GUIDE VFD GF630N02 Series

Instruction manual version: 1.03

Foreword

Thank you for choosing us! At the same time, you will enjoy the comprehensive and sincere service we provide for you!

VFD GF630N02 series is a high-performance textile VFD, and its performance index of vector control without speed sensor has reached the world leading level.

In order to fully utilize the excellent performance of this product and to ensure the safety of the user and the equipment, please read this manual in detail before use.

This instruction manual is an accessory sent with the product, please make sure to keep it in a safe place after use, so that it can be used in the future for overhauling and maintenance of the VFD.

For the use of this VFD if there are questions or special requirements, please feel free to contact the company's local offices or distributors, but also directly with the headquarters of the company's after-sales service center, we will be happy to serve you.

The contents of this manual are subject to change without notice.

Wuhan Guide Technology Co.,Ltd.

Safety Precautions

Safety statement

1) Please read and observe the safety precautions before installation, operation, and maintenance of the product.

2) To ensure personal and equipment safety, please follow all safety precautions indicated on the product and described in the manual during installation, operation, and maintenance of the product.

3) The "CAUTION", "WARNING" and "DANGER" in this manual do not represent all the safety precautions to be observed, but only serve as a supplement to all safety precautions.

4) This product shall be used in an environment that meets the requirements of the design specifications, otherwise it may cause malfunctions. Functional abnormalities or component damage caused by failure to comply with relevant regulations are not within the scope of product quality assurance.

5) Our company will not bear any legal responsibility for personal safety accidents, property losses, etc. caused by illegal operation of products.

Safety level

Symbol	Symbol description
DANGER	◆ "DANGER" means that death or serious bodily injury will result if the operation is not carried out as specified
CAUTION	◆ "CAUTION" indicates a critical step, which needs to be operated according to the prompts and specifications
WARNING	◆ "WARNING" means that death or serious bodily injury may result if the operation is not carried out as specified

Safety instructions

Important notes
DANGER ◆ Do not touch the radiator by hand after ten minutes of power-on or within a period of time after power-off to prevent burns. ◆ Do not power on and off the VFD frequently, and do not power on again within five minutes after power off. ◆ Do not remove the cover of the VFD or touch the printed circuit board when it is powered on to prevent electric shock. ◆ Wiring, inspection and other operations must be carried out 10 minutes after the power is turned off. ◆ The grounding terminal of the VFD must be well grounded!

- No foreign matters are allowed to fall into the VFD.

WARNING

- The VFD must not be installed on flammable materials.
- This series of VFD are not suitable for flammable and explosive environments. If necessary, please order a special VFD from the manufacturer.
- It is forbidden to disassemble, assemble or modify the VFD without permission!
- It is strictly forbidden to connect the AC power supply to the output terminals U, V and W of the VFD.
- When the VFD is powered on, do not open the cover or carry out wiring operations.

Unpacking acceptance

CAUTION

- Before unpacking, please check whether the outer packaging of the product is intact, whether there is damage, soaking, moisture, deformation, etc.
- Please open the package in accordance with the specified hierarchical order. It is strictly prohibited to handle it with excessive force!
- When unpacking, please check whether there is any damage, rust, or dents on the surface of the product and its accessories.
- After unpacking, please carefully check whether the quantity and data of the product and its accessories are complete against the packing list.

WARNING

- Upon unpacking, refrain from installing the product if water has infiltrated the product, any parts are missing, or any parts are damaged!
- If the product and its accessories are found to have damage, rust, signs of use and other problems during unpacking, do not install them!
- Please carefully check against the packing list, and do not install if the packing list does not match the product name!

Storage and transportation

CAUTION

- Please store and transport the product according to the storage and transportation conditions, and the storage temperature and humidity shall meet the requirements.
- Avoid storage and transportation in places where water splashes, rain, direct sunlight, intense electric field, strong magnetic field, strong vibration, etc.
- Avoid storing the product for more than 3 months. If the storage time is too long, please carry out closer protection and necessary inspection.
- Please pack the product strictly before vehicle transportation. Closed boxes must be used for long-distance transportation.
- It is strictly forbidden to transport this product together with equipment or articles that may affect or damage this product.

WARNING

- Be sure to use professional loading and unloading equipment to handle large or heavy equipment and products!
- When handling the product by hands, be sure to hold the product housing firmly to avoid falling product parts, otherwise there is a risk of injury!
- When handling the product, be sure to lift and place it gently, and always be mindful of objects underfoot to prevent tripping or falling, otherwise there is a risk of injury or product damage!
- When the equipment is being lifted by lifting tools, no individuals are permitted to stand or remain beneath the equipment.

Installation

WARNING

- Be sure to read the product instruction manual and safety precautions carefully before installation!
- It is strictly forbidden to modify this product!
- It is strictly forbidden to screw the fixing bolts of product parts and components and the bolts marked in red!
- Do not install this product in places with intense electric field or strong electromagnetic wave interference!
- When this product is installed in a cabinet or terminal equipment, the cabinet or terminal equipment shall be provided with corresponding protective devices such as fireproof enclosure, electrical protective enclosure and mechanical protective enclosure, and the protection grade shall meet the requirements of relevant IEC standards and local laws and regulations.

DANGER

- Non-professionals are strictly prohibited from product installation, wiring, maintenance, inspection or component replacement!
- The installation, wiring, maintenance, inspection or component replacement of this product can only be carried out by professionals who have received relevant training on electrical equipment and have sufficient electrical knowledge.
- The installation personnel must be familiar with the product installation requirements and relevant technical data.
- When it is necessary to install transformers and other equipment with strong electromagnetic interference, please install shielding protection devices to avoid malfunction of this product!

Wiring

DANGER

- Non-professionals are strictly prohibited from equipment installation, wiring, maintenance, inspection or component replacement!
- Do not perform wiring operations when the power is on, otherwise there will be a risk of electric shock.
- Before wiring, cut off the power supply of all equipment. After the power is cut off, there is residual voltage in the internal capacitor of the equipment. Please wait at least 10 minutes before wiring.
- Ensure that the equipment and products are properly grounded, otherwise there will be a risk of electric shock.
- Please adhere to the procedures outlined in the Electrostatic Discharge (ESD) prevention guidelines and wear an electrostatic wrist strap during wiring and other operations to prevent damage to the internal circuitry of the equipment or product.

WARNING

- It is strictly forbidden to connect the input power supply to the output terminals of the equipment or product, as this may cause equipment damage or even lead to a fire.
- When connecting the driver to the motor, be sure to ensure that the phase sequence of the driver and the motor terminals is accurate and consistent to avoid reverse rotation of the motor.
- The cables used in wiring must meet the corresponding requirements for diameter and shielding, and the shielding layer of shielded cables must be reliably grounded at one end!
- After wiring, make sure that there are no falling screws or exposed cables inside the equipment and product.

Power up

WARNING

- Before powering up, please confirm that the equipment and products are installed properly, the wiring is firm, and the motor device is allowed to be restarted.
- Before powering up, please confirm that the power supply meets the requirements of the equipment to avoid equipment damage or fire!
- When powering up, the mechanical device of the equipment or product may act suddenly. Please stay away from the mechanical device.
- After powering up, do not open the equipment cabinet door or product protective cover, otherwise there will be a risk of electric shock!
- It is strictly prohibited to touch any wiring terminals of the equipment while it is powered on, otherwise there will be a risk of electric shock!
- It is strictly prohibited to disassemble any devices or components of the equipment and products while they are powered on, otherwise there will be a risk of electric shock!

Running

DANGER

- It is strictly prohibited to touch any wiring terminals of the equipment while it is in running state, otherwise there will be a risk of electric shock!
- It is strictly prohibited to disassemble any devices or components of the equipment and products while they are in running state, otherwise there will be a risk of electric shock!
- It is strictly forbidden to touch the equipment housing, fan or resistance to test the temperature, otherwise it may cause burns!
- It is strictly forbidden for non-professional technicians to detect signals during running, otherwise it may cause personal injury or equipment damage!

WARNING

- During running, avoid other articles or metal objects from falling into the equipment, otherwise the equipment will be damaged!
- Do not use the contactor on-off method to control the start and stop of the equipment, otherwise the equipment will be damaged!

Maintenance

WARNING

- Before powering up, please confirm that the equipment and products are installed properly, the wiring is firm, and the motor device is allowed to be restarted.
- Before powering up, please confirm that the power supply meets the requirements of the equipment to avoid equipment damage or fire!
- When powering up, the mechanical device of the equipment or product may act suddenly. Please stay away from the mechanical device.
- After powering up, do not open the equipment cabinet door or product protective cover, otherwise there will be a risk of electric shock!
- It is strictly prohibited to touch any wiring terminals of the equipment while it is powered on, otherwise there will be a risk of electric shock!
- It is strictly prohibited to disassemble any devices or components of the equipment and products while they are powered on, otherwise there will be a risk of electric shock!

Scrapping

WARNING

- Please scrap equipment and products in accordance with relevant national regulations and standards to avoid property losses or casualties!
- Scrapped equipment and products shall be treated and recycled in accordance with industrial waste treatment standards to avoid environmental pollution.

Precaution instructions

1) Residual current operated protective device

In running state, the equipment may produce a significant leakage current that flows through the protective grounding conductor. When utilizing a residual current operated protective device (RCD) or a residual current monitor (RCM), it is imperative to employ an RCD or RCM with a response delay or one that is capable of filtering higher order current harmonics.

Please install a Type B residual current device (RCD) on the primary side of the power supply. When selecting a residual current device (RCD), consider the transient and steady-state ground leakage currents that may occur during the startup and running of the equipment. Select a dedicated RCD with measures to suppress high-order harmonics, or a general RCD with a larger residual current.

2) Motor insulation inspection

When the motor is used for the first time or used again after a long time, the motor insulation inspection shall be carried out to prevent the VFD from being damaged due to the insulation failure of the motor winding. During the motor insulation inspection, please disconnect the connecting wire between the motor and the VFD. It is recommended to use a 500V voltage type megohmmeter to ensure that the measured insulation resistance of the motor is not less than 5MΩ.

3) Use other than rated voltage value

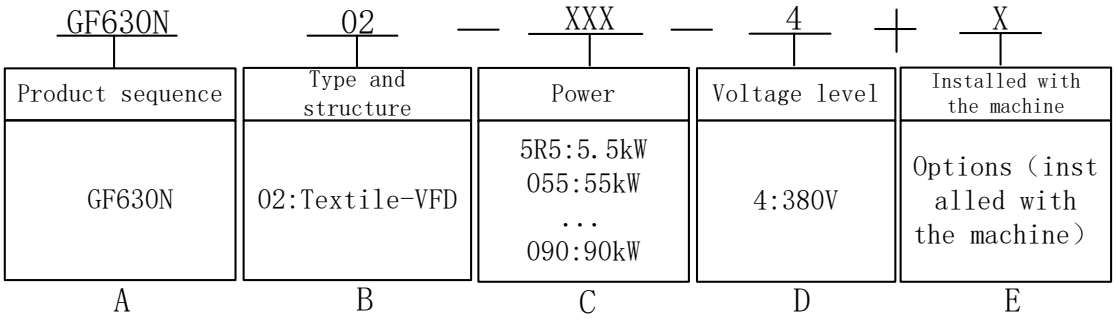
If the VFD is used outside the allowable working voltage range specified in the manual, it is easy to cause internal damage to the VFD. If necessary, use a step-up or step-down device to transform the power supply and connect it to the VFD.

CONTENTS

1. Product Information

1.1 Nameplate and model number

VFD Model Meaning:



System Product Model Field Description

field identifier	Detailed description of fields
A	GF630N: Product Serial Number
B	Structure and type: 02 Textile VFD
C	Power: 011:11kW 090:90kW
D	4: Voltage level 380V
E	Options are installed with the machine

Options:

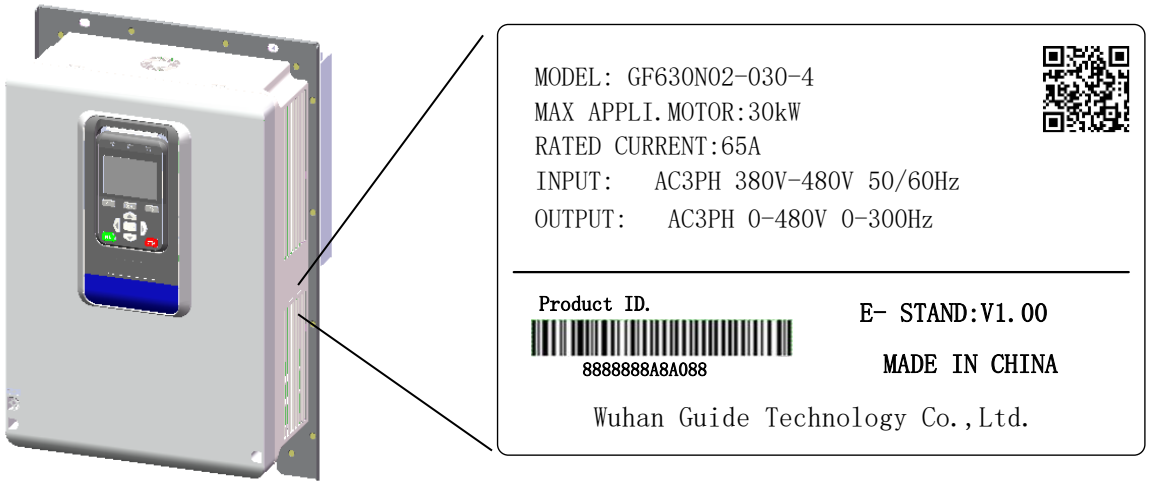
Coding	Note	Coding	Note
DL	External DC reactor	MB01	Modbus RTU communication card
LCD	Chinese and English LCD panels	PN01	Profinet Communication Card
CAN01	CANopen Communication Card	DP01	Profibus DP communication card
PG02	Incremental encoder cards for standard VFDs	IO01 (IO expansion card)	7DI+4DO+Modbus RTU communication

IO02 (IO expansion card)	5DI+2DO	PC03 (process card)	20DI+6DO
PC01 (process card)	20DI+6DO+CANopen communication+Modbus RTU communication	/	/

Model number example description:

GF630N02-011-4+LCD+MB01: 380V/11kW textile VFD, no built-in DC reactor, built-in braking unit, optional LCD panel, Modbus RTU communication card.

The nameplate of GF630N02 series VFD is shown in the figure (30kW for example)



Product nameplate description

Model No.: GF630N02-030-4 indicates that the rated power of GF630N02 series VFD is 30kW and the voltage level is 380V.

AC indicates alternating current power input and output.

3PH indicates three-phase input and output.

380V-480V 50/60Hz indicates the input voltage range and frequency.

0-480V 0-300Hz indicates the VFD output voltage range and output frequency range.

GF630N02 VFD Product List

Model number	Light overload condition		Heavy overload conditions		Models	Default carrier frequency [k]
	Output current [A]	Applicable motor capacity [kW]	Output current [A]	Applicable motor capacity [kW]		
GF630N02-011-4	23	11	17	7.5	S1	3.5
GF630N02-015-4	31	15	23	11		
GF630N02-018-4	37	18.5	31	15	S2	
GF630N02-022-4	46	22	37	18.5		
GF630N02-030-4	64	30	46	22		
GF630N02-037-4	75	37	64	30	S3	3
GF630N02-045-4	93	45	74	37		
GF630N02-055-4	114	55	93	45		
GF630N02-075-4	154	75	114	55		
GF630N02-090-4	187	90	154	75		

Notes:

1、11KW~30KW without DC reactor, 37KW~90KW can be equipped with external DC reactor;

2、Built-in brake unit as standard;

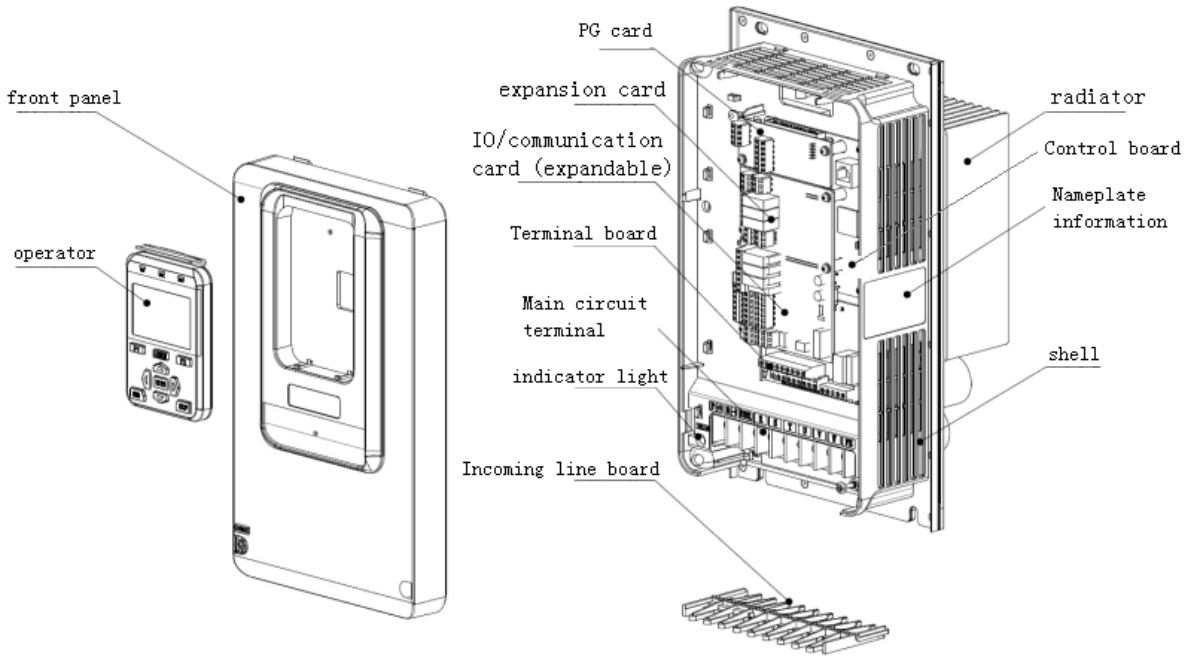
3、Standard with LED digital display panel

4、Light overload condition: 120% of rated output current, overload is allowed to be overloaded for 1 minute every 5 minutes; Heavy overload condition: rated output current, overload is allowed to be overloaded for 1 minute every 5 minutes.

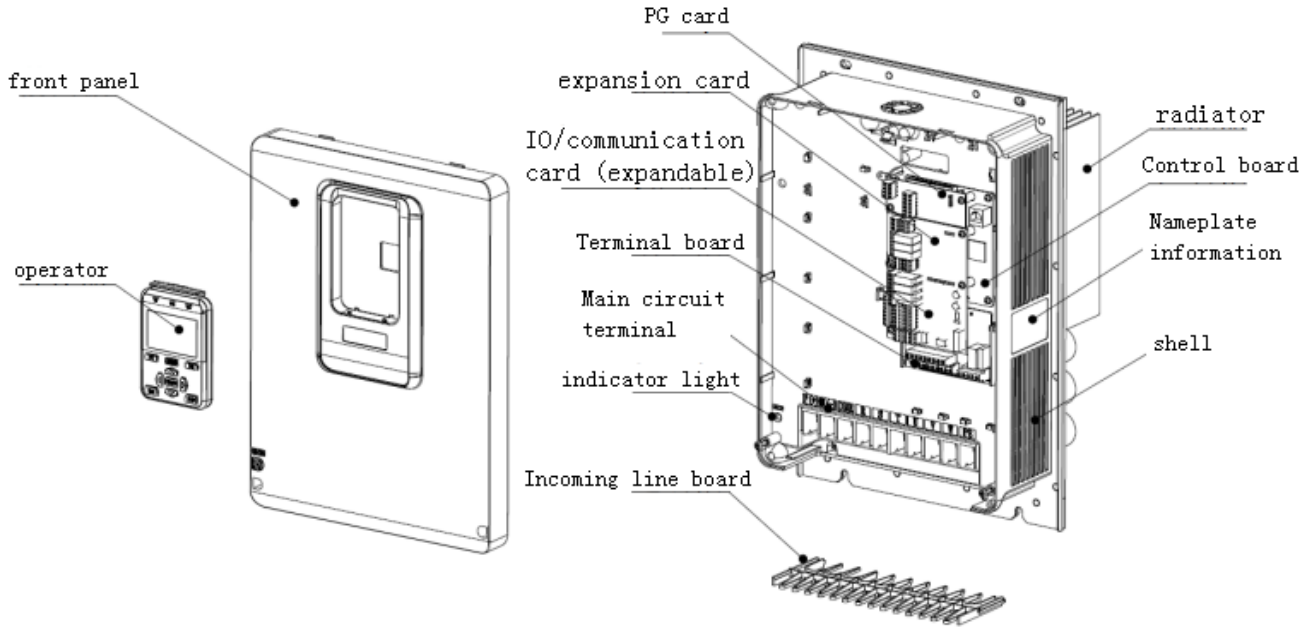
150% of output current, overload allowed for 1 minute every 5 minutes.

1.2 Description of components

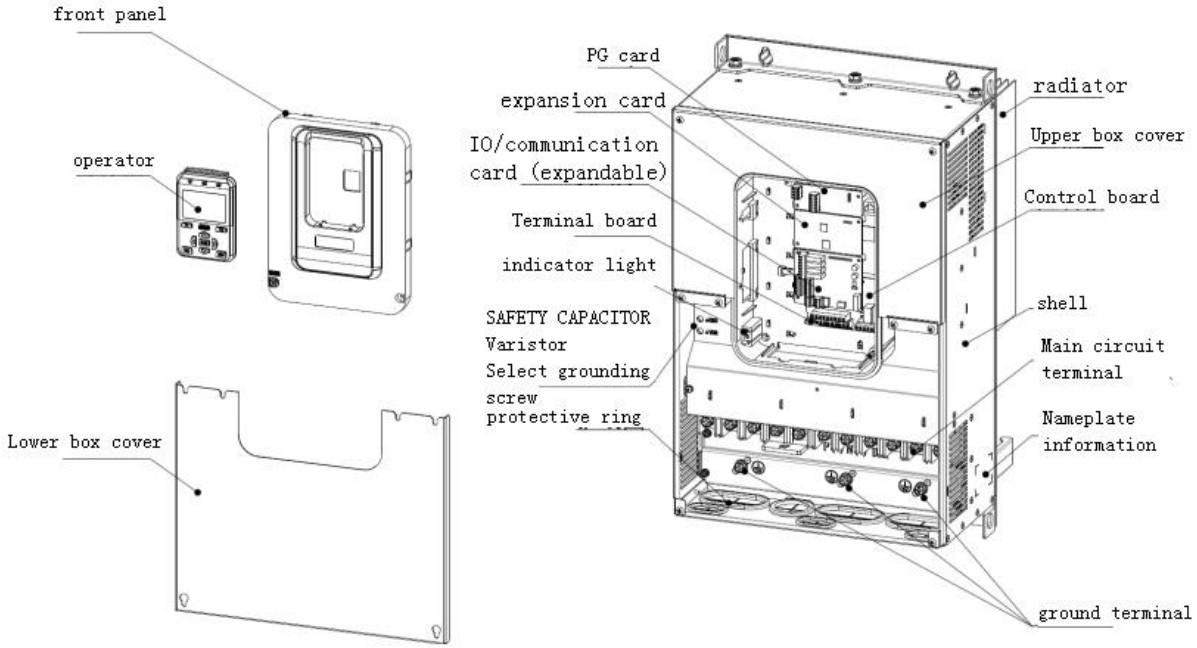
GF630N02 series VFDs have two types of structure depending on the power level, which are plastic structure and sheet metal structure. As shown in the figure below:



Schematic diagram of S1 product components (three-phase 380V to 480V, 11kW to 15kW)

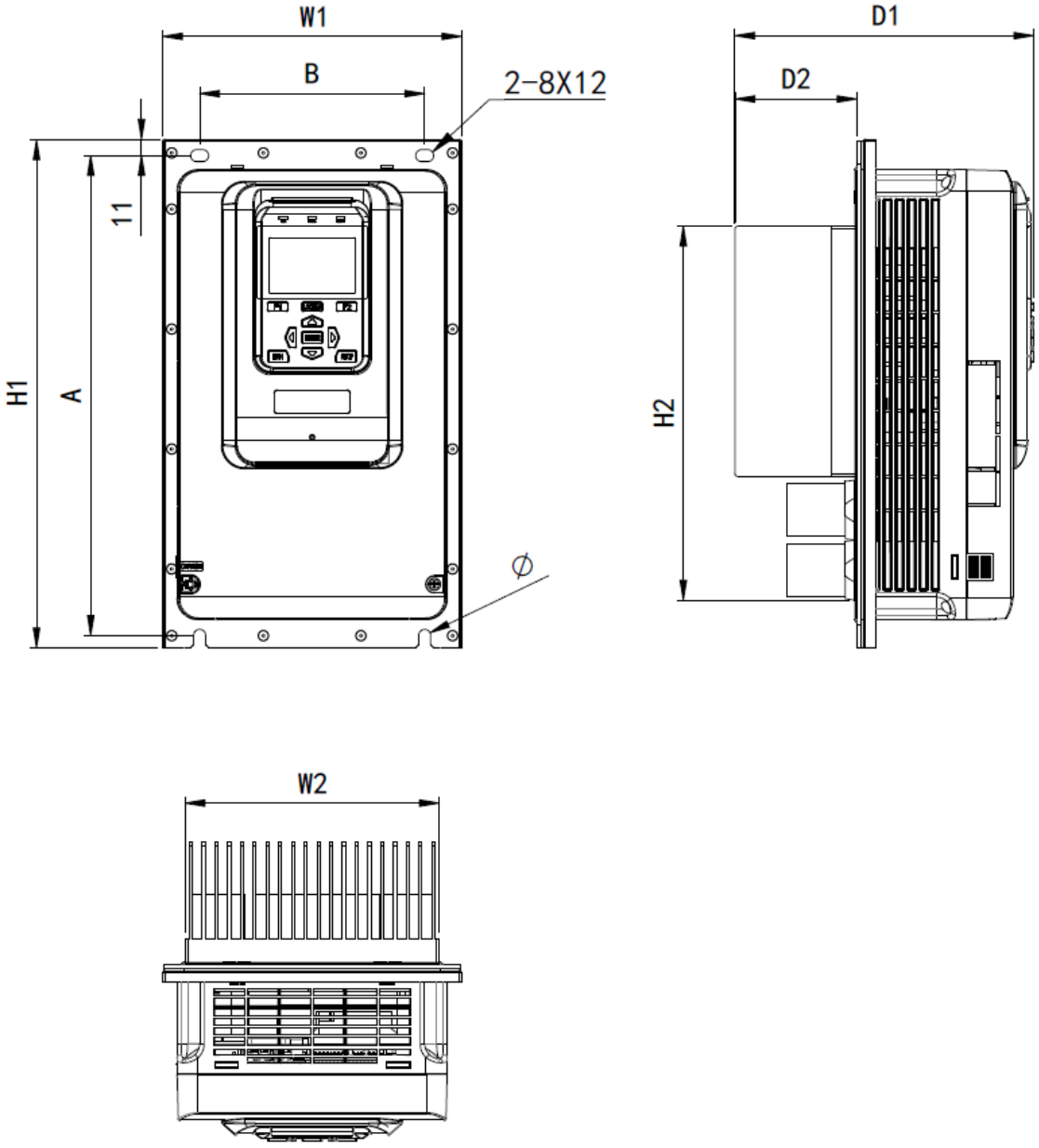


S2 Schematic diagram of product components (three-phase 380V to 480V, 18.5kW to 30kW)

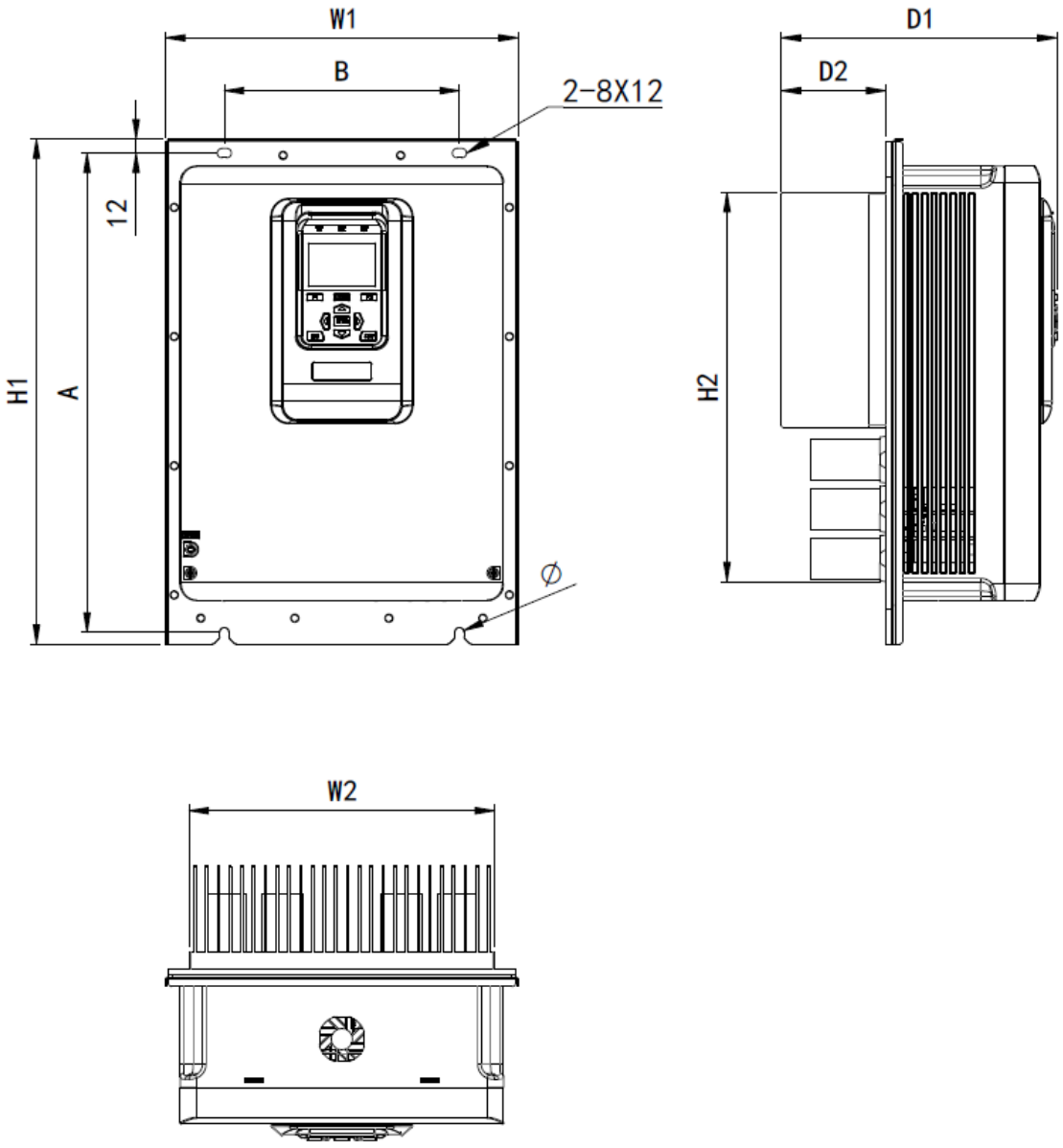


Schematic diagram of S3 product components (three-phase 380V to 480V, 37kW to 90kW)

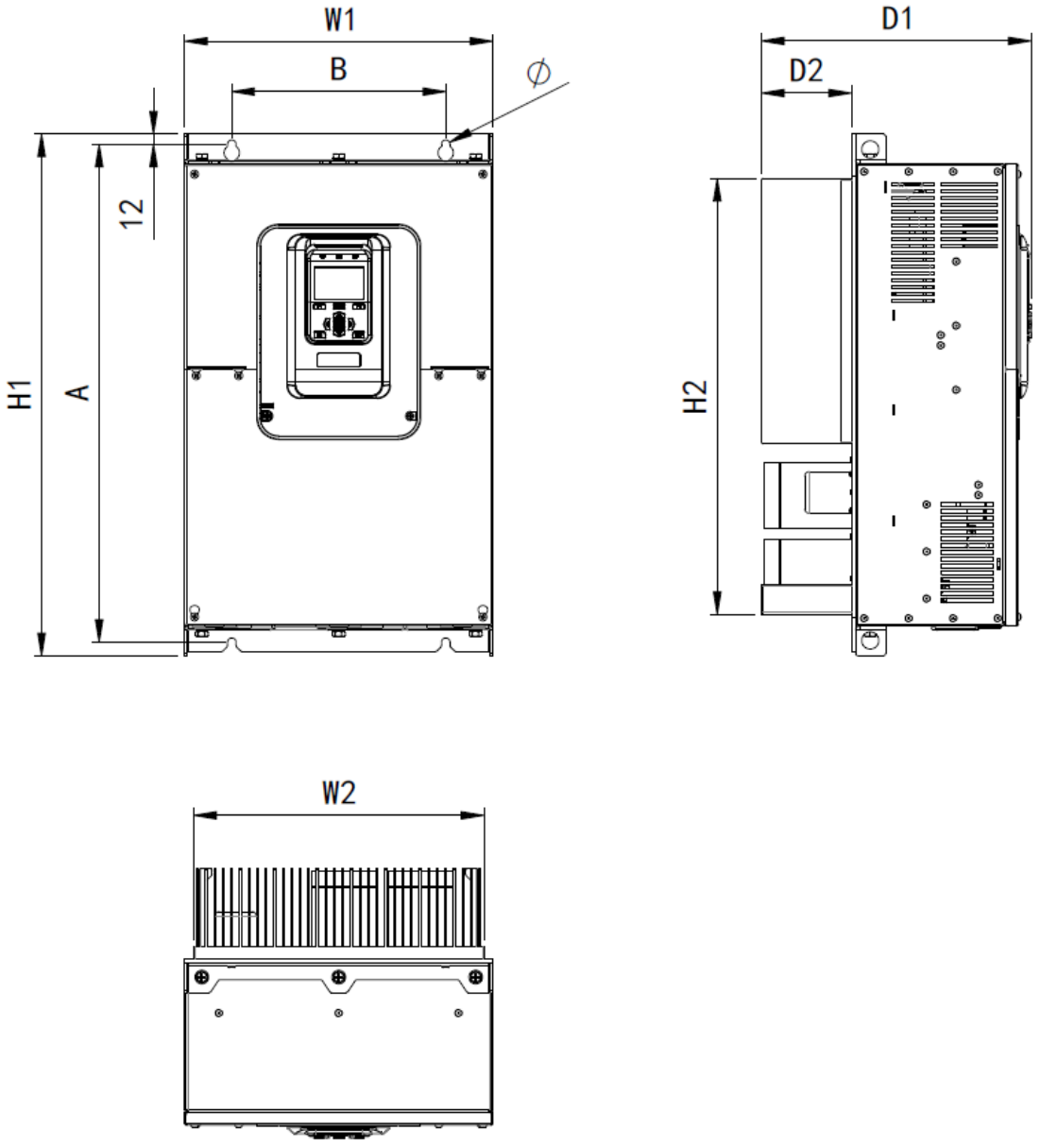
1.3 S1~S3 overall dimensions



S1 model dimensions and installation dimensions schematic diagram



S2 model dimensions and mounting dimensions schematic diagram



S3 model dimensions and installation dimensions schematic diagram

1.4 External dimensions and installation dimensions

Models	Power (output)	Overall dimensions (unit: mm)						Mounting Dimensions Unit: mm		Mounting diameter of hole	Recommended mounting bolts grade 8.8	Weight kg
		H1	H2	W1	W2	D1	D2	A	B	Φ	M	
S1	11kW	340	250	200	134	200	82	320	150	Φ8	4-M6	6
	15kW											
S2	18.5kW	430	332	300	260	235	89	408	200	Φ8	4-M6	12
	22kW											
	30kW											
S3	37kW	610	510	360	339	315	105	582	250	Φ10	4-M8	33
	45kW											
	55kW											
	75kW											
	90kW											

1.5 Comprehensive product performance index

Sports event		Instructions
importation	Input Voltage	Three-phase 380V～480V
	Rated frequency	50/60Hz
	Allowable voltage fluctuation	-15% to +10%
	Allowable frequency fluctuations	Allowable range of frequency variation is fLN ± 2 % (± 4 % for independent power grids). Frequency variation rate: ≤ 2 % fLN/s
exports	Output Voltage Range	0～Input Voltage
	Asymmetry of	Under normal use conditions, the asymmetry of the output

	output voltage	three-phase voltage should not exceed 1 % under the symmetrical load condition of each phase throughout the output frequency adjustment range.
	Output frequency range	0 to 300Hz
containment characterization	Run command method	Panel control, terminal control, communication control
	carrier frequency	1kHz to 10kHz, adjustable according to temperature and load characteristics
	frequency resolution	Digital setting: 0.01Hz, analog setting: Maximum frequency x 0.1%
	control method	Closed-loop vector control (VC), open-loop vector control (SVC), V/F control
	V/F control	Linear, multi-point, square
	torque control	With PG torque control, without PG torque control
	top speed	300 Hz, depending on the electrical and mechanical characteristics of the motor
	Starting torque	0Hz/200% (VC and SVC), 0.8Hz/150% (V/F)
	Speed range	1:500 (SVC), 1:1000 (VC)
	Speed Accuracy	±0.02% rated speed (VC), ±0.2% rated speed (SVC), ±0.5% rated speed (V/F)
	overload capacity	Light overload capacity is: 120% of rated output current, overload allowed for 1 minute every 5 minutes Heavy overload capacity is: 150% of rated output current, 1 minute overload allowed every 5 minutes
	torque compensation	Automatic torque compensation function
	Acceleration and deceleration mode	Straight lines, user-defined multi-point curves
	Automatic voltage adjustment	Automatically maintains constant output voltage during grid fluctuations
	DC braking	DC braking at startup and DC braking at shutdown

	method	
	Built-in process PID	Closed-loop control systems for process quantities (pressure, temperature, flow, etc.) can be easily realized.
	special function	Free function modules for user programmable applications: Logic function module, math function module, timer module, PID module, etc; Motion Control: Multi-curve acceleration/deceleration function, timer-controlled run/stop control, etc; Synchronization control: master/slave synchronization control, speed/torque control
importation exports terminals	input terminal	5 digital inputs, 2 analog inputs (voltage 0 to +10V or current 0mA/4mA to 20mA) are standard on the terminal board.
	output terminal	3 digital outputs (1 collector output and 2 relay outputs), 2 analog outputs (voltage 0 to +10V or current 0mA/4mA to 20mA) are standard on the terminal board.
human-computer interfaces	Operation panel LED/LCD	Can set the relevant parameters, can also display the output frequency, output voltage, output current and other parameters; running state, fault state and parameter setting state should be corresponding display. Content: function, data, unit.
protective function		Over-current protection, over-voltage protection, under-voltage protection, over-heating protection, overload protection, etc.
Location		Free from direct sunlight, dust and corrosive environments
matrix	altitude	Below 1000 meters, no derating is required. If the altitude exceeds 1,000 meters, reduce the rated voltage and rated output current by 1% for each additional 100 meters. For altitudes over 3000 meters, consult the manufacturer for guidance.
	environmental temperature	-10℃～+40℃, the ambient temperature over 40℃ needs to be derated, and the derating is 1% for every 1℃ increase in ambient temperature. Ambient temperature over 50℃ need to consult with the manufacturer for guidance. Ambient temperature below -10℃, need to add additional auxiliary heating equipment

	humidity level	Less than 95% RH, no water droplet condensation
	stockpile	Storage temperature -20℃～+60℃. At the same time, due to the characteristics of electrolytic capacitors, the storage time is more than half a year, every six months need to power on the VFD for 10-30 minutes, so that the electrolytic capacitor charging
other than	efficiencies	＞98%
	option card	The control board is equipped with 3 slots for communication cards, expansion IO cards and PG cards.
	Other interfaces	Interface for external keyboard
	protection class	IP20
	Cooling method	External air-cooling required
	contamination level	2
	noises	≤80db

1.6 Main technical characteristics

(1) Both open-loop vector and closed-loop vector are capable of 200% torque output at zero speed;

(2) The load does not exceed 50% of the rated load of the motor, and GF630N02 VFD can implement self-tuning of motor with load, and it is consistent with the motor parameters obtained from self-tuning of motor with no load;

(3) GF630N02 has a built-in constant power control function, when it enters the constant power weak magnetic speed regulation zone, the VFD automatically adjusts the output frequency according to the load size.

