Input terminal status at first fault	-	-	●
F9-41	Output terminal status at first fault	-	-	●
F9-42	Inverter status at first failure	-	-	●
F9-43	Power-up time at first failure	-	-	●

Param.	Designation	Scope	Factory Default	Attr
F9-44	Running time at first failure	-	-	●
F9-47	Fault protection action option 1	Position: Motor overload 0: Free parking 1：Shutdown by shutdown 2: Continue to run Ten bits: input out of phase Hundred: output out of phase Thousands of bits: external failure Wan bit: communication anomaly	0	☆
F9-48	Fault protection action option 2	Individual position: encoder/PG card anomaly 0: Free parking Ten bits: function code reading and writing abnormalities 0: Free parking 1：Shutdown by shutdown Hundred bits: inverter overload fault action selection 0: Free stop 1: Derate operation Thousand position: motor overheating 10,000 bits: running time arrives	0	☆
F9-49	Fault protection action option 3	Digit: User-defined fault 1 0: Free parking 1：Shutdown by shutdown 2: Continue to run Ten bits: user-defined fault 2 0: Free parking 1：Shutdown by shutdown 2: Continue to run Hundredth place: power-up time arrives 0: Free parking 1：Shutdown by shutdown 2: Continue to run Thousands of bits: drop load 0: Free parking	0	☆

Param.	Designation	Scope	Factory Default	Attr
		1: Slow down and stop		
		2: Jump directly to 7% of the rated frequency of the motor to continue running without dropping the load		
		Automatic return to set frequency operation		
		10,000 bits: PID feedback lost at runtime		
		0: Free parking		
		1：Shutdown by shutdown		
		2: Continue to run		
F9-50	Fault protection action selection 4	Individual position: excessive speed deviation	0	☆
		0: Free parking		
		1：Shutdown by shutdown		
		2: Continue to run		
		Ten bits: motor over speed		
		Hundredth place: initial position error		
F9-54	Continued operation frequency selection in case of failure	0: Run at the current operating frequency	0	☆
		1：Running at set frequency		
		2：Operating at the upper limit frequency		
		3: Run at the lower frequency limit		
		4: Runs on abnormal standby frequency		
F9-55	Abnormal standby frequency	0.0%~100.0%	100.00 %	☆
		(100.0% corresponds to the maximum frequency F0-10)		
F9-56	Motor temperature sensor type	0: No temperature sensor	0	☆
		1: PT100		
		2: PT1000		
F9-57	Motor overheating protection threshold	0℃~200℃	110°C	☆
F9-58	Motor overheating	0℃~200℃	90°C	☆

Param.	Designation	Scope	Factory Default	Attr
	pre-alarm threshold			
F9-59	Instant stop non-stop function selection	0 Invalid 1 Bus voltage constant control 2 Deceleration stop	0	★
F9-60	Instantaneous stop and non-stop recovery voltage	80%~100%	85%	★
F9-61	Instantaneous stop and non-stop voltage recovery judgment time	0.0~100.0s	0.5S	★
F9-62	Instantaneous stop and non-stop action voltage	60%~100%	80%	★
F9-63	Drop protection options	0: Invalid 1: Effective	0	☆
F9-64	Drop detection level	0.0~100.0%	10.00%	☆
F9-65	Drop detection time	0.0~60.0s	1.0s	☆
F9-67	Overspeed detection value	0.0%~50.0% (maximum frequency)	20.00%	☆
F9-68	Over speed detection time	0.0s: no detection 0.1~60.0s	1.0s	☆

Param.	Designation	Scope	Factory Default	Attr
F9-69	Excessive speed deviation detection value	0.0%~50.0% (maximum frequency)	20.00%	☆
F9-70	Detection time for excessive speed deviation	0.0s: no detection 0.1~60.0s	5.0s	☆
F9-71	Instant stop non-stop gain Kp	0~100	40	☆
F9-72	Instantaneous stop non-stop integration factor Ki	0~100	30	☆
F9-73	Instant stop non-stop action deceleration time	0~300.0s	20.0s	★
Group FA PID function				
FA-00	PID given source	0: FA-01 setting 1: AI1 2: AI2 3: Panel Potentiometer 4: Pulse setting (X6) 5: Communication given 6: Multi-segment command giving	0	☆
FA-01	PID value is given	0.0%~100.0%	50.00%	☆
FA-02	PID feedback source	0: AI1 1: AI2 2: Panel Potentiometer 3: AI1-AI2 4: Pulse setting (X6)	0	☆

Param.	Designation	Scope	Factory Default	Attr
		5: Communication given		
		6: AI1+AI2		
		7: MAX(|AI1|,|AI2|)		
		8: MIN(|AI1|,|AI2|)		
FA-03	Direction of PID action	0: positive effect	0	☆
		1: Counterproductive		
FA-04	PID giving feedback range	0~65535	1000	☆
FA-05	Proportional gain KP1	0.0~1000.0	20	☆
FA-06	Integration time TI1	0.01s~10.00s	2.00s	☆
FA-07	Differential Time TD1	0.000s~10.000s	0.000s	☆
FA-08	PID reversal cut-off frequency	0.00~maximum frequency	0.00Hz	★
FA-09	PID deviation limit	0.0%~100.0%	0.00%	☆
FA-10	PID differential limiting	0.00%~100.00%	0.10%	☆
FA-11	PID given change time	0.00~650.00s	0.00s	☆
FA-12	PID feedback filtering time	0.00~60.00s	0.00s	☆
FA-13	PID output filtering time	0.00~60.00s	0.00s	☆
FA-14	Reserved	-	-	☆
FA-15	Proportional gain KP2	0.0~1000.0	20	☆
FA-16	Integration time TI2	0.01s~10.00s	2.00s	☆
FA-17	Differential Time TD2	0.000s~10.000s	0.000s	☆
FA-18	PID parameter	0: No switching	0	☆
		1: Switching via X terminal		