1.7 VFD heat generation

Model number	Applicable motor capacity [kW]	Heat generation [kW]
GF630N02-011-4	11	0.277

GF630N02-015-4	15	0.328
GF630N02-018-4	18.5	0.5
GF630N02-022-4	22	0.645
GF630N02-030-4	30	0.722
GF630N02-037-4	37	0.906
GF630N02-045-4	45	1.128
GF630N02-055-	55	1.313
GF630N02-075-4	75	1.486
GF630N02-090-4	90	1.956

1.8 Description of optional accessories for frequency converters

Name	Model number	Descriptive
Universal PG Card	GDHF-APGX1	The GDHF-APGX1 Universal PG Card can be used as an adapter for encoder access to the VFD and used with the GF630N02 series VFD. (Output DC voltage 15V)
IO Expansion Card 1	GDHF-AIOX1S	GDHF-AIOX1 Expansion Card (7 digital inputs, 4 relay outputs, 1 485 communication) is used with GF630N02 series products.
IO Expansion Card 2	GDHF-AIOX2	GDHF-AIOX2 Expansion Card (5 digital inputs, 2 relay outputs,) works with GF630N02 series products.
CAN communication card	GDHF-ACNX1	Supports CAN-OPEN slave protocol with CAN2.0B interface for use with GF630N02 series products.
MB Communication Card	GDHF-AMBX1	GDHF-AMBX1 communication card supports MODBUS-RTU slave protocol, with RS485 interface, providing with RS485 MODBUS-RTU interface devices to realize networking, with GF630N02 series products.

Process Card 1	GDHF-AGYZ1 Process Card	The GDHF-AGYZ1 process card (20 digital inputs, 6 relay outputs, 1 CAN communication, 1 485 communication) is an industry-specific function expansion card for use with the GF630N02.
Process Card 3	GDHF-AGYZ3 Process Card	The GDHF-AGYZ3 process card (20-channel digital input, 6-channel relay output) is an industry-specific function expansion card for use with the GF630N02.

1.9 Storage, transportation and installation of the frequency converter

WARNING

1. Working on the device/system of the frequency converter by untrained and qualified personnel or failing to comply with the relevant provisions of the WARNING may result in serious personal injury or substantial property damage. Only certified and qualified personnel trained in the design, installation, commissioning and operation of the equipment are permitted to work on this device/system.
2. Input power cords are only permitted to be permanently fastened and the unit must be reliably grounded.
3. Even if the VFD is not in operation, the following terminals may still carry dangerous voltages:
   - -Power terminals R, S, T
   - -Terminals U, V, W for motor connection
   - -DC bus terminals P1, P, N
4. After the power switch is disconnected, you must wait at least 10 minutes for the VFD to discharge before allowing installation operations to begin.
5. The minimum cross-sectional area of the grounding conductor must be equal to or greater than the cross-sectional area of the supply power cable.

CAUTION

1. **Hold the bottom of the body when handling.**

   Holding the panel only, there is a danger of the subject falling and hitting your foot and injuring yourself.

2. **Please install it on a plate of non-flammable material such as metal.**

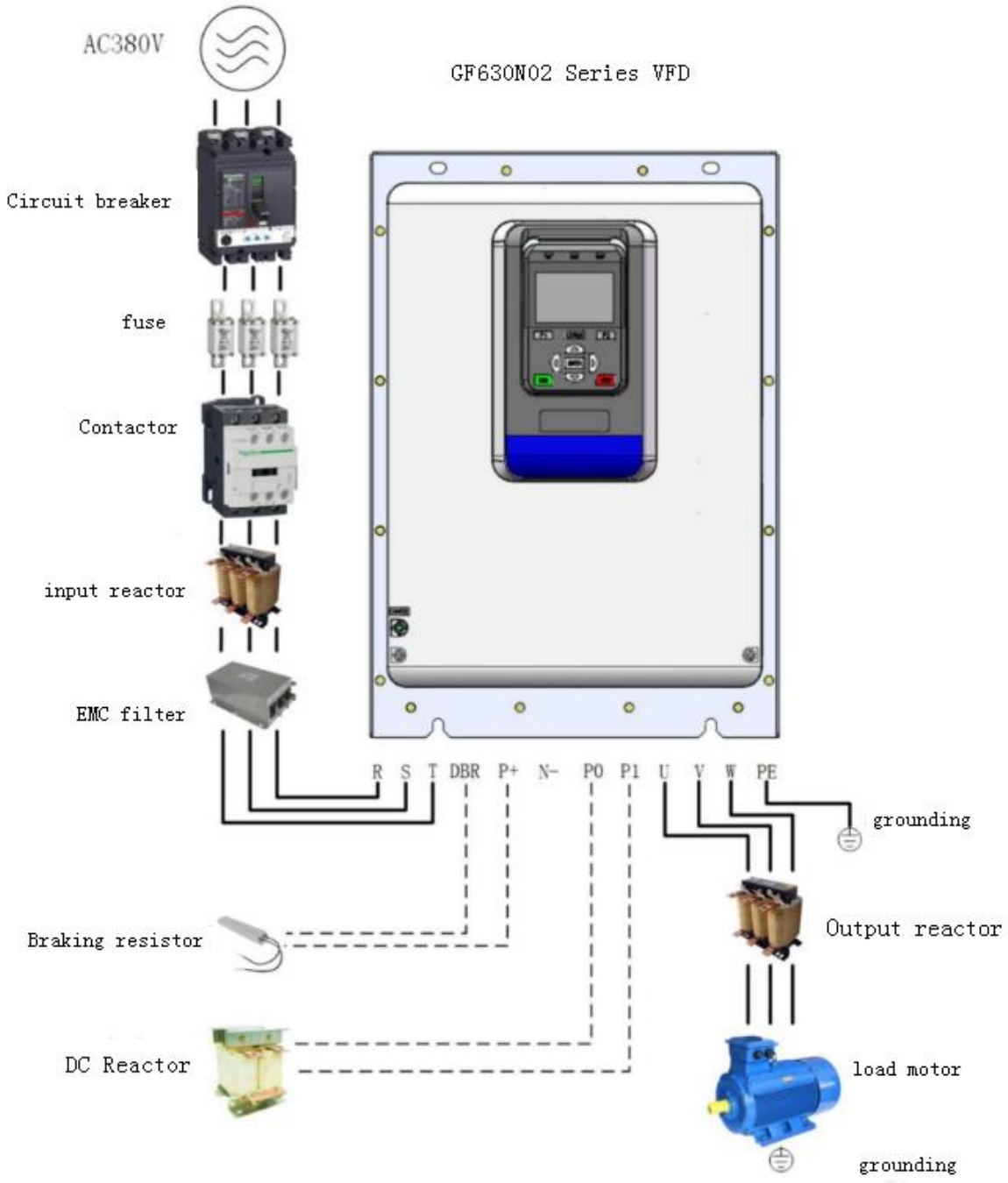
   Installation on flammable materials poses a fire hazard.

3. **When two or more VFDs are installed in the same control cabinet, set up a cooling fan and keep the air temperature at the air inlet below 40° C.**

   Due to overheating, it can cause fires and other accidents.

2. System Connections

2.1 System connection diagram



Instructions for the use of peripheral electrical components of the GF630N02 VFD system

2.2 Description of system components

Accessory Name	Mounting position	Functional Description
Interrupter	Between the power supply and the input side of the VFD	Short-circuit breakers: cut off the power supply in case of overcurrent of downstream equipment to prevent accidents
		Leakage protection circuit breaker: VFD may generate high frequency leakage current when working, in order to prevent electric shock accident and induce electric fire, please choose to install suitable leakage protection circuit breaker according to the site conditions.
(Electrical) fuse	Between the power supply and the input side of the VFD	Prevents accidents due to short circuits and protects back-end semiconductor devices.
Contactors	Between the circuit breaker and the input side of the VFD	Frequent up and down operation of the frequency converter through the contactor should be avoided (the interval time should not be less than one hour) or direct start operation.
Input Reactor	Input side of VFD	Improve the power factor on the input side; Effectively eliminates high harmonics on the input side, preventing damage to other equipment caused by voltage waveform distortion; Eliminates input current imbalance caused by power supply phase imbalance.
EMC Filters	Input side of VFD	Reduce the VFD's external conduction and radiation interference; reduce the conduction interference flowing from the power supply side to the VFD, and improve the VFD's anti-interference ability.
DC Reactors	30kW or more external DC reactor	Improve the power factor on the input side; Improve the overall efficiency and thermal stability of the VFD; Effectively eliminates the influence of high harmonics on the input side on the VFD and reduces the external conduction and radiation interference.
Braking Resistors	90kW and below	For models 90kW and below, please use the optional braking resistor according to the instruction manual; The motor consumes regenerative energy through the braking resistor during deceleration.
Output Reactor	Between the output side of the VFD and the motor, mounted	The output side of the VFD generally contains more high harmonics. When the motor is far away from the VFD, there is a large distributed capacitance in the line. One of the harmonics may generate

	close to the VFD	resonance in the circuit, bringing two effects: a) Destroys the insulation of the motor and can damage the motor over a long period of time. b) Generate large leakage current, causing frequent protection of the VFD. Generally the distance between VFD and motor is more than 100m, it is recommended to install output AC reactor.
dv/dt reactors	Installation near the VFD on the output side of the VFD	Optional dv/dt reactors protect motor insulation and reduce bearing currents.
output toroid	Installation near the VFD on the output side of the VFD	The output magnetic ring is mainly used to reduce the bearing current.
electrical machinery	VFD output side	Please select the appropriate motor as recommended.

◆ Do not install capacitors or surge suppressors on the output side of the VFD, as this will result in malfunctioning of the VFD or damage to the capacitors and surge suppressors.

◆ The input/output (main circuit) of the VFD contains harmonic components that may interfere with communication equipment in the vicinity of the VFD.

Anti-interference filters can be installed to minimize interference.

2.3 Wiring specifications

Power (output)	Circuit breaker (A) reference current	Input line/output line (mm^2) (CEFR single-core cable 40% cycle duty)	Contactor (A) Rated operating current (AC-3)
11kW	24	2.5	25
15kW	32	4	32
18.5kW	41	4	50
22kW	47	6	50

30kW	65	10	65
37kW	75	10	80
45kW	94	16	95
55kW	115	16	115
75kW	155	25	150
90kW	188	35	205

2.4 Input/Output AC Reactor Selection

Power (output)	Input Reactor 2% input voltage drop		Output Reactor 1% output voltage drop	
	Current (A)	Inductance (mH)	Current (A)	Inductance (mH)
11kW	28.0	0.50	24	0.29
15kW	38.0	0.37	32	0.22
18.5kW	45.0	0.31	38	0.18
22kW	54.0	0.26	47	0.15
30kW	75.0	0.19	65	0.11
37kW	86.0	0.16	75	0.09
45kW	92	0.15	94	0.07
55kW	112	0.13	115	0.06
75kW	152	0.09	155	0.05
90kW	185	0.08	188	0.04

2.5 Braking resistor selection

Converter quantitative (science)	Braking Resistors			
	Recommended resistance value (Ω)	Minimum resistance value (Ω)	Power (KW) (30% Kc)	Power (KW) (50% Kc)
11kW	50	40	≥4.0	≥5.2

15kW	40	32	≥5	≥6.5
18.5kW	32	24	≥6	≥8.0
22kW	22	18	≥8	≥11
30kW	20	18	≥10	≥13
37kW	16	14.8	≥12	≥16
45kW	13	8	≥15	≥20
55kW	10	8	≥20	≥26
75kW	7.5	6.8	≥26	≥35
90kW	6.8	5.1	≥29	≥38

Note: 1. The VFD has a built-in braking unit, corresponding to 100% braking torque;

2, Kc: braking frequency, refers to the proportion of the regeneration process to the entire motor operating process;

3、Braking resistor power can be adjusted according to the actual application conditions.

3. Installation and Wiring

3.1 Environmental requirements for operation, storage and pre-transportation of frequency converters

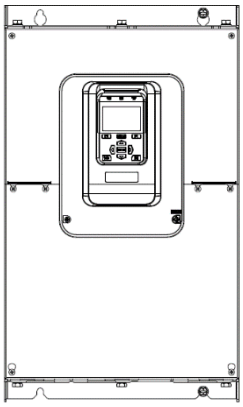
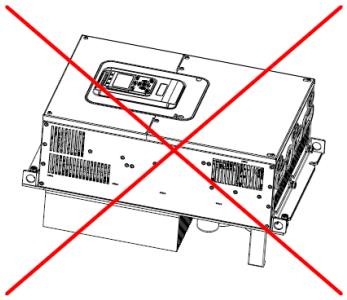
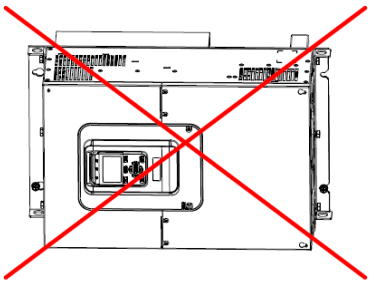
	(Of a computer) run	Save	Haulage
Wrap	Fixed installation	In protective packaging	Manufacturer's standard box for shipping
Establishments	Installation site: Vertically mounted on a sturdy indoor base with at least 10cm of space between the inlet and outlet and at least 5cm of space between the left and right sides of the chassis. The cooling medium is air. Avoid direct sunlight and external biological intrusion, if it can not meet the requirements, need to add additional protection.	Storage sites: Store in a clean, dry indoor location. Total shipping and storage time not to exceed 6 months.	Transportation: In a standard packing box, it can be transported by cars, trains, airplanes, ships and other similar means.

Matrix temp	-10℃～+40℃, the ambient temperature over 40℃ needs to be derated, and the derating is 1% for every 1℃ increase in ambient temperature. When the ambient temperature exceeds 50℃, it is necessary to consult the manufacturer for guidance. Ambient temperatures below -10° C require additional auxiliary heating equipment.	-20℃～+60℃, air temperature change less than 1℃/min.	-20℃～+60℃
Magnanimity push down	70 to 106 kPa 0.7 to 1.05 Atmospheric pressure	70 to 106 kPa 0.7 to 1.05 Atmospheric pressure	60 to 106 kPa 0.6 to 1.05 Atmospheric pressure
Vibratory	(Math.) Sinusoidal curve 10Hz≤ f≤57Hz: Amplitude: 0.075mm 57Hz≤f≤150Hz: acceleration: 9.8 m/s2	(Math.) Sinusoidal curve 10Hz≤f≤57Hz: Amplitude: 0.075mm 57Hz≤f≤150Hz: acceleration: 9.8 m/s2	Random vibration: Random vibration severity level II for road transportation
Under attack	Impermissible	Maximum 100m/s^2, 11ms	Maximum 100m/s^2, 11ms
Liberty whereabouts	Impermissible	250mm, when weight <100kg; 100mm, when weight ≥100kg.	250mm, when weight <100kg; 100mm, when weight ≥100kg.
Counterpart humidity level	Less than 95% RH, no water droplet condensation		
Mounting high degree	Below 1000 meters, no derating is required. If the altitude exceeds 1,000 meters, reduce the rated voltage and rated output current at a rate of 1% for each additional 100 meters. For altitudes over 3000 meters, consult the manufacturer for guidance.		
Contamination hierarchy	Pollution level 2		
Gas (i.e. gaseous substance) contamination	The place of use should avoid places with dust, corrosive gases, flammable and explosive gases, no oil mist, salt corrosion and so on. If it can not meet, need to add additional protection.		

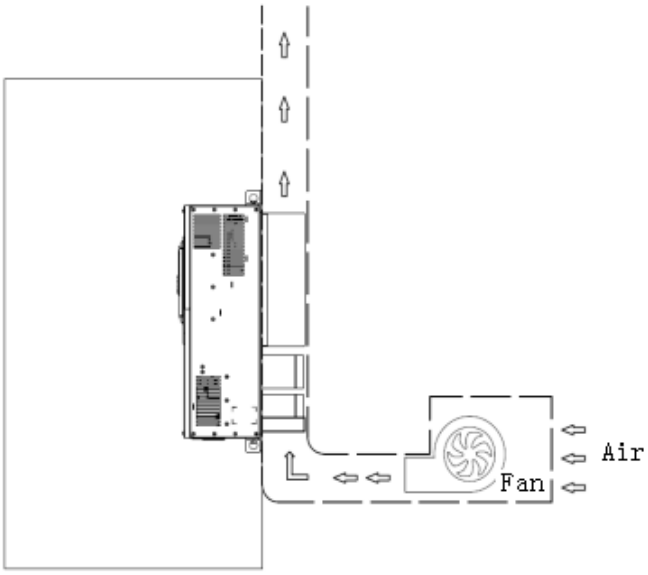
3.2 Installation space and orientation

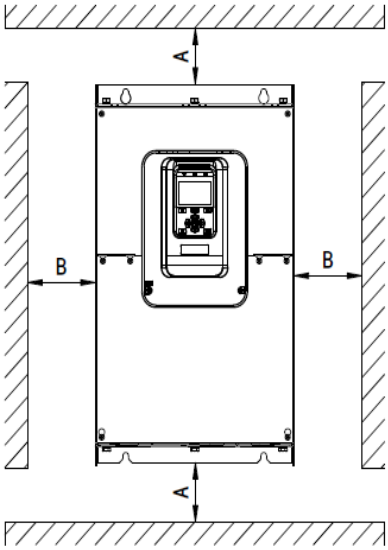
3.2.1 Direction of installation

To facilitate heat dissipation from the VFD, install the VFD in a vertical orientation. Please check the mounting position according to the following requirements.

Correct Installation	Incorrect installation method	
		

3.2.2 Installation methods





Models	Power band	Dimensional requirements (unit: mm)	
S1	11kW～15kW	A≥100	B ≥ 20
S2	18.5kW～30kW	A≥200	B ≥ 20

S3	37kW～90kW	A≥250	B≥50

The following table shows the specification of air velocity of cooling duct for each model.

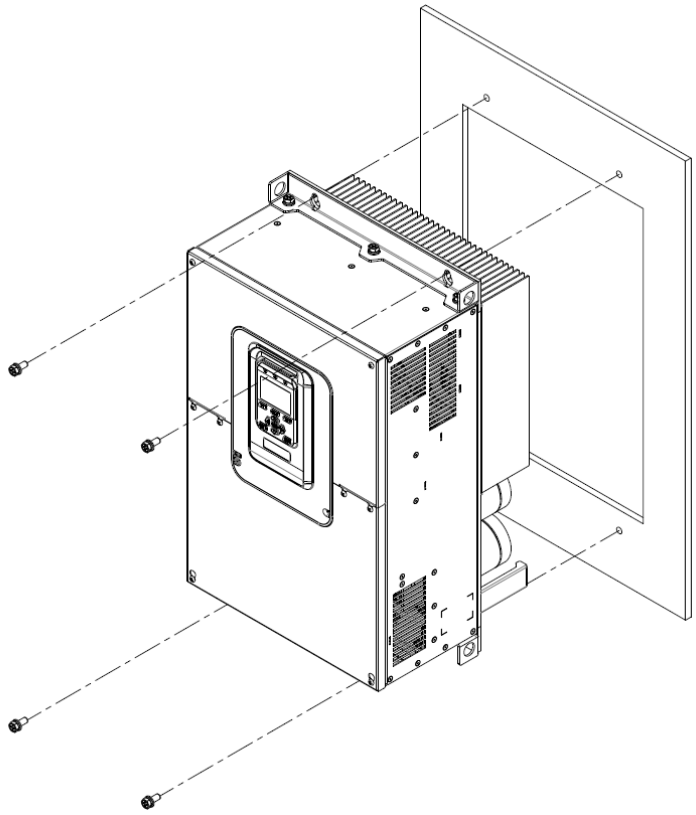
Models	S1		S2			S3				
Power (kW)	11	15	18.5	22	30	37	45	55	75	90
For the default carrier frequency, the wind speed should be (m/s).	3.5		3.5			3.5	3.5	4.5	6	8.5

Note: The closer the duct size is to the radiator size, the better the actual heat dissipation will be.

3.2.3 Installation instructions

Depending on factors such as different power applications and space, please install the product according to the following installation instructions.

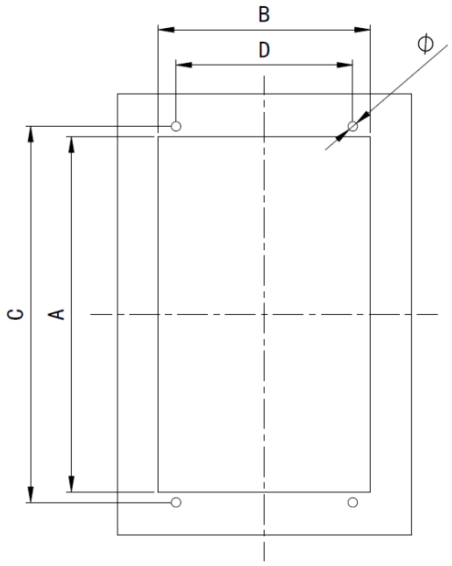
（1） Through-wall mounting (for VFDs of all form factors)



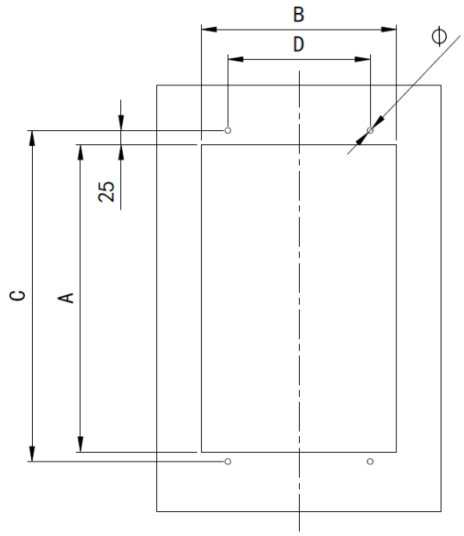
Serial number	Compatible Models	Power band	Fastening screw
1	S1	11kW～15kW	4-M6
2	S2	18.5kW～30kW	4-M6
3	S3	37kW～90kW	4-M8

Note: Installation torque M6: 30±3 KGF.CM; M8: 90±5 KGF.CM

Openings Dimension Drawing:



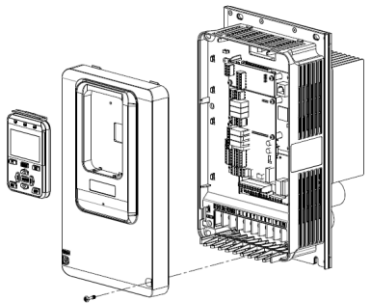
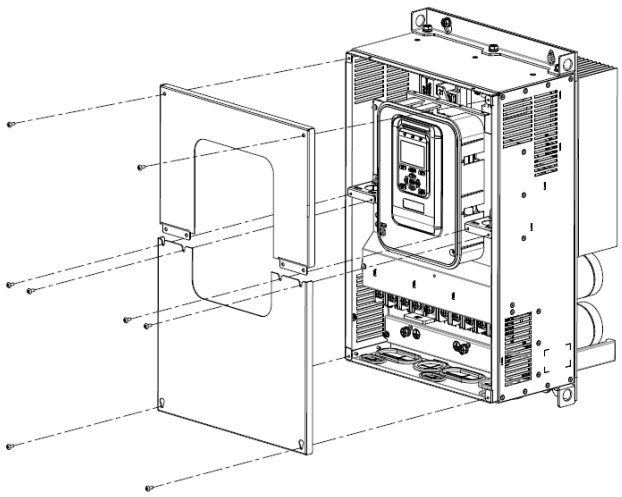
S1~S2 Mounting Opening Dimension Drawing



S3 Mounting Opening Dimension Drawing

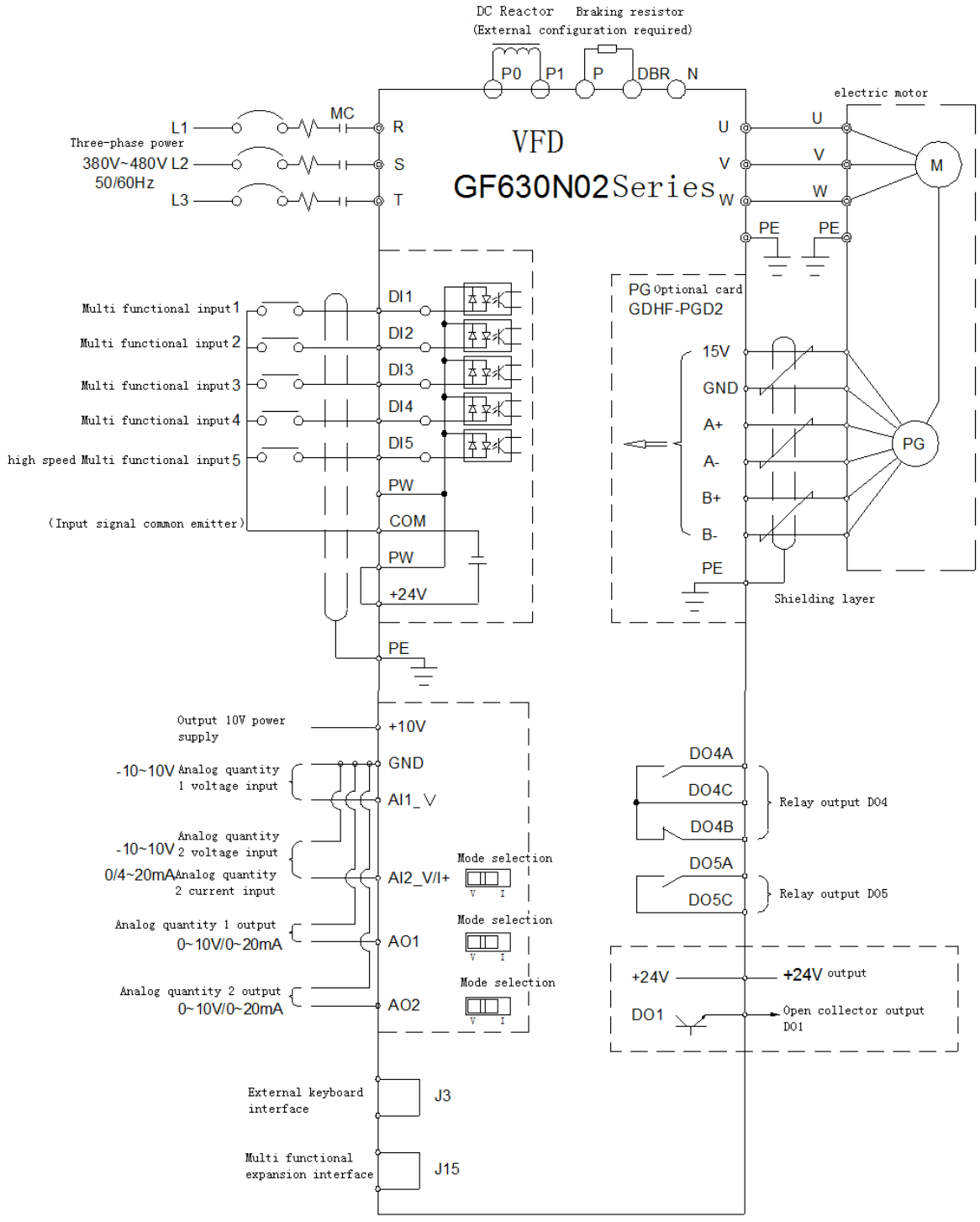
Serial number	Compatible Models	Power band	Hole Size (Unit: mm)		Mounting Dimensions (Unit: mm)		Diameter of hole (Unit: mm)
			A	B	C	D	Φ
1	S1	11kW～15kW	302	180	320	150	Φ8
2	S2	18.5kW～30kW	370	278	408	200	Φ8
3	S3	37kW～90kW	540	343	582	250	Φ10

3.2.4 Removal and installation of cover plates

<table>
<tr><td colspan="2">Removal and Installation of Plastic Case Models (S1 to S2)</td></tr>
<tr><td>1) After removing the keyboard, remove the back keyboard cable;</td><td rowspan="2">  </td></tr>
<tr><td>2) Use a screwdriver to disassemble the M4 loose screws on the face cover, and then uncover the face cover (pay attention to careful disassembly so as not to break the ring of plastic clips).</td></tr>
<tr><td colspan="2">Removal and Installation of the Sheet Metal Model (S3) Lid</td></tr>
<tr><td>1) Use a screwdriver to remove all of the several screws on the cover plate;</td><td rowspan="3">  </td></tr>
<tr><td>2) Push the upper box cover vertically upward and remove it;</td></tr>
<tr><td>3) Lower box cover down to take out (the bottom two screws can not be taken out, the box cover pushed to the hoist hole and then pull out vertically can be).</td></tr>
</table>

3.3 Wiring

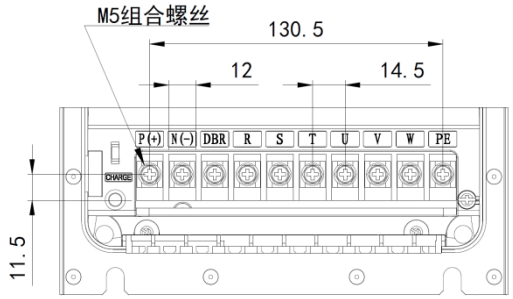
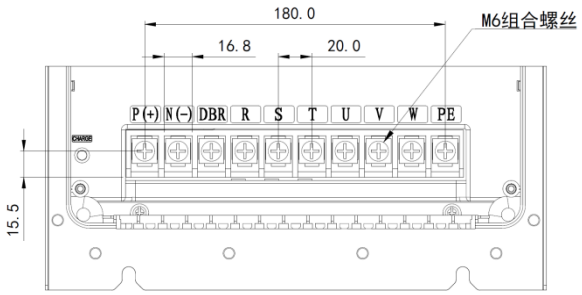
3.3.1 Standard wiring diagrams



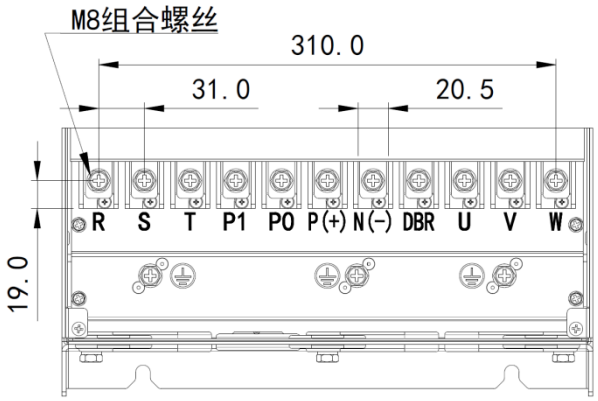
Three-phase 380~480V Typical Wiring Diagrams

Note: --Shield; Twisted Pair

3.3.2 Main circuit terminals (provided by the Structures Department)

S1 Main Circuit Terminal Distribution Diagram	S2 Main Circuit Terminal Distribution Diagram
	

S3 Main Circuit Terminal Distribution Diagram



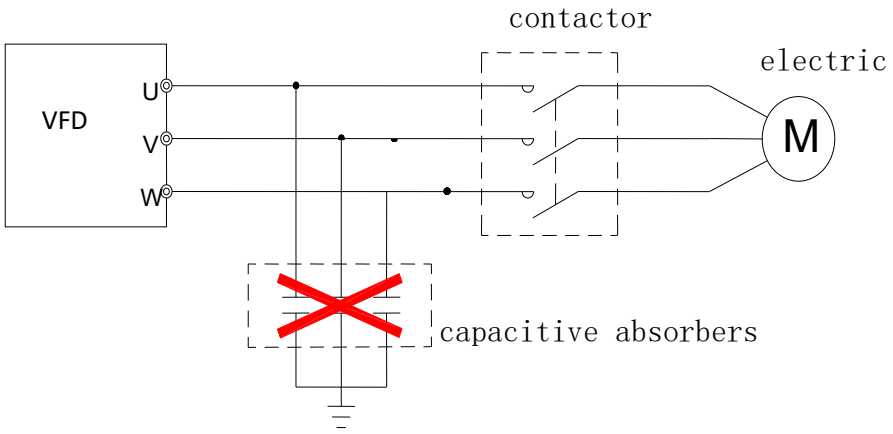
Terminal symbol	Functional Description
P(+)	DC side voltage positive terminal
P1	Reserve terminal for parallel wiring
N(-)	DC side voltage negative terminal
R, S, T	Three-phase AC power supply to the grid
U, V, W	Connecting three-phase AC motor
DBR	Brake Resistor Terminal Block
PO	37-90KW DC reactor reserved terminals

3.3.3 Wiring Precautions

Serial number	Wiring Precautions	Note
1	Wiring operations must be performed by a qualified professional technician.	
2	Before wiring, make sure that the power supply has been completely cut off for more than 10 minutes	

	otherwise there is a risk of electric shock.	
3	It is absolutely prohibited to connect the power cord to the output terminals U, V, and W of the VFD.	
4	The VFD and motor must be safely grounded.	
5	Ensure that an intermediate circuit breaker is connected between the VFD and the power supply to prevent the accident from expanding if the VFD fails.	
6	When adding an electromagnetic contactor between the VFD and the motor, be sure to ensure that the contactor's action timing is such that the contactor can only be actuated when there is no output from the VFD.	
7	The U, V, W outputs of the VFD cannot be equipped with absorption capacitors or other capacitance-absorbing devices.	As shown in the figure below.
8	To minimize electromagnetic interference, connect surge absorbers to the coils of electromagnetic contactors, relays, and other devices in the circuit around the VFD.	
9	Use multi-core shielded cable or twisted pair to connect the control terminal. When wiring, the control cable should be kept away from the main circuit and strong electric lines (including power lines, motor lines, relays, contactor lines, etc.) for more than 10cm.	
10	The wiring of relay input and output circuits should be made with stranded or shielded wires of 0.75mm² or more, with the shield connected to the ground terminal of the VFD, and with a wiring length of less than 50m.	
11	The control line should be separated from the main circuit power line, parallel wiring should be separated by more than 10cm, and cross wiring should be made perpendicular.	
12	The wiring between the frequency converter and the motor should be less than 100m, when the wiring length is more than 100m, it is recommended to increase the output reactor and consult the manufacturer.	
13	All leads shall be sufficiently tightened to the terminals to assure good contact. The main circuit leads should be made of cable wire or copper rows. When cable wires are used, they must be cold pressed or soldered using lugs of the appropriate cross-	

	section before wiring is implemented.	
14	The withstand voltage of all leads must correspond to the voltage level of the VFD.	
15	Shielded cables are recommended for output cables (connection between VFD and motor) larger than 30 m.	