Param.	Designation	Scope	Factory Default	Attr
	switching conditions	2: Automatic switching according to deviation 3: Automatic switching according to operating frequency		
FA-19	PID parameter switching deviation 1	0.0%~FA-20	20.00%	☆
FA-20	PID parameter switching deviation 2	FA-19~100.0%	80.00%	☆
FA-21	PID initial value	0.0%~100.0%	0.00%	☆
FA-22	PID initial value hold time	0.00~650.00s	0.00s	☆
FA-25	PID integral property	**Units digit**: Integral separation 0: Disabled 1: Enabled **Tens digit**: Whether to stop integration after reaching output limit 0: Continue integrating 1: Stop integrating	0	☆
FA-26	PID feedback loss detection value	0.0%: No judgment of feedback loss 0.1%~100.0%	0.00%	☆
FA-27	PID feedback loss detection time	0.0s~20.0s	0.0s	☆
FA-28	PID computation option	0: No computation in stop status 1: Computation continued in stop status	0	☆
Group FB Fixing length and counting				
FB-05	Set length	0m~65535m	1000m	☆

Param.	Designation	Scope	Factory Default	Attr
FB-06	Actual length	0m~65535m	0m	☆
FB-07	Number of pulses per meter	0.1~6553.5	100	☆
FB-08	Set count value	1~65535	1000	☆
FB-09	Specify the count value	1~65535	1000	☆
Group FC Multi-segment instruction, simple PLC				
FC-00	Multi-band frequency 0	-100.0%~100.0%	0.00%	☆
FC-01	Multi-band frequency1	-100.0%~100.0%	0.00%	☆
FC-02	Multi-band frequency2	-100.0%~100.0%	0.00%	☆
FC-03	Multi-band frequency3	-100.0%~100.0%	0.00%	☆
FC-04	Multi-band frequency4	-100.0%~100.0%	0.00%	☆
FC-05	Multi-band frequency5	-100.0%~100.0%	0.00%	☆
FC-06	Multi-band frequency6	-100.0%~100.0%	0.00%	☆
FC-07	Multi-band frequency7	-100.0%~100.0%	0.00%	☆
FC-08	Multi-band frequency8	-100.0%~100.0%	0.00%	☆
FC-09	Multi-band frequency9	-100.0%~100.0%	0.00%	☆
FC-10	Multi-band frequency 10	-100.0%~100.0%	0.00%	☆
FC-11	Multi-band frequency 11	-100.0%~100.0%	0.00%	☆
FC-12	Multi-band frequency 12	-100.0%~100.0%	0.00%	☆
FC-13	Multi-band frequency 13	-100.0%~100.0%	0.00%	☆

Param.	Designation	Scope	Factory Default	Attr
FC-14	Multi-band frequency 14	-100.0%~100.0%	0.00%	☆
FC-15	Multi-band frequency 15	-100.0%~100.0%	0.00%	☆
FC-16	Simple PLC operation method	0: Single run end stop 1: Single run end hold final value 2: Keep cycling	0	☆
FC-17	Simple PLC power-down memory selection	Digit: Power-down memory selection 0: Power down without memory Ten positions: downtime memory selection 0: Shutdown without memory 1: Power-down memory 1: Downtime memory	0	☆
FC-18	Simple PLC segment 0 runtime	0.0s(h)~6553.5s(h)	0.0s(h)	☆
FC-19	Simple PLC section 0 acceleration and deceleration time selection	0~3	0	☆
FC-20	Simple PLC 1st period run time	0.0s(h)~6553.5s(h)	0.0s(h)	☆
FC-21	Simple PLC 1st stage acceleration and deceleration time selection	0~3	0	☆
FC-22	Simple PLC 2nd runtime	0.0s(h)~6553.5s(h)	0.0s(h)	☆
FC-23	Simple PLC 2nd stage	0~3	0	☆

Param.	Designation	Scope	Factory Default	Attr
	acceleration and deceleration time selection			
FC-24	Simple PLC Section 3 runtime	0.0s(h)~6553.5s(h)	0.0s(h)	☆
FC-25	Simple PLC section 3 acceleration and deceleration time selection	0~3	0	☆
FC-26	Simple PLC segment 4 runtime	0.0s(h)~6553.5s(h)	0.0s(h)	☆
FC-27	Simple PLC paragraph 4 acceleration and deceleration time selection	0~3	0	☆
FC-28	Simple PLC Section 5 runtime	0.0s(h)~6553.5s(h)	0.0s(h)	☆
FC-29	Simple PLC section 5 acceleration and deceleration time selection	0~3	0	☆
FC-30	Simple PLC paragraph 6 runtime	0.0s(h)~6553.5s(h)	0.0s(h)	☆

Param.	Designation	Scope	Factory Default	Attr
FC-31	Simple PLC section 6 acceleration and deceleration time selection	0~3	0	☆
FC-32	Simple PLC paragraph 7 runtime	0.0s(h)~6553.5s(h)	0.0s(h)	☆
FC-33	Simple PLC paragraph 7 acceleration and deceleration time selection	0~3	0	☆
FC-34	Simple PLC paragraph 8 runtime	0.0s(h)~6553.5s(h)	0.0s(h)	☆
FC-35	Simple PLC section 8 acceleration and deceleration time selection	0~3	0	☆
FC-36	Simple PLC paragraph 9 runtime	0.0s(h)~6553.5s(h)	0.0s(h)	☆
FC-37	Simple PLC paragraph 9 acceleration and deceleration time selection	0~3	0	☆