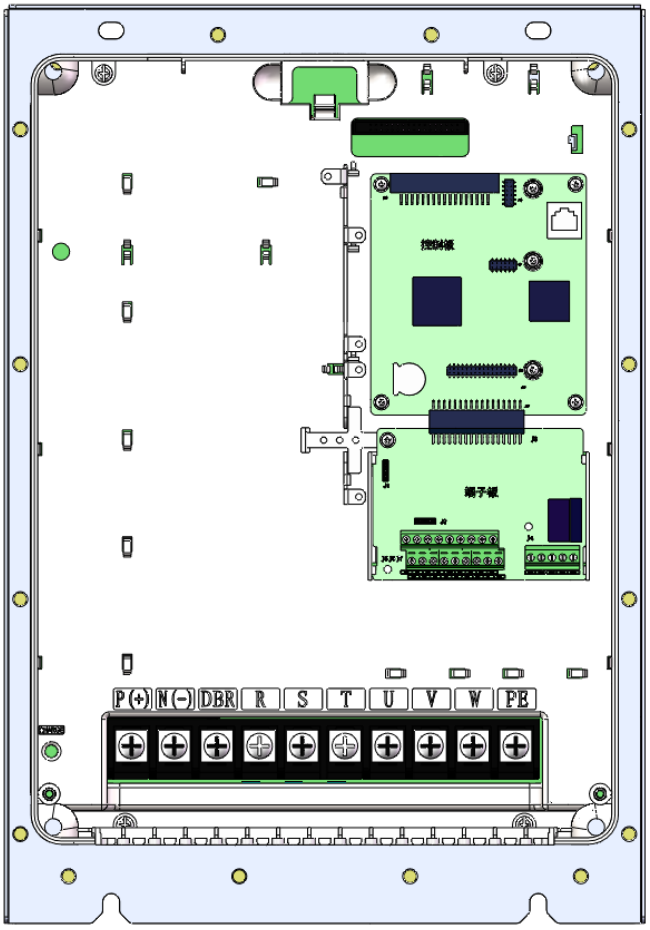


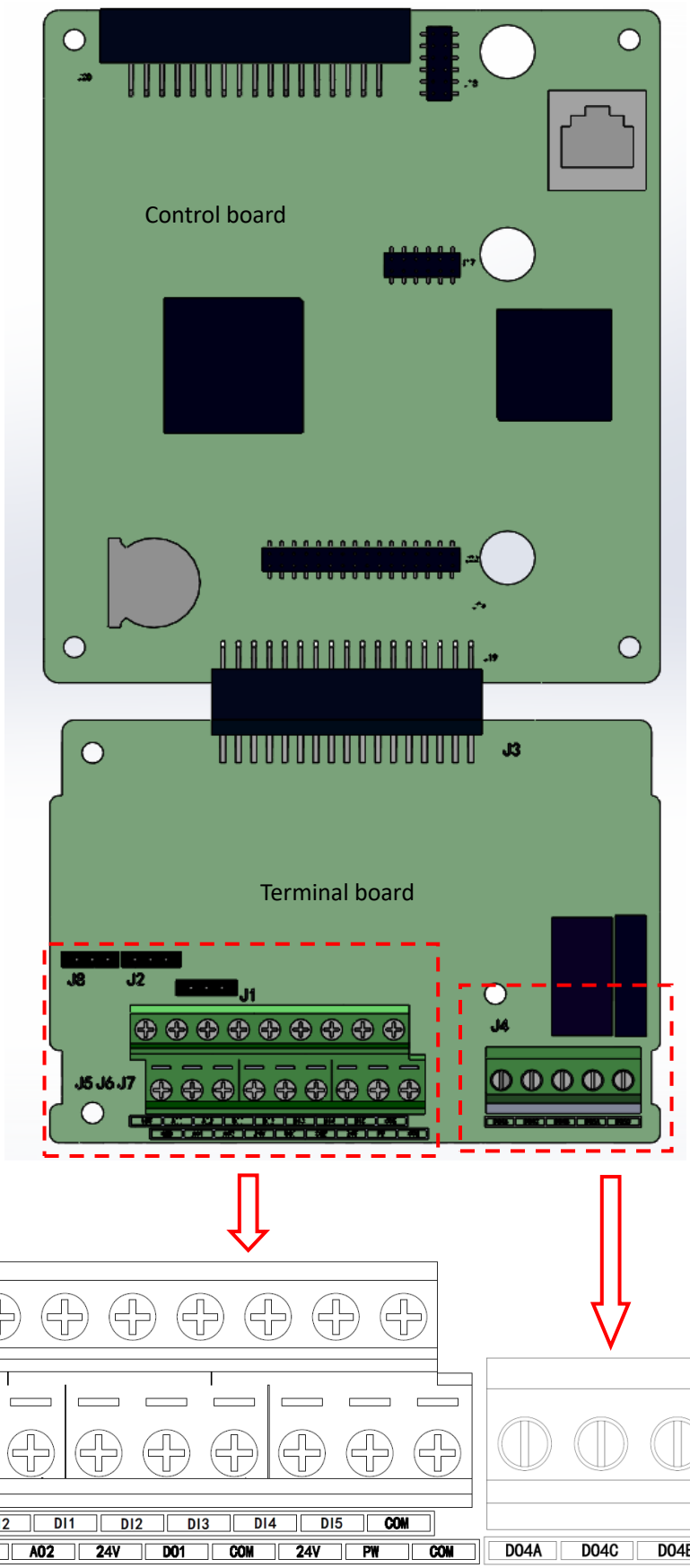
Connection of capacitive absorbers to the outputs is prohibited

3.3.4 Control board

When wiring the control circuit, if it involves jumper operation, PG card access or function expansion card access, it is necessary to remove the outer cover of the VFD first. After removing the outer cover, the control board, jumper wires and expansion cards will be installed as shown in the figure below.

Schematic diagram of GF630N02 control board installation position




Control board
J3
Terminal board
J8
J2
J1
J4
J5 J6 J7
10V
AI1
AI2
DI1
DI2
DI3
DI4
DI5
COM
GND
AO1
AO2
24V
DO1
COM
24V
PW
COM
DO4A
DO4C
DO4B
DO5A
DO5C

Form	Terminal Symbols	Terminal Name	Functional Description
Power supply	+10V-GND	External +10V power supply	Provide +10V power supply to the outside, maximum output current: 50mA generally used as an external potentiometer power supply, potentiometer resistance range 1kΩ~5kΩ
	+24V-COM	External +24V power supply	Provides +24V external power supply, which is generally used as the working power supply for digital input/output terminals and external sensor power supply Maximum output current: 200mA
	PW	External Input Terminal	Factory default connection to +24V via shorting tabs When external signals are used to drive DI1~DI5 and DO1, the PW must be connected to the external power supply and disconnected from the +24V power supply terminal.
Analog input	AI1-GND	Analog input terminal 1	Input voltage range: DC -10V~10V Input impedance: 100kΩ
	AI2-GND	Analog input terminal 2	Input range: -10VDC~10VDC/0mA~20mA, selected by J1 jumper on terminal board to decide voltage or current input. Input impedance: 100kΩ for voltage input, 500Ω for current input.
Digital input	DI1- PW	Digital Input 1	Opto-coupler isolated, compatible with bipolar inputs Input impedance: 3.3kΩ Voltage range at effective level input: 9V~30V, DI1-DI4 maximum input frequency up to 500Hz, DI5 maximum input frequency 20KHz.
	DI2- PW	Digital Inputs 2	
	DI3- PW	Digital Input 3	
	DI4- PW	Digital Inputs 4	
	DI5- PW	Digital Input 5	
Analog output	AO1-GND	Analog Output 1	Voltage or current output is determined by the J2 jumper selection on the terminal block. Output voltage range: 0V~10V Output current range: 0mA~20mA
	AO2-GND	Analog Output 2	Voltage or current output is determined by the J2 jumper selection on the terminal block. Output voltage range: 0V~10V Output current range: 0mA~20mA
Digital output	DO1-PW	Digital output 1	Optocoupler isolated, bipolar open collector outputs Output voltage range: 0V~24V Output current range: 0mA~50mA
Relay output	DO4A-DO4C	Open the terminals often 1	Contact drive capability: 250VAC, 3A, COSφ=0.4 30VDC, 1A
	DO4B-DO4C	Normally closed terminal 2	

	DO5A-DO5C	Normal open terminal 3	Contact drive capability: 250VAC, 2A, COSϕ=0.4 30VDC, 1A

Form	Terminal Symbols	Terminal Name	Functional Description
Jumper	J2	AO1, AO2 output selection	Voltage and current outputs are selectable, the default is voltage output.
	J1	AI2 Input Selection	Voltage and current input selectable, default is voltage input

4. Operation panel

4.1 Description of the operating panel

GF630N02 series VFD can realize parameter view and modification, as well as parameter backup, restore and comparison functions through LED operation panel. The operation panel is subject to the actual ordering specifications.

4.2 LED Operation panel

4.2.1 Introduction of LED operation panel interface

The following figure describes the appearance of the operation panel and the functions of the buttons.

(1) LED operation panel indicator

The "RUN" indicator lights up when the motor is running and goes out otherwise.

The "LOCAL" indicator lights up when local mode is selected and goes out when remote mode is selected.

The "FAULT" indicator flashes when there is a system fault and goes out when there is no fault.

(2) LED operation panel LED display

status display area

Status display	Status Description
RUN	Motor running display, off if not running
LOCAL	Local mode display, remote mode off
RWD	Motor selects forward rotation display, selects reverse rotation off
REV	Motor selects reverse rotation display, selects forward rotation off
FAULT	Fault blinking occurs

Data display area

A total of 5-digit LEDs on the operation panel can display the set frequency, output frequency, various monitoring data and alarm codes. The following figure shows the correspondence table with the LED display.

显示文字	LED显示	显示文字	LED显示	显示文字	LED显示	显示文字	LED显示
0		A		K		U	
1		B		L		V	
2		C		M		W	
3		D		N		X	无
4		E		O		Y	
5		F		P		Z	
6		G		Q		°（度）	
7		H		R		?	
8		I		S			
9		J		T			

unit display area

Unit Display	Unit description
RPM	Speed unit (rpm)
Hz	RPM Unit Frequency (Hz)
V	Voltage units (volts)
A	Current units (amperes)
%	percentage

Keyboard key area

Keystrokes	Key Name	Key Function
F1	exit button	Return to current menu, return to higher menu/initial screen
LOC/REM	Local/Remote Keys	Local and remote mode switching
F2	Forward/reverse key	Motor forward/reverse switching
	upper key	Scroll up menu or setup parameter +1

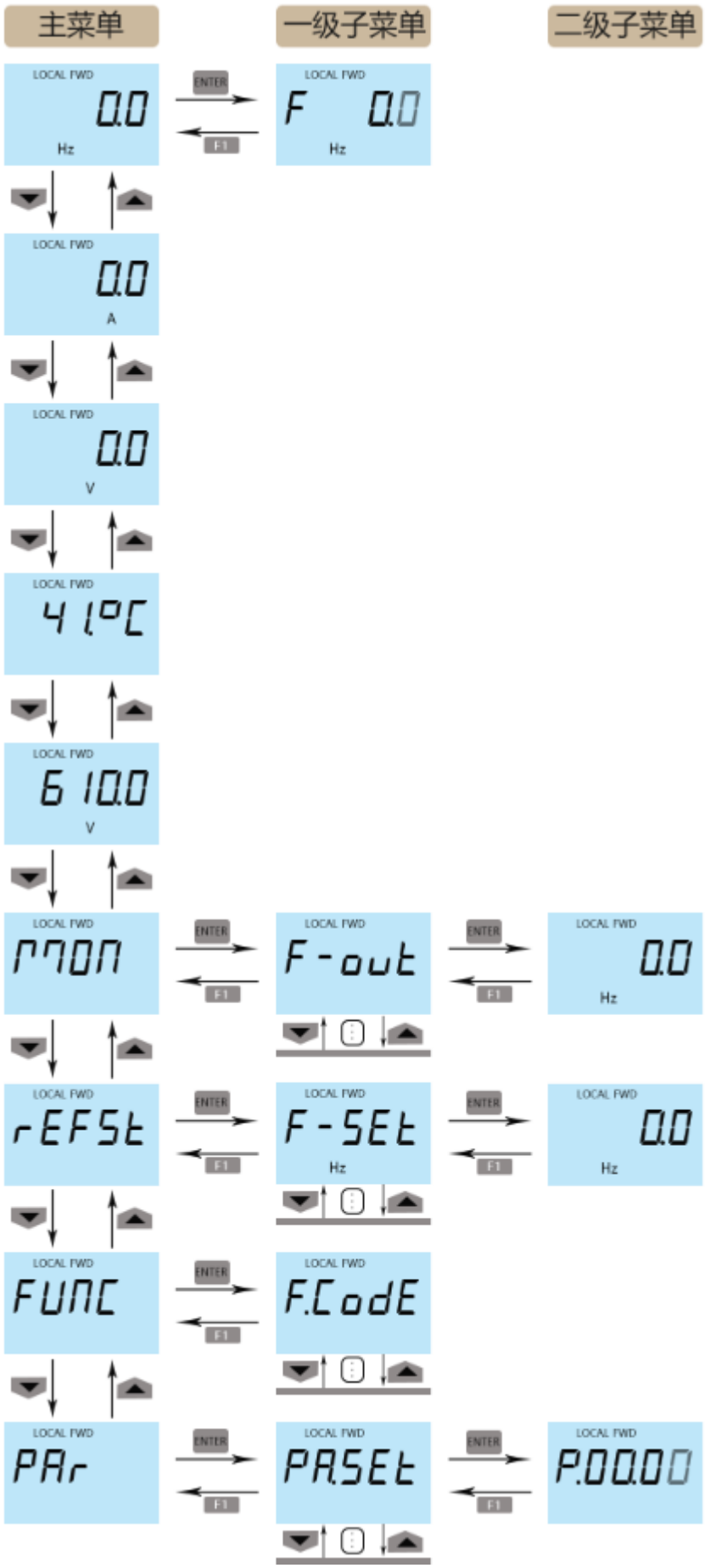
	Down button	Scroll down menu or setup parameter-1
	Left/Reset Button	Setting parameter shifts bits to the left/fault reset
	Right click	Setting the parameter to shift the number of bits to the right
	OK button	Step by step into the menu interface, set the parameters to determine
	Run key (on a computer keyboard)	Starter motor
	Stop button	Stop motor

4.2.2 LED operation panel key operation

The data value of the key is composed of the main menu and the lower menu. If you move from the upper menu to the lower menu, press the ▼ down key. If you go back to the upper menu from the lower menu, you have to press the ▲ up key. You can also increase or decrease the data value by the up and down keys, and after determining the data value, you can confirm it by the ENTER key. Use ◄ left key to move the digits of the numbers when setting the parameters, when the cursor moves to the leftmost, it will automatically jump back to the rightmost, ditto the right key function. When running the VFD with the operation keyboard, use RUN and STOP keys to start and stop the motor (please set the parameters first and cut to the local mode), in LOCAL mode, F2 key controls the forward and reverse of the motor, and use LOCAL/REMOTE key to switch the local/remote mode.

4.2.3 LED operation panel main menu composition diagram

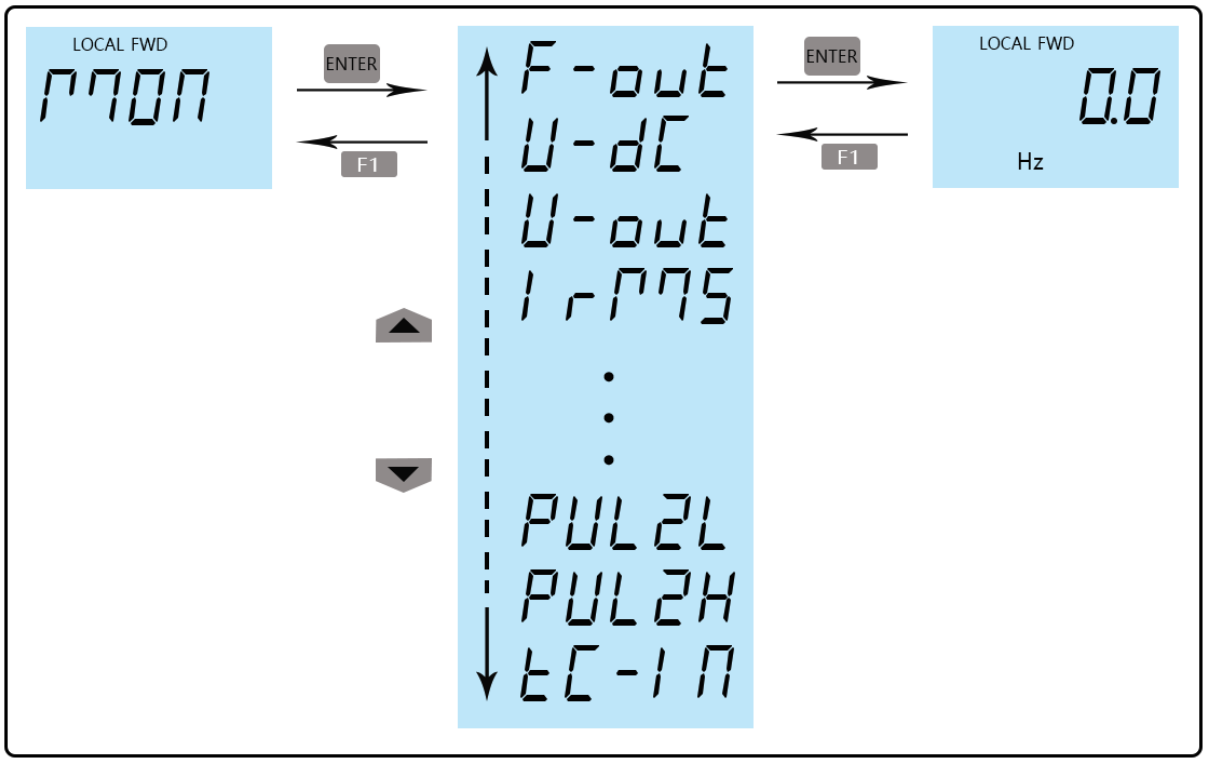
Type of model	Categorization	Functional Description
0.0	Display the current output frequency, unit: HZ	Output frequency monitoring value in HZ
0.0	Display current output current, unit: A	Output current monitoring value in A
0.0	Display the current output voltage, unit: V	Output voltage monitoring value in V
0.° C	Display the current temperature in ° C	Temperature monitoring value in ° C
0.0	Displays the current bus voltage in V	Busbar voltage monitoring value in V
MON	Individual monitoring variables	monitoring mode
REFST	Setting of each reference value	Reference value setting
FUNC	Functional menus	Menu
PAR	Various settings on parameters	parameterization


主菜单
一级子菜单
二级子菜单
LOCAL FWD
0.0
Hz
ENTER
F1
F 0.0
A
V
41°C
610.0
MON
F-out
rEFSt
F-SEt
FUNC
F.CodE
PAr
PASEt
P.0000

4.2.4 Explanation of the menu composition of the LED operation panel

（1） Monitor Mode (Drive Monitor)

Monitors the operating status of the VFD, the status of the digital



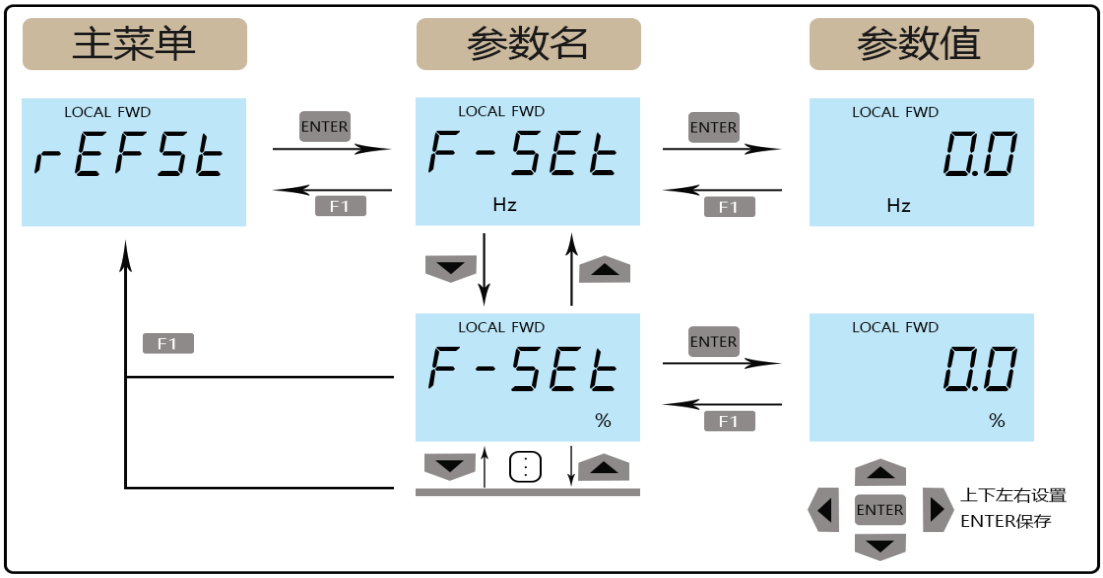
inputs and outputs (I/Os), and the values of the analog quantities.

Type of model	Display format	Categorization	Unit (of measure)	Parameter description
Monitoring mode MON	F-OUT	Motor speed [Hz]	Hz	Motor speed during operation
	V-DC	busbar voltage	V	DC bus voltage
	V-OUT	output voltage	V	Output voltage
	IRMS	Motor Current	A	Three-phase current RMS
	TORQ	Load torque	%	Load torque
	P-OUT	output power	kW	output power
	TEMP	temp	℃	Temperature of IGBT in the product
	F-SET	Given frequency [Hz]	Hz	given frequency
	D-IN	digital input	not have	Digital Segment Display

	D-OUT	digital output	not have	Digital Segment Display
	AOUT1	Analog output 1	%	Analog output 1
	AOUT2	Analog output 2	%	Analog output 2
	V1-IN	Analog input 1 (voltage)	V	Analog input 1 (voltage)
	A1-IN	Analog input 1 (current)	A	Analog input 1 (current)
	V2-IN	Analog input 2 (voltage)	V	Analog input 2 (voltage)
	A2-IN	Analog input 2 (current)	A	Analog input 2 (current)
	ROTOR	Encoder speed	rpm	Speed of encoder sampling
	F-AFE	Frequency (AFE)	Hz	Grid frequency sampled in the rectifier-feedback module
	V-AFE	Voltage value (AFE)	V	Amplitude of the voltage sampled in the rectifier-feedback module
	I-A	Phase A current	A	A phase current sampling value
	I-B	B-phase current	A	B-phase current sampling value
	I-C	Phase C current	A	C phase current sampling value
	IMAX	Maximum current	A	Maximum current during start or stop
	PUL1L	Encoder 1 pulse low	not have	Encoder 1 pulse low
	PUL1H	Encoder 1 pulse high	not have	Encoder 1 pulse high
	PUL2L	Encoder 2 pulse low	not have	Encoder 2 pulse low
	PUL2H	Encoder 2 pulse high	not have	Encoder 2 pulse high
	TC-IN	Process Card Digital Inputs	not have	Digital Segment Display

（2） Set reference value (REFST)

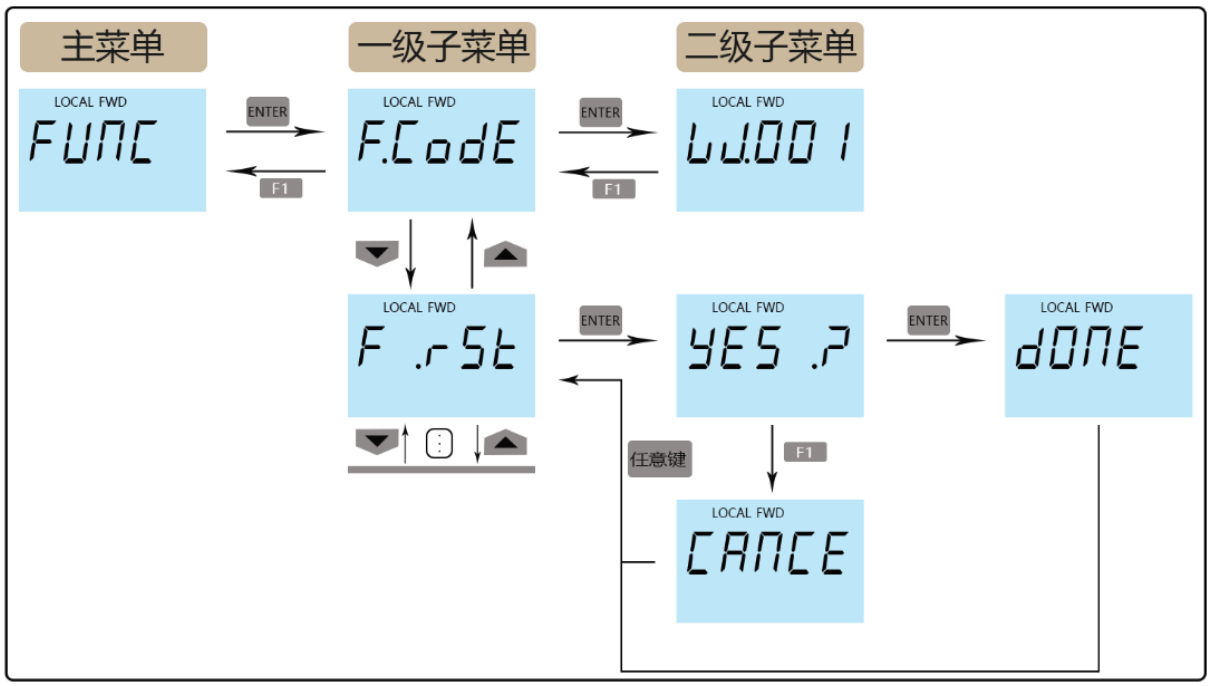
You can set the given speed and given torque of the VFD, and the key operation is shown below:



Type of model	Display format	Categorization	Unit (of measure)	Parameter description
Set reference value REFST	F-SET	given speed	[Hz]	Speed in Hz
	F-SET	given speed	[%]	Speed in %
	T-SET	Torque Setting	[%]	Torque in %
	TLIM	Torque Limit	[%]	Torque limit value %
	A1SET	Analog output 1	[%]	Given analog 1 output
	A2SET	Analog output 2	[%]	Given analog 2 outputs

（3） Function Setting (FUNC)

Function Setting (FUNC) contains View Current Fault Code, Fault Reset, Historical Fault, Clear Fault Record, System Reset, Date Setting, VFD Version Number, Panel Version Number. Select the corresponding function and click ENTER to execute the function. The key operation is shown below:



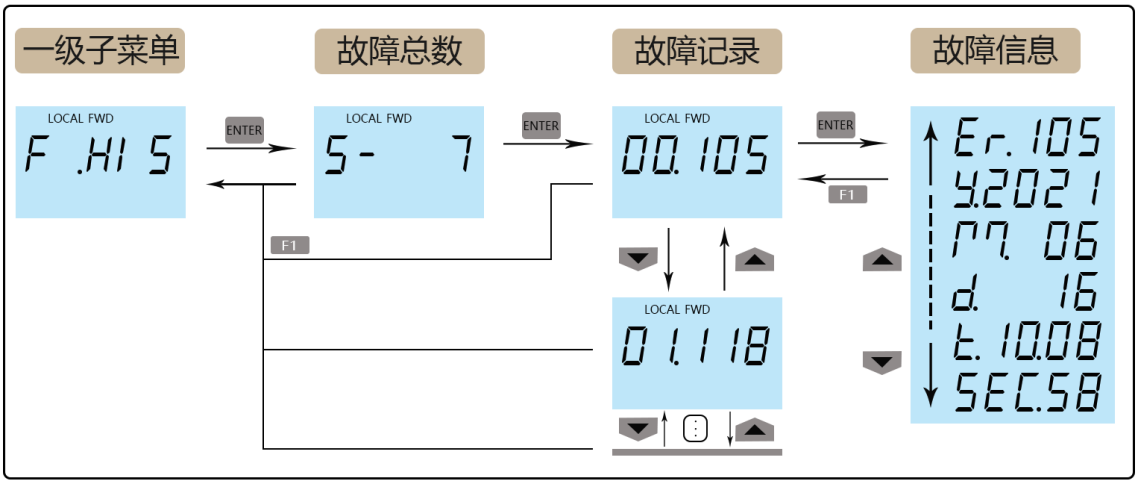
Type of model	display format	Functional classification	Functional Description
menu FUNC	F. CODE	Current Fault Code	Display the current fault code or warning code
	F. RST	fault reset	Reset the current fault
	F. HIS	Historical Failures	View historical faults
	F. CLR	History Fault Clearing	Deleting historical fault information stored in the VFD
	SY.RST	system reset	The VFD restarts immediately after executing this function
	DATE	Date Time	View or set the VFD date and time
	DR. VER	VFD version number	Check the VFD software version number
	PD.VER	Panel version number	View panel software version number
	BACKU	backup parameter	Backup DSP's parameter set to the panel
	RECOV	reduction parameter	Importing a panel's parameter set into the DSP
	COMP	Comparison parameters	Compare the parameter sets of the panel and the DSP

F.CODE: Display the current fault code or warning code of the VFD. 5 seconds without key operation or click ESC key to exit the display of fault code or warning code.

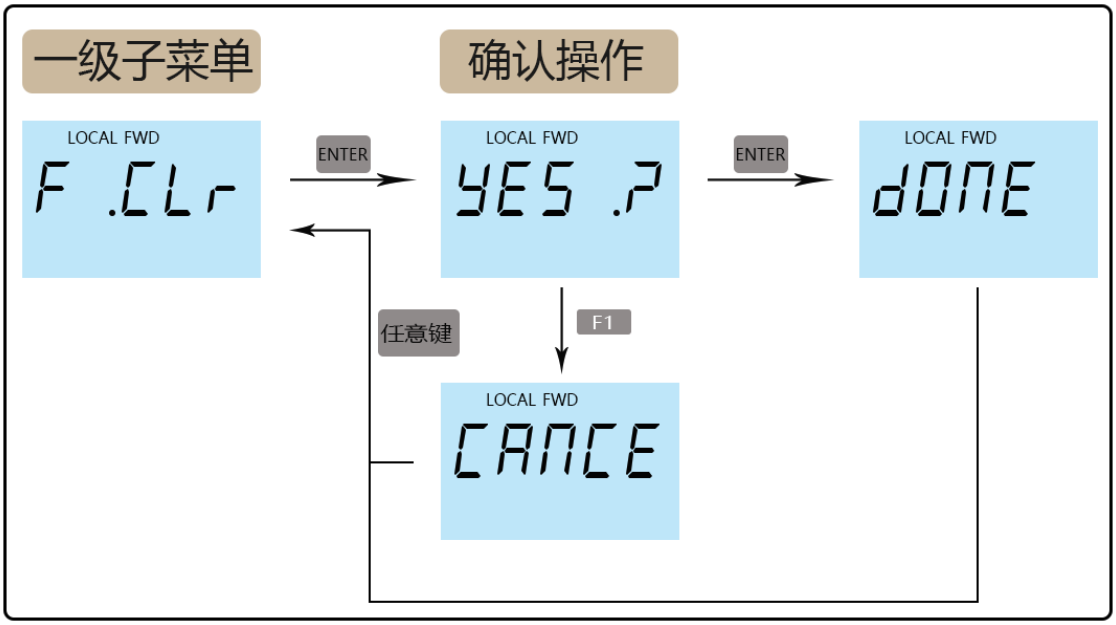
F.RST: Reset the current fault of the VFD. After clicking ENTER key to enter, the confirmation dialog box is displayed: **YES ?** , click **ENTER** key to confirm, and start to execute the fault reset operation, after the execution is completed, the screen displays: **DONE**; click ESC key to cancel the operation of this function, the screen displays: **CANCE.**

F.HIS: can be used to view the history of faults saved in the VFD, click ENTER key to enter, it will display: **S-XXX**, that is, a total of **XXX** history of faults; press any key to enter the history of fault code display: **XX.EEE**, where **XX** is the order of the number, the number starts from 0, increasing in turn, 0 means the most recent faults that occurred, **EEE** means the fault code, the meaning of the detailed code Please refer to the relevant explanation of the fault code; continue to click the ENTER key to enter the fault code details interface, through the up or down key, you can view the date and time of the occurrence of the fault; **ER.XXX** for the fault code, **Y.20XX** for the year 20XX, **M.XX** for the month of XX, **D.XX** for the day of XX, **T.XX.XX** for the time of XX XX, **SEC.XX** for the second of XX. Press ESC key to return to the previous level display under different interface.

The operation flow is shown below:

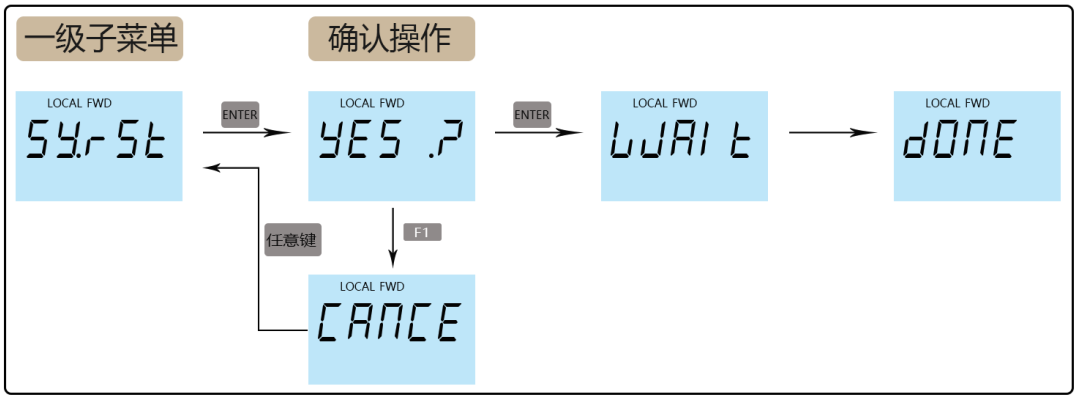


F.CLR: It is used to delete the historical faults saved in the VFD, after clicking ENTER key to enter, the confirmation dialog box is displayed: **YES ?** , click **ENTER** to confirm, and start to execute the delete operation, after the execution is completed, the screen displays: **DONE**; click other keys, to cancel the operation, the screen displays: **CANCE.** The operation flow is shown below:



SY.RST: It is used to perform system reset for the VFD, after clicking ENTER key to enter, the confirmation dialog box is displayed: **YES ?** , click **ENTER** to confirm, the screen displays: **WAIT.** and begin to execute the

system reset operation, after the execution is completed, the screen displays: **DONE**; immediately after the screen restart. Under the confirmation dialog box, click on other keys, in order to cancel the operation, the screen displays: **CANCE**. The operation flow is shown below:



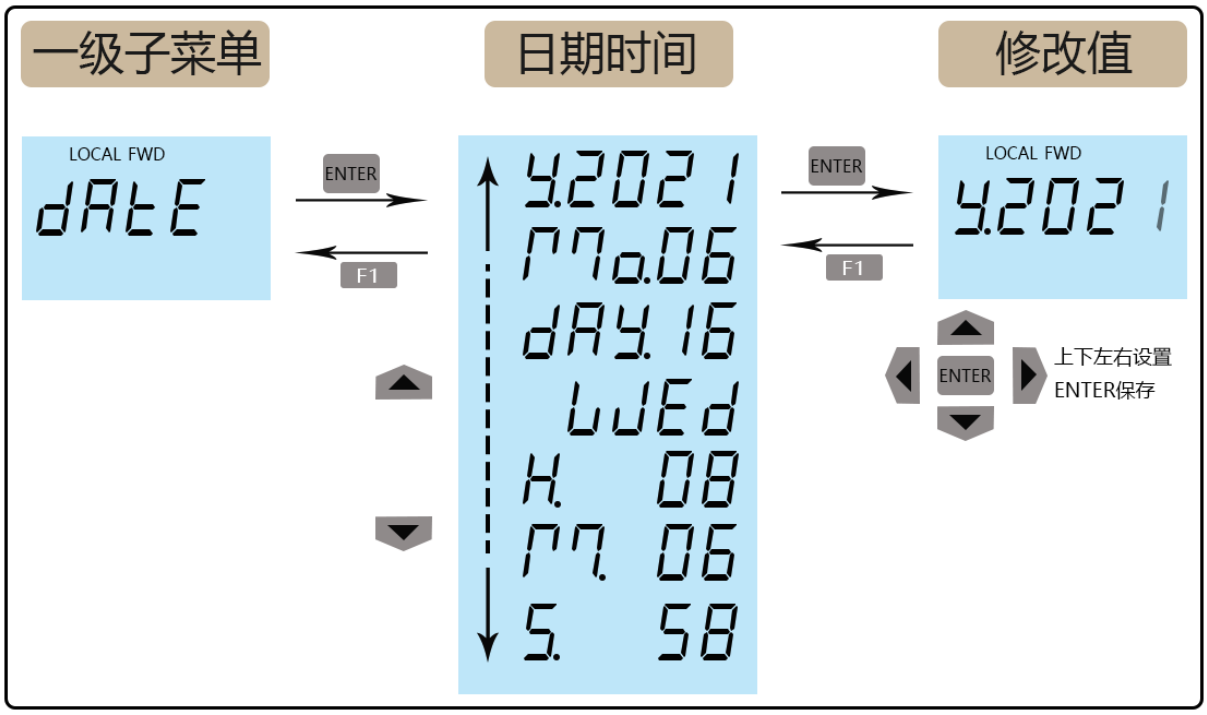
DATE: It is used to set the date and time of the VFD, after clicking ENTER to enter, you can use the up and down keys to check the present date and time, the menu is year, month, day, week, hour, minute and second in order; under the corresponding display screen, click ENTER, the numbers will start flashing, through the left, up and down keys to adjust the correct date or time, click ENTER, it will make corresponding modification to the VFD will be modified accordingly and the numbers will stop flashing.

The format of the specific numerical expressions is shown in the table below:

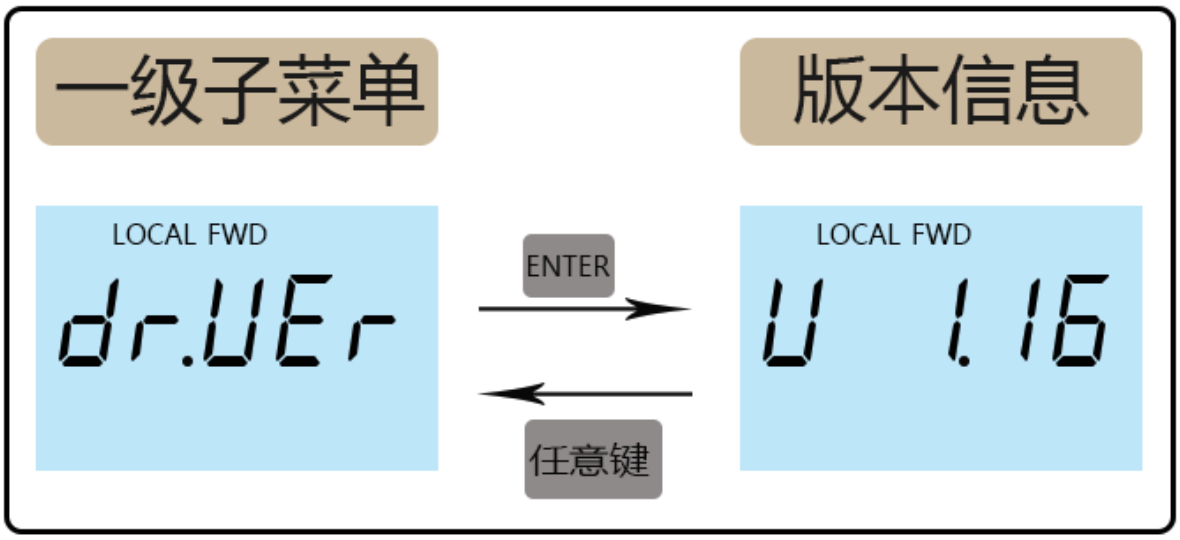
Type of model	Display format	Functional classification	Functional Description
menu DATE	Y.20XX	Current date: Year	Show current date: year, i.e.: 20XX
	MO.XX	Current date: Month	Display the current date: month, i.e.: XX month
	DAY.XX	Current date: Day	Display the current date: day, i.e.: XX day
	XXXX.	Current date: Week	Shows the current day of the week, i.e: MON.: Monday TUES: Tuesday WED.: Wednesday

			THUR.: Thursday FRI.: Friday SAT.: Saturday SUN.: Sunday
	H.XX	Current time: Hour	Display the current time: hour, i.e.: XX hour
	M.XX	Current time: minutes	Display the current time: minutes, i.e.: XX minutes
	S.XX	Current time: seconds	Display the current time: seconds, i.e.: XX seconds

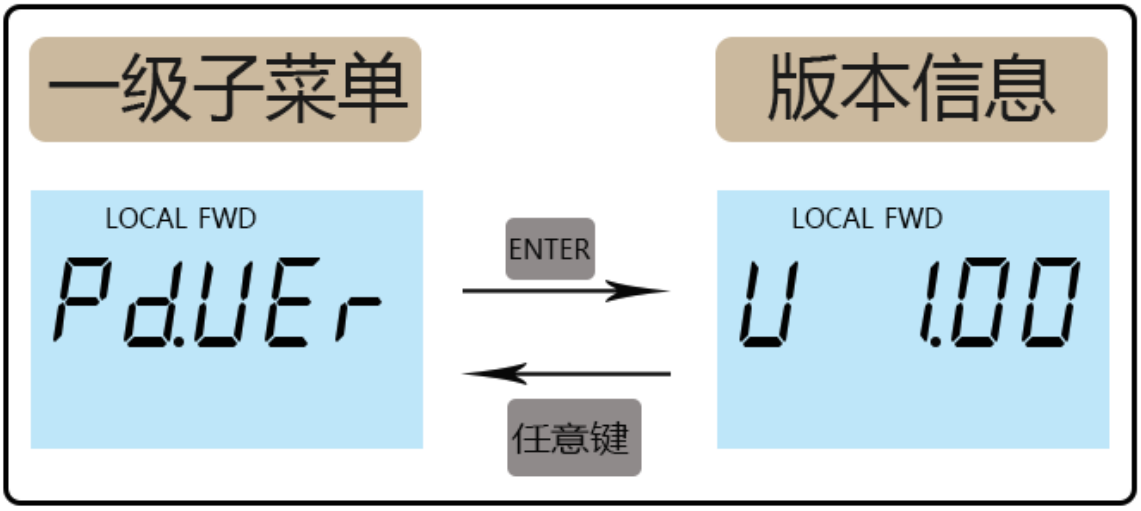
The operation flow is shown below:



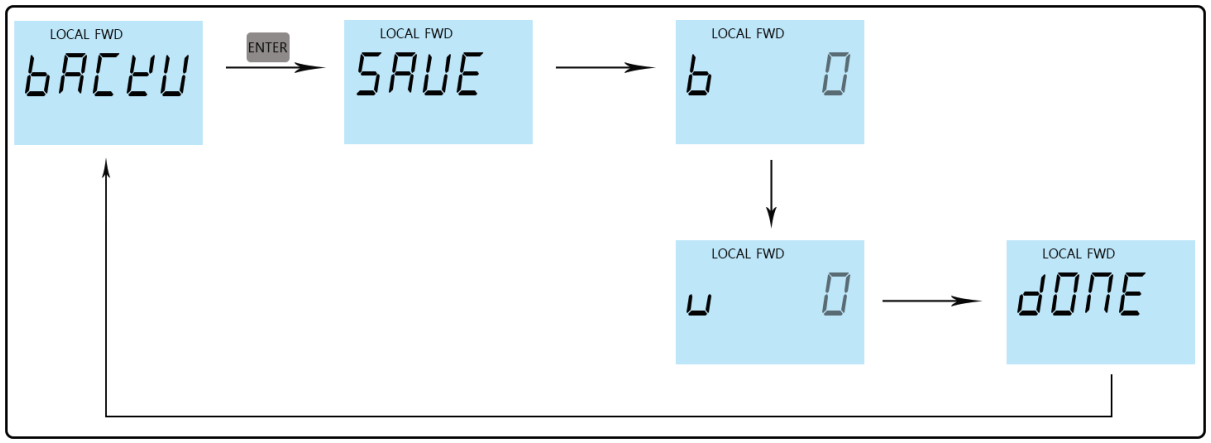
DR.VER: It is used to check the software version of the VFD, after clicking ENTER key to enter, the screen displays: **VX.XX**; after pressing any key or 5 seconds, it returns to the previous menu, the operation flow is as follows:



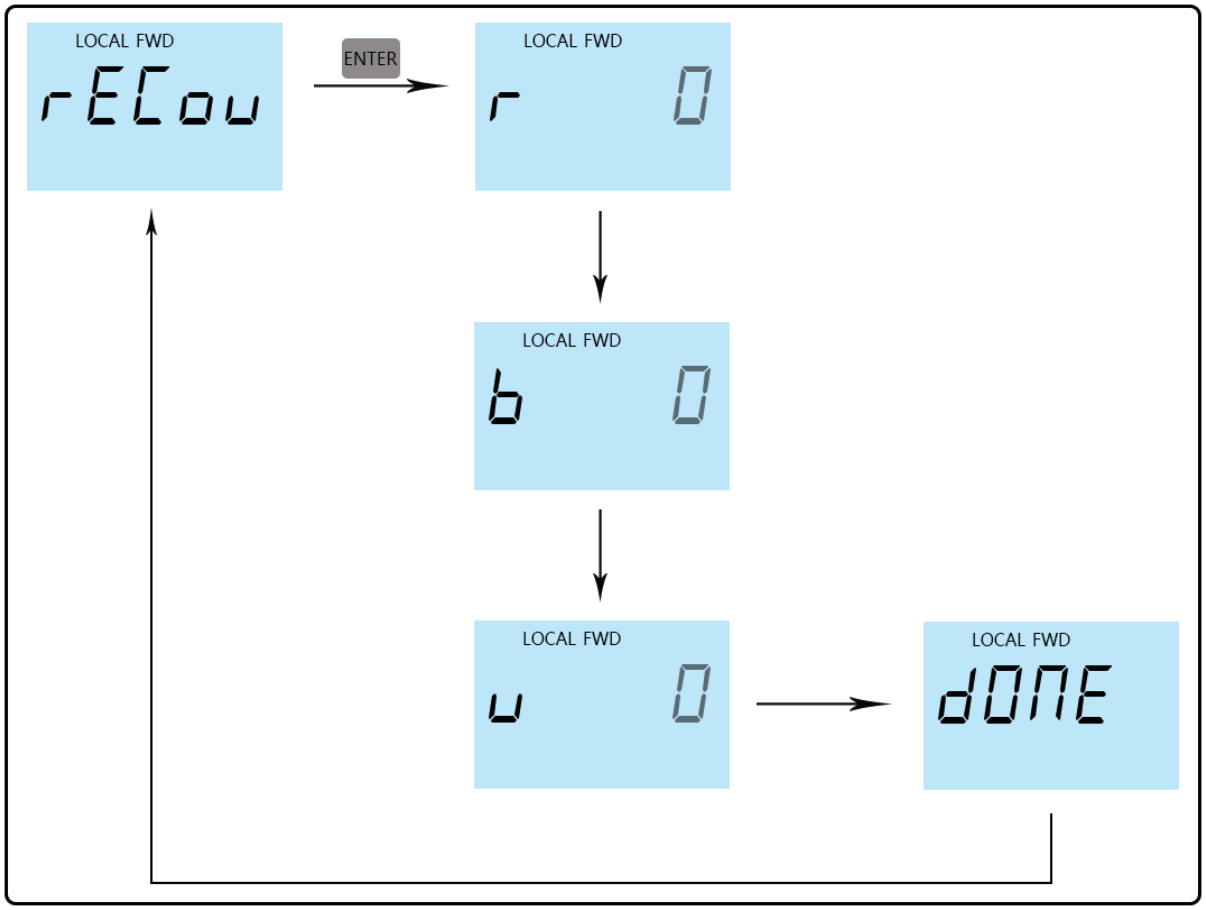
PD.VER: Used to view the software version of this panel, click ENTER to enter, the screen displays: **VX.XX**; press any key or 5 seconds, return to the previous menu, the operation flow is shown below:



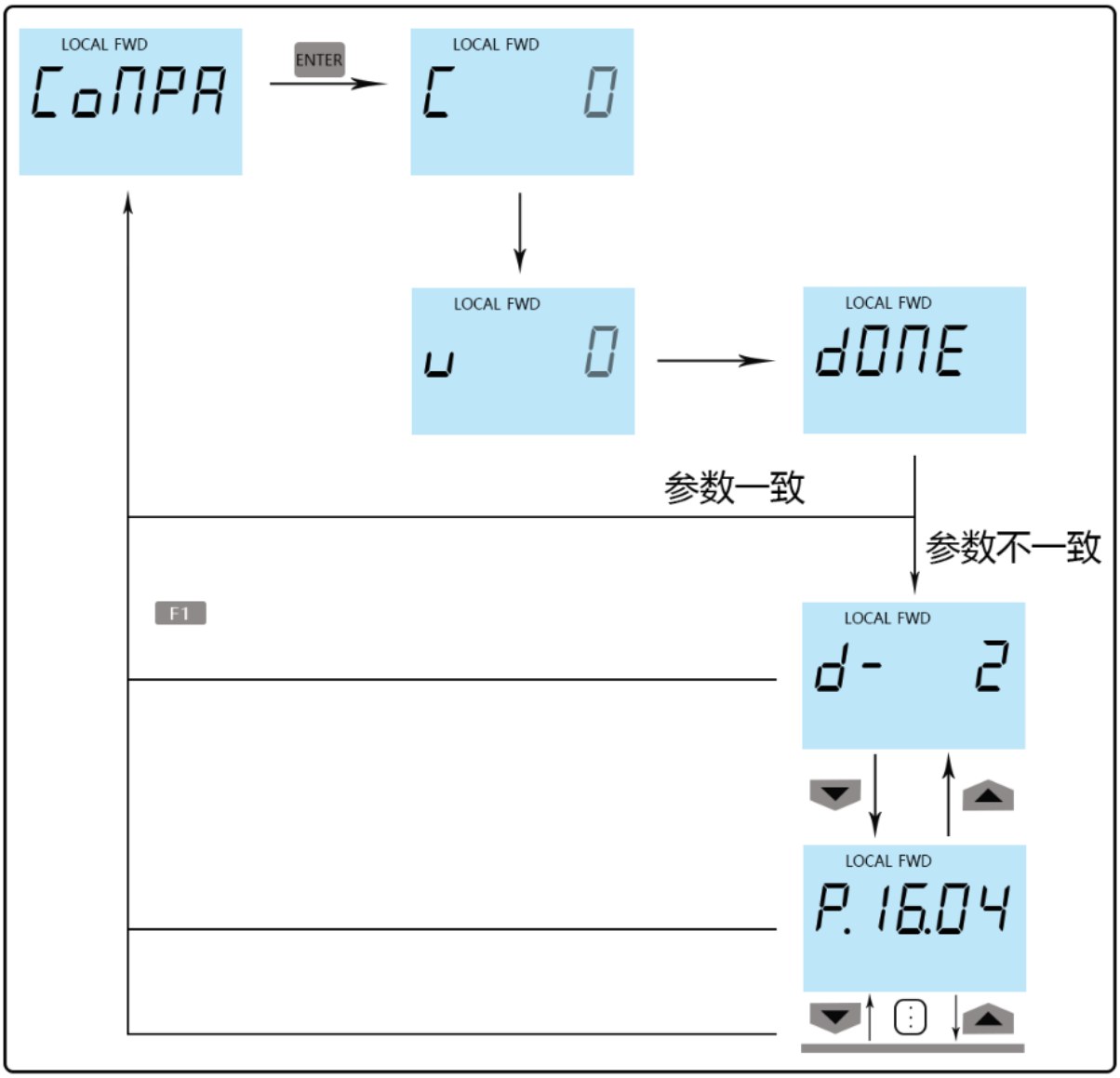
BACKU: It is used to back up the parameters of DSP, b means to back up the parameters of DSP to the panel, v means to check the parameters backed up by the panel and the DSP parameters and pairs. After completion, the backup parameters are successfully backed up. The operation flow of backing up to the panel is as follows:



RECOV: import the parameters of the panel into the DSP, r means importing parameters in the overlay, b means backing up the DSP panel parameters, and v means checking the imported parameters. If there is no problem in the three steps, it means that the imported parameters are completed. The operation flow is shown below:

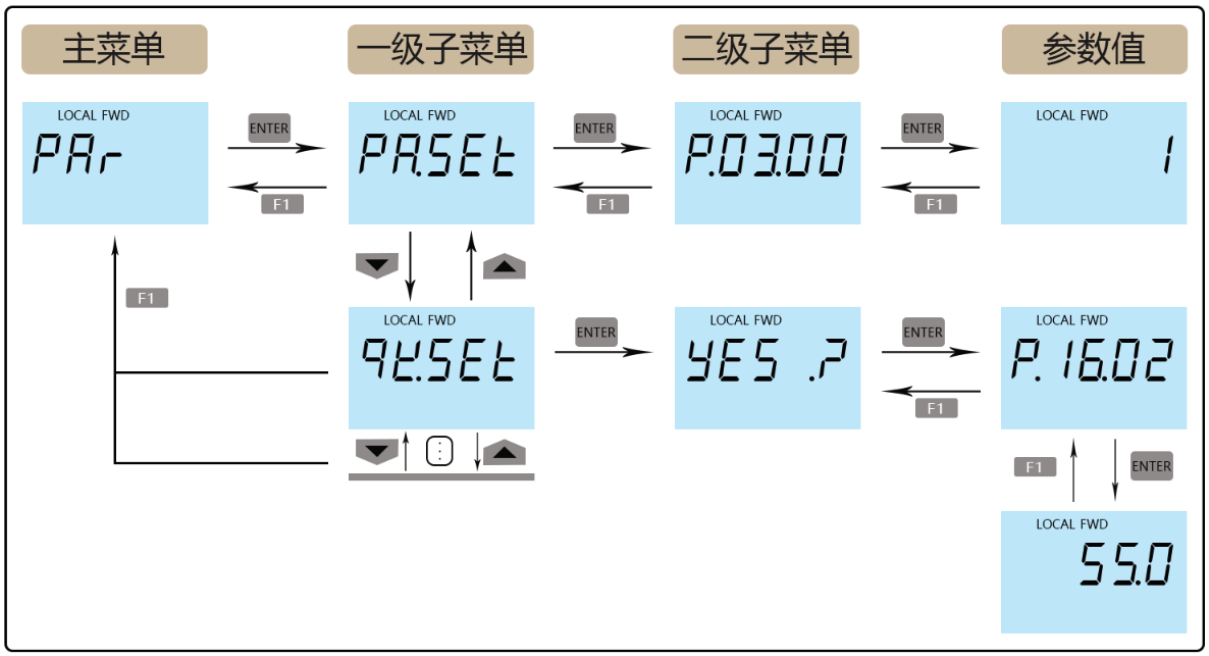


COMP: Compare the parameters of the panel and DSP with different display parameter groups. The operation flow is shown below:



（4） Parameter setting (**PAR**)

Parameter Setting (PAR) contains various functions related to VFD parameters, including parameter viewing and modification, VFD quick setting, parameter initialization, self-tuning 1, self-tuning 2, self-tuning 3, self-tuning 4, advanced privilege password input, and advanced privilege locking, and clicking the ENTER key can execute the corresponding functions. The key operation is shown below:

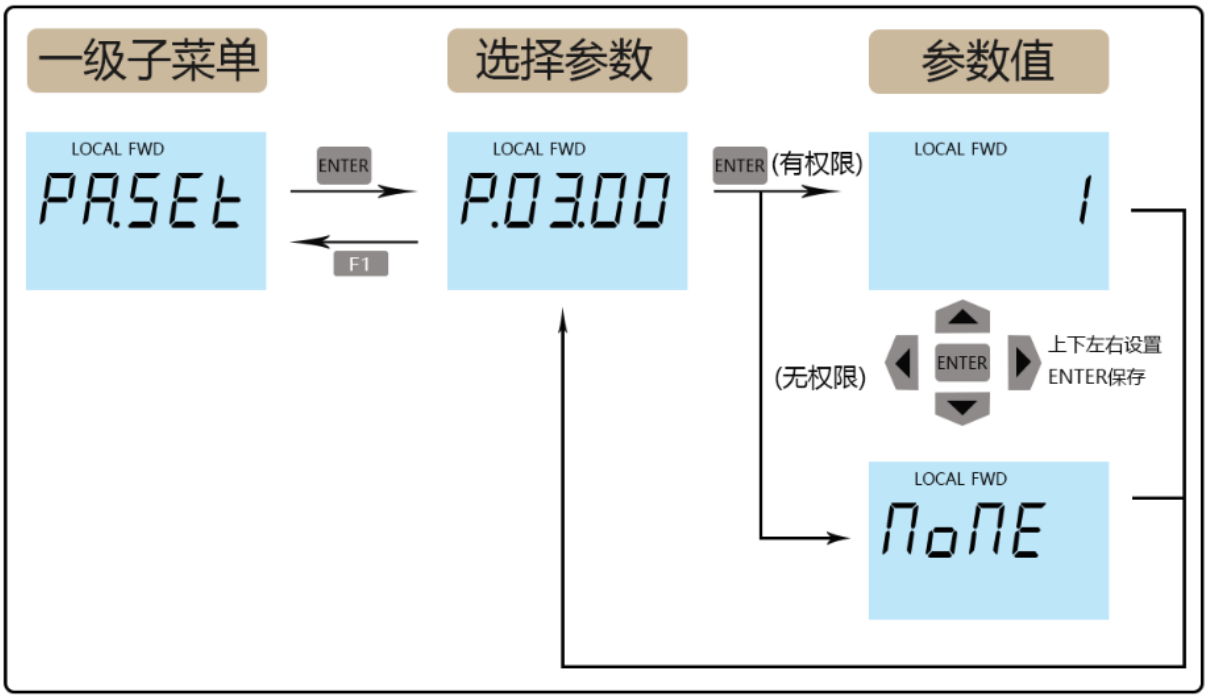


Type of model	Display format	Functional classification	Functional Description
parameterization PAR	PA.SET	parameterization	View or modify the corresponding VFD parameters; Parameter access privileges are categorized as: normal privileges, advanced privileges; Normal privilege: you can access parameters with low privilege; Advanced Privilege: allows access to parameters containing both low and high privileges; Panel power-up defaults to: normal permissions. In the PASW. function, enter the correct VFD password to gain advanced privileges.
	QK.SET	Quick Setup	Quick setup of commonly used parameters.
	PA.INI	Parameter initialization	Parameter initialization is restored to the initially set value.
	TUNE.1	Static self-tuning	Motor static self-tuning.
	TUNE.2	Dynamic self-tuning	self-tuning of motor dynamics.
	TUNE.3	Moment of inertia self-tuning	self-tuning of mechanical moment of inertia.

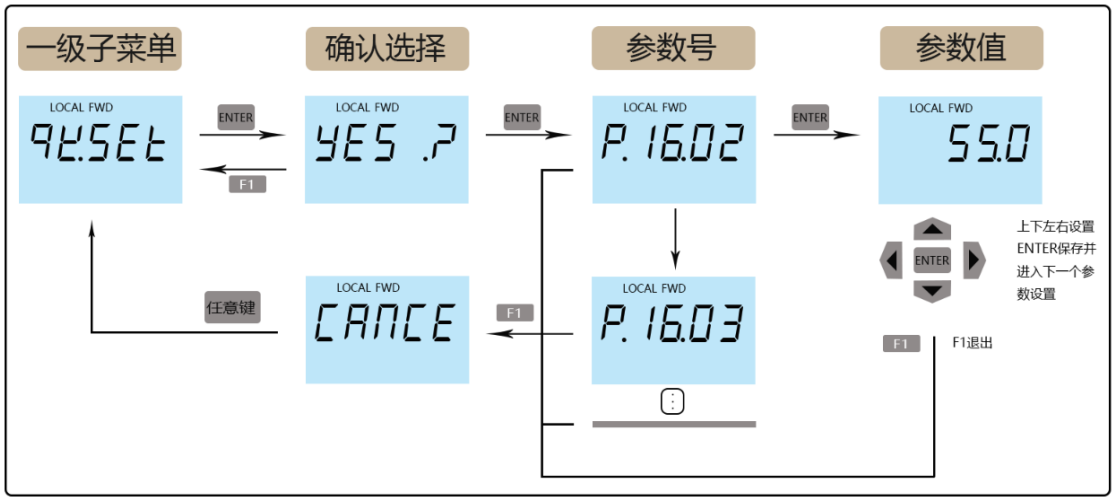
	TUNE.4	Capacitive self-tuning (AFE)	Effective only in AFE control mode.
	PASW.	Advanced Privilege Password Entry	Password entry screen, enter the correct password to gain advanced privileges for parameter access.
	P.LOCK	Advanced Privilege Lockout	Remove advanced privileges for parameter access and change to normal privileges.

PA.SET: Display or modify VFD parameters. Click ENTER to enter the parameter number modification interface "P.AA.BB", use the up and down left keys to modify the required parameter number, AA indicates the parameter group number, BB indicates the parameter number, if the parameter number of the group has reached the largest parameter number contained in the parameter group, the parameter group number automatically enters the next group of parameter groups. After inputting the required parameter number, click ENTER to enter the page of viewing and modifying the data of the parameter number. If you do not have access to the current parameter, the screen will display NONE, which indicates that the parameter cannot be viewed, and you need to obtain advanced privileges to view it; if you have access to the current parameter, the screen will display the real-time value of the parameter, and you can modify the parameter value by using the left button, the up button, and the down button, and clicking ENTER to save the modified parameter value, and the screen will return to the interface of the input parameter number.

The operation flow is shown below:



QK.SET: It is used to quickly set the commonly used VFD parameters, click ENTER to display the confirmation dialog box: **YES ?** , click ENTER to confirm, display the parameter number and enter the parameter value setting screen, use the left key, up key and down key to modify the parameter value, click ENTER to save the modified parameter value and enter the next parameter number; in this function, under the parameter data input screen, click ESC key, it will exit the whole quick setting function. The operation flow is shown below:

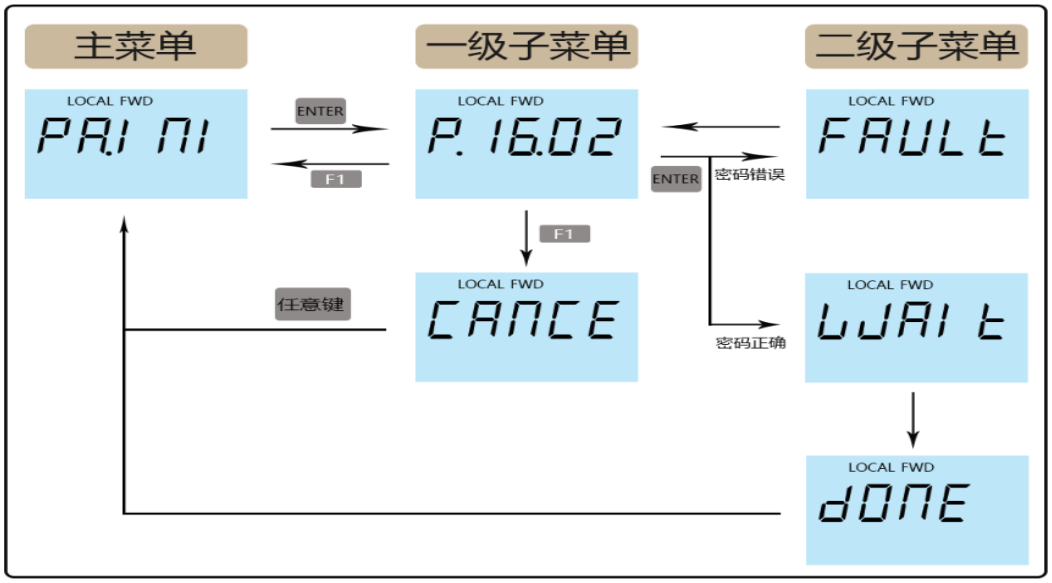


The common parameter numbers included are listed in the table below:

Type of model	Common Parameter Number	Parameter name
Quick Setup QK.SET	P.16.02	Motor rated power
	P.16.03	Motor rated voltage
	P.16.04	Motor rated current
	P.16.05	Motor rated frequency
	P.16.06	Rated motor speed
	P.16.07	Motor rated poles
	P.16.09	Motor synchronous speed
	P.16.11	Control mode selection
	P.16.14	V/F curve setting
	P.16.24	Maximum frequency
	P.08.16	Acceleration time 1
	P.08.35	Deceleration time 1
	P.08.00	Startup Source Selection
	P.08.10	Velocity feed source
	P.08.03	Parking
	P.07.00	Current limit value [motor 1]
	P.07.04	Overcurrent protection [motor 1]
	P.07.19	Overspeed fault [motor 1]

PA.INI: All parameters are restored to factory settings, i.e. parameters are initialized. After clicking ENTER, the screen of inputting password "P.----" will appear, input the correct password by left button, up button, down button, i.e. input the password to get the advanced privilege; input correctly, the screen prompts "**WAIT.**" and carries on the operation of initialization of parameters. Initialization operation, after the initialization operation is completed, the screen displays "**DONE**" and returns to the previous menu; if the input password is incorrect, the screen displays "**FAULT**" and returns to the password input screen; if you click on the ESC key on the interface of password input, that is, to exit the parameter initialization. If you click the ESC key in the interface of password input, it will exit the menu of parameter initialization. The

operation flow is shown below:

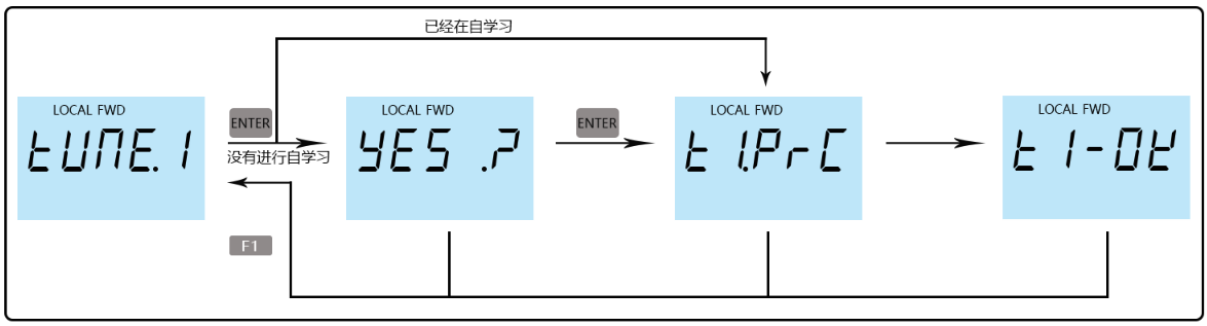


TUNE.1, TUNE.2, TUNE.3, TUNE.4: correspond to static self-tuning, dynamic self-tuning, rotational inertia self-tuning, and capacitive self-tuning (AFE), respectively.

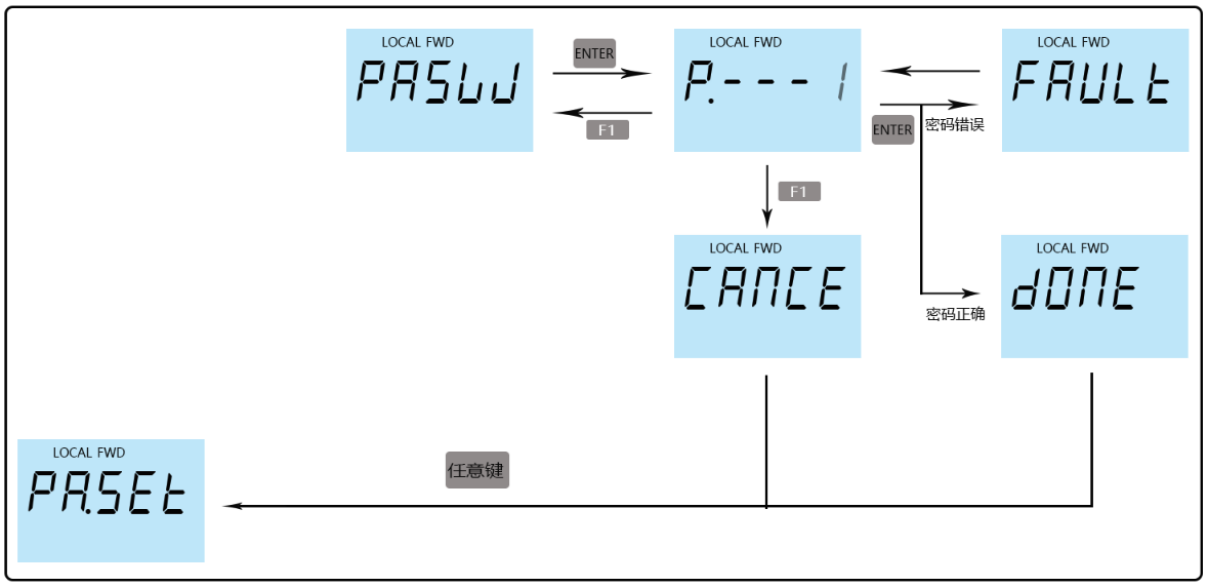
Select "**TUNE.X**" in Function Setting and press ENTER to perform self-tuning. During the self-tuning process, "**TX.PRC.**" is displayed, and "**TX-OK**" is displayed when self-tuning is completed.

Under the self-tuning menu, if the VFD is not ready, the screen will stay in the "**YES ?**" screen. screen; if the VFD is ready, please continue to click ENTER to confirm the start of the self-tuning function until the screen displays "**TX.PRC.**". PRC." screen, i.e., when the self-tuning is in progress, you can click ESC key to exit the self-tuning screen temporarily and perform other functions such as monitoring. Under the self-tuning function selection menu, click the ENTER key to enter, and if there is a self-tuning operation at present, the screen directly displays "**TX.PRC.**". When self-tuning is completed, the screen displays "**TX-OK**".