Param.	Designation	Scope	Factory Default	Attr
FC-38	Simple PLC paragraph 10 runtime	0.0s(h)~6553.5s(h)	0.0s(h)	☆
FC-39	Simple PLC 10th acceleration and deceleration time selection	0~3	0	☆
FC-40	Simple PLC paragraph 11 runtime	0.0s(h)~6553.5s(h)	0.0s(h)	☆
FC-41	Simple PLC paragraph 11 acceleration and deceleration time selection	0~3	0	☆
FC-42	Simple PLC 12th runtime	0.0s(h)~6553.5s(h)	0.0s(h)	☆
FC-43	Simple PLC section 12 acceleration and deceleration time selection	0~3	0	☆
FC-44	Simple PLC paragraph 13 runtime	0.0s(h)~6553.5s(h)	0.0s(h)	☆
FC-45	Simple PLC paragraph 13 acceleration and deceleration	0~3	0	☆

Param.	Designation	Scope	Factory Default	Attr
	time selection			
FC-46	Simple PLC paragraph 14 runtime	0.0s(h)~6553.5s(h)	0.0s(h)	☆
FC-47	Simple PLC paragraph 14 acceleration and deceleration time selection	0~3	0	☆
FC-48	Simple PLC paragraph 15 running time	0.0s(h)~6553.5s(h)	0.0s(h)	☆
FC-49	Simple PLC paragraph 15 acceleration and deceleration time selection	0~3	0	☆
FC-50	Simple PLC runtime units	0: s (seconds) 1: h (hour)	0	☆
FC-51	Multi-segment instruction 0 giving method	0: Function code FC-00 is given	0	☆
Group Fd Communication parameters				
Fd-00	Communication baud rate	Digit: MODBUS 0: 300BPS 1: 600BPS 2: 1200BPS 3: 2400BPS 4: 4800BPS 5: 9600BPS 6: 19200BPS	5	☆

Param.	Designation	Scope	Factory Default	Attr
		7: 38400BPS		
		8: 57600BPS		
		9: 115200BPS		
		Tenth position: reserved		
		Hundredth place: Reserved		
		Thousands: Reserved		
Fd-01	MODBUS Data Format	0: No checksum (8-N-2)	0	☆
		1: Even check (8-E-1)		
		2: Odd check (8-O-1)		
		3: No checksum (8-N-1)		
Fd-02	Local Address	0: Broadcast address	1	☆
		1~247		
Fd-03	MODBUS answer delay	0~20ms	2	☆
Fd-04	Serial communication timeout time	0.0: Invalid	0	☆
		0.1~60.0s		
Fd-05	Communication data format	Digit: MODBUS	30	☆
		0: Non-standard MODBUS protocol		
		1: Standard MODBUS protocol		
Fd-06	Communication reading current resolution	0: 0.01A (valid for ≤55kW)	0	☆
Group FP Function Code Management				
FP-00	User Password	0~65535	0	☆
FP-01	Parameter initialization	0: No operation	0	★
		01: Restore factory parameters, not including motor parameters		
		02: Clear the recorded information		
		04: Backup the user's current parameters		
		501: Restore user backup parameters		
FP-02	Function parameter	Digit: U group display selection	11	★
		0: No display		

Param.	Designation	Scope	Factory Default	Attr
	group display selection	1: Display Ten bits: P group display selection 0: No display 1: Display		
FP-03	Personalized parameter group display selection	Digit: User-defined parameter group display selection 0: No display 1: Display Ten bits: user change parameter group display selection 0: No display 1: Display	0	☆
FP-04	Function Code Modification Properties	0: Modifiable	0	☆
Group P0 torque control parameters				
P0-00	Speed/Torque Control Method Selection	0: Speed control 1: Torque control	0	★
P0-01	Torque setting selection in torque control mode	0: Digital setting 1 (P0-03) 1: AI1 2: AI2 3: Panel Potentiometer 4：PULSE pulse 5: Communication given 6: MIN(AI1,AI2) 7: MAX(AI1,AI2) (Full range for options 1-7, corresponding to P0-03 digital settings)	0	★
P0-03	Digital setting of torque in torque control mode	-200.0%~200.0%	150.00 %	☆
P0-05	Torque control forward	0.00Hz~maximum frequency	50.00Hz	☆

Param.	Designation	Scope	Factory Default	Attr
	maximum frequency			
P0-06	Torque control reverse maximum frequency	0.00Hz~maximum frequency	50.00Hz	☆
P0-07	Torque rise filtering time	0.00s~65000s	0.00s	☆
P0-08	Torque drop filtering time	0.00s~65000s	0.00s	☆
Group P5 Control optimization parameters				
P5-00	PWM switching upper frequency	5.00Hz~maximum frequency	8.00Hz	☆
P5-01	PWM modulation method	0: Asynchronous modulation 1: Synchronous modulation	0	☆
P5-02	Deadband compensation mode selection	0: No compensation 1: Compensation mode 1	1	☆
P5-03	Random PWM depth	0: Random PWM is invalid 1~10: PWM carrier frequency random depth	0	☆
P5-04	Fast current limit enable	0: No enablement 1: Enabling	1	☆
P5-05	Maximum output voltage factor	100~110%	105%	★
P5-06	Undervoltage point setting	210~420V	350V	☆
P5-08	Low-speed carrier frequency	0.0~8.0kHz	0	☆
P5-09	Overpressure point setting	200.0V~2500.0V	Model	★

Param.	Designation	Scope	Factory Default	Attr
P5-11	Low-speed DC braking threshold	0.00~5.00Hz	0.30Hz	☆
Group U0 Basic monitoring parameters				
U0-00	Operating frequency (Hz)	0.01Hz	7000H	
U0-01	Setting frequency (Hz)	0.01Hz	7001H	
U0-02	Bus voltage (V)	0.1V	7002H	
U0-03	Output Voltage (V)	1V	7003H	
U0-04	Output current (A)	0.01A	7004H	
U0-05	Output power (kW)	0.1kW	7005H	
U0-06	Output torque (%)	0.001	7006H	
U0-07	X input state	1	7007H	
U0-08	DO Output Status	1	7008H	
U0-09	AI1 Voltage (V)	0.01V	7009H	
U0-10	AI2 Voltage (V) / Current (mA)	0.01V/0.01mA	700AH	
U0-12	Counting value	1	700CH	
U0-13	Length value	1	700DH	
U0-14	Load speed display	1	700EH	
U0-15	PID setting	1	700FH	
U0-16	PID feedback	1	7010H	
U0-17	PLC Phase	1	7011H	