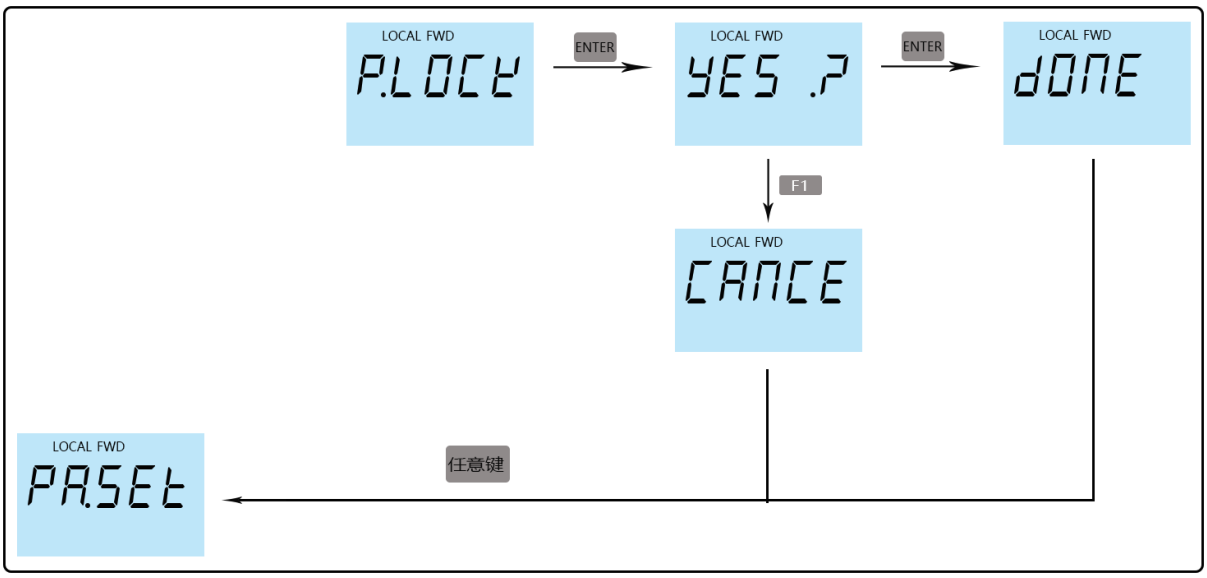
Take **TUNE.1** as an example the operation flow is shown below:



PASW.: Advanced Access Password Entry. Enter the correct password, you can get the advanced privilege of parameter access, and you can view more parameters with higher privilege. After execution, it will jump to PA.SET screen directly, and the operation flow is as follows:



P.LOCK: Advanced privilege lock. Clicking ENTER to confirm will cancel the advanced privilege of parameter access and change it to ordinary privilege. When no key operation timeout, i.e. half of the set value of the backlight off time, the screen will switch to the main menu, and at the same time, the parameter access privilege will be changed to ordinary privilege. After the execution, it will jump to PA.SET screen, the operation flow is as follows:



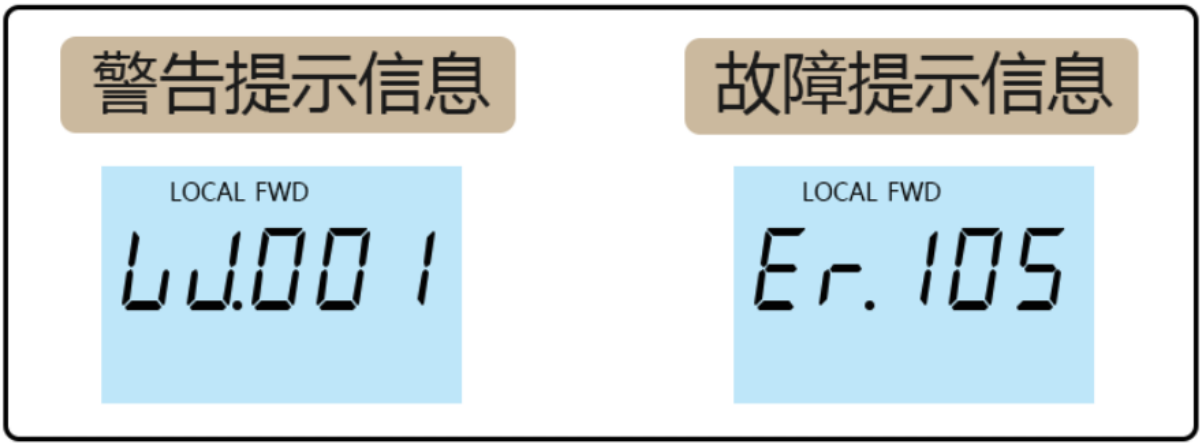
（5） Warning and Error

When a malfunction or warning occurs, the malfunction and warning box will be displayed, and "RESET" can be used to reset the malfunction only when the malfunction or warning box is displayed. You can use the "ESC" key to temporarily hide the warning and fault prompts, but the warning or fault prompts will still be displayed for more than 15 seconds until the faults and warnings are eliminated.

After the prompt box has been hidden, the fault needs to be reset, under the main menu, press RESET to reset the fault.

After the box has been hidden, you can use "F.CODE" to bring up the trouble box again.

Where XXX is a fault code or warning code.

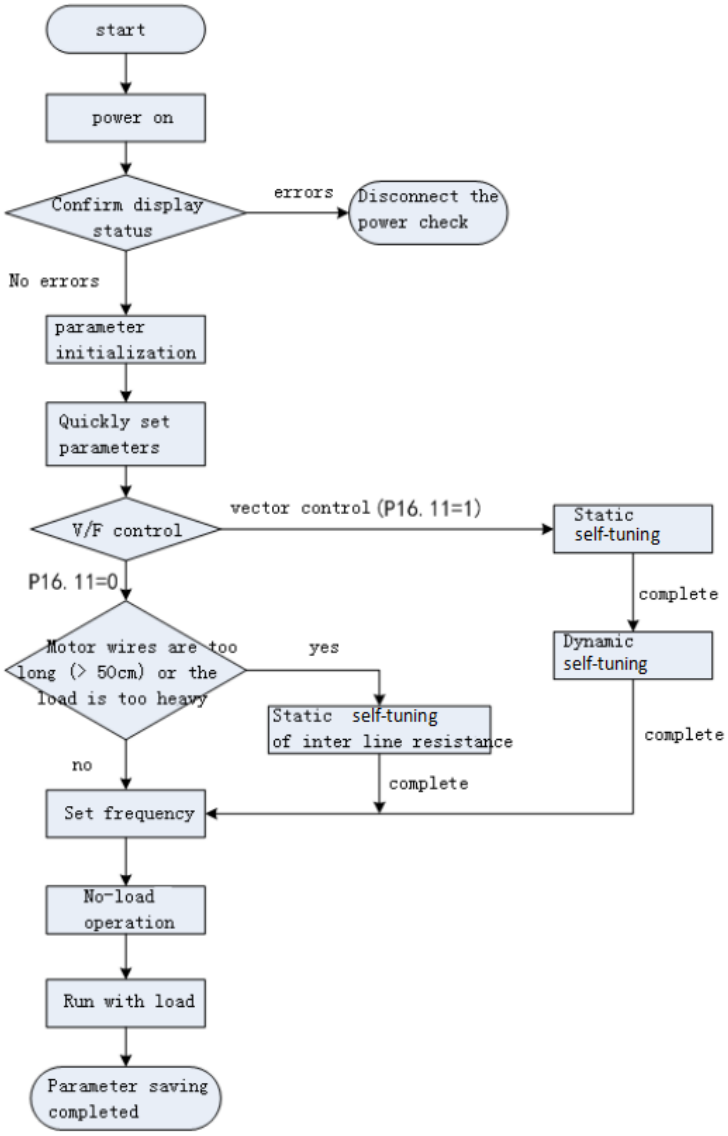


5. System Commissioning

This chapter introduces the basic debugging steps of the textile special VFD, mainly including the frequency command setting of the VFD, the control of startup and shutdown, according to the contents of this chapter can realize the trial operation of the VFD-controlled motor.

5.1 Quick debugging guide

Please perform a trial run based on the flowchart shown below.



Attention:

1, Before using the Operation panel for self-tuning, be sure to select the Local/Remote key as Local.

2, the initial value of the control mode is V/F control (P16.11=0). In order to get better control performance, it is recommended that the V/F control also do static self-tuning.

3, vector control is divided into closed-loop vector control (P16.11=2) and open-loop vector control (P16.11=1). Closed-loop vector and open-loop

vector must do self-tuning strictly according to the following steps, first static self-tuning, then dynamic self-tuning, and finally rotational inertia self-tuning, which is recommended to be done in all three steps, otherwise there will be a risk of reporting faults during actual operation. The motor parameters obtained from the three steps of self-tuning done in the open-loop vector control mode are also applicable to the closed-loop vector control mode.

5.2 Checking before turning on the power

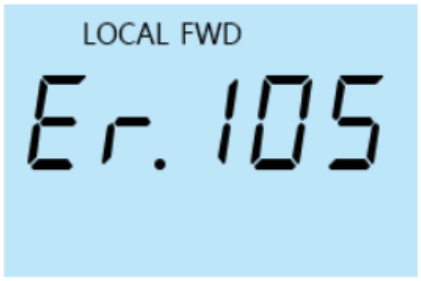
Be sure to check the following items before turning on the power.

Sports event	Element
Confirmation of power supply voltage	Whether the power supply voltage is within the permissible range, three-phase AC380~460V 50/60Hz;
Confirmation of connection between VFD output terminals and motor terminals	Are the output terminals (U,V,W) of the motor and the motor well connected;
Confirmation of connection to VFD control circuit terminals	Whether the control terminals of the VFD are well connected to other control devices;
When using a PG encoder card	Is the PG encoder card well connected to the motor encoder;
Load Confirmation	Whether the motor is in the no-load state (not connected to the mechanical state).

5.3 Confirmation of display status after power-on

The LED operation panel indicates the status:

When the power is turned on, the display of the operator in the normal state is shown below.

State of affairs	Demonstrate	Instructions
normal time		Factory default display is digitally set to 10.00Hz
malfunction		The VFD is stopped during a fault and the fault type is displayed.
When the communication connection is disconnected		The communication connection is disconnected and there is a communication failure with the DSP.

5.4 Restoring factory settings

The LED operation panel reverts to the factory settings as follows:

For details, see PA.INI in (4) Parameter Settings in Chapter 4, 4.2.4 Description of Menu Composition.

5.5 Quick Setup Parameters

Quickly set the following parameters to be able to test run the motor.

Function code	Name	Clarification	Factory value	Function code	Name	Clarification	Factory value

P16.2	Motor rated power	Refer to the motor nameplate to set the motor rated power		P16.24	Maximum frequency	Setting the maximum frequency (this parameter is only valid in V/F control mode)	50 [Hz]
P16.3	Motor rated voltage	Set the rated motor voltage with reference to the motor nameplate		P8.16	Acceleration time 1	Acceleration time from the stop state to the set value of P8.15	3
P16.4	Motor rated current	Set the rated motor current by referring to the motor nameplate.		P8.35	Deceleration time 1	Deceleration time from P8.34 set value to stop	3
P16.5	Motor rated frequency	Refer to the motor nameplate to set the rated motor frequency		P8.0	Startup method selection	[0] Digital input terminal [1] Operation panel [2] DP communication [3] MODBUS [4] Free function module	1
P16.6	Rated motor speed	Refer to the motor nameplate to set the rated motor speed		P8.10	Velocity feed source	[0] I/O terminal [1] Analog input 1 [2] Analog Input 2 [3] Operation panel [4] DP communication [5] MODBUS [6] Free function module	3
P16.7	Motor rated poles	Setting according to the rated		P8.3	Parking	[0] Ramp parking [1] Free parking	1

		speed (120 x P16.5 / P16.6) rounded down					
P16.9	Motor synchronous speed	Set according to rated speed (120 x P16.5 / P16.7)		P7.0	Current limit [motor 1]	0~300[%]	180%
P16.11	Control mode selection	[0] V/F control [1] Open-loop vectors [2] Closed-loop vectors	0	P7.4	Overcurrent protection [motor 1]	0~300[%]	235%
P16.14	V/F curve setting	[0] Linear V/F curve [1] Multi-point V/F curves [2] Quadratic power curves	0	P7.19	Overspeed fault [motor 1]	100.0 to 720.0 [%]	120%

5.6 self-tuning of motor parameters

self-tuning is necessary when the motor wires are too long or when vector control is selected. Please perform self-tuning in the following order to automatically recognize the motor parameters.

（1） Select Control Mode

Function code	Parameter selection	Control mode	self-tuning options
P16.11	0	V/F control	Static self-tuning
	1	vector control	Static and dynamic self-tuning
	2		

（2） Considerations Before Implementing a self-tuning Model

The GF630N02 series VFD provides a parameter self-tuning function. The accurate self-tuning of parameters comes from the correct setting of motor

nameplate parameters. In order to ensure the control performance, please configure the motor according to the standard adapted motor of the VFD, if the difference between the motor power and the standard adapted motor is too large, the control performance of the VFD will be significantly reduced. Please check the following four things before motor self-tuning:

Inspection items	Inspection matters	Note
Whether the motor shaft is connected to other mechanical equipment	Dynamic self-tuning is best when performed without loads	In motor dynamic self-tuning, the motor will rotate at 7.5% of the rated speed.
	If the motor is connected to other mechanical equipment, the load must not exceed 50% of the rated load.	
Motor capacity and VFD capacity	Motor power and VFD power requirements are not less than 1/5 of the VFD power	
Is the motor parameter setting input correct?	The P16 group parameters are consistent with the motor nameplate parameters, such as rated power, voltage, current, speed, number of poles, and synchronous speed.	Incorrect inputs may cause self-tuning to fail or the motor to fail to operate properly.
Whether an encoder is mounted on the motor	If closed-loop vector control is used, an encoder should be installed on the motor.	
	If V/F control or open-loop vector control is used, the presence or absence of an installed encoder does not affect motor self-tuning.	

(3) self-tuning of motor parameters

Type of self-tuning	Control mode	self-tuning content	Control method	Operational requirement
Static self-tuning	V/F control mode	Self-tuning of the resistance between the wires, recognizing only the value of the stator resistance	this locality	1,Check Static self-tuning in Function Setting; 2,Press the confirmation button for self-tuning. 3,self-tuning process shows "Static self-tuning in progress!" 4,When the self-tuning is completed, it displays "Static self-tuning completed!". .

				5, dynamic self-tuning and rotational inertia self-tuning cannot be done in VF mode.
Dynamic self-tuning	Vector control mode	Identification of stator and rotor resistance and inductance parameters	Local & Remote	1,The static self-tuning in vector control mode must be completed first. 2,Remote: self-tuning by operating the handle of the corresponding mechanism in the driver's cab (gears are not limited). Local: Check Dynamic self-tuning in the Feature Settings; 3,Check Static self-tuning in Function Setting; 4,Press the confirmation button for self-tuning. 5. "Dynamic self-tuning in progress!" is displayed during the self-tuning process. 6,When the self-tuning is completed, it displays "Dynamic self-tuning completed!". .
Moment of inertia self-tuning	Vector control mode	Optimization of the mechanical moment of inertia	Local & Remote	1,self-tuning of rotational inertia is performed with the motor shaft connected to the load. 2,When self-tuning of moment of inertia is performed, the load of the motor must not exceed 50% of the rated load. 3,The rotational inertia uses the default value, and the vector control can operate normally. 4,Select self-tuning of rotational inertia in the function setting; 5,Press the confirmation button for self-tuning. 6,self-tuning process shows "self-tuning of rotational inertia is in progress!" 7,When the self-tuning is completed, it shows "self-tuning of rotational inertia completed!". .

(4) Trial run in no-load condition:

The following explains how to test run the motor under no load.

Before operation, confirm the safety around the motor and machinery, and confirm that the emergency stop circuit and mechanical safety devices operate correctly. During operation, confirm that the motor rotates normally (whether there is abnormal sound and vibration), and confirm that the acceleration and deceleration of the motor are normal.

The procedure for using the operation panel is described below:

	Manipulate	Caveat
Step 1	Turn on the power and display the initial screen	
Step 2	Press LOC/REM to select LOCAL, LOCAL indicator lights up	
Step 3	Press the ENTER key of the operation panel to set the reference [1] speed to 5 Hz.	
Step 4	Press the RUN button to run the VFD, the RUN indicator lights up and the motor rotates positively	Verify that the motor is rotating in the correct direction and that there is no fault indication on the VFD;
Step 5	If there is no fault in step 4, gradually increase the frequency setting to 50 Hz.	Confirm the output current through the operation panel to ensure that the current does not exceed the rated current of the motor;
Step 6	After confirming, press the STOP button to stop the operation.	

(5) Trial run with status:

The following describes the method of trial operation of the motor under load.

element	manipulate	note
Mechanical system connections	Make sure that the area around the motor and machinery is safe	
	Make sure the motor stops completely	
	Please connect the mechanical system	
	Make sure the mounting screws are not loose, and fix the motor shaft and mechanical system firmly.	
	Make sure that the emergency stop circuit and mechanical safety	

		devices are operating correctly.	
		Be prepared to press the STOP button on the operation panel at any time to prevent abnormalities.	
Operating procedure	Step 1	Turn on the power and display the initial screen	
	Step 2	Press LOC/REM to select LOCAL, LOCAL indicator lights up	
	Step 3	Press the ENTER key on the operation panel to set the reference value [1] speed to 5Hz	
	Step 4	Press the RUN button to run the VFD, the RUN indicator lights up and the motor rotates positively	Verify that the motor is rotating in the correct direction and that there is no fault indication on the VFD;
	Step 5	If there is no fault in step 4, gradually increase the frequency setting to 50 Hz.	Confirm the output current through the operation panel to ensure that the current does not exceed the rated current of the motor;
	Step 6	After confirming, press the STOP button to stop operation	
		Is the acceleration and deceleration of the motor normal	
Operational confirmations		Whether the direction of action of the machinery is correct (whether the direction of rotation of the motor is correct)	
		Is the acceleration and deceleration of the motor normal	
		Confirm that the output current is not too high	
		Change the frequency command and direction of rotation to check for abnormal sounds and vibrations.	

（6） Parameter saving

Select Backup All Parameters in Function Setting to copy the parameter values of the VFD to the storage area of the operation panel. If the frequency converter needs to replace the control board, copy the data recorded in the operation panel to the new control board, and the operation can be resumed.

Note: The software version in the control board when restoring the parameters must be the same as the previous one, otherwise the restoration of the parameters will not be successful.

6. VFD Parameter Setting Instructions

Containment	Functional constituency	Clarification	Containment	Functional group	Instructions
parameter control	P0	parameter control	V/F Parameters	P16	Motor 1 parameter V/F group
Terminal control	P3	Digital Input Terminal Block		P17	Motor 2 parameter V/F group
	P4	Digital Output Terminal Block		P18	Motor 3 parameter V/F group
	P5	Analog Input Terminal Block		P19	Motor 4 parameter V/F group
	P6	Analog Output Terminal Block	vector control	P20	Motor 1 vector control group
Safeguard	P7	Protection parameter sets		P21	Motor 2 vector control group
Start-stop control	P8	Motor 1 start/stop control group		P22	Motor 3 vector control group
	P9	Motor 2 start/stop control group		P23	Motor 4 vector control group
	P10	Motor 3 start-stop control group	newsletter	P31	CAN bus
	P11	Motor 4 start-stop control group		P32	MODBUS bus
Segment speed control	P12	Motor 1-stage speed brake set			
	P13	Motor 2-stage speed brake set			
	P14	Motor 3-stage speed brake set			
	P15	Motor 4-stage speed brake set			

6.1 Parameter control P0

Function code	Name	Instructions	Setting range	Default value	Particular
P0.0	Initialization Options	[0] Default setting: initialized with default parameters; [1] Last save: Initialize the parameters of the last save;	0 to 1	0	
P0.1	Initialization power	VFD power	0 to 27	14	
P0.3	Initialization Frequency	[0]50HZ [1]60HZ	0 to 1	0	
P0.4	Set Password	Used to set the password for modifying parameters			
P0.5	enter a password	Used to enter the correct password in order to modify the parameters			

6.2 Digital Input Terminal Block P3

Function code	Name	Show	Setting range	Default value	Explanation
P3.0	Digital input terminal 1	Programmable Multi-Function Terminals	0 to 41	0	
P3.1	Digital Input Terminal 2	Programmable Multi-Function Terminals	0 to 41	0	
P3.2	Digital Input Terminal 3	Programmable Multi-Function Terminals	0 to 41	0	
P3.3	Digital input terminal 4	Programmable Multi-Function Terminals	0 to 41	0	
P3.4	Digital Input Terminal 5	Programmable Multi-Function Terminals	0 to 41	0	
P3.5	Digital Input	Programmable Multi-Function	0 to 41	0	

	Terminal 6	Terminals			
P3.6	Digital Input Terminal 7	Programmable Multi-Function Terminals	0 to 41	0	
P3.7	Digital Input Terminal 8	Programmable Multi-Function Terminals	0 to 41	0	
P3.8	Digital input terminal 9	Programmable Multi-Function Terminals	0 to 41	0	
P3.9	Digital input terminal 10	Programmable Multi-Function Terminals	0 to 41	0	
P3.10	Digital Input Terminal 11	Programmable Multi-Function Terminals	0 to 41	0	
P3.11	Digital Input Terminal 12	Programmable Multi-Function Terminals	0 to 41	0	
P3.12	Power-on automatic operation control	[0] disable; [1] enable	0 to 1	0	
P3.13	HDI5 lower frequency limit	Externally given lower limit pulse frequency	0.100 to 50.000	0.100	
P3.14	HDI5 Lower Frequency Corresponding Speed	The speed corresponding to the externally given lower limit pulse frequency	0.0 to 300.0	0.0	
P3.15	HDI5 upper frequency	Externally given upper limit pulse frequency	0.100 to 50.000	0.100	
P3.16	HDI5 upper frequency corresponding speed	The speed corresponding to the externally given upper limit pulse frequency	0.0 to 100.0	0.0	
P3.17	Frequency UP@Hz/sec	The given frequency increases in steps per second.	0.0 to 50.0	1.0	
P3.18	Frequency DOWN@Hz/sec	The given frequency decreases in steps per second.	0.0 to 50.0	1.0	

This parameter is used to set the function corresponding to the digital multi-function input terminal.

Setpoint	Functionality	Clarification
0	prohibit the use of sth.	The VFD does not operate even if a signal is input. Unused terminals can be set to disabled to prevent malfunction.
1	forward motion (e.g. of a ship)	Forward and reverse motor control via external terminals
2	invert the operation	
3	driver enable (High level)	Enable when this terminal is high.
4	Driver Enable.NC (Low level)	Enable when this terminal is low.
5	fault reset	External fault reset function. Same function as the </RST key on the operation panel. Remote fault reset is possible with this function.
6	Multi-Segment Speed 1 (Bit 0)	Multi-speed command input terminal (see 7.1 for details)
7	Multi-speed 2 (bit 1)	
8	Multi-speed 3 (bit 2)	
9	Multi-speed 4 (bit 3)	
11	Direction change signal	Changing the direction of operation when there is a signal on this terminal
12	Local emergency stop signal (High level)	Valid when input terminal is high
13	Local emergency stop signal.NC (Low level)	Valid when input terminal is low
14	Remote emergency stop signal (High level)	Valid when input terminal is high

15	Remote emergency stop signal.NC (Low level)	Valid when input terminal is low
16	Slave ready signal	Slave ready when signal is present on this terminal
17	Select motor 0	Motor selection bit 1 and motor selection bit 0 combine to form a motor selection signal, with 00 indicating that the target motor is 1, 01 indicating that the target motor is 2, 10 indicating that the target motor is 3, and 11 indicating that the target motor is 4.
18	Select motor 1	
19	Startup/given source selection	For selective switching of start-stop and speed feed sources
20	Main contactor suction confirmation	Main contactor status feedback in AFE control mode
21	Unshakeable upper limit	The rope length is the equivalent rope length of the ascending limit when there is a signal on this terminal.
22-23	FUNC 22～ FUNC 23	standby
24	free parking	This function is enabled when there is a signal on this terminal.
25	FUNC25	standby
26	Dynamic torque control	Torque control mode when there is a signal on this terminal, otherwise speed control mode
27	FUNC 27	standby
29	Anti-Shake Selection	This function is enabled when there is a signal on this terminal.
30	Two/four times conversion	Converts to quadruple when a signal is present on this terminal.
31	Frequency UP	When there is a signal at this terminal, the frequency increases in step frequency
32	Frequency DOWN	When there is a signal at this terminal, the frequency will be reduced in step frequency
33	Emergency Deceleration Enable	When there is a signal at this terminal, the deceleration time becomes the normal deceleration time multiplied by the value of parameter P8.62, which can be used to reduce the deceleration time in an emergency.

40	Anti-punching zero position	A signal on this terminal indicates that the anti-roofing limit is being calibrated.
41	anti-roofing bypass	The presence of a signal on this terminal indicates that operation can be continued without being restricted by the anti-roofing limit.

6.3 Digital output terminal block P4

Function code	Name	Clarification	Setting range	Default value	Particular
P4.0	Digital output terminal 1	Multi-function switching output terminal	0 to 64	0	
P4.1	Digital output terminal 2	Multi-function switching output terminal	0 to 64	0	
P4.2	Digital output terminal 3	Multi-function switching output terminal	0 to 64	0	
P4.3	Digital output terminal 4	Multi-function switching output terminal	0 to 64	0	
P4.4	Digital output terminal 5	Multi-function switching output terminal	0 to 64	0	
P4.5	Digital output terminal 6	Multi-function switching output terminal	0 to 64	0	
P4.6	Digital output terminal 7	Multi-function switching output terminal	0 to 64	0	
P4.16	Free function block digital output 1	Free function module settings	0 to 500	0	
P4.17	Free function block digital output 2	Free Function Module Setting	0 to 500	0	
P4.18	Free Function Block Digital Output 3	Free Function Module Setting	0 to 500	0	
P4.19	Free function block digital output 4	Free Function Module Setting	0 to 500	0	

The functions of the multifunction switching output terminals are shown in the table below:

Setpoint	Functionality	Clarification
0	prohibit the use of sth.	This terminal has no function
1	operating signal	Valid for normal operation (see 7.2 for details)
2	fault output	Output ON signal when the VFD is malfunctioning
3	Brake Brake	Valid when the brake meets the conditions for opening (see 7.2 for details)
4	run request (computing)	Valid when run signal is input
5	ready run	Valid when the VFD is ready
6	Multi-speed 1	[6] to [9] Effective when multispeed commands are input.
7	Multi-speed 2	
8	Multi-speed 3	
9	Multi-speed 4	
10	FUNC 10	standby
11	orientations	Effective when there is a signal in the input direction
12	warnings	Effective in the event of a warning
13	overtemperature warning	Effective when overheating occurs
14	overload warning	Effective when an overload warning occurs
15	overspeed warning	Effective when an overspeed warning occurs
16	Holding brake failure	Effective in the event of a brake failure (see 7.7 for details)
17	Motor Selection 0	This signal is active when motor 1 is selected
18	Motor option 1	This signal is active when motor 2 is selected
19	Motor option 2	This signal is active when motor 3 is selected
20	Motor Selection 3	This signal is active when motor 4 is selected
21-31	FUNC 21 to FUNC 31	standby
32	Pre-charge completion	This terminal is signaled when there is a run signal in AFE control mode.

	signal	
33-48	FUNC 33 to FUNC 48	standby
49	PROFIBUS Function 1	PROFIBUS Function 1 Output 1 This terminal signal is active
50	PROFIBUS Function 2	PROFIBUS function 2 output 1 Signal valid on this terminal
51	PROFIBUS Function 3	PROFIBUS Function 3 Output 1 Signal active on this terminal
52	PROFIBUS Function 4	PROFIBUS Function 4 Output 1 Signal active on this terminal
53	PROFIBUS Function 5	PROFIBUS Function 5 Output 1 Signal active on this terminal
54-56	FUNC 54 to FUNC 56	standby
57	Local function 1	Local Function 1 Output 1 Signal valid on this terminal
58	Local Function 2	Local Function 2 Output 1 Signal valid on this terminal
59	Local Function 3	Local Function 3 Output 1 Signal valid on this terminal
60	Local function 4	Local Function 4 Output 1 This terminal signal is active
61	Free Function Module 1	Free Function Module 1 Output 1 Signal valid on this terminal
62	Free Function Module 2	Free Function Module 2 Output 1 Signal valid on this terminal
63	Free Function Module 3	Free Function Module 3 Output 1 Signal valid on this terminal
64	Free function module 4	Free Function Module 4 Output 1 Signal valid on this terminal

6.4 Analog input terminal block P5

Function	Name	Clarification	Setting range	Default	Particular
P5.0	AI1 type	[0] Prohibition [1]0 to +10V [2] -10 to +10V [3] 0-20mA	0 to 3	1	
P5.1	AI1 Filter Time	Set the filter time corresponding to the analog terminal AI1 analog. Use when the set value fluctuates greatly due to interference from the surrounding environment. Setting the filter time to a larger value will reduce the setting up and down but the response will be slower.	0.0 to 1000.0 [ms]	0.0 [ms]	
P5.2	AI1 voltage bias	Setting the AI1 voltage bias	-10.00 to 10.00 [V]	0.000 [V]	See 7.3 for details
P5.3	AI1 current bias	Setting the AI1 current bias	-20.00 to 20.00 [mA]	0.000 [mA]	See 7.3 for details
P5.4	AI1 minimum voltage	Setting AI1 minimum voltage	-10.00 to 10.00 [V]	0.000 [V]	See 7.3 for details
P5.5	AI1 Minimum current	Setting AI1 minimum current	0.00 to 20.00 [mA]	0.000 [mA]	See 7.3 for details
P5.6	AI1 Minimum given value	Setting the minimum given value of AI1	-300.0 to 300.0 [%]	0.0 [%]	See 7.3 for details

P5.7	AI1 Maximum Voltage	Setting the maximum voltage of AI1	-10.00 to 10.00 [V]	10.000 [V]	See 7.3 for details
P5.8	AI1 Maximum current	Setting AI1 maximum current	0.00 to 20.00 [mA]	20.000 [mA]	See 7.3 for details
P5.9	AI1 Maximum given value	Setting the maximum given value of AI1	-300.0 to 300.0 [%]	100.0 [%]	See 7.3 for details
P5.18	AI2 type	[0] Prohibition [1]0 to +10V [2] -10 to +10V [3] 0-20mA	0 to 3	3	
P5.19	AI2 Filter Time	Set the filter time corresponding to the analog terminal AI2 analog. Use when the set value fluctuates greatly due to interference from the surrounding environment. Setting a larger value for the filtering time reduces the fluctuation up and down of the set value, but the response will be slower.	0.0 to 1000.0 [ms]	0.0 [ms]	
P5.20	AI2 voltage bias	Setting the AI2 voltage bias	-10.00 to 10.00 [V]	0.000 [V]	
P5.21	AI2 current bias	Setting the AI2 current bias	-20.00 to 20.00 [mA]	0.000 [mA]	
P5.22	AI2 Minimum Voltage	Setting AI2 minimum voltage	-10.00 to 10.00 [V]	0.000 [V]	
P5.23	AI2 Minimum Current	Setting AI2 minimum current	0.00 to 20.00 [mA]	0.000 [mA]	

P5.24	AI2 Minimum given value	Setting the AI2 minimum given value	-300.0 to 300.0 [%]	0.0 [%]	
P5.25	AI2 Maximum Voltage	Setting AI2 maximum voltage	-10.00 to 10.00 [V]	10.000 [V]	
P5.26	AI2 Maximum Current	Setting AI2 maximum current	0.00 to 20.00 [mA]	20.000 [mA]	
P5.27	AI2 Maximum given value	Setting the maximum given value of AI2	-300.0 to 300.0 [%]	100.0 [%]	

6.5 Analog output terminal block P6

Function code	Name	Clarification	Setting range	Default value	Particular
P6.0	AO1 output setting	See Table 7-1	0 to 14	2	
P6.2	AO1 Output Min.	Setting AO1 output minimum value	-300.0 to 300.0 [%]	0.0 [%]	See 7.4 for details
P6.3	AO1 output max.	Setting the maximum value of AO1 output	-300.0 to 300.0 [%]	100.0 [%]	See 7.4 for details
P6.4	AO1 Minimum Output [mA, V]	Setting AO1 minimum output	0.0 to 100.0 [%]	0.0 [%]	See 7.4 for details
P6.5	AO1 maximum output [mA, V]	Setting the maximum output of AO1	0.0 to 100.0 [%]	100.0 [%]	See 7.4 for details
P6.6	AO1 deviation value	Setting the AO1 deviation value	-100.00 to 100.00 [%]	0.00 [%]	

P6.7	A01 fixed output	Setting A01 fixed output (this setting is valid when P6.0 is set to [13])	0.0 to 100.0 [%]	0.0 [%]	
P6.8	A01 filter time	Set the filter time corresponding to the analog terminal A01 analog. Use when the output value fluctuates greatly due to interference from the surrounding environment. Setting the filter time to a larger value reduces the up and down fluctuation of the output value but slows down the response.	0.0 to 1000.0 [ms]	10.0 [ms]	
P6.14	A02 output setting	See Table 7-1	0 to 14	4	
P6.16	A02 Output Min.	Setting the A02 output minimum	-300.0 to 300.0 [%]	0.0 [%]	
P6.17	A02 output max.	Setting the A02 output maximum value	-300.0 to 300.0 [%]	100.0 [%]	
P6.18	A02 Minimum Output [mA, V]	Setting the A02 Minimum Output	0.0 to 100.0 [%]	0.0 [%]	
P6.19	A02 Maximum Output [mA, V]	Setting the A02 maximum output	0.0 to 100.0 [%]	100.0 [%]	
P6.20	A02 deviation value	Setting the A02 deviation value	-100.00 to 100.00 [%]	0.00 [%]	

P6.21	AO2 fixed output	Setting the AO2 fixed output (This setting is valid when P6.14 is set to [13].)	0.0 to 100.0 [%]	0.0 [%]	
P6.22	AO2 filter time	Set the filter time corresponding to the analog terminal AO1 analog. Use when the output value fluctuates greatly due to interference from the surrounding environment. Setting the filter time to a larger value reduces the up and down fluctuation of the output value but slows down the response.	0.0 to 1000.0 [ms]	10.0 [ms]	

Table 7-1 Analog Output Description

Setpoint	Name	Show
0	Unsigned output frequency	Unsigned VFD output frequency
1	Signed Output Frequency	Signed VFD output frequency
2	Unsigned motor speed	Unsigned motor speed
3	Symbolized motor speed	Symbolized motor speed
4	Output Current	Output Current
5	Unsigned motor torque	Unsigned motor torque
6	Signed motor torque	Signed motor torque
7	Motor Load	Motor Load
8	Busbar voltage (%)	Bus voltage (percentage output)
9	output power	output power

10	output voltage	output voltage
11	VFD temperature (%)	VFD temperature (percentage output for a maximum temperature of 150° C)
12	DP communication setting	Profibus setting
13	parameterization	Output with parameter P6.7 or P6.21 set value
14	local setting	Set value on the host computer software to output

6.6 Protection parameter group P7

Function code	Name	Clarification	Setting range	Default value	Particular
P7.0	Current limit value [motor 1]	Setting the motor 1 current limit value	0.0 to 300.0 [%]	180.0 [%]	See 7.5 for details
P7.1	Current limit value [motor 2]	Setting the motor 2 current limit value	0.0 to 300.0 [%]	180.0 [%]	See 7.5 for details
P7.2	Current limit value [motor 3]	Setting the motor 3 current limit value	0.0 to 300.0 [%]	180.0 [%]	See 7.5 for details
P7.3	Current limit value [motor 4]	Setting the motor 4 current limit value	0.0 to 300.0 [%]	180.0 [%]	See 7.5 for details
P7.4	Overcurrent protection [motor 1]	Setting the motor 1 overcurrent protection value	0.0 to 300.0 [%]	235.0 [%]	See 7.5 for details
P7.5	Overcurrent protection [motor 2]	Setting the motor 2 overcurrent protection value	0.0 to 300.0 [%]	235.0 [%]	See 7.5 for details
P7.6	Overcurrent protection [motor 3]	Setting the motor 3 overcurrent protection value	0.0 to 300.0 [%]	235.0 [%]	See 7.5 for details
P7.7	Overcurrent protection [motor 4]	Setting the motor 4 overcurrent protection value	0.0 to 300.0 [%]	235.0 [%]	See 7.5 for details

P7.8	Zero sequence current overcurrent [motor 1]	Setting motor 1 zero sequence current overcurrent	0.0 to 100.0 [%]	20.0 [%]	See 7.5 for details
P7.9	Zero sequence current overcurrent [motor 2]	Setting motor 2 zero sequence current overcurrent	0.0 to 100.0 [%]	20.0 [%]	See 7.5 for details
P7.10	Zero sequence current overcurrent [motor 3]	Setting motor 3 zero sequence current overcurrent	0.0 to 100.0 [%]	20.0 [%]	See 7.5 for details
P7.11	Zero sequence current overcurrent [motor 4]	Setting motor 4 zero sequence current overcurrent	0.0 to 100.0 [%]	20.0 [%]	See 7.5 for details
P7.12	Busbar overvoltage	Setting the bus overvoltage value	600 to 820 [V]	800 [V]	See 7.5 for details
P7.13	Busbar undervoltage	Setting the bus undervoltage value	300-500 [V]	350 [V]	See 7.5 for details
P7.14	overtemperature fault	Setting the over-temperature fault value	60.0 to 100.0 [° C]	87.5 [° C]	See 7.5 for details
P7.15	Over Temperature Alarm	Setting the over-temperature alarm value	50.0 to 100.0 [° C]	80.0 [° C]	See 7.5 for details
P7.19	Overspeed fault [motor 1]	Setting the motor 1 overspeed fault value	100.0 to 720.0 [%]	120.0 [%]	See 7.5 for details
P7.20	Overspeed fault [motor 2]	Setting the motor 2 overspeed fault value	100.0 to 720.0 [%]	120.0 [%]	See 7.5 for details
P7.21	Overspeed fault [motor 3]	Setting the motor 3 overspeed fault value	100.0 to 720.0 [%]	120.0 [%]	See 7.5 for details
P7.22	Overspeed fault [motor 4]	Setting the motor 4 overspeed fault value	100.0 to 720.0 [%]	120.0 [%]	See 7.5 for details
P7.23	Open-loop vector protection 1 time M1	Setting the motor 1 open-loop vector protection time	0.00 to 3.00 [s]	0.50 [s]	See 7.5 for details