Param.	Designation	Scope	Factory Default	Attr
U0-18	Input pulse frequency (Hz)	0.01kHz	7012H	
U0-19	Feedback speed (Hz)	0.01Hz	7013H	
U0-20	Remaining running time	0.1Min	7014H	
U0-21	AI1 Pre-calibration voltage	0.001V	7015H	
U0-22	AI2 Pre-calibration voltage (V) / current (mA)	0.001V/0.01mA	7016H	
U0-24	Line Speed	1m/Min	7018H	
U0-25	Current power-up time	1Min	7019H	
U0-26	Current running time	0.1Min	701AH	
U0-27	Input pulse frequency	1Hz	701BH	
U0-28	Communication setpoint	0.0001	701CH	
U0-30	Main frequency display	0.01Hz	701EH	
U0-31	Auxiliary frequency display	0.01Hz	701FH	
U0-32	View any memory address value	1	7020H	
U0-34	Motor temperature value	1℃	7022H	

Param.	Designation	Scope	Factory Default	Attr
U0-39	V/F separation target voltage	1V	7027H	
U0-40	V/F Separate Output Voltage	1V	7028H	
U0-41	X Visual display of input status	1	7029H	
U0-42	Visual display of DO output status	1	702AH	
U0-43	X Function Status Visual Display 1 (Function 01-40)	1	702BH	
U0-44	X Function Status Visual Display 2 (Function 41-80)	1	702CH	
U0-45	Fault Information	1	702DH	
U0-59	Setting frequency (%)	0	703BH	
U0-60	Operating frequency (%)	0	703CH	
U0-61	Inverter status	1	703DH	
U0-62	Current fault code	1	703EH	

Chapter 7 Troubleshooting

Danger

1、It is strictly forbidden to conduct wiring or overhaul when the power is on, otherwise there is a risk of electric shock.
2、Do not disassemble the casing or touch the internal circuit after the inverter is charged, otherwise there will be a risk of electric shock.
3、 fault checking must be carried out by professionals, non-professional personnel are strictly prohibited to check, maintain and repair the inverter.

7.1 Cause of failure and its countermeasures

When a fault occurs, please first carefully troubleshoot according to the following table, and when the fault cannot be eliminated, do not power up by yourself. Please contact the supplier or manufacturer for technical support in time.
You can view the previous two, previous and latest fault record types by function codes F9-14, F9-15 and F9-16. The fault types are recorded as numeric codes (1-75), and the fault codes correspond to the fault display and fault names and suggested solutions as shown in the table below.

7.2 Troubleshooting

Fault Code	Fault display	Fault name	Cause	Policy
02	Er002	Accelerated overcurrent	Torque boost value is too large for V/f control	Decrease torque boost value
			Too much starting frequency	Lower starting frequency value
			Acceleration time is too short	Extended acceleration time
			Improper setting of motor parameters	Correct setting according to motor nameplate
			Overload	Load reduction
			Inappropriate V/f curve for V/f control	Set the V/f curve correctly
			Restarting of rotating motors	Reduced current limit or speed search start
			Output phase to phase short circuit or short circuit to ground	Check motor wiring and output to ground impedance

03	Er003	Deceleration overcurrent	Too much inertia of the load	Use of energy brakes
			Deceleration time is too short	Extended deceleration time
			Low grid input voltage	Check grid voltage
			Output phase to phase short circuit or short circuit to ground	Check motor wiring and output to ground impedance
04	Er004	Constant speed overcurrent	Overload	Load reduction
			Inverter power level is too small	Selecting the right inverter power
			Low grid input voltage	Check grid voltage
			Output phase to phase short circuit or short circuit to ground	Check motor wiring and output to ground impedance
05	Er005	Accelerated overpressure	Too much inertia of the load	Use of energy brakes
			Abnormal input voltage	Check grid voltage
			Output phase to phase short circuit or short circuit to ground	Check motor wiring and output to ground impedance
06	Er006	Deceleration overpressure	Too much inertia of the load	Use of energy brakes
			Deceleration time is too short	Extended deceleration time
			Abnormal input voltage	Check grid voltage
			Improper setting of regulator parameters during vector control operation	Correct setting of regulator parameters
			Output phase to phase short circuit or short circuit to ground	Check motor wiring and output to ground impedance
07	Er007	Constant speed	Improper setting of regulator parameters	Correct setting of regulator parameters

		overpressure	during vector control operation	
			Abnormal input voltage	Check grid voltage
			Too much load fluctuation	Check the load
			Output phase to phase short circuit or short circuit to ground	Check motor wiring and output to ground impedance
08	Er008	Input power abnormal	Severe three-phase unbalance of input power supply voltage	Check input grid voltage
			Abnormal power input wiring	Check power input wiring
			Abnormal DC bus capacitance	Seeking Services
09	Er009	Abnormal power supply during operation	DC bus voltage fluctuates too much or drops out during operation	Check whether the input grid voltage and load are normal
10	Er010	Drive overload	Torque boost value is too large for V/f control	Decrease torque boost value
			Too much starting frequency	Lower starting frequency value
			Acceleration and deceleration times are too short	Extended acceleration and deceleration time
			Improper setting of motor parameters	Correct setting according to motor nameplate
			Overload	Load reduction
			Inappropriate V/f curve for V/f control	Set the V/f curve correctly
			Restarting of rotating motors	Reduced current limit or speed search start
			Output phase to phase short circuit or short circuit to ground	Check motor wiring and output to ground impedance

11	Er011	Motor overload	Torque boost value is too large for V/f control	Decrease torque boost value
			Inappropriate V/f curve for V/f control	Set the V/f curve correctly
			Improper setting of motor parameters	Correct setting according to motor nameplate
			Improper setting of motor overload protection time	Correctly set the motor overload protection time
			Motor blockage or sudden load change is too large	Check the cause of motor blockage or check the load condition
			Long-term low speed and heavy load operation of general motors	Selecting inverter motors
12	Er012	Input out of phase	Abnormal three-phase input voltage	Check peripheral circuit problems
			Driver board abnormality	Seeking Services
			Lightning protection board anomaly	Seeking Services
			Main control board abnormal	Seeking Services
13	Er013	Output out of phase	Abnormal motor wire connection	Check the motor connection
			Motor three-phase unbalance	Check the motor or replace it
			Incorrect setting of vector control parameters	Correct setting of vector control parameters
14	Er014	Heat sink overheat protection	Fan damage	Fan replacement
			Blocked air ducts	Unclogging of air ducts
			Temperature sensor abnormality	Seeking Services
			Inverter module installation abnormality	Seeking Services

15	Er015	External equipment failure	External fault terminal active	Check the status of the external fault terminal
			Stall condition lasts too long	Check for load abnormalities
16	Er016	Port communication exception	Improper baud rate setting for communication	Correct setting
			Communication port connection cable disconnected	Reconnect
			The upper unit is not working	Make the upper computer work
			Frequency converter itself communication parameter error	Correct setting
17	Er017	Contactor abnormality	Contactor contact resistance is too high	Check if the contactor is damaged
			Contactor is not engaged	Replace the contactor and check the circuit
18	Er018	Abnormal current detection circuit	Abnormal connection between control board and driver board	Check the lineup and reinsert
			Control board current detection circuit abnormal	Seeking Services
			Driver board current detection circuit abnormal	Seeking Services
			Damaged current sensor	Seeking Services
			Switching power supply damage	Seeking Services
19	Er019	Parameter recognition failure	Bad motor wiring	Check motor wiring
			Identify when the motor is rotating	Identify when the motor is at standstill
			The deviation of motor parameter setting is too large	Correct setting according to motor nameplate

21	Er021	EEPROM read/write failure	An abnormality occurred in the parameter reading and writing on the control board	Seeking Services
22	Er022	Hardware Anomaly 1	Overcurrent factors	Handled in accordance with overcurrent treatment
			Input power abnormal	Check input grid voltage
			Abnormal motor output	Check motor or motor wiring
			Inverter module abnormal	Seeking Services
23	Er023	Output shorted to ground	Output wiring shorted to ground	Check motor wiring and output to ground impedance
			Abnormal motor insulation	Check the motor
			Inverter module abnormal	Seeking Services
			Output leakage current to ground is too high	Seeking Services
26	Er026	Continuous run time to	Continuous run time arrival function is set	See F8 group function description
29	Er029	Cumulative running time to	Cumulative runtime arrival function is set	See F8 group function description
30	Er030	Load Drop Failure	Inverter operating current less than 9-64 setpoint	Correctly set 9-64 dropout level
31	Er031	PID feedback lost	PID feedback channel abnormality	Check the feedback channel
			PID parameter setting is not reasonable	Correct setting
40	Er040	Wave-by-wave current limiting fault	Excessive load during operation	Check the load for short circuit, blocked rotation

41	Er041	Motor switching failure	Switching motors during operation	Motor switching operation after stopping the machine
42	Er042	Speed deviation fault	No parameter identification	Perform parameter identification
			Speed deviation is too large, 9-69,9-70 parameters are not reasonable	Correctly set parameters
			Encoder parameter setting error	Reasonable setting parameters
43	ER043	Over speed fault	No parameter identification	Perform parameter identification
			Speed deviation is too large, 9-67,9-68 parameters are not reasonable	Correctly set parameters
			Encoder parameter setting error	Reasonable setting parameters
45	Er045	Excessive temperature	Temperature sampling failure	Check the temperature sampling link

Chapter 8 Maintenance

Danger

1、Before carrying out maintenance or repair, please cut off all the equipment power, after cutting off the inverter input power, because there is still residual voltage on the internal DC capacitor of the inverter, please wait at least a few minutes for the power indicator to go out before operation, and when the power is on again, you need to wait for the interval of power on time specified by the inverter.

2、Do not remove the inverter housing, change the wiring, remove the cable or replace the cooling fan while the inverter is in operation, otherwise there is a risk of electric shock.

3、please be sure to ground the grounding terminal of the motor, otherwise there is a risk of electric shock in contact with the motor shell.

4. Do not perform maintenance, servicing and repair if you are not a professional electrician.

Attention

1、If you need to replace the fan, please correctly identify the direction of the fan outlet, if the wrong direction, it will lead to cold

but is ineffective and does not provide cooling.

2、Do not disassemble and install the motor when the inverter is running. Otherwise it will cause electric shock and inverter damage.

3、When wiring the control circuit, please use shielded cable and reliable grounding.

4. Do not change the internal circuit of the inverter, otherwise it will cause damage to the inverter.

8.1 Daily inspection items

Users should carry out routine and regular maintenance and repair of the inverter to avoid abnormal aging of the internal components of the inverter due to the influence of temperature, humidity, dust and vibration of the environment, which may lead to an increase in the probability of potential failure of the inverter or reduce the service life of the inverter. Especially for high temperature environment, frequent starting and stopping occasions, power and load fluctuation conditions, the existence of large vibration or shock environment, the existence of dust / hydrochloric acid corrosive environment should be shortened as appropriate periodic inspection cycle interval.

To ensure that the inverter functions properly and the product is protected from damage, please check the following items daily.