P7.24	Open-loop vector protection 1 time M2	Setting the motor 2 open-loop vector protection time	0.00 to 3.00 [s]	0.50 [s]	See 7.5 for details
P7.25	Open-loop vector protection 1 time M3	Setting the motor 3 open-loop vector protection time	0.00 to 3.00 [s]	0.50 [s]	See 7.5 for details
P7.26	Open-loop vector protection 1 time M4	Setting the motor 4 open-loop vector protection time	0.00 to 3.00 [s]	0.50 [s]	See 7.5 for details
P7.27	Motor 1 blocking detection time	Setting the motor 1 blocking protection detection time	0.00 to 3.00 [s]	2.00 [s]	
P7.28	Motor 2 blocking detection time	Setting the motor 2 blocking protection detection time	0.00 to 3.00 [s]	2.00 [s]	
P7.29	Motor 3 blocking detection time	Setting the motor 3 blocking protection detection time	0.00 to 3.00 [s]	2.00 [s]	
P7.30	Motor 4 blocking detection time	Setting the motor 4 blocking protection detection time	0.00 to 3.00 [s]	2.00 [s]	
P7.31	Speed anomaly range	Setting the abnormal speed protection percentage value	0.0 to 100.0 [%]	25.0 [%]	
P7.32	Speed anomaly detection time	Setting the abnormal speed protection detection time	0.00 to 5.00 [s]	1 [s]	
P7.33	self-tuning failure time	Setting the self-tuning failure detection time	0.0 to 1000.0 [s]	360.0 [s]	
P7.34	Over-torque enable after gate opening	[0] Prohibition [1] Enable	0 to 1	0	
P7.47	continuous current	Setting the current value that allows long time operation	0.0 to 300.0 [%]	100.0 [%]	See 7.5 for details
P7.48	Overload current1	Setting the value of overload current 1	0.0 to 300.0 [%]	150.0 [%]	See 7.5 for details
P7.49	Overload time1	Setting the permissible overload current 1 time	0.00 to 60.00 [s]	60.00 [s]	See 7.5 for details

P7.50	Overload current2	Setting the value of overload current 2	0.0 to 300.0 [%]	200.0 [%]	See 7.5 for details
P7.51	Overload time2	Setting the permissible overload current 2 time	0.00 to 5.00 [s]	5.00 [s]	See 7.5 for details
P7.55	Input phase loss protection enable	[0] Prohibition [1] Enable	0 to 1	0	
P7.56	Input phase loss preset		0.0 to 200.0 [%]	120.0 [%]	
P7.57	Input phase failure detection time		0.0 to 12.0 [s]	5 [s]	
P7.59	Output out-of-phase protection enable	[0] Prohibition [1] Enable	0 to 1	1	
P7.60	Output out-of-phase detection time		0.10 to 3.00 [s]	0.30 [s]	
P7.64	braking mode	[0] Prohibition [1] Enable	0 to 1	0	See 7.5 for details
P7.65	Brake Start Deviation Voltage	Setting the brake start voltage deviation value	-25 to 150 [V]	50 [V]	See 7.5 for details
P7.66	Brake operating deviation voltage	Setting the brake turn-on holding voltage deviation value	-25 to 150 [V]	100 [V]	See 7.5 for details
P7.69	Overvoltage Suppression Enable	[0] Prohibition [1] Enable	0 to 1	0	See 7.5 for details
P7.70	Overvoltage suppression deviation value	Setting overvoltage suppression value deviation	-25 to 150 [V]	100 [V]	See 7.5 for details
P7.71	Overvoltage inhibit 1 enable	[0] Prohibition [1] Enable	0 to 1	0	See 7.5 for details
P7.73	Undervoltage Limit Enable	[0] Prohibition [1] Enable	0 to 1	0	
P7.74	Undervoltage limit value		300-500 [V]	460 [V]	

P7.75	Undervoltage Controller Gain		0.0 to 1000.0 [%]	100.0 [%]	
P7.76	Undervoltage recovery time		0.00 to 300.00 [s]	1.00 [s]	
P7.77	Undervoltage dropout value		0.0 to 200.0 [%]	15.0 [%]	
P7.94	Pre-Charge Action Options	[0] Operation control [1] Bus voltage control	0 to 1	1	
P7.95	Pre-charge failure time	Setting the pre-charge failure time in AFE control mode	0.0 to 3000.0 [s]	15.0 [s]	
P7.96	Pre-charge shutdown delay	Thyristor Off Delay	0.00 to 300.00 [s]	0.00 [s]	

6.7 Motor 1 start/stop control group P8

Function code	Name	Instructions	Setting range	Default value	Explanation
P8.0	Startup Source Selection	[0] Digital input terminal [1] Operation panel [2] DP communication [3] MODBUS [4] Free function module	0 to 4	0	
P8.3	Parking	[0] Ramp parking [1] Free parking	0 to 1	0	See 7.6 for details
P8.4	Startup source 2 selection	[0] Digital input terminal [1] Operation panel [2] DP communication [3] MODBUS [4] Free function module	0 to 4	0	
P8.6	runtime delay	Setting the runtime delay time	0.00 to 300.00 [s]	0.00 [s]	See 7.6 for details

P8.7	Torque holding after zero speed	Holding time of zero speed state when stopping	0.00 to 300.00 [s]	0.00 [s]	See 7.6 for details
P8.10	Velocity feed source	[0] I/O terminal [1] Analog input 1 [2] Analog Input 2 [3] Operation panel [4] DP communication [5] MODBUS [6] Free function module	0 to 6	0	
P8.12	Velocity feed source 2	[0] I/O terminal [1] Analog input 1 [2] Analog Input 2 [3] Operation panel [4] DP communication [5] MODBUS [6] Free function module	0 to 6	0	
P8.15	Acceleration zone 1	Setting the first accelerated gradient pattern	0.0 to 300.0 [%]	100.0 [%]	See 7.6 for details
P8.16	Acceleration time 1	Acceleration time from the stop state to the set value of P8.15	0.0 to 300.0 [s]	3.00 [s]	See 7.6 for details
P8.17	Acceleration zone 2	Setting the second acceleration gradient mode	0.0 to 300.0 [%]	200.0 [%]	See 7.6 for details
P8.18	Acceleration time 2	Acceleration time from P8.15 set value to P8.17 set value	0.0 to 300.0 [s]	4.00 [s]	See 7.6 for details
P8.19	Acceleration zone 3	Setting the third acceleration gradient mode	0.0 to 300.0 [%]	240.0 [%]	See 7.6 for details
P8.20	Acceleration time 3	Acceleration time from P8.17 set value to P8.19 set value	0.0 to 300.0 [s]	7.00 [s]	See 7.6 for details
P8.21	Acceleration zone 4	Setting the fourth acceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details

P8.22	Acceleration time 4	Acceleration time from P8.19 set value to P8.21 set value	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P8.23	Acceleration zone 5	Setting the fifth acceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details
P8.24	Acceleration time 5	Acceleration time from P8.21 set value to P8.23 set value	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P8.25	Acceleration zone 6	Setting the sixth acceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details
P8.26	Acceleration time 6	Acceleration time from P8.23 set value to P8.25 set value	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P8.27	Acceleration zone 7	Setting the seventh acceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details
P8.28	Acceleration time 7	Acceleration time from P8.25 set value to P8.27 set value	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P8.29	Acceleration zone 8	Setting the eighth acceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details
P8.30	Acceleration time 8	Acceleration time from set value P8.27 to set value P8.29	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P8.32	Deceleration time control source	[0] Disable [1] PROFIBUS [2] MODBUS [3] Local Settings	0 to 3	0	See 7.6 for details
P8.33	Deceleration Time Multiplier		0.1 to 10.0	1.0	See 7.6 for details
P8.34	Deceleration zone 1	Setting the first deceleration gradient pattern	0.0 to 300.0 [%]	100.0 [%]	See 7.6 for details
P8.35	Deceleration time 1	Deceleration time from P8.34 set value to stop	0.0 to 300.0 [s]	3.00 [s]	See 7.6 for details

P8.36	Deceleration zone 2	Setting the second deceleration gradient mode	0.0 to 300.0 [%]	200.0 [%]	See 7.6 for details
P8.37	Deceleration time 2	Deceleration time from P8.34 set value to P8.36 set value	0.0 to 300.0 [s]	4.00 [s]	See 7.6 for details
P8.38	Deceleration zone 3	Setting the third deceleration gradient mode	0.0 to 300.0 [%]	240.0 [%]	See 7.6 for details
P8.39	Deceleration time 3	Deceleration time from P8.36 set value to P8.38 set value	0.0 to 300.0 [s]	7.00 [s]	See 7.6 for details
P8.40	Deceleration zone 4	Setting the fourth deceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details
P8.41	Deceleration time4	Deceleration time from set value P8.38 to set value P8.40	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P8.42	Deceleration zone 5	Setting the fifth deceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details
P8.43	Deceleration time 5	Deceleration time from set value P8.40 to set value P8.42	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P8.44	Deceleration zone 6	Setting the sixth deceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details
P8.45	Deceleration time 6	Deceleration time from P8.42 set value to P8.44 set value	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P8.46	Deceleration zone 7	Setting the seventh deceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details
P8.47	Deceleration time 7	Deceleration time from set value P8.44 to set value P8.46	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P8.48	Deceleration zone 8	Setting the eighth deceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details
P8.49	Deceleration time 8	Deceleration time from set value P8.46 to set value P8.48	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details

P8.53	Linearization of backshift to deceleration	[0] Prohibition [1] Enable	0 to 1	0	See 7.6 for details
P8.54	Free-running start speed		0.0 to 300.0 [%]	0.0 [%]	See 7.6 for details
P8.55	Variable direction deceleration enable	[0] Prohibition [1] Enable	0 to 1	0	See 7.6 for details
P8.56	Vertical deceleration time		0.00 to 300.00 [s]	1.50 [s]	See 7.6 for details
P8.57	Emergency stop method	[0] Ramp parking [1] Free parking	0 to 1	1	
P8.58	Emergency stop deceleration time		0.00 to 300.00 [s]	1.50 [s]	
P8.62	Emergency Deceleration Time Ratio		0 to 1	0.5	

6.8 Motor 2 start/stop control group P9

Function code	Name	Instructions	Setting range	Default value	Particular
P9.0	Startup Source Selection	[0] Digital input terminal [1] Operation panel [2] DP communication [3] MODBUS [4] Free function module	0 to 4	0	
P9.3	Parking	[0] Ramp parking [1] Free parking	0 to 1	0	See 7.6 for details

P9.4	Startup source 2 selection	[0] Digital input terminal [1] Operation panel [2] DP communication [3] MODBUS [4] Free function module	0 to 4	0	
P9.6	runtime delay	Setting the runtime delay time	0.00 to 300.00 [s]	0.00 [s]	See 7.6 for details
P9.7	Torque holding after zero speed	Holding time of zero speed state at stop	0.00 to 300.00 [s]	0.00 [s]	See 7.6 for details
P9.10	Velocity feed source	[0] I/O terminal [1] Analog input 1 [2] Analog Input 2 [3] Operation panel [4] DP communication [5] MODBUS [6] Free function module	0 to 6	0	
P9.12	Velocity feed source 2	[0] I/O terminal [1] Analog input 1 [2] Analog Input 2 [3] Operation panel [4] DP communication [5] MODBUS [6] Free function module	0 to 6	0	
P9.15	Acceleration zone 1	Setting the first accelerated gradient pattern	0.0 to 300.0 [%]	100.0 [%]	See 7.6 for details
P9.16	Acceleration time 1	Acceleration time from the stop state to the set value of P8.15	0.0 to 300.0 [s]	3.00 [s]	See 7.6 for details
P9.17	Acceleration zone 2	Setting the second acceleration gradient mode	0.0 to 300.0 [%]	200.0 [%]	See 7.6 for details

P9.18	Acceleration time 2	Acceleration time from P8.15 set value to P8.17 set value	0.0 to 300.0 [s]	4.00 [s]	See 7.6 for details
P9.19	Acceleration zone 3	Setting the third acceleration gradient mode	0.0 to 300.0 [%]	240.0 [%]	See 7.6 for details
P9.20	Acceleration time 3	Acceleration time from P8.17 set value to P8.19 set value	0.0 to 300.0 [s]	7.00 [s]	See 7.6 for details
P9.21	Acceleration zone 4	Setting the fourth acceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details
P9.22	Acceleration time 4	Acceleration time from P8.19 set value to P8.21 set value	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P9.23	Acceleration zone 5	Setting the fifth acceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details
P9.24	Acceleration time 5	Acceleration time from P8.21 set value to P8.23 set value	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P9.25	Acceleration zone 6	Setting the sixth acceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details
P9.26	Acceleration time 6	Acceleration time from P8.23 set value to P8.25 set value	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P9.27	Acceleration zone 7	Setting the seventh acceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details
P9.28	Acceleration time 7	Acceleration time from P8.25 set value to P8.27 set value	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details

P9.29	Acceleration zone 8	Setting the eighth acceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details
P9.30	Acceleration time 8	Acceleration time from set value P8.27 to set value P8.29	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P9.32	Deceleration time control source	[0] Disable [1] PROFIBUS [2] MODBUS [3] Local Settings	0 to 3	0	See 7.6 for details
P9.33	Deceleration Time Multiplier		0.1 to 10.0	1.0	See 7.6 for details
P9.34	Deceleration zone 1	Setting the first deceleration gradient pattern	0.0 to 300.0 [%]	100.0 [%]	See 7.6 for details
P9.35	Deceleration time 1	Deceleration time from P8.34 set value to stop	0.0 to 300.0 [s]	3.00 [s]	See 7.6 for details
P9.36	Deceleration zone 2	Setting the second deceleration gradient mode	0.0 to 300.0 [%]	200.0 [%]	See 7.6 for details
P9.37	Deceleration time 2	Deceleration time from P8.34 set value to P8.36 set value	0.0 to 300.0 [s]	4.00 [s]	See 7.6 for details
P9.38	Deceleration zone 3	Setting the third deceleration gradient mode	0.0 to 300.0 [%]	240.0 [%]	See 7.6 for details
P9.39	Deceleration time 3	Deceleration time from P8.36 set value to P8.38 set value	0.0 to 300.0 [s]	7.00 [s]	See 7.6 for details
P9.40	Deceleration zone 4	Setting the fourth deceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details

P9.41	Deceleration time4	Deceleration time from set value P8.38 to set value P8.40	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P9.42	Deceleration zone 5	Setting the fifth deceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details
P9.43	Deceleration time 5	Deceleration time from set value P8.40 to set value P8.42	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P9.44	Deceleration zone 6	Setting the sixth deceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details
P9.45	Deceleration time 6	Deceleration time from P8.42 set value to P8.44 set value	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P9.46	Deceleration zone 7	Setting the seventh deceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details
P9.47	Deceleration time 7	Deceleration time from set value P8.44 to set value P8.46	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P9.48	Deceleration zone 8	Setting the eighth deceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details
P9.49	Deceleration time 8	Deceleration time from set value P8.46 to set value P8.48	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P9.53	Linearization of backshift to deceleration	[0] Prohibition [1] Enable	0 to 1	0	See 7.6 for details
P9.54	Free-running start speed		0.0 to 300.0 [%]	0.0 [%]	See 7.6 for details

P9.55	Change direction deceleration enable	[0] Prohibition [1] Enable	0 to 1	0	See 7.6 for details
P9.56	Change of direction deceleration time		0.00 to 300.00 [s]	1.50 [s]	See 7.6 for details
P9.57	Emergency stop method	[0] Ramp parking [1] Free parking	0 to 1	1	
P9.58	Emergency stop deceleration time		0.00 to 300.00 [s]	1.50 [s]	
P9.62	Emergency Deceleration Time Ratio		0 to 1	0.5	

6.9 Motor 3 start/stop control group P10

function	Name	clarification	Setting	default	particular
P10.0	Startup Source Selection	[0] Digital input terminal [1] Operation panel [2] DP communication [3] MODBUS [4] Free function module	0 to 4	0	
P10.3	Parking	[0] Ramp parking [1] Free parking	0 to 1	0	See 7.6 for details
P10.4	Startup source 2 selection	[0] Digital input terminal [1] Operation panel [2] DP communication [3] MODBUS [4] Free function module	0 to 4	0	

P10.6	runtime delay	Setting the runtime delay time	0.00 to 300.00 [s]	0.00 [s]	See 7.6 for details
P10.7	Torque holding after zero speed	Holding time of zero speed state when stopping	0.00 to 300.00 [s]	0.00 [s]	See 7.6 for details
P10.10	Velocity feed source	[0] I/O terminal [1] Analog input 1 [2] Analog Input 2 [3] Operation panel [4] DP communication [5] MODBUS [6] Free function module	0 to 6	0	
P10.12	Velocity feed source 2	[0] I/O terminal [1] Analog input 1 [2] Analog Input 2 [3] Operation panel [4] DP communication [5] MODBUS [6] Free function module	0 to 6	0	
P10.15	Acceleration zone 1	Setting the first accelerated gradient pattern	0.0 to 300.0 [%]	100.0 [%]	See 7.6 for details
P10.16	Acceleration time 1	Acceleration time from the stop state to the set value of P8.15	0.0 to 300.0 [s]	3.00 [s]	See 7.6 for details
P10.17	Acceleration zone 2	Setting the second acceleration gradient mode	0.0 to 300.0 [%]	200.0 [%]	See 7.6 for details
P10.18	Acceleration time 2	Acceleration time from P8.15 set value to P8.17 set value	0.0 to 300.0 [s]	4.00 [s]	See 7.6 for details
P10.19	Acceleration zone 3	Setting the third acceleration gradient mode	0.0 to 300.0 [%]	240.0 [%]	See 7.6 for details

P10.20	Acceleration time 3	Acceleration time from P8.17 set value to P8.19 set value	0.0 to 300.0 [s]	7.00 [s]	See 7.6 for details
P10.21	Acceleration zone 4	Setting the fourth acceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details
P10.22	Acceleration time 4	Acceleration time from P8.19 set value to P8.21 set value	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P10.23	Acceleration zone 5	Setting the fifth acceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details
P10.24	Acceleration time 5	Acceleration time from P8.21 set value to P8.23 set value	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P10.25	Acceleration zone 6	Setting the sixth acceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details
P10.26	Acceleration time 6	Acceleration time from P8.23 set value to P8.25 set value	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P10.27	Acceleration zone 7	Setting the seventh acceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details
P10.28	Acceleration time 7	Acceleration time from P8.25 set value to P8.27 set value	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P10.29	Acceleration zone 8	Setting the eighth acceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details
P10.30	Acceleration time 8	Acceleration time from set value P8.27 to set value P8.29	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details

P10.32	Deceleration time control source	[0] Disable [1] PROFIBUS [2] MODBUS [3] Local Settings	0 to 3	0	See 7.6 for details
P10.33	Deceleration Time Multiplier		0.1 to 10.0	1.0	See 7.6 for details
P10.34	Deceleration zone 1	Setting the first deceleration gradient pattern	0.0 to 300.0 [%]	100.0 [%]	See 7.6 for details
P8.35	Deceleration time 1	Deceleration time from P8.34 set value to stop	0.0 to 300.0 [s]	3.00 [s]	See 7.6 for details
P10.36	Deceleration zone 2	Setting the second deceleration gradient mode	0.0 to 300.0 [%]	200.0 [%]	See 7.6 for details
P10.37	Deceleration time 2	Deceleration time from P8.34 set value to P8.36 set value	0.0 to 300.0 [s]	4.00 [s]	See 7.6 for details
P10.38	Deceleration zone 3	Setting the third deceleration gradient mode	0.0 to 300.0 [%]	240.0 [%]	See 7.6 for details
P10.39	Deceleration time 3	Deceleration time from P8.36 set value to P8.38 set value	0.0 to 300.0 [s]	7.00 [s]	See 7.6 for details
P10.40	Deceleration zone 4	Setting the fourth deceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details
P10.41	Deceleration time 4	Deceleration time from set value P8.38 to set value P8.40	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P10.42	Deceleration zone 5	Setting the fifth deceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details

P10.43	Deceleration time 5	Deceleration time from set value P8.40 to set value P8.42	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P10.44	Deceleration zone 6	Setting the sixth deceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details
P10.45	Deceleration time 6	Deceleration time from P8.42 set value to P8.44 set value	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P10.46	Deceleration zone 7	Setting the seventh deceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details
P10.47	Deceleration time 7	Deceleration time from set value P8.44 to set value P8.46	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P10.48	Deceleration zone 8	Setting the eighth deceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details
P10.49	Deceleration time 8	Deceleration time from set value P8.46 to set value P8.48	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P10.53	Linearization of backshift to deceleration	[0] Prohibition [1] Enable	0 to 1	0	See 7.6 for details
P10.54	Free-running start speed		0.0 to 300.0 [%]	0.0 [%]	See 7.6 for details
P10.55	Variable direction deceleration enable	[0] Prohibition [1] Enable	0 to 1	0	See 7.6 for details
P10.56	Vertical deceleration time		0.00 to 300.00 [s]	1.50 [s]	See 7.6 for details

P10.57	Emergency stop method	[0] Ramp parking [1] Free parking	0 to 1	1	
P10.58	Emergency stop deceleration time		0.00 to 300.00 [s]	1.50 [s]	
P10.62	Emergency Deceleration Time Ratio		0 to 1	0.5	

6.10 Motor 4 start/stop control group P11

Function code	Name	Clarification	Setting range	Default value	Particular
P11.0	Startup Source Selection	[0] Digital input terminal [1] Operation panel [2] DP communication [3] MODBUS [4] Free function module	0 to 4	0	
P11.3	Parking	[0] Ramp parking [1] Free parking	0 to 1	0	See 7.6 for details
P11.4	Startup source 2 selection	[0] Digital input terminal [1] Operation panel [2] DP communication [3] MODBUS [4] Free function module	0 to 4	0	
P11.6	runtime delay	Setting the runtime delay time	0.00 to 300.00 [s]	0.00 [s]	See 7.6 for details
P11.7	Torque holding after zero speed	Holding time of zero speed state at stop	0.00 to 300.00 [s]	0.00 [s]	See 7.6 for details

P11.10	Velocity feed source	[0] I/O terminal [1] Analog input 1 [2] Analog Input 2 [3] Operation panel [4] DP communication [5] MODBUS [6] Free function module	0 to 6	0	
P11.12	Velocity feed source 2	[0] I/O terminal [1] Analog input 1 [2] Analog Input 2 [3] Operation panel [4] DP communication [5] MODBUS [6] Free function module	0 to 6	0	
P11.15	Acceleration zone 1	Setting the first accelerated gradient pattern	0.0 to 300.0 [%]	100.0 [%]	See 7.6 for details
P11.16	Acceleration time 1	Acceleration time from the stop state to the set value of P8.15	0.0 to 300.0 [s]	3.00 [s]	See 7.6 for details
P11.17	Acceleration zone 2	Setting the second acceleration gradient mode	0.0 to 300.0 [%]	200.0 [%]	See 7.6 for details
P11.18	Acceleration time 2	Acceleration time from P8.15 set value to P8.17 set value	0.0 to 300.0 [s]	4.00 [s]	See 7.6 for details
P11.19	Acceleration zone 3	Setting the third acceleration gradient mode	0.0 to 300.0 [%]	240.0 [%]	See 7.6 for details
P11.20	Acceleration time 3	Acceleration time from P8.17 set value to P8.19 set value	0.0 to 300.0 [s]	7.00 [s]	See 7.6 for details
P11.21	Acceleration zone 4	Setting the fourth acceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details

P11.22	Acceleration time 4	Acceleration time from P8.19 set value to P8.21 set value	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P11.23	Acceleration zone 5	Setting the fifth acceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details
P11.24	Acceleration time 5	Acceleration time from P8.21 set value to P8.23 set value	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P11.25	Acceleration zone 6	Setting the sixth acceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details
P11.26	Acceleration time 6	Acceleration time from P8.23 set value to P8.25 set value	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P11.27	Acceleration zone 7	Setting the seventh acceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details
P11.28	Acceleration time 7	Acceleration time from P8.25 set value to P8.27 set value	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P11.29	Acceleration zone 8	Setting the eighth acceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details
P11.30	Acceleration time 8	Acceleration time from set value P8.27 to set value P8.29	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P11.32	Deceleration time control source	[0] Disable [1] PROFIBUS [2] MODBUS [3] Local Settings	0 to 3	0	See 7.6 for details
P11.33	Deceleration Time Multiplier		0.1 to 10.0	1.0	See 7.6 for details

P11.34	Deceleration zone 1	Setting the first deceleration gradient pattern	0.0 to 300.0 [%]	100.0 [%]	See 7.6 for details
P11.35	Deceleration time 1	Deceleration time from P8.34 set value to stop	0.0 to 300.0 [s]	3.00 [s]	See 7.6 for details
P11.36	Deceleration zone 2	Setting the second deceleration gradient mode	0.0 to 300.0 [%]	200.0 [%]	See 7.6 for details
P11.37	Deceleration time 2	Deceleration time from P8.34 set value to P8.36 set value	0.0 to 300.0 [s]	4.00 [s]	See 7.6 for details
P11.38	Deceleration zone 3	Setting the third deceleration gradient mode	0.0 to 300.0 [%]	240.0 [%]	See 7.6 for details
P11.39	Deceleration time 3	Deceleration time from P8.36 set value to P8.38 set value	0.0 to 300.0 [s]	7.00 [s]	See 7.6 for details
P11.40	Deceleration zone 4	Setting the fourth deceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details
P11.41	Deceleration time 4	Deceleration time from set value P8.38 to set value P8.40	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P11.42	Deceleration zone 5	Setting the fifth deceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details
P11.43	Deceleration time 5	Deceleration time from set value P8.40 to set value P8.42	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P11.44	Deceleration zone 6	Setting the sixth deceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details

P11.45	Deceleration time 6	Deceleration time from P8.42 set value to P8.44 set value	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P11.46	Deceleration zone 7	Setting the seventh deceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details
P11.47	Deceleration time 7	Deceleration time from P8.44 set value to P8.46 set value	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P11.48	Deceleration zone 8	Setting the eighth deceleration gradient mode	0.0 to 300.0 [%]	300.0 [%]	See 7.6 for details
P11.49	Deceleration time 8	Deceleration time from set value P8.46 to set value P8.48	0.0 to 300.0 [s]	10.00 [s]	See 7.6 for details
P11.53	Linearization of backshift to deceleration	[0] Prohibition [1] Enable	0 to 1	0	See 7.6 for details
P11.54	Free-running start speed		0.0 to 300.0 [%]	0.0 [%]	See 7.6 for details
P11.55	Change direction deceleration enable	[0] Prohibition [1] Enable	0 to 1	0	See 7.6 for details
P11.56	Vertical deceleration time		0.00 to 300.00 [s]	1.50 [s]	See 7.6 for details
P11.57	Emergency stop method	[0] Ramp parking [1] Free parking	0 to 1	1	
P11.58	Emergency stop deceleration time		0.00 to 300.00 [s]	1.50 [s]	

P11.62	Emergency Deceleration Time Ratio		0 to 1	0.5	

6.11 Motor 1-stage speed brake group P12

Function code	Name	Instructions	Setting range	Default value	Explanation
P12.0	Multi-speed mode selection	[0] Direct Input [1] Binary	0 to 1	1	See 7.7 for details
P12.1	Multi-band speed unit selection	[0][%] [1][Hz] [2][rpm]	0 to 2	1	
P12.2	Multi-speed 1		0.0 to 3000.0	10.0	
P12.3	Multi-speed 2		0.0 to 3000.0	20.0	
P12.4	Multi-speed 3		0.0 to 3000.0	35.0	
P12.5	Multi-speed 4		0.0 to 3000.0	50.0	
P12.6	Multi-speed 5		0.0 to 3000.0	50.0	
P12.7	Multi-speed 6		0.0 to 3000.0	50.0	
P12.8	Multi-Speed 7		0.0 to 3000.0	50.0	
P12.9	Multi-Segment Speed 8		0.0 to 3000.0	50.0	
P12.10	Multi-speed 9		0.0 to 3000.0	50.0	
P12.11	Multi-speed 10		0.0 to 3000.0	50.0	
P12.12	Multi-speed 11		0.0 to 3000.0	50.0	

P12.13	Multi-speed 12		0.0 to 3000.0	50.0	
P12.14	Multi-speed 13		0.0 to 3000.0	50.0	
P12.15	Multi-speed 14		0.0 to 3000.0	50.0	
P12.16	Multi-speed 15		0.0 to 3000.0	50.0	
P12.17	Multi-speed 16		0.0 to 3000.0	50.0	
P12.21	Startup enable after current disappears	For some special motors with large residual magnetism, the current has to disappear before starting again each time the motor is started or reversed.	0 to 1	0	
P12.22	Open gate forward speed value	Setting the open gate forward speed value	0.0 to 20.0 [%]	2.0 [%]	See 7.7 for details
P12.23	Open gate reverse speed value	Setting the open gate reverse speed value	0.0 to 20.0 [%]	0.0 [%]	See 7.7 for details
P12.24	Open gate positive torque	Setting the positive opening torque	0.0 to 200.0 [%]	30.0 [%]	See 7.7 for details
P12.25	Open gate reverse torque	Setting the opening reverse torque	0.0 to 200.0 [%]	20.0 [%]	See 7.7 for details
P12.26	Positive gate opening delay	Setting the forward gate opening delay time	0.00 to 2.00 [s]	0.00 [s]	See 7.7 for details
P12.27	Reverse gate opening delay	Setting the reverse gate opening delay time	0.00 to 2.00 [s]	0.00 [s]	See 7.7 for details
P12.28	Positive gate opening control delay	Setting the positive gate opening time	0.00 to 2.00 [s]	0.07 [s]	See 7.7 for details
P12.29	Reverse gate opening control delay	Setting the reverse gate opening time	0.00 to 2.00 [s]	0.07 [s]	See 7.7 for details

P12.30	Open gate limit @ given reverse	For some special motors with large residual magnetism, special control is required when controlling from forward to reverse.	0 to 1	0	
P12.31	Open Gate Limit @ Reverse Delay	For some special motors with large residual magnetism, special control is required when controlling from forward to reverse.	0 to 2	0.3	
P12.32	Forward Braking Speed	Setting the holding speed in forward direction	0.0 to 20.0 [%]	0.0 [%]	See 7.7 for details
P12.33	Reverse Braking Speed	Setting the brake speed in reverse	0.0 to 20.0 [%]	0.0 [%]	See 7.7 for details
P12.34	Positive Brake Delay Time	Setting the forward brake delay time	0.00 to 2.00 [s]	0.00 [s]	See 7.7 for details
P12.35	Reverse Brake Delay Time	Setting the delay time for the reverse holding brake	0.00 to 2.00 [s]	0.00 [s]	See 7.7 for details
P12.36	Positive holding time	Setting the forward hold time	0.00 to 2.00 [s]	0.50 [s]	See 7.7 for details
P12.37	Reverse holding time	Setting the reverse holding time	0.00 to 2.00 [s]	0.50 [s]	See 7.7 for details
P12.39	Abnormal brake rise enable	[0] Prohibition [1] Enable	0 to 1	0	Whether ascending is permitted after brake failure

6.12 Motor 2-stage speed brake set P13

Function code	Name	Show how to	Setting range	Default value	Explanation
P13.0	Multi-speed mode selection	[0] Direct Input [1] Binary	0 to 1	1	See 7.7 for details
P13.1	Multi-band speed unit selection	[0][%] [1][Hz] [2][rpm]	0 to 2	1	

P13.2	Multi-speed 1		0.0 to 3000.0	10.0	
P13.3	Multi-speed 2		0.0 to 3000.0	20.0	
P13.4	Multi-speed 3		0.0 to 3000.0	35.0	
P13.5	Multi-speed 4		0.0 to 3000.0	50.0	
P13.6	Multi-speed 5		0.0 to 3000.0	50.0	
P13.7	Multi-speed 6		0.0 to 3000.0	50.0	
P13.8	Multi-Speed 7		0.0 to 3000.0	50.0	
P13.9	Multi-Segment Speed 8		0.0 to 3000.0	50.0	
P13.10	Multi-speed 9		0.0 to 3000.0	50.0	
P13.11	Multi-speed 10		0.0 to 3000.0	50.0	
P13.12	Multi-speed 11		0.0 to 3000.0	50.0	
P13.13	Multi-speed 12		0.0 to 3000.0	50.0	
P13.14	Multi-speed 13		0.0 to 3000.0	50.0	
P13.15	Multi-speed 14		0.0 to 3000.0	50.0	
P13.16	Multi-speed 15		0.0 to 3000.0	50.0	
P13.17	Multi-speed 16		0.0 to 3000.0	50.0	
P13.21	Startup enable after current disappears	For some special motors with large residual magnetism, the current has to disappear before starting again each time the motor is started or reversed.	0 to 1	0	

P13.22	Open gate forward speed value	Setting the open gate forward speed value	0.0 to 20.0 [%]	2.0 [%]	See 7.7 for details
P13.23	Open gate reverse speed value	Setting the open gate reverse speed value	0.0 to 20.0 [%]	0.0 [%]	See 7.7 for details
P13.24	Open gate positive torque	Setting the positive opening torque	0.0 to 200.0 [%]	30.0 [%]	See 7.7 for details
P13.25	Open gate reverse torque	Setting the opening reverse torque	0.0 to 200.0 [%]	20.0 [%]	See 7.7 for details
P13.26	Positive gate opening delay	Setting the positive gate opening delay time	0.00 to 2.00 [s]	0.00 [s]	See 7.7 for details
P13.27	Reverse gate opening delay	Setting the reverse gate opening delay time	0.00 to 2.00 [s]	0.00 [s]	See 7.7 for details
P13.28	Positive gate opening control delay	Setting the positive gate opening time	0.00 to 2.00 [s]	0.07 [s]	See 7.7 for details
P13.29	Reverse gate opening control delay	Setting the reverse gate opening time	0.00 to 2.00 [s]	0.07 [s]	See 7.7 for details
P13.30	Open gate limit @ given reverse	For some special motors with large residual magnetism, special control is required when controlling from forward to reverse.	0 to 1	0	
P13.31	Open Gate Limit @ Reverse Delay	For some special motors with large residual magnetism, special control is required when controlling from forward to reverse.	0 to 2	0.3	
P13.32	Forward Braking Speed	Setting the holding speed in forward direction	0.0 to 20.0 [%]	0.0 [%]	See 7.7 for details
P13.33	Reverse Braking Speed	Setting the brake speed in reverse	0.0 to 20.0 [%]	0.0 [%]	See 7.7 for details
P13.34	Positive Brake Delay Time	Setting the forward brake delay time	0.00 to 2.00 [s]	0.00 [s]	See 7.7 for details
P12.35	Reverse Brake Delay Time	Setting the delay time for the reverse holding brake	0.00 to 2.00 [s]	0.00 [s]	See 7.7 for details

P13.36	Positive holding time	Setting the positive holding time	0.00 to 2.00 [s]	0.50 [s]	See 7.7 for details
P13.37	Reverse holding time	Setting the reverse holding time	0.00 to 2.00 [s]	0.50 [s]	See 7.7 for details
P13.39	Abnormal brake rise enable	[0] Prohibition [1] Enable	0 to 1	0	Whether ascending is permitted after brake failure

6.13 Motor 3-stage speed brake set P14

Function code	Name	Clarification	Setting range	Default value	Particular
P14.0	Multi-speed mode selection	[0] Direct Input [1] Binary	0 to 1	1	See 7.7 for details
P14.1	Multi-band speed unit selection	[0][%] [1][Hz] [2][rpm]	0 to 2	1	
P14.2	Multi-speed 1		0.0 to 3000.0	10.0	
P14.3	Multi-speed 2		0.0 to 3000.0	20.0	
P14.4	Multi-speed 3		0.0 to 3000.0	35.0	
P14.5	Multi-speed 4		0.0 to 3000.0	50.0	
P14.6	Multi-speed 5		0.0 to 3000.0	50.0	
P14.7	Multi-speed 6		0.0 to 3000.0	50.0	
P14.8	Multi-Speed 7		0.0 to 3000.0	50.0	
P14.9	Multi-Segment Speed 8		0.0 to 3000.0	50.0	
P14.10	Multi-speed 9		0.0 to 3000.0	50.0	

P14.11	Multi-speed 10		0.0 to 3000.0	50.0	
P14.12	Multi-speed 11		0.0 to 3000.0	50.0	
P14.13	Multi-speed 12		0.0 to 3000.0	50.0	
P14.14	Multi-speed 13		0.0 to 3000.0	50.0	
P14.15	Multi-speed 14		0.0 to 3000.0	50.0	
P14.16	Multi-speed 15		0.0 to 3000.0	50.0	
P14.17	Multi-speed 16		0.0 to 3000.0	50.0	
P14.21	Startup enable after current disappears	For some special motors with large residual magnetism, the current has to disappear before starting again each time the motor is started or reversed.	0 to 1	0	
P14.22	Open gate forward speed value	Setting the open gate forward speed value	0.0 to 20.0 [%]	2.0 [%]	See 7.7 for details
P14.23	Open gate reverse speed value	Setting the open gate reverse speed value	0.0 to 20.0 [%]	0.0 [%]	See 7.7 for details
P14.24	Open gate positive torque	Setting the positive opening torque	0.0 to 200.0 [%]	30.0 [%]	See 7.7 for details
P14.25	Open gate reverse torque	Setting the opening reverse torque	0.0 to 200.0 [%]	20.0 [%]	See 7.7 for details
P14.26	Positive gate opening delay	Setting the positive gate opening delay time	0.00 to 2.00 [s]	0.00 [s]	See 7.7 for details
P14.27	Reverse gate opening delay	Setting the reverse gate opening delay time	0.00 to 2.00 [s]	0.00 [s]	See 7.7 for details
P14.28	Positive gate opening control delay	Setting the positive gate opening time	0.00 to 2.00 [s]	0.07 [s]	See 7.7 for details