Inspection items	Inspection content	Countermeasures in case of failure
Motor	Whether the motor has abnormal sound and vibration phenomenon	● Confirmation of abnormal mechanical connections.
		● Confirm that the motor is out of phase.
		● Confirm that the motor fixing screws are secure.
Fans	Abnormal use of inverter and motor cooling fan	● Confirm that the inverter cooling fan is operating.
		● Confirmation of abnormalities in the motor-side cooling fan.
		● Confirm that ventilation channels are not blocked.
		● Confirm that the ambient temperature is within the allowable range.
Installation Environment	Is the electrical cabinet and cable trough abnormal	● Confirm that there is no insulation breakage in the incoming and outgoing cables of the inverter.
		● Confirm that the connection cable terminals are not loose or corroded through.
Load	Does the inverter operating current exceed the inverter rating and motor rating for a certain period of time	● Confirm that the motor parameters are set correctly.
		● Confirm that the motor is not overloaded.
		● Check if the mechanical vibration is too large (normal condition <1g).
Input Voltage	Is the power supply voltage between the main circuit	● Confirmation that the input voltage is within the allowable range.

	and the control circuit abnormal	● Confirm that there is no large load starting around.

8.2 Periodic inspection items

Please regularly check the places that are difficult to check in operation. You should always keep the inverter in a clean state, effectively remove the dust on the upper surface of the inverter, prevent the dust from entering the interior of the inverter, especially the metal dust, and effectively remove the oil from the cooling fan of the inverter.

Inspection items	Inspection content	Inspection content
Complete machine	Whether there is garbage, dirt, dust accumulation on the surface	● Confirm that the inverter cabinet is powered off.
		● Removal of trash or dust by vacuuming to avoid contact with components.
		If surface dirt cannot be removed, wipe with alcohol and allow to dry and evaporate completely.
Wires and Cables	Whether the power cord and connections are discolored.	● Replacement of cables that have cracked.
	Whether the insulation layer is aging or cracked.	● Replace the connection terminal that has been damaged.
Electromagnetic contactor periphery	Whether the action is not firmly sucked or make a strange noise.	● Replace the components that have been abnormal.
	Whether there is a short circuit, water contamination, expansion, rupture of peripheral devices	
Duct Vents	Whether the air duct and heat sink are blocked.	● Sweeping of air ducts.
	Whether the fan is damaged.	● Replace the fan.
Control circuit	Whether the control components have poor contact.	● Cleaning of foreign matter on the surface of control circuits and connection terminals.
	Terminals Whether the screws are loose.	
	Control the cable for insulation cracking.	● Replace broken and corroded control cables.

8.3 Inverter storage

Frequency converter temporary storage and long-term storage must pay attention to the following points.

(1) Store as much as possible in the original packaging in our boxes.

(2) Do not allow the whole machine to be placed in humid, high temperature, or outdoor exposure for a long time.

(3) Long time storage will lead to the deterioration of electrolytic capacitors, must ensure that the power is turned on once within 6 months, the power-on time is at least 5 hours, the input voltage must be slowly increased to the rated value with the regulator or consult the technical support of inverter professionals.

Appendix A Modbus Communication Protocol

GK310 series inverter provides RS485 communication interface and supports Modbus-RTU slave communication protocol. Users can connect the inverter to the "single master and multiple slave" PC/PLC control network with RS485 bus, and the inverter can be used as a slave to realize centralized control through the PC/PLC host. Through the Modbus communication protocol, you can set the operation command of the inverter, modify or read the function code parameters, read the working status and fault information of the inverter, etc.

This serial communication protocol defines the content of the information transmitted in serial communication and the format used. It includes the host polling (or broadcast) format, the encoding method of the host, the content including the function code of the requested action, the transmitted data and the error checks, etc. The response from the slave uses the same structure, and the content includes action confirmation, return data and error checks, etc. If the slave makes an error in receiving information or fails to complete the action requested by the host, it will organize a fault message as a response back to the host.

1. Bus structure

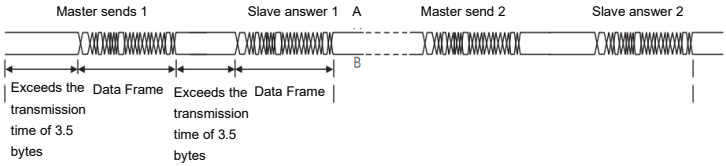
1) Topology

Single-Master-Multi-Slave System. Each communication device in the network has a unique slave address. One of the devices acts as the communication host (often a PC host, PLC, HMI, etc.), initiates communication, reads or writes parameters to the slave, and the slave responds to the host's queries or communication operations to this machine. Only one device can send data at the same moment, while the other devices are in the receiving state.

The slave addresses are set in the range of 1 to 247, with 0 being the broadcast communication address. All slave addresses in the network must be unique.

2）Communication transmission method

Asynchronous serial, half-duplex transmission method. Data is sent one frame at a time in the form of a telegram during serial asynchronous communication. It is agreed in the MODBUS-RTU protocol that when the idle time without data on the communication data line is greater than 3.5 Byte of transmission time, it indicates the start of a new communication frame.



The built-in communication protocol of GK310 series inverter is Modbus-RTU slave communication protocol, which can respond to the "query/command" of the host, or make

corresponding action according to the "query/command" of the host, and communicate data response. The host can communicate to a slave individually or broadcast information to all slaves. For the individual access "query/command" from the host, the accessed slave has to return an answer frame; for the broadcast message from the host, the slave does not need to respond back to the host.

2. Communication data format

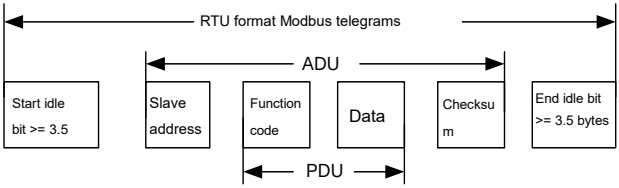


Fig.1 RTU data frame format

RTU method.