P14.29	Reverse gate opening control delay	Setting the reverse gate opening time	0.00 to 2.00 [s]	0.07 [s]	See 7.7 for details
P14.30	Open gate limit @ given reverse	For some special motors with large residual magnetism, special control is required when controlling from forward to reverse.	0 to 1	0	
P14.31	Open Gate Limit @ Reverse Delay	For some special motors with large residual magnetism, special control is required when controlling from forward to reverse.	0 to 2	0.3	
P14.32	Forward Braking Speed	Setting the holding speed in forward direction	0.0 to 20.0 [%]	0.0 [%]	See 7.7 for details
P14.33	Reverse Braking Speed	Setting the brake speed in reverse	0.0 to 20.0 [%]	0.0 [%]	See 7.7 for details
P14.34	Positive Brake Delay Time	Setting the forward brake delay time	0.00 to 2.00 [s]	0.00 [s]	See 7.7 for details
P14.35	Reverse Brake Delay Time	Setting the delay time for the reverse holding brake	0.00 to 2.00 [s]	0.00 [s]	See 7.7 for details
P14.36	Positive holding time	Setting the positive holding time	0.00 to 2.00 [s]	0.50 [s]	See 7.7 for details
P14.37	Reverse holding time	Setting the reverse holding time	0.00 to 2.00 [s]	0.50 [s]	See 7.7 for details
P14.39	Abnormal brake rise enable	[0] Prohibition [1] Enable	0 to 1	0	Whether ascending is permitted after brake failure

6.14 Motor 4-stage speed brake set P15

Function code	Name	Clarification	Setting range	Default value	Particular
P15.0	Multi-speed mode selection	[0] Direct Input [1] Binary	0 to 1	1	See 7.7 for details
P15.1	Multi-band speed unit selection	[0][%] [1][Hz] [2][rpm]	0 to 2	1	
P15.2	Multi-speed 1		0.0 to 3000.0	10.0	
P15.3	Multi-speed 2		0.0 to 3000.0	20.0	
P15.4	Multi-speed 3		0.0 to 3000.0	35.0	
P15.5	Multi-speed 4		0.0 to 3000.0	50.0	
P15.6	Multi-speed 5		0.0 to 3000.0	50.0	
P15.7	Multi-speed 6		0.0 to 3000.0	50.0	
P15.8	Multi-Speed 7		0.0 to 3000.0	50.0	
P15.9	Multi-Segment Speed 8		0.0 to 3000.0	50.0	
P15.10	Multi-speed 9		0.0 to 3000.0	50.0	
P15.11	Multi-speed 10		0.0 to 3000.0	50.0	
P15.12	Multi-speed 11		0.0 to 3000.0	50.0	
P15.13	Multi-speed 12		0.0 to 3000.0	50.0	
P15.14	Multi-speed 13		0.0 to 3000.0	50.0	

P15.15	Multi-speed 14		0.0 to 3000.0	50.0	
P15.16	Multi-speed 15		0.0 to 3000.0	50.0	
P15.17	Multi-speed 16		0.0 to 3000.0	50.0	
P15.21	Startup enable after current disappears	For some special motors with large residual magnetism, the current has to disappear before starting again each time the motor is started or reversed.	0 to 1	0	
P15.22	Open gate forward speed value	Setting the open gate forward speed value	0.0 to 20.0 [%]	2.0 [%]	See 7.7 for details
P15.23	Open gate reverse speed value	Setting the open gate reverse speed value	0.0 to 20.0 [%]	0.0 [%]	See 7.7 for details
P15.24	Open gate positive torque	Setting the positive opening torque	0.0 to 200.0 [%]	30.0 [%]	See 7.7 for details
P15.25	Open gate reverse torque	Setting the opening reverse torque	0.0 to 200.0 [%]	20.0 [%]	See 7.7 for details
P15.26	Positive gate opening delay	Setting the forward gate opening delay time	0.00 to 2.00 [s]	0.00 [s]	See 7.7 for details
P15.27	Reverse gate opening delay	Setting the reverse gate opening delay time	0.00 to 2.00 [s]	0.00 [s]	See 7.7 for details
P15.28	Positive gate opening control delay	Setting the positive gate opening time	0.00 to 2.00 [s]	0.07 [s]	See 7.7 for details
P15.29	Reverse gate opening control delay	Setting the reverse gate opening time	0.00 to 2.00 [s]	0.07 [s]	See 7.7 for details

P15.30	Open gate limit @ given reverse	For some special motors with large residual magnetism, special control is required when controlling from forward to reverse.	0 to 1	0	
P15.31	Open Gate Limit @ Reverse Delay	For some special motors with large residual magnetism, special control is required when controlling from forward to reverse.	0 to 2	0.3	
P15.32	Forward Braking Speed	Setting the holding speed in forward direction	0.0 to 20.0 [%]	0.0 [%]	See 7.7 for details
P15.33	Reverse Braking Speed	Setting the brake speed in reverse	0.0 to 20.0 [%]	0.0 [%]	See 7.7 for details
P15.34	Positive Brake Delay Time	Setting the forward brake delay time	0.00 to 2.00 [s]	0.00 [s]	See 7.7 for details
P15.35	Reverse Brake Delay Time	Setting the delay time for the reverse holding brake	0.00 to 2.00 [s]	0.00 [s]	See 7.7 for details
P15.36	Positive holding time	Setting the forward hold time	0.00 to 2.00 [s]	0.50 [s]	See 7.7 for details
P15.37	Reverse holding time	Setting the reverse holding time	0.00 to 2.00 [s]	0.50 [s]	See 7.7 for details
P15.39	Abnormal brake rise enable	[0] Prohibition [1] Enable	0 to 1	0	Whether ascending is permitted after brake failure

6.15 Motor 1 parameter V/F group P16

Function code	Name	Clarification	Setting range	Default value	Particular
P16.0	Input voltage setting	Set according to actual input voltage	320 to 460 [V]	380 [V]	
P16.2	Motor rated power	Setting according to motor nameplate parameters	0.0 to 4000.0 [kW]	Model Determination [kW]	
P16.3	Motor rated voltage	Setting according to motor nameplate parameters	320-460 [V]	380 [V]	
P16.4	Motor rated current	Setting according to motor nameplate parameters	0.0 to 6500.0 [A]	Model Determination [A]	
P16.5	Motor rated frequency	Setting according to motor nameplate parameters	0.0 to 300.0 [Hz]	50.0 [Hz]	
P16.6	Rated motor speed	Setting according to motor nameplate parameters	0 to 6000 [rpm]	1465 [rpm]	
P16.7	Motor rated poles	Setting according to motor nameplate parameters	2 to 12 [pole]	4 [pole]	See 7.8 for details
P16.9	Motor synchronous speed	Setting according to motor nameplate parameters	0 to 7200 [rpm]	1500 [rpm]	See 7.8 for details
P16.11	Control mode selection	[0] V/F control [1] Open-loop vectors [2] Closed-loop vectors	0 to 2	0	
P16.12	Carrier frequency setting	Set carrier frequency	1.00 to 10.00 [kHz]	3.00 [kHz]	See 7.8 for details

P16.14	V/F curve setting	[0] Linear V/F curve [1] Multi-point V/F curves [2] Quadratic power curves	0 to 2	0	See 7.8 for details
P16.15	torque compensation	[0] Prohibition [1] Enable	0 to 1	0	See 7.8 for details
P16.16	Torque compensation time	Setting torque compensation time	2 to 500 [ms]	500 [ms]	
P16.17	V/F control mode	[0] Frequency control [1] Slip control	0 to 1	0	
P16.18	Slippage compensation time	Setting the slip compensation time	10 to 1000 [ms]	200 [ms]	
P16.19	Stator resistance self-tuning option	[0] Online [1] Offline	0 to 1	0	
P16.22	Start-up delay time	Setting the start-up delay time	0.00 to 100.00 [s]	0.00 [s]	See 7.8 for details
P16.23	minimum frequency	Setting the minimum frequency (this parameter is only valid in V/F control mode)	0.00 to 300.00 [Hz]	0.00 [Hz]	
P16.24	Maximum frequency	Setting the maximum frequency (this parameter is only valid in V/F control mode)	0.00 to 300.00 [Hz]	50.00 [Hz]	
P16.25	Maximum modulation rate	Setting the maximum modulation rate	0.0 to 120.0 [%]	100.0 [%]	

P16.26	V/F startup voltage bias	Set V/F startup voltage bias	0.00 to 10.00 [%]	0.75 [%]	See 7.8 for details
P16.27	Rated Frequency Output Voltage	Output voltage at set rated frequency	0.0 to 200.0 [%]	100.0 [%]	See 7.8 for details
P16.30	Power-of-two starting voltage compensation	Setting the power-of-two curve to start voltage compensation	0.0 to 100.0 [%]	0.0 [%]	See 7.8 for details
P16.33	Multi-point V/F curves	Setting the number of points in a multi-point V/F curve	0 to 6	2	See 7.8 for details
P16.34	V/F frequency point 1		0.0 to 300.0 [Hz]	5.0 [Hz]	
P16.35	V/F voltage point 1		0.0 to 125.0 [%]	11.5 [%]	
P16.36	V/F frequency point 2		0.0 to 300.0 [Hz]	50.0 [Hz]	
P16.37	V/F voltage point 2		0.0 to 125.0 [%]	100.0 [%]	
P16.38	V/F frequency point 3		0.0 to 300.0 [Hz]	50.0 [Hz]	
P16.39	V/F voltage point 3		0.0 to 125.0 [%]	100.0 [%]	
P16.40	V/F frequency point 4		0.0 to 300.0 [Hz]	50.0 [Hz]	
P16.41	V/F voltage point 4		0.0 to 125.0 [%]	100.0 [%]	
P16.42	V/F frequency point 5		0.0 to 300.0 [Hz]	50.0 [Hz]	
P16.43	V/F voltage point 5		0.0 to 125.0 [%]	100.0 [%]	

P16.44	V/F frequency point 6		0.0 to 300.0 [Hz]	50.0 [Hz]	
P16.45	V/F voltage point 6		0.0 to 125.0 [%]	100.0 [%]	
P16.48	frequency modulation source	[0] Prohibition [1] PID module 1 [2] PID module 2 [3] Free function blocks	0 to 3	0	
P16.50	Start DC braking time	Setting the start DC braking time	0.00 to 300.00 [s]	0.00 [s]	See 7.8 for details
P16.51	Starting DC braking current	Setting the starting DC braking current	0.0 to 150.0 [%]	70.0 [%]	See 7.8 for details
P16.52	Starting DC braking frequency	Setting the starting DC braking frequency	0.00 to 5.00 [Hz]	0.00 [Hz]	See 7.8 for details
P16.54	Stop DC braking time	Setting the stop DC braking time	0.00 to 300.00 [s]	0.00 [s]	See 7.8 for details
P16.55	Stop DC braking current	Setting the stopping DC braking current	0.0 to 150.0 [%]	75.0 [%]	See 7.8 for details
P16.56	Stop DC braking frequency	Setting the stop DC braking frequency	0.00 to 5.00 [Hz]	0.00 [Hz]	See 7.8 for details
P16.59	Overcurrent protection proportional gain	Setting the overcurrent protection ratio	0.0 to 1000.0 [%]	100.0 [%]	
P16.60	Integral gain for overcurrent protection	Setting overcurrent protection points	0.0 to 1000.0 [%]	100.0 [%]	

P16.61	Overpressure limiting ratio	Setting the overvoltage limiting ratio	0.0 to 1000.0 [%]	100.0 [%]	
P16.62	Overvoltage Limit Points	Setting overvoltage limit points	0.0 to 1000.0 [%]	100.0 [%]	
P16.64	V/F stabilizing action gain	Setting the V/F stabilizing action gain	0.0 to 1000.0 [%]	100.0 [%]	See 7.8 for details
P16.66	Current Limit Proportional Gain	Setting the current limit loop ratio in V/F mode	0.0 to 1000.0 [%]	100.0 [%]	
P16.67	Start DC braking ratio	Setting the starting DC braking ratio	0.0 to 1000.0 [%]	100.0 [%]	
P16.68	Initiate DC braking credit	Setting the startup DC braking integral	0.0 to 1000.0 [%]	100.0 [%]	
P16.69	Stop DC braking ratio	Setting the stop DC braking ratio	0.0 to 1000.0 [%]	100.0 [%]	
P16.70	Stop DC braking points	Setting the stopping DC braking integral	0.0 to 1000.0 [%]	100.0 [%]	

6.16 Motor 2 parameter V/F group P17

Function code	Name	Clarification	Setting range	Default value	Explanation
P17.0	Input voltage setting	Set according to actual input voltage	320 to 460 [V]	380 [V]	
P17.2	Motor rated power	Setting according to motor nameplate parameters	0.0 to 4000.0 [kW]	Model Determination [kW]	
P17.3	Motor rated voltage	Setting according to motor nameplate parameters	320-460 [V]	380 [V]	

P17.4	Motor rated current	Setting according to motor nameplate parameters	0.0 to 6500.0 [A]	Model Determination [A]	
P17.5	Motor rated frequency	Setting according to motor nameplate parameters	0.0 to 300.0 [Hz]	50.0 [Hz]	
P17.6	Rated motor speed	Setting according to motor nameplate parameters	0 to 6000 [rpm]	1465 [rpm]	
P17.7	Motor rated poles	Setting according to motor nameplate parameters	2 to 12 [pole]	4 [pole]	See 7.8 for details
P17.9	Motor synchronous speed	Setting according to motor nameplate parameters	0 to 7200 [rpm]	1500 [rpm]	See 7.8 for details
P17.11	Control mode selection	[0] V/F control [1] Open-loop vectors [2] Closed-loop vectors	0 to 2	0	
P17.12	Carrier frequency setting	Set carrier frequency	1.00 to 10.00 [kHz]	3.00 [kHz]	See 7.8 for details
P17.14	V/F curve setting	[0] Linear V/F curve [1] Multi-point V/F curves [2] Quadratic power curves	0 to 2	0	See 7.8 for details
P17.15	torque compensation	[0] Prohibition [1] Enable	0 to 1	0	See 7.8 for details
P17.16	Torque compensation time	Setting torque compensation time	2 to 500 [ms]	500 [ms]	
P17.17	V/F control mode	[0] Frequency control [1] Slip control	0 to 1	0	

P17.18	Slippage compensation time	Setting the slip compensation time	10 to 1000 [ms]	200 [ms]	
P17.19	Stator resistance self-tuning option	[0] Online [1] Offline	0 to 1	0	
P17.22	Start-up delay time	Setting the start-up delay time	0.00 to 100.00 [s]	0.00 [s]	See 7.8 for details
P17.23	minimum frequency	Setting the minimum frequency (this parameter is only valid in V/F control mode)	0.00 to 300.00 [Hz]	0.00 [Hz]	
P17.24	Maximum frequency	Setting the maximum frequency (this parameter is only valid in V/F control mode)	0.00 to 300.00 [Hz]	50.00 [Hz]	
P17.25	Maximum modulation rate	Setting the maximum modulation rate	0.0 to 120.0 [%]	100.0 [%]	
P17.26	V/F startup voltage bias	Set V/F startup voltage bias	0.00 to 10.00 [%]	0.75 [%]	See 7.8 for details
P17.27	Rated Frequency Output Voltage	Output voltage at set rated frequency	0.0 to 200.0 [%]	100.0 [%]	See 7.8 for details
P17.30	Power-of-two starting voltage compensation	Setting the power-of-two curve to start voltage compensation	0.0 to 100.0 [%]	0.0 [%]	See 7.8 for details
P17.33	Multi-point V/F curves	Setting the number of points in a multi-point V/F curve	0 to 6	2	See 7.8 for details

P17.34	V/F frequency point 1		0.0 to 300.0 [Hz]	5.0 [Hz]	
P17.35	V/F voltage point 1		0.0 to 125.0 [%]	11.5 [%]	
P17.36	V/F frequency point 2		0.0 to 300.0 [Hz]	50.0 [Hz]	
P17.37	V/F voltage point 2		0.0 to 125.0 [%]	100.0 [%]	
P17.38	V/F frequency point 3		0.0 to 300.0 [Hz]	50.0 [Hz]	
P17.39	V/F voltage point 3		0.0 to 125.0 [%]	100.0 [%]	
P17.40	V/F frequency point 4		0.0 to 300.0 [Hz]	50.0 [Hz]	
P17.41	V/F voltage point 4		0.0 to 125.0 [%]	100.0 [%]	
P17.42	V/F frequency point 5		0.0 to 300.0 [Hz]	50.0 [Hz]	
P17.43	V/F voltage point 5		0.0 to 125.0 [%]	100.0 [%]	
P17.44	V/F frequency point 6		0.0 to 300.0 [Hz]	50.0 [Hz]	
P17.45	V/F voltage point 6		0.0 to 125.0 [%]	100.0 [%]	
P17.48	frequency modulation source	[0] Prohibition [1] PID module 1 [2] PID module 2 [3] Free function blocks	0 to 3	0	
P17.50	Start DC braking time	Setting the start DC braking time	0.00 to 300.00 [s]	0.00 [s]	See 7.8 for details

P17.51	Starting DC braking current	Setting the starting DC braking current	0.0 to 150.0 [%]	70.0 [%]	See 7.8 for details
P17.52	Starting DC braking frequency	Setting the starting DC braking frequency	0.00 to 5.00 [Hz]	0.00 [Hz]	See 7.8 for details
P17.54	Stop DC braking time	Setting the stop DC braking time	0.00 to 300.00 [s]	0.00 [s]	See 7.8 for details
P17.55	Stop DC braking current	Setting the stopping DC braking current	0.0 to 150.0 [%]	75.0 [%]	See 7.8 for details
P17.56	Stop DC braking frequency	Setting the stop DC braking frequency	0.00 to 5.00 [Hz]	0.00 [Hz]	See 7.8 for details
P17.59	Overcurrent protection proportional gain	Setting the overcurrent protection ratio	0.0 to 1000.0 [%]	100.0 [%]	
P17.60	Integral gain for overcurrent protection	Setting overcurrent protection points	0.0 to 1000.0 [%]	100.0 [%]	
P17.61	Overpressure limiting ratio	Setting the overvoltage limiting ratio	0.0 to 1000.0 [%]	100.0 [%]	
P17.62	Overvoltage Limit Points	Setting overvoltage limit points	0.0 to 1000.0 [%]	100.0 [%]	
P17.64	V/F stabilizing action gain	Setting the V/F stabilizing action gain	0.0 to 1000.0 [%]	100.0 [%]	See 7.8 for details
P17.66	Current Limit Proportional Gain	Setting the current limit loop ratio in V/F mode	0.0 to 1000.0 [%]	100.0 [%]	

P17.67	Start DC braking ratio	Setting the starting DC braking ratio	0.0 to 1000.0 [%]	100.0 [%]	
P17.68	Initiate DC braking credit	Setting the startup DC braking integral	0.0 to 1000.0 [%]	100.0 [%]	
P17.69	Stop DC braking ratio	Setting the stop DC braking ratio	0.0 to 1000.0 [%]	100.0 [%]	
P17.70	Stop DC Brake Integration	Setting the stopping DC braking integral	0.0 to 1000.0 [%]	100.0 [%]	

6.17 Motor 3 parameter V/F group P18

Function code	Name	Clarification	Setting range	Default value	Particular
P18.0	Input voltage setting	Set according to actual input voltage	320-460 [V]	380 [V]	
P18.2	Motor rated power	Setting according to motor nameplate parameters	0.0 to 4000.0 [kW]	Model Determination [kW]	
P18.3	Motor rated voltage	Setting according to motor nameplate parameters	320-460 [V]	380 [V]	
P18.4	Motor rated current	Setting according to motor nameplate parameters	0.0 to 6500.0 [A]	Model Determination [A]	
P18.5	Motor rated frequency	Setting according to motor nameplate parameters	0.0 to 300.0 [Hz]	50.0 [Hz]	
P18.6	Rated motor speed	Setting according to motor nameplate parameters	0 to 6000 [rpm]	1465 [rpm]	
P18.7	Motor rated poles	Setting according to motor nameplate parameters	2 to 12 [pole]	4 [pole]	See 7.8 for details

P18.9	Motor synchronous speed	Setting according to motor nameplate parameters	0 to 7200 [rpm]	1500 [rpm]	See 7.8 for details
P18.11	Control mode selection	[0] V/F control [1] Open-loop vectors [2] Closed-loop vectors	0 to 2	0	
P18.12	Carrier frequency setting	Set carrier frequency	1.00 to 10.00 [kHz]	3.00 [kHz]	See 7.8 for details
P18.14	V/F curve setting	[0] Linear V/F curve [1] Multi-point V/F curves [2] Quadratic power curves	0 to 2	0	See 7.8 for details
P18.15	torque compensation	[0] Prohibition [1] Enable	0 to 1	0	See 7.8 for details
P18.16	Torque compensation time	Setting torque compensation time	2 to 500 [ms]	500 [ms]	
P18.17	V/F control mode	[0] Frequency control [1] Slip control	0 to 1	0	
P18.18	Slippage compensation time	Setting the slip compensation time	10 to 1000 [ms]	200 [ms]	
P18.19	Stator resistance self-tuning option	[0] Online [1] Offline	0 to 1	0	
P18.22	Start-up delay time	Setting the start-up delay time	0.00 to 100.00 [s]	0.00 [s]	See 7.8 for details

P18.23	minimum frequency	Setting the minimum frequency (this parameter is only valid in V/F control mode)	0.00 to 300.00 [Hz]	0.00 [Hz]	
P18.24	Maximum frequency	Setting the maximum frequency (this parameter is only valid in V/F control mode)	0.00 to 300.00 [Hz]	50.00 [Hz]	
P18.25	Maximum modulation rate	Setting the maximum modulation rate	0.0 to 120.0 [%]	100.0 [%]	
P18.26	V/F startup voltage bias	Set V/F startup voltage bias	0.00 to 10.00 [%]	0.75 [%]	See 7.8 for details
P18.27	Rated Frequency Output Voltage	Output voltage at set rated frequency	0.0 to 200.0 [%]	100.0 [%]	See 7.8 for details
P18.30	Power-of-two starting voltage compensation	Setting the power-of-two curve to start voltage compensation	0.0 to 100.0 [%]	0.0 [%]	See 7.8 for details
P18.33	Multi-point V/F curves	Setting the number of points in a multi-point V/F curve	0 to 6	2	See 7.8 for details
P18.34	V/F frequency point 1		0.0 to 300.0 [Hz]	5.0 [Hz]	
P18.35	V/F voltage point 1		0.0 to 125.0 [%]	11.5 [%]	
P18.36	V/F frequency point 2		0.0 to 300.0 [Hz]	50.0 [Hz]	
P18.37	V/F voltage point 2		0.0 to 125.0 [%]	100.0 [%]	

P18.38	V/F frequency point 3		0.0 to 300.0 [Hz]	50.0 [Hz]	
P18.39	V/F voltage point 3		0.0 to 125.0 [%]	100.0 [%]	
P18.40	V/F frequency point 4		0.0 to 300.0 [Hz]	50.0 [Hz]	
P18.41	V/F voltage point 4		0.0 to 125.0 [%]	100.0 [%]	
P18.42	V/F frequency point 5		0.0 to 300.0 [Hz]	50.0 [Hz]	
P18.43	V/F voltage point 5		0.0 to 125.0 [%]	100.0 [%]	
P18.44	V/F frequency point 6		0.0 to 300.0 [Hz]	50.0 [Hz]	
P18.45	V/F voltage point 6		0.0 to 125.0 [%]	100.0 [%]	
P18.48	frequency modulation source	[0] Prohibition [1] PID module 1 [2] PID module 2 [3] Free function blocks	0 to 3	0	
P18.50	Start DC braking time	Setting the start DC braking time	0.00 to 300.00 [s]	0.00 [s]	See 7.8 for details
P18.51	Starting DC braking current	Setting the starting DC braking current	0.0 to 150.0 [%]	70.0 [%]	See 7.8 for details
P18.52	Starting DC braking frequency	Setting the starting DC braking frequency	0.00 to 5.00 [Hz]	0.00 [Hz]	See 7.8 for details
P18.54	Stop DC braking time	Setting the stop DC braking time	0.00 to 300.00 [s]	0.00 [s]	See 7.8 for details

P18.55	Stop DC braking current	Setting the stopping DC braking current	0.0 to 150.0 [%]	75.0 [%]	See 7.8 for details
P18.56	Stop DC braking frequency	Setting the stop DC braking frequency	0.00 to 5.00 [Hz]	0.00 [Hz]	See 7.8 for details
P18.59	Overcurrent protection proportional gain	Setting the overcurrent protection ratio	0.0 to 1000.0 [%]	100.0 [%]	
P18.60	Integral gain for overcurrent protection	Setting overcurrent protection points	0.0 to 1000.0 [%]	100.0 [%]	
P18.61	Overpressure limiting ratio	Setting the overvoltage limiting ratio	0.0 to 1000.0 [%]	100.0 [%]	
P18.62	Overvoltage Limit Points	Setting overvoltage limit points	0.0 to 1000.0 [%]	100.0 [%]	
P18.64	V/F stabilizing action gain	Setting the V/F stabilizing action gain	0.0 to 1000.0 [%]	100.0 [%]	See 7.8 for details
P18.66	Current Limit Proportional Gain	Setting the current limit loop ratio in V/F mode	0.0 to 1000.0 [%]	100.0 [%]	
P18.67	Start DC braking ratio	Setting the starting DC braking ratio	0.0 to 1000.0 [%]	100.0 [%]	
P18.68	Initiate DC braking credit	Setting the startup DC braking integral	0.0 to 1000.0 [%]	100.0 [%]	
P18.69	Stop DC braking ratio	Setting the stop DC braking ratio	0.0 to 1000.0 [%]	100.0 [%]	
P18.70	Stop DC Brake Integration	Setting the stopping DC braking integral	0.0 to 1000.0 [%]	100.0 [%]	

6.18 Motor 4-parameter V/F group P19

Function code	Name	Clarification	Setting range	Default value	Particular
P19.0	Input Voltage Setting	Set according to actual input voltage	320-460 [V]	380 [V]	
P19.2	Motor rated power	Setting according to motor nameplate parameters	0.0 to 4000.0 [kW]	Model Determination [kW]	
P19.3	Motor rated voltage	Setting according to motor nameplate parameters	320 to 460 [V]	380 [V]	
P19.4	Motor rated current	Setting according to motor nameplate parameters	0.0 to 6500.0 [A]	Model Determination [A]	
P19.5	Motor rated frequency	Setting according to motor nameplate parameters	0.0 to 300.0 [Hz]	50.0 [Hz]	
P19.6	Rated motor speed	Setting according to motor nameplate parameters	0 to 6000 [rpm]	1465 [rpm]	
P19.7	Motor rated poles	Setting according to motor nameplate parameters	2 to 12 [pole]	4 [pole]	See 7.8 for details
P19.9	Motor synchronous speed	Setting according to motor nameplate parameters	0 to 7200 [rpm]	1500 [rpm]	See 7.8 for details
P19.11	Control mode selection	[0] V/F control [1] Open-loop vectors [2] Closed-loop vectors	0 to 2	0	
P19.12	Carrier frequency setting	Set carrier frequency	1.00 to 10.00 [kHz]	3.00 [kHz]	See 7.8 for details

P19.14	V/F curve setting	[0] Linear V/F curve [1] Multi-point V/F curves [2] Quadratic power curves	0 to 2	0	See 7.8 for details
P19.15	torque compensation	[0] Prohibition [1] Enable	0 to 1	0	See 7.8 for details
P19.16	Torque compensation time	Setting torque compensation time	2 to 500 [ms]	500 [ms]	
P19.17	V/F control mode	[0] Frequency control [1] Slip control	0 to 1	0	
P19.18	Slippage compensation time	Setting the slip compensation time	10 to 1000 [ms]	200 [ms]	
P19.19	Stator resistance self-tuning option	[0] Online [1] Offline	0 to 1	0	
P19.22	Start-up delay time	Setting the start-up delay time	0.00 to 100.00 [s]	0.00 [s]	See 7.8 for details
P19.23	minimum frequency	Setting the minimum frequency (this parameter is only valid in V/F control mode)	0.00 to 300.00 [Hz]	0.00 [Hz]	
P19.24	Maximum frequency	Setting the maximum frequency (this parameter is only valid in V/F control mode)	0.00 to 300.00 [Hz]	50.00 [Hz]	
P19.25	Maximum modulation rate	Setting the maximum modulation rate	0.0 to 120.0 [%]	100.0 [%]	

P19.26	V/F startup voltage bias	Set V/F startup voltage bias	0.00 to 10.00 [%]	0.75 [%]	See 7.8 for details
P19.27	Rated Frequency Output Voltage	Output voltage at set rated frequency	0.0 to 200.0 [%]	100.0 [%]	See 7.8 for details
P19.30	Power-of-two starting voltage compensation	Setting the power-of-two curve to start voltage compensation	0.0 to 100.0 [%]	0.0 [%]	See 7.8 for details
P19.33	Multi-point V/F curves	Setting the number of points in a multi-point V/F curve	0 to 6	2	See 7.8 for details
P19.34	V/F frequency point 1		0.0 to 300.0 [Hz]	5.0 [Hz]	
P19.35	V/F voltage point 1		0.0 to 125.0 [%]	11.5 [%]	
P19.36	V/F frequency point 2		0.0 to 300.0 [Hz]	50.0 [Hz]	
P19.37	V/F voltage point 2		0.0 to 125.0 [%]	100.0 [%]	
P19.38	V/F frequency point 3		0.0 to 300.0 [Hz]	50.0 [Hz]	
P19.39	V/F voltage point 3		0.0 to 125.0 [%]	100.0 [%]	
P19.40	V/F frequency point 4		0.0 to 300.0 [Hz]	50.0 [Hz]	
P19.41	V/F voltage point 4		0.0 to 125.0 [%]	100.0 [%]	
P19.42	V/F frequency point 5		0.0 to 300.0 [Hz]	50.0 [Hz]	

P19.43	V/F voltage point 5		0.0 to 125.0 [%]	100.0 [%]	
P19.44	V/F frequency point 6		0.0 to 300.0 [Hz]	50.0 [Hz]	
P19.45	V/F voltage point 6		0.0 to 125.0 [%]	100.0 [%]	
P19.48	frequency modulation source	[0] Prohibition [1] PID module 1 [2] PID module 2 [3] Free function blocks	0 to 3	0	
P19.50	Start DC braking time	Setting the start DC braking time	0.00 to 300.00 [s]	0.00 [s]	See 7.8 for details
P19.51	Starting DC braking current	Setting the starting DC braking current	0.0 to 150.0 [%]	70.0 [%]	See 7.8 for details
P19.52	Starting DC braking frequency	Setting the starting DC braking frequency	0.00 to 5.00 [Hz]	0.00 [Hz]	See 7.8 for details
P19.54	Stop DC braking time	Setting the stop DC braking time	0.00 to 300.00 [s]	0.00 [s]	See 7.8 for details
P19.55	Stop DC braking current	Setting the stopping DC braking current	0.0 to 150.0 [%]	75.0 [%]	See 7.8 for details
P19.56	Stop DC braking frequency	Setting the stop DC braking frequency	0.00 to 5.00 [Hz]	0.00 [Hz]	See 7.8 for details
P19.59	Overcurrent protection proportional gain	Setting the overcurrent protection ratio	0.0 to 1000.0 [%]	100.0 [%]	

P19.60	Integral gain for overcurrent protection	Setting of overcurrent protection points	0.0 to 1000.0 [%]	100.0 [%]	
P19.61	Overpressure limiting ratio	Setting the overvoltage limiting ratio	0.0 to 1000.0 [%]	100.0 [%]	
P19.62	Overvoltage Limit Points	Setting overvoltage limit points	0.0 to 1000.0 [%]	100.0 [%]	
P19.64	V/F stabilizing action gain	Setting the V/F stabilizing action gain	0.0 to 1000.0 [%]	100.0 [%]	See 7.8 for details
P19.66	Current Limit Proportional Gain	Setting the current limit loop ratio in V/F mode	0.0 to 1000.0 [%]	100.0 [%]	
P19.67	Start DC braking ratio	Setting the starting DC braking ratio	0.0 to 1000.0 [%]	100.0 [%]	
P19.68	Initiate DC braking credit	Setting the startup DC braking integral	0.0 to 1000.0 [%]	100.0 [%]	
P19.69	Stop DC braking ratio	Setting the stop DC braking ratio	0.0 to 1000.0 [%]	100.0 [%]	
P19.70	Stop DC Brake Integration	Setting the stopping DC braking integral	0.0 to 1000.0 [%]	100.0 [%]	

6.19 Motor 1 vector control group P20

Function code	Name	Clarification	Setting range	Default value	Particular
P20.0	torque control	[0] Prohibition [1] Enable	0 to 1	0	See 7.9 for details

P20.1	Positive torque source selection	[0] Velocity loop outputs [1] Analog input 1 [2] Analog Input 2 [3] Operation panel [4] Parameter setting: according to the value of P20.3 [5] DP communication [6] MODBUS [7] Free function blocks	0 to 7	0	See 7.9 for details
P20.2	Negative torque source selection	ibid	0 to 7	0	
P20.3	Fixed torque value setting	Fixed torque value setting	-300.0 to 300.0 [%]	0.0 [%]	See 7.9 for details
P20.5	Torque input value filtering time		0 to 1000 [ms]	0 [ms]	
P20.6	Torque setting factor		0.0 to 200.0 [%]	100.0 [%]	See 7.9 for details
P20.7	Torque limit value setting method	[0] Internal limit values [1] Parameter setting: according to P20.8 and P20.9 [2] Analog input 1 [3] Analog input 2 [4] Operation panel [5] DP communication [6] MODBUS [7] Free function blocks	0 to 7	0	See 7.9 for details
P20.8	Forward torque limit value	This value is valid if [1] is selected for P20.7.	0.0 to 300.0 [%]	200.0 [%]	See 7.9 for details

P20.9	Reverse torque limit value	This value is valid if [1] is selected for P20.7.	0.0 to 300.0 [%]	200.0 [%]	See 7.9 for details
P20.11	Torque limiting filter time		0 to 1000 [ms]	0 [ms]	
P20.13	Estimating RPM Filtering Time	Setting the open-loop vector speed estimation filtering time	20.0 to 500.0 [ms]	100.0 [ms]	See 7.9 for details
P20.14	Number of encoder pulses	Setting the number of pulses for 1 revolution of the motor	0 to 60000	1024	
P20.15	Encoder phase sequence reversal	[0] Prohibition [1] Enable	0 to 1	0	See 7.9 for details
P20.16	Forward Maximum Velocity	Setting the forward maximum speed (valid only with vector control)	0.0 to 300.0 [%]	100.0 [%]	
P20.17	Reverse Maximum Speed	Setting the reverse maximum speed (valid only with vector control)	0.0 to 300.0 [%]	100.0 [%]	
P20.18	Forward Minimum Velocity	Setting the forward minimum speed (valid only with vector control)	0.0 to 300.0 [%]	0.0 [%]	
P20.19	Reverse Minimum Speed	Setting the reverse minimum speed (valid only with vector control)	0.0 to 300.0 [%]	0.0 [%]	
P20.20	Constant power speed limit enable	[0] Prohibition [1] Enable	0 to 1	0	
P20.21	Constant Power Speed Limit Curve	[0] Parabolic [1] Linear	0 to 1	0	

P20.22	Speed limit value at light load	This parameter is valid in constant power mode	0.0 to 300.0 [%]	160.0 [%]	
P20.23	Light load setting value	This parameter is valid in constant power mode	0.0 to 200.0 [%]	20.0 [%]	
P20.24	Speed limit value for heavy load	This parameter is valid in constant power mode	0.0 to 300.0 [%]	100.0 [%]	
P20.25	Overloaded set values	This parameter is valid in constant power mode	0.0 to 200.0 [%]	100.0 [%]	
P20.26	Position Loop Gain	Position Loop Gain	0.0 to 1000.0 [%]	0.0 [%]	See 7.9 for details
P20.27	Position loop velocity compensation	Position loop output limit value corresponding to maximum speed regulation	0.00 to 15.00 [%]	2.00 [%]	See 7.9 for details
P20.28	Torque control speed limit	[0] Maximum speed value: speed limited by P20.16 and P20.17 [1] Ramp Inputs [2] Ramp Outputs [3] DP communication	0 to 3	0	
P20.30	Speed Bias Setting Source (in torque mode)	[0] Speed bias value: Speed bias for P20.31 and P20.32 set values [1] Analog input 1 [2] Analog input 2 [3] Panel Settings	0 to 3	0	
P20.31	Positive speed bias	Setting the forward speed bias value	0.0 to 100.0 [%]	5.0 [%]	
P20.32	Reverse speed bias	Setting the reverse speed bias value	0.0 to 100.0 [%]	5.0 [%]	