The idle time between frames in the RTU mode can be set either by function code or by adhering to the Modbus internal convention, which has the following minimum idle time between frames.

1. Frames are defined by bus idle time greater than or equal to 3.5 bytes of time at the head and tail of the frame.

2. The gap between characters must be less than 1.5 characters communication time after the start of the frame, otherwise the newly received characters will be treated as the header of a new frame.

3、The data checksum uses CRC-16, the whole message is involved in the checksum, and the high and low bytes of the checksum need to be exchanged and sent. Please refer to the example at the back of the protocol for the specific CRC checksum.

Table 1 Data frame field description

Frame header START	Greater than 3.5 character transfer time idle
Slave Address ADR	Communication address range: 1 to 247; 0: broadcast address
Command Code CMD	03: Read slave parameters; 06: Write slave parameters
Function code address H	The internal parameter address of the inverter is expressed in hexadecimal system; it is divided into function code type and non-function code type (such as operation status parameter, operation command, etc.) parameters, etc. See the address definition for details.
Function code address L	When transmitting, the high byte comes first and the low byte comes second.
Data H	

Data L	The data to be answered, or the data to be written, is transmitted with the high byte first and the low byte second.
CRC CHK low	Detection value: CRC16 checksum value. When transmitting, the low byte comes first and the high byte comes second.
CRC CHK High	See the description of CRC checksum in this section for details on the calculation method.
END	At 3.5 characters

3. 0x03: Read parameters and status words of multiple inverters

PDU section content	Data length (bytes)	Scope
Request.		
Function Code	1	0x03
Register start address	2	0x0000 ~ 0xFFFF
Number of registers	2	0x0001 ~ 0x0010
Response.		
Function Code	1	0x03
Number of bytes read	1	2*Number of registers
Read Content	2*Number of registers	

4. 0x06: Write parameter or control words

PDU section content	Data length (bytes)	Scope
Request.		
Function Code	1	0x06
Register Address	2	0x0000 ~ 0xFFFF
Register Data	2	0x0000 ~ 0xFFFF
Response.		
Function Code	1	0x06
Register Address	2	0x0000 ~ 0xFFFF
Register Data	2	0x0000 ~ 0xFFFF

GK310 series inverter supports Modbus-RTU communication protocol. Through these protocols, the host computer can control, monitor and modify the function parameters of the inverter.

GK310 communication data can be divided into function code data and non-function code data. Non-function code data includes operation command, operation status, operation

parameters, fault information, etc.

5. Function code data address definition

The function code data is an important setting parameter of the inverter, divided into Group F and Group P function parameters, as follows.

Table 2 Communication Address Map

ADDRESS	DESCRIPTION	FUNCTION CODE	NOTES
0X0000	F-group parameter (RAM) address	Read/Write	F-group parameters in RAM
0XF000	F-group parameter (ROM) address	Read/Write	F-group parameters in ROM
0X4000	P-group parameter (RAM) address	Read/Write	P-group parameters in RAM
0XA000	P-group parameter (ROM) address	Read/Write	P-group parameters in ROM
0X1000	Running parameters	Read/Write	Inverter control & status
0X2000	Control commands	Write only	Start/stop, jog, reset, etc.
0X2001	DO control	Write only	Digital Output
0X2002	AO1 control	Write only	Analog Output 1
0X2003	AO2 control	Write only	Analog Output 2
0X2004	HDO control	Write only	High-speed DO
0X3000	Running status	Read only	Inverter operating status
0X7000	U-group parameters	Read only	Monitoring array U0–UF
0X8000	Fault codes	Read only	Error code list

For function codes in the **F0 to FF** and **P0 to PF** groups, the **communication address** is composed as follows:

- The **high 16 bits** represent the **function group code**.
- The **low 16 bits** represent the **function code's number** within that group, in hexadecimal format.

Examples:

- FA-17:
  - Communication address: **FA11H**
  - FA indicates the **FA function group**,
  - 11H (hexadecimal for 17) is the function code serial number.
- P5-08:
  - Communication address: A508H
  - A5 represents the **P5 function group**,
  - 08H is the function code serial number.

6. Addressing Method for Parameter Read/Write

To reduce wear on the EEPROM from frequent writes, the inverter distinguishes between parameters that require EEPROM storage and those that do not. This distinction is reflected in the high 16 bits of the communication address during write operations.

F-group Parameters (FA-20)

- **Read (RAM or ROM):**
  High byte = 0xFA; parameter number = 0x14 for FA-20 → Address = **0xFA14**
- **Write to RAM:**
  High byte = 0x0A; parameter number = 0x14 for FA-20 → Address = **0x0A14**
- **Write to ROM (use sparingly):**
  High byte = 0xFA; parameter number = 0x14 → Address = **0xFA14**

P-group Parameters (P1-20)

- Read:
  High byte = 0xA1; number = 0x14 for P1-20 → Address = **0xA114**
- Write to RAM:
  High byte = 0x41; number = 0x14 → Address = **0x4114**
- Write to ROM (use sparingly):
  High byte = 0xA1; number = 0x14 → Address = **0xA114**

7. Inverter Stop/Run Parameters (0x1000)

Address	*Description*	*Address*	*Description*
0x1000	Communication settings	0x1010	PID settings
0x1001	Running frequency	0x1011	PID feedback
0x1002	DC bus voltage	0x1012	PLC step
0x1003	Output voltage	0x1013	Pulse input frequency (×0.01 kHz)
0x1004	Output current	0x1014	Feedback speed (×0.1 Hz)
0x1005	Output power	0x1015	Remaining run time
0x1006	Output torque	0x1016	AI1 voltage (pre-calibration)
0x1007	Running speed	0x1017	AI2 voltage (pre-calibration)
0x1008	DI input status flags	0x1019	Linear (belt) speed
0x1009	DO output status flags	0x101A	Power-up time
0x100A	AI1 voltage	0x101B	Run time
0x100B	AI2 voltage	0x101C	Pulse input frequency (1 Hz)
0x100C	Reserved	0x101D	Communication settings (mirror of 1000h)
0x100D	Count value input	0x101E	Actual feedback speed
0x100E	Length value input	0x101F	Display of main frequency X
0x100F	Load speed	0x1020	Display of auxiliary frequency Y

Note: The value at 0x1000 is the % of maximum frequency (e.g. 10000 = 100.00%).

8. Inverter Command Parameters (0x2000)

When **F0-02 = 2 (Communications control)**, you can issue start/stop/jog commands via address 0x2000:

Command Code	*Function*
1	Forward run
2	Reverse run
3	Forward jog
4	Reverse jog
5	Coasting stop
6	Decelerated stop
7	Fault reset

9. Inverter Running Status (0x3000)

Read from 0x3000 (Function Code 03) to get operating status:

STATUS CODE	MEANING
1	Forward running
2	Reverse running
3	Stopped

10. U-Group Monitoring Array (0x7000)

Starting at address 0x7000, you can read U0–UF monitoring parameters.

- High word: 0x70–0x7F
- Low word: parameter index within the group

e.g. U0-11 → Address = **0x700B**

(Refer to the user manual for detailed definitions of U0–UF.)

11. Fault Data (0x8000)

Read at 0x8000 to retrieve the current fault code:

CODE	FAULT DESCRIPTION	CODE	FAULT DESCRIPTION
0000	No fault	**0012**	Current detection fault
0002	Overcurrent during acceleration	**0013**	Motor tuning fault
0003	Overcurrent during deceleration	**0015**	Parameter read/write error
0004	Constant-speed overcurrent	**0016**	Hardware fault
0005	Overvoltage during acceleration	**0017**	Motor-to-ground short
0006	Overvoltage during deceleration	**001A**	Runtime expired
0007	Constant-speed overvoltage	**001D**	Power-up time expired
0008	Braking resistor overload	**001E**	Load loss
0009	Undervoltage fault	**001F**	PID feedback lost
000A	Inverter overload	**0028**	Fast current limit timeout
000B	Motor overload	**0029**	Motor switch during run
000C	Input phase loss	**002A**	Excessive speed deviation
000D	Output phase loss	**002D**	Motor over-temperature
000E	Module over-temperature	**0047**	High-voltage alarm
000F	External fault	**0048**	Low-voltage alarm
0010	Communication anomaly	**0049**	Water shortage alarm
0011	Contactor anomaly	**004A**	Burst pipe alarm

12. Modbus Communication Control Examples

1. Start Forward Run for Inverter #1

FIELD	VALUE
ADDRESS	0x01
FUNCTION CODE	0x06
REGISTER ADDRESS	0x2000
REGISTER VALUE	0x0001 (Forward Run)
CRC CHECKSUM	0x43CA

- **Request Frame:** 01 06 20 00 00 01 43 CA
- **Response Frame:** 01 06 20 00 00 01 43 CA

2. Read U0-00 and U0-01 Parameters from Inverter #1

FIELD	VALUE
ADDRESS	0x01
FUNCTION CODE	0x03
START ADDRESS	0x7000
NUMBER OF REGISTERS	0x0002
CRC CHECKSUM	0xDECB

- **Request Frame:** 01 03 70 00 00 02 DE CB
- **Response Frame:** 01 03 04 00 16 00 00 1B F7
    - (Returned values: 0x0016 for U0-00, 0x0000 for U0-01)

3. Write Parameters P1-02 = 102 and P1-03 = 103

FIELD	VALUE
ADDRESS	0x01
FUNCTION CODE	0x10 (Write Multiple Registers)
START ADDRESS	0x1102
NUMBER OF REGISTERS	0x0002
BYTE COUNT	0x04
REGISTER DATA	0x0066 (102), 0x0067 (103)
CRC CHECKSUM	0x13D3

- **Request Frame:** 01 10 11 02 00 02 04 00 66 00 67 13 D3
- **Response Frame:** 01 10 11 02 00 02 E5 34

13. Field Application Example:

3-Wire Control Using DI1, DI2, and Virtual DI3

Scenario:

The customer is using **3-wire mode 2** with physical terminals DI1 and DI2, and defines DI3 as a **virtual terminal via RS485**.

- **DI1**: Start (Forward run)
- **DI2**: Direction control (Forward/Reverse)
- **DI3**: Stop (via virtual terminal through Modbus)

Parameter Settings:

PARAMETER	VALUE	DESCRIPTION
F0-02	1	Control via terminals (Start/Stop)
F4-00	1	X1 terminal assigned to FWD

F4-01	2	X2 terminal assigned to REV
A1-02	3	Virtual DI3 set for 3-wire mode
A1-05	0x00100	X3 terminal mapped to virtual DI3
A1-06	0x00100	Controlled via communication

Control via Modbus

Enable Virtual DI3 (X3 Active - Value: 0x00100):

FIELD	VALUE
ADDRESS	0x01
FUNCTION CODE	0x06
REGISTER ADDRESS	0xA106
REGISTER VALUE	0x0064
CRC CHECKSUM	0x4BDC

- **Request Frame:** 01 06 A1 06 00 64 4B DC

Disable Virtual DI3 (X3 Inactive - Value: 0x00000):

FIELD	VALUE
ADDRESS	0x01
FUNCTION CODE	0x06
REGISTER ADDRESS	0xA106
REGISTER VALUE	0x0000
CRC CHECKSUM	0x4A37

- **Request Frame: 01 06 A1 06 00 00 4A 37**