P20.34	Synchronization Compensation Enable	[0] Prohibition [1] Enable	0 to 1	0	See 7.9 for details
P20.35	Magnetic Field Holding Time	Magnetic field holding time after stopping	0.0 to 100.0 [s]	0.0 [s]	
P20.36	Starting magnetic field current	Setting the starting magnetic field current value	50.0 to 150.0 [%]	110.0 [%]	
P20.37	starting magnetic flux	starting magnetic flux	0.0 to 150.0 [%]	100.0 [%]	See 7.9 for details
P20.38	Starting flux end speed	Starting flux end speed	0.0 to 100.0 [%]	25.0 [%]	See 7.9 for details
P20.39	fundamental magnetic flux	fundamental magnetic flux	0.0 to 120.0 [%]	100.0 [%]	See 7.9 for details
P20.40	Basic magnetic flux starting speed	Basic magnetic flux starting speed	0.0 to 150.0 [%]	100.0 [%]	See 7.9 for details
P20.41	Maximum magnetic flux	Maximum magnetic flux	0.0 to 150.0 [%]	135.0 [%]	
P20.42	Torque observation function	[0] Prohibition [1] Enable	0 to 1	1	
P20.43	Torque observation time	Load observation time	25 to 1000 [ms]	75 [ms]	
P20.44	Load observation time	Weight observation time (functioning at constant power)	25 to 1000 [ms]	250 [ms]	
P20.45	No-load positive load torque value	This parameter is valid in constant power mode (weight)	0.0 to 100.0 [%]	22.0 [%]	
P20.46	No-load reverse load torque value	This parameter is valid in constant power mode	0.0 to 100.0 [%]	18.0 [%]	

P20.47	Heavy duty positive load torque value	This parameter is valid in constant power mode	0.0 to 200.0 [%]	92.0 [%]	
P20.48	Heavy load reverse load torque value	This parameter is valid in constant power mode	0.0 to 200.0 [%]	87.0 [%]	
P20.49	Load value at heavy load	This parameter is valid in constant power mode	0.0 to 150.0 [%]	100.0 [%]	
P20.51	Overvoltage suppression proportional gain	Bus overvoltage suppression proportional gain	0.0 to 1000.0 [%]	100.0 [%]	
P20.52	Overvoltage suppression integral	Bus overvoltage suppression integral	0.0 to 1000.0 [%]	100.0 [%]	
P20.53	Excitation control Kp	Flux Controller Proportional Gain	0.0 to 1000.0 [%]	100.0 [%]	
P20.54	Excitation Control Ki	Flux Controller Integral Gain	0.0 to 1000.0 [%]	100.0 [%]	
P20.55	Speed tracking proportional gain	Speed tracking controller proportional gain	0.0 to 1000.0 [%]	100.0 [%]	See 7.9 for details
P20.56	Speed Tracking Integral Gain	Speed Tracking Controller Integral Gain	0.0 to 1000.0 [%]	100.0 [%]	See 7.9 for details

P20.57	Maximum speed proportional gain	The proportional gain corresponding to the maximum speed, the	0.0 to 100.0 [%]	100.0 [%]	Prevent control oscillation after overclocking, if there is over current reported after overclocking, you can turn down this value
P20.58	Speed gain switching speed	Speed value at which the speed tracking proportional gain starts to change linearly	0.0 to 100.0 [%]	100.0 [%]	Generally set to 100% for the base speed, the speed tracking proportional gain will be adjusted towards the maximum value after overclocking.
P20.60	DROOP control gain	When set to 0, DROOP control is not effective	0.0 to 100.0 [%]	0.0 [%]	See 7.9 for details
P20.61	DROOP control filter time	Adjust the DROOP control response. Increase this value when vibrations and oscillations occur	30 to 2000 [ms]	50 [ms]	See 7.9 for details

P20.62	Current Proportional Gain	Current controller proportional gain	0.0 to 1000.0 [%]	100.0 [%]	See 7.9 for details
P20.63	Current Integral Gain	Current Controller Integral Gain	0.0 to 1000.0 [%]	100.0 [%]	See 7.9 for details
P20.98	moment of inertia (mechanics)	Moment of inertia (expressed in time)	0.01 to 300.00 [s]	0.75 [s]	
P20.99	Friction loss factor	Friction loss factor	0.00 to 10.00 [%]	0.00 [%]	

6.20 Motor 2 vector control group P21

Function code	Name	Clarification	Setting range	Default value	Particular
P21.0	torque control	[0] Prohibition [1] Enable	0 to 1	0	See 7.9 for details
P21.1	Positive torque source selection	[0] Velocity loop outputs [1] Analog input 1 [2] Analog Input 2 [3] Operation panel [4] Parameter setting: according to the value of P20.3 [5] DP communication [6] MODBUS [7] Free function blocks	0 to 7	0	See 7.9 for details
P21.2	Negative torque source selection	ibid	0 to 7	0	
P21.3	Fixed torque value setting	Fixed torque value setting	-300.0 to 300.0 [%]	0.0 [%]	See 7.9 for details
P21.5	Torque input value filtering time		0 to 1000 [ms]	0 [ms]	

P21.6	Torque setting factor		0.0 to 200.0 [%]	100.0 [%]	See 7.9 for details
P21.7	Torque limit value setting method	[0] Internal limit values [1] Parameter setting: according to P20.8 and P20.9 [2] Analog input 1 [3] Analog input 2 [4] Operation panel [5] DP communication [6] MODBUS [7] Free function blocks	0 to 7	0	See 7.9 for details
P21.8	Forward torque limit value	This value is valid if [1] is selected for P20.7.	0.0 to 300.0 [%]	200.0 [%]	See 7.9 for details
P21.9	Reverse torque limit value	This value is valid if [1] is selected for P20.7.	0.0 to 300.0 [%]	200.0 [%]	See 7.9 for details
P21.11	Torque limiting filter time		0 to 1000 [ms]	0 [ms]	
P21.13	Estimating RPM Filtering Time	Setting the open-loop vector speed estimation filtering time	20.0 to 500.0 [ms]	100.0 [ms]	See 7.9 for details
P21.14	Number of encoder pulses	Setting the number of pulses for 1 revolution of the motor	0 to 60000	1024	
P21.15	Encoder phase sequence reversal	[0] Prohibition [1] Enable	0 to 1	0	See 7.9 for details
P21.16	Forward Maximum Velocity	Setting the forward maximum speed (valid only with vector control)	0.0 to 300.0 [%]	100.0 [%]	

P21.17	Reverse Maximum Speed	Setting the reverse maximum speed (valid only with vector control)	0.0 to 300.0 [%]	100.0 [%]	
P21.18	Forward Minimum Velocity	Setting the forward minimum speed (valid only with vector control)	0.0 to 300.0 [%]	0.0 [%]	
P21.19	Reverse Minimum Speed	Setting the reverse minimum speed (valid only with vector control)	0.0 to 300.0 [%]	0.0 [%]	
P21.20	Constant power speed limit enable	[0] Prohibition [1] Enable	0 to 1	0	
P21.21	Constant Power Speed Limit Curve	[0] Parabolic [1] Linear	0 to 1	0	
P21.22	Speed limit value at light load	This parameter is valid in constant power mode	0.0 to 300.0 [%]	160.0 [%]	
P21.23	Light load setting value	This parameter is valid in constant power mode	0.0 to 200.0 [%]	20.0 [%]	
P21.24	Speed limit value for heavy load	This parameter is valid in constant power mode	0.0 to 300.0 [%]	100.0 [%]	
P21.25	Overloaded set values	This parameter is valid in constant power mode	0.0 to 200.0 [%]	100.0 [%]	
P21.26	Position Loop Gain	Position Loop Gain	0.0 to 1000.0 [%]	0.0 [%]	See 7.9 for details
P21.27	Position loop velocity compensation	Position loop output limit value corresponding to maximum speed regulation	0.00 to 15.00 [%]	2.00 [%]	See 7.9 for details
P21.28	Torque control speed limit	[0] Maximum speed value: speed limited by P20.16 and P20.17 [1] Ramp Inputs [2] Ramp Outputs [3] DP communication	0 to 3	0	

P21.30	Speed Bias Setting Source (in torque mode)	[0] Speed bias value: Speed bias for P20.31 and P20.32 set values [1] Analog input 1 [2] Analog input 2 [3] Panel Settings	0 to 3	0	
P21.31	Positive speed bias	Setting the forward speed bias value	0.0 to 100.0 [%]	5.0 [%]	
P21.32	Reverse speed bias	Setting the reverse speed bias value	0.0 to 100.0 [%]	5.0 [%]	
P21.34	Synchronization Compensation Enable	[0] Prohibition [1] Enable	0 to 1	0	See 7.9 for details
P21.35	Magnetic Field Holding Time	Magnetic field holding time after stopping	0.0 to 100.0 [s]	0.0 [s]	
P21.36	Starting magnetic field current	Setting the starting magnetic field current value	50.0 to 150.0 [%]	110.0 [%]	
P21.37	starting magnetic flux	starting magnetic flux	0.0 to 150.0 [%]	100.0 [%]	See 7.9 for details
P21.38	Starting flux end speed	Starting flux end speed	0.0 to 100.0 [%]	25.0 [%]	See 7.9 for details
P21.39	fundamental magnetic flux	fundamental magnetic flux	0.0 to 120.0 [%]	100.0 [%]	See 7.9 for details
P21.40	Basic magnetic flux starting speed	Basic magnetic flux starting speed	0.0 to 150.0 [%]	100.0 [%]	See 7.9 for details
P21.41	Maximum magnetic flux	Maximum magnetic flux	0.0 to 150.0 [%]	135.0 [%]	
P21.42	Torque observation function	[0] Prohibition [1] Enable	0 to 1	1	

P21.43	Torque observation time	Load observation time	25 to 1000 [ms]	75 [ms]	
P21.44	Load observation time	Weight observation time (functioning at constant power)	25 to 1000 [ms]	250 [ms]	
P21.45	No-load positive load torque value	This parameter is valid in constant power mode (weight)	0.0 to 100.0 [%]	22.0 [%]	
P21.46	No-load reverse load torque value	This parameter is valid in constant power mode	0.0 to 100.0 [%]	18.0 [%]	
P21.47	Heavy duty positive load torque value	This parameter is valid in constant power mode	0.0 to 200.0 [%]	92.0 [%]	
P21.48	Heavy load reverse load torque value	This parameter is valid in constant power mode	0.0 to 200.0 [%]	87.0 [%]	
P21.49	Load value at heavy load	This parameter is valid in constant power mode	0.0 to 150.0 [%]	100.0 [%]	
P21.51	Overvoltage suppression proportional gain	Bus overvoltage suppression proportional gain	0.0 to 1000.0 [%]	100.0 [%]	
P21.52	Overvoltage suppression integral	Bus overvoltage suppression integral	0.0 to 1000.0 [%]	100.0 [%]	
P21.53	Excitation control Kp	Flux Controller Proportional Gain	0.0 to 1000.0 [%]	100.0 [%]	
P21.54	Excitation Control Ki	Flux Controller Integral Gain	0.0 to 1000.0 [%]	100.0 [%]	
P21.55	Speed tracking proportional gain	Speed tracking controller proportional gain	0.0 to 1000.0 [%]	100.0 [%]	See 7.9 for details
P21.56	Speed Tracking Integral Gain	Speed Tracking Controller Integral Gain	0.0 to 1000.0 [%]	100.0 [%]	See 7.9 for details

P21.57	Maximum speed proportional gain	The proportional gain corresponding to the maximum speed, the	0.0 to 100.0 [%]	100.0 [%]	Prevent control oscillation after overclocking, if there is overcurrent reported after overclocking, you can turn down this value
P21.58	Speed gain switching speed	Speed value at which the speed tracking proportional gain starts to change linearly	0.0 to 100.0 [%]	100.0 [%]	Generally set to 100% for the base speed, the speed tracking proportional gain will be adjusted towards the maximum value after overclocking.
P21.60	DROOP control gain	When set to 0, DROOP control is not effective	0.0 to 100.0 [%]	0.0 [%]	See 7.9 for details

P21.61	DROOP control filter time	Adjust the DROOP control response. Increase this value when vibrations and oscillations occur	30 to 2000 [ms]	50 [ms]	See 7.9 for details
P21.62	Current Proportional Gain	Current controller proportional gain	0.0 to 1000.0 [%]	100.0 [%]	See 7.9 for details
P21.63	Current Integral Gain	Current Controller Integral Gain	0.0 to 1000.0 [%]	100.0 [%]	See 7.9 for details
P21.98	moment of inertia (mechanics)	Moment of inertia (expressed in time)	0.01 to 300.00 [s]	0.75 [s]	
P21.99	Friction loss factor	Friction loss factor	0.00 to 10.00 [%]	0.00 [%]	

6.21 Motor 3 vector control group P22

Function code	Name	Clarification	Setting range	Default value	Explanation
P22.0	torque control	[0] Prohibition [1] Enable	0 to 1	0	See 7.9 for details
P22.1	Positive torque source selection	[0] Velocity loop outputs [1] Analog input 1 [2] Analog Input 2 [3] Operation panel [4] Parameter setting: according to the value of P20.3 [5] DP communication [6] MODBUS [7] Free function blocks	0 to 7	0	See 7.9 for details
P22.2	Negative torque source selection	ibid	0 to 7	0	

P22.3	Fixed torque value setting	Fixed torque value setting	-300.0 to 300.0 [%]	0.0 [%]	See 7.9 for details
P22.5	Torque input value filtering time		0 to 1000 [ms]	0 [ms]	
P22.6	Torque setting factor		0.0 to 200.0 [%]	100.0 [%]	See 7.9 for details
P22.7	Torque limit value setting method	[0] Internal limit values [1] Parameter setting: according to P20.8 and P20.9 [2] Analog input 1 [3] Analog input 2 [4] Operation panel [5] DP communication [6] MODBUS [7] Free function blocks	0 to 7	0	See 7.9 for details
P22.8	Forward torque limit value	This value is valid if [1] is selected for P20.7.	0.0 to 300.0 [%]	200.0 [%]	See 7.9 for details
P22.9	Reverse torque limit value	This value is valid if [1] is selected for P20.7.	0.0 to 300.0 [%]	200.0 [%]	See 7.9 for details
P22.11	Torque limiting filter time		0 to 1000 [ms]	0 [ms]	
P22.13	Estimating RPM Filtering Time	Setting the open-loop vector speed estimation filtering time	20.0 to 500.0 [ms]	100.0 [ms]	See 7.9 for details
P22.14	Number of encoder pulses	Setting the number of pulses for 1 revolution of the motor	0 to 60000	1024	
P22.15	Encoder phase sequence reversal	[0] Prohibition [1] Enable	0 to 1	0	See 7.9 for details

P22.16	Forward Maximum Velocity	Setting the forward maximum speed (valid only with vector control)	0.0 to 300.0 [%]	100.0 [%]	
P22.17	Reverse Maximum Speed	Setting the reverse maximum speed (valid only with vector control)	0.0 to 300.0 [%]	100.0 [%]	
P22.18	Forward Minimum Velocity	Setting the forward minimum speed (valid only with vector control)	0.0 to 300.0 [%]	0.0 [%]	
P22.19	Reverse Minimum Speed	Setting the reverse minimum speed (valid only with vector control)	0.0 to 300.0 [%]	0.0 [%]	
P22.20	Constant power speed limit enable	[0] Prohibition [1] Enable	0 to 1	0	
P22.21	Constant Power Speed Limit Curve	[0] Parabolic [1] Linear	0 to 1	0	
P22.22	Speed limit value at light load	This parameter is valid in constant power mode	0.0 to 300.0 [%]	160.0 [%]	
P22.23	Light load setting value	This parameter is valid in constant power mode	0.0 to 200.0 [%]	20.0 [%]	
P22.24	Speed limit value for heavy load	This parameter is valid in constant power mode	0.0 to 300.0 [%]	100.0 [%]	
P22.25	Overloaded set values	This parameter is valid in constant power mode	0.0 to 200.0 [%]	100.0 [%]	
P22.26	Position Loop Gain	Position Loop Gain	0.0 to 1000.0 [%]	0.0 [%]	See 7.9 for details
P22.27	Position loop velocity compensation	Position loop output limit value corresponding to maximum speed regulation	0.00 to 15.00 [%]	2.00 [%]	See 7.9 for details

P22.28	Torque control speed limit	[0] Maximum speed value: speed limited by P20.16 and P20.17 [1] Ramp Inputs [2] Ramp Outputs [3] DP communication	0 to 3	0	
P22.30	Speed Bias Setting Source (in torque mode)	[0] Speed bias value: Speed bias for P20.31 and P20.32 set values [1] Analog input 1 [2] Analog input 2 [3] Panel Settings	0 to 3	0	
P22.31	Positive speed bias	Setting the forward speed bias value	0.0 to 100.0 [%]	5.0 [%]	
P22.32	Reverse speed bias	Setting the reverse speed bias value	0.0 to 100.0 [%]	5.0 [%]	
P22.34	Synchronization Compensation Enable	[0] Prohibition [1] Enable	0 to 1	0	See 7.9 for details
P22.35	magnetic field retention time	Magnetic field holding time after stopping	0.0 to 100.0 [s]	0.0 [s]	
P22.36	Starting magnetic field current	Setting the starting magnetic field current value	50.0 to 150.0 [%]	110.0 [%]	
P22.37	starting magnetic flux	starting magnetic flux	0.0 to 150.0 [%]	100.0 [%]	See 7.9 for details
P22.38	Starting flux end speed	Starting flux end speed	0.0 to 100.0 [%]	25.0 [%]	See 7.9 for details
P22.39	fundamental magnetic flux	fundamental magnetic flux	0.0 to 120.0 [%]	100.0 [%]	See 7.9 for details
P22.40	Basic magnetic flux starting speed	Basic magnetic flux starting speed	0.0 to 150.0 [%]	100.0 [%]	See 7.9 for details

P22.41	Maximum magnetic flux	Maximum magnetic flux	0.0 to 150.0 [%]	135.0 [%]	
P22.42	Torque observation function	[0] Prohibition [1] Enable	0 to 1	1	
P22.43	Torque observation time	Load observation time	25 to 1000 [ms]	75 [ms]	
P22.44	Load observation time	Weight observation time (functioning at constant power)	25 to 1000 [ms]	250 [ms]	
P22.45	No-load positive load torque value	This parameter is valid in constant power mode (weight)	0.0 to 100.0 [%]	22.0 [%]	
P22.46	No-load reverse load torque value	This parameter is valid in constant power mode	0.0 to 100.0 [%]	18.0 [%]	
P22.47	Heavy duty positive load torque value	This parameter is valid in constant power mode	0.0 to 200.0 [%]	92.0 [%]	
P22.48	Heavy load reverse load torque value	This parameter is valid in constant power mode	0.0 to 200.0 [%]	87.0 [%]	
P22.49	Load value at heavy load	This parameter is valid in constant power mode	0.0 to 150.0 [%]	100.0 [%]	
P22.51	Overvoltage suppression proportional gain	Bus overvoltage suppression proportional gain	0.0 to 1000.0 [%]	100.0 [%]	
P22.52	Overvoltage suppression integral	Bus overvoltage suppression integral	0.0 to 1000.0 [%]	100.0 [%]	
P22.53	Excitation control Kp	Flux Controller Proportional Gain	0.0 to 1000.0 [%]	100.0 [%]	
P22.54	Excitation Control Ki	Flux Controller Integral Gain	0.0 to 1000.0 [%]	100.0 [%]	
P22.55	Speed tracking proportional gain	Speed tracking controller proportional gain	0.0 to 1000.0 [%]	100.0 [%]	See 7.9 for details

P22.56	Speed Tracking Integral Gain	Speed Tracking Controller Integral Gain	0.0 to 1000.0 [%]	100.0 [%]	See 7.9 for details
P22.57	Maximum speed proportional gain	The proportional gain corresponding to the maximum speed, the	0.0 to 100.0 [%]	100.0 [%]	Prevent control oscillation after overclocking, if there is over current reported after overclocking, you can turn down this value

P22.58	Speed gain switching speed	Speed value at which the speed tracking proportional gain starts to change linearly	0.0 to 100.0 [%]	100.0 [%]	Generally set to 100% for the base speed, the speed tracking proportional gain will be adjusted towards the maximum value after overclocking.
P22.60	DROOP control gain	When set to 0, DROOP control is not effective	0.0 to 100.0 [%]	0.0 [%]	See 7.9 for details
P22.61	DROOP control filter time	Adjust the DROOP control response. Increase this value when vibrations and oscillations occur	30 to 2000 [ms]	50 [ms]	See 7.9 for details
P22.62	Current Proportional Gain	Current controller proportional gain	0.0 to 1000.0 [%]	100.0 [%]	See 7.9 for details
P22.63	Current Integral Gain	Current Controller Integral Gain	0.0 to 1000.0 [%]	100.0 [%]	See 7.9 for details
P22.64	Master-Slave 2 Control Gain	Master-Slave Control Method 2 Control Gain	0.0 to 100.0 [%]	0.0 [%]	See 7.9 for details

P22.65	Master-Slave 2 control filter time	Master-Slave Control Method 2 Filter Time	30 to 2000.0 ms	50 ms	
P22.98	moment of inertia (mechanics)	Moment of inertia (expressed in time)	0.01 to 300.00 [s]	0.75 [s]	
P22.99	Friction loss factor	Friction loss factor	0.00 to 10.00 [%]	0.00 [%]	

6.22 Motor 4 vector control group P23

Function code	Name	Clarification	Setting range	Default value	Explanation
P23.0	torque control	[0] Prohibition [1] Enable	0 to 1	0	See 7.9 for details
P23.1	Positive torque source selection	[0] Velocity loop outputs [1] Analog input 1 [2] Analog Input 2 [3] Operation panel [4] Parameter setting: according to the value of P20.3 [5] DP communication [6] MODBUS [7] Free function blocks	0 to 7	0	See 7.9 for details
P23.2	Negative torque source selection	ibid	0 to 7	0	
P23.3	Fixed torque value setting	Fixed torque value setting	-300.0 to 300.0 [%]	0.0 [%]	See 7.9 for details
P23.5	Torque input value filtering time		0 to 1000 [ms]	0 [ms]	
P23.6	Torque setting factor		0.0 to 200.0 [%]	100.0 [%]	See 7.9 for details

P23.7	Torque limit value setting method	[0] Internal limit values [1] Parameter setting: according to P20.8 and P20.9 [2] Analog input 1 [3] Analog input 2 [4] Operation panel [5] DP communication [6] MODBUS [7] Free function blocks	0 to 7	0	See 7.9 for details
P23.8	Forward torque limit value	This value is valid if [1] is selected for P20.7.	0.0 to 300.0 [%]	200.0 [%]	See 7.9 for details
P23.9	Reverse torque limit value	This value is valid if [1] is selected for P20.7.	0.0 to 300.0 [%]	200.0 [%]	See 7.9 for details
P23.11	Torque limiting filter time		0 to 1000 [ms]	0 [ms]	
P23.13	Estimating RPM Filtering Time	Setting the open-loop vector speed estimation filtering time	20.0 to 500.0 [ms]	100.0 [ms]	See 7.9 for details
P23.14	Number of encoder pulses	Setting the number of pulses for 1 revolution of the motor	0 to 60000	1024	
P23.15	Encoder phase sequence reversal	[0] Prohibition [1] Enable	0 to 1	0	See 7.9 for details
P23.16	Forward Maximum Velocity	Setting the forward maximum speed (valid only with vector control)	0.0 to 300.0 [%]	100.0 [%]	
P23.17	Reverse Maximum Speed	Setting the reverse maximum speed (valid only with vector control)	0.0 to 300.0 [%]	100.0 [%]	

P23.18	Forward Minimum Velocity	Setting the forward minimum speed (valid only with vector control)	0.0 to 300.0 [%]	0.0 [%]	
P23.19	Reverse Minimum Speed	Setting the reverse minimum speed (valid only with vector control)	0.0 to 300.0 [%]	0.0 [%]	
P23.20	Constant power speed limit enable	[0] Prohibition [1] Enable	0 to 1	0	
P23.21	Constant Power Speed Limit Curve	[0] Parabolic [1] Linear	0 to 1	0	
P23.22	Speed limit value at light load	This parameter is valid in constant power mode	0.0 to 300.0 [%]	160.0 [%]	
P23.23	Light load setting value	This parameter is valid in constant power mode	0.0 to 200.0 [%]	20.0 [%]	
P23.24	Speed limit value for heavy load	This parameter is valid in constant power mode	0.0 to 300.0 [%]	100.0 [%]	
P23.25	Overloaded set values	This parameter is valid in constant power mode	0.0 to 200.0 [%]	100.0 [%]	
P23.26	Position Loop Gain	Position Loop Gain	0.0 to 1000.0 [%]	0.0 [%]	See 7.9 for details
P23.27	Position loop velocity compensation	Position loop output limit value corresponding to maximum speed regulation	0.00 to 15.00 [%]	2.00 [%]	See 7.9 for details

P23.28	Torque control speed limit	[0] Maximum speed value: speed limited by P20.16 and P20.17 [1] Ramp Inputs [2] Ramp Outputs [3] DP communication	0 to 3	0	
P23.30	Speed Bias Setting Source (in torque mode)	[0] Speed bias value: Speed bias for P20.31 and P20.32 set values [1] Analog input 1 [2] Analog input 2 [3] Panel Settings	0 to 3	0	
P23.31	Positive speed bias	Setting the forward speed bias value	0.0 to 100.0 [%]	5.0 [%]	
P23.32	Reverse speed bias	Setting the reverse speed bias value	0.0 to 100.0 [%]	5.0 [%]	
P23.34	Synchronization Compensation Enable	[0] Prohibition [1] Enable	0 to 1	0	See 7.9 for details
P23.35	Magnetic Field Holding Time	Magnetic field holding time after stopping	0.0 to 100.0 [s]	0.0 [s]	
P23.36	Starting magnetic field current	Setting the starting magnetic field current value	50.0 to 150.0 [%]	110.0 [%]	
P23.37	starting magnetic flux	starting magnetic flux	0.0 to 150.0 [%]	100.0 [%]	See 7.9 for details
P23.38	Starting flux end speed	Starting flux end speed	0.0 to 100.0 [%]	25.0 [%]	See 7.9 for details
P23.39	fundamental magnetic flux	fundamental magnetic flux	0.0 to 120.0 [%]	100.0 [%]	See 7.9 for details
P23.40	Fundamental flux starting speed	Fundamental flux starting speed	0.0 to 150.0 [%]	100.0 [%]	See 7.9 for details

P23.41	Maximum magnetic flux	Maximum magnetic flux	0.0 to 150.0 [%]	135.0 [%]	
P23.42	Torque observation function	[0] Prohibition [1] Enable	0 to 1	1	
P23.43	Torque observation time	Load observation time	25 to 1000 [ms]	75 [ms]	
P23.44	Load observation time	Weight observation time (functioning at constant power)	25 to 1000 [ms]	250 [ms]	
P23.45	No-load positive load torque value	This parameter is valid in constant power mode (weight)	0.0 to 100.0 [%]	22.0 [%]	
P23.46	No-load reverse load torque value	This parameter is valid in constant power mode	0.0 to 100.0 [%]	18.0 [%]	
P23.47	Heavy Duty Positive Load Torque Value	This parameter is valid in constant power mode	0.0 to 200.0 [%]	92.0 [%]	
P23.48	Heavy load reverse load torque value	This parameter is valid in constant power mode	0.0 to 200.0 [%]	87.0 [%]	
P23.49	Load value at heavy load	This parameter is valid in constant power mode	0.0 to 150.0 [%]	100.0 [%]	
P23.51	Overvoltage suppression proportional gain	Bus overvoltage suppression proportional gain	0.0 to 1000.0 [%]	100.0 [%]	
P23.52	Overvoltage suppression integral	Bus overvoltage suppression integral	0.0 to 1000.0 [%]	100.0 [%]	
P23.53	Excitation control Kp	Flux Controller Proportional Gain	0.0 to 1000.0 [%]	100.0 [%]	
P23.54	Excitation Control Ki	Flux Controller Integral Gain	0.0 to 1000.0 [%]	100.0 [%]	

P23.55	Speed tracking proportional gain	Speed tracking controller proportional gain	0.0 to 1000.0 [%]	100.0 [%]	See 7.9 for details
P23.56	Speed Tracking Integral Gain	Speed Tracking Controller Integral Gain	0.0 to 1000.0 [%]	100.0 [%]	See 7.9 for details
P23.57	Maximum speed proportional gain	The proportional gain corresponding to the maximum speed, the	0.0 to 100.0 [%]	100.0 [%]	Prevent control oscillation after overclocking, if there is overcurrent reported after overclocking, you can turn down this value
P23.58	Speed gain switching speed	Speed value at which the speed tracking proportional gain starts to change linearly	0.0 to 100.0 [%]	100.0 [%]	Generally set to 100% for the base speed, the speed tracking proportional gain will be adjusted towards the maximum value after over clocking.
P23.60	DROOP control gain	When set to 0, DROOP control is not effective	0.0 to 100.0 [%]	0.0 [%]	See 7.9 for details

P23.61	DROOP control filter time	Adjust the DROOP control response. Increase this value when vibrations and oscillations occur	30 to 2000 [ms]	50 [ms]	See 7.9 for details
P23.62	Current Proportional Gain	Current controller proportional gain	0.0 to 1000.0 [%]	100.0 [%]	See 7.9 for details
P23.63	Current Integral Gain	Current Controller Integral Gain	0.0 to 1000.0 [%]	100.0 [%]	See 7.9 for details
P23.64	Master-Slave 2 Control Gain	Master-Slave Control Method 2 Control Gain	0.0 to 100.0 [%]	0.0 [%]	See 7.9 for details
P23.65	Master-Slave 2 control filter time	Master-Slave Control Method 2 Filter Time	30 to 2000.0 ms	50 ms	
P23.98	moment of inertia (mechanics)	Moment of inertia (expressed in time)	0.01 to 300.00 [s]	0.75 [s]	
P23.99	Friction loss factor	Friction loss factor	0.00 to 10.00 [%]	0.00 [%]	

6.23 CAN bus P31

Function code	Name	Instructions	Setting range	Default value	Explanation
P31.0	CAN bus enable	[0] Prohibition [1] Enable	0 to 1	0	
P31.1	Canopen Slave ID	According to the master setting	1 to 127	1	
P31.2	Baud rate selection	[0] 20 Kbps [1] 50 Kbps [2] 125 Kbps [3] 250 Kbps [4] 500 Kbps [5] 800 Kbps [6] 1000 Kbps	0 to 6	5	
P31.3	Can bus fault detection time		0 to 60 [s]	0 [s]	
P31.4	Can bus status	[0] Initialization [1] Stop [2] Run [3] Pre-operation	0 to 3	0	

6.24 MODBUS bus P32

Function code	Name	Clarification	Setting range	Default value	Explanation
P32.0	MODBUS bus enable	[0] Prohibition [1] Enable	0 to 1	0	
P32.1	MODBUS slave ID	According to the master setting	1 to 255	1	
P32.2	Port Selection	[0]RS485 [1] RS232	0 to 1	0	
P32.3	Baud rate selection	[0] 9600 BPS; [1] 14400 BPS; [2] 19200 BPS; [3] 38400 BPS; [4] 56,000 BPS; [5] 57600 BPS; [6] 115200 BPS;	0 to 6	3	
P32.4	Data Bit Checksum	[0] None_8_1_CFG; [1] Even_8_1_CFG; [2] Odd_8_1_CFG; [3] None_8_2_CFG; [4] Even_8_2_CFG; [5] Odd_8_2_CFG;	0 to 5	0	
P32.5	Modbus bus fault detection time	Setting the Modbus bus fault detection time Fault detection is disabled when set to 0 and no Modbus bus faults will be generated.	0 to 100 [s]	0 [s]	Setting to 0s disables bus fault detection.

7. Detailed Parameter Function Description

7.1 Digital Input Terminals

(1) Multi-Segment Speed Control

The multispeed command value is set by selecting [0] direct input or [1] binary according to parameter P12.0 (multispeed setting mode).

A. Select [0] for direct entry

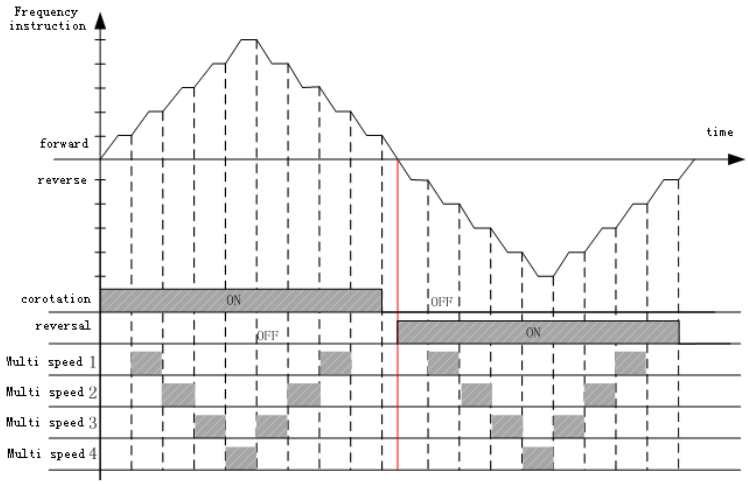
[1] Forward operation [2] Reverse operation - 1 paragraph

[6] Multi-Segment Speed 1 (Bit 0) --- 2 segments

[7] Multi-Segment Speed 2 (Bit 1) - 3 segments

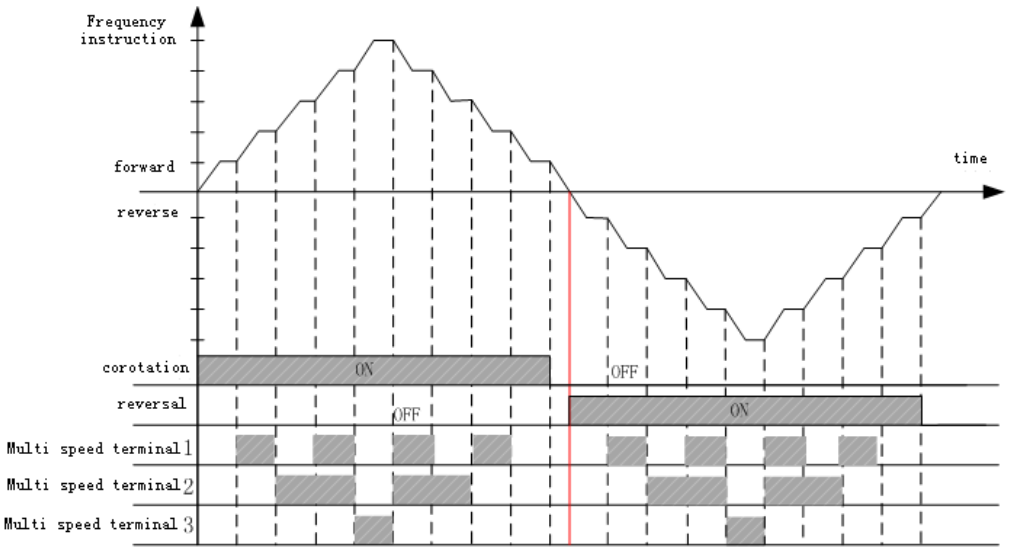
[8] Multi-band speed 3 (bit 2) - 4 bands

[9] Multi-band speed 4 (bit 3) - 5 bands



B. Select [1] Binary

The 16-phase diagram is composed of four multispeed terminals (calculated using 8421 decoding). When only the forward or reverse operation signal is input, operation is performed at the greater value of parameter P12.2 (multispeed 1) and the minimum speed setting.



(2) Confirmation of open brake status

Set the function of DI terminal as [22] "Holding brake contactor state", if the absolute value of feedback speed is greater than or equal to 10Hz during operation, and no open gate feedback confirmation signal is received at this time, report E106 "Holding brake feedback abnormality 1"; if the absolute value of feedback speed is less than 10Hz during operation, and no open gate feedback confirmation signal is received within 2s, report E107 "Holding brake feedback abnormality 2". If the absolute value of the feedback speed is less than 10Hz during operation, and no feedback confirmation signal for opening the gate is received within 2s, report E107 "abnormal holding brake feedback 2".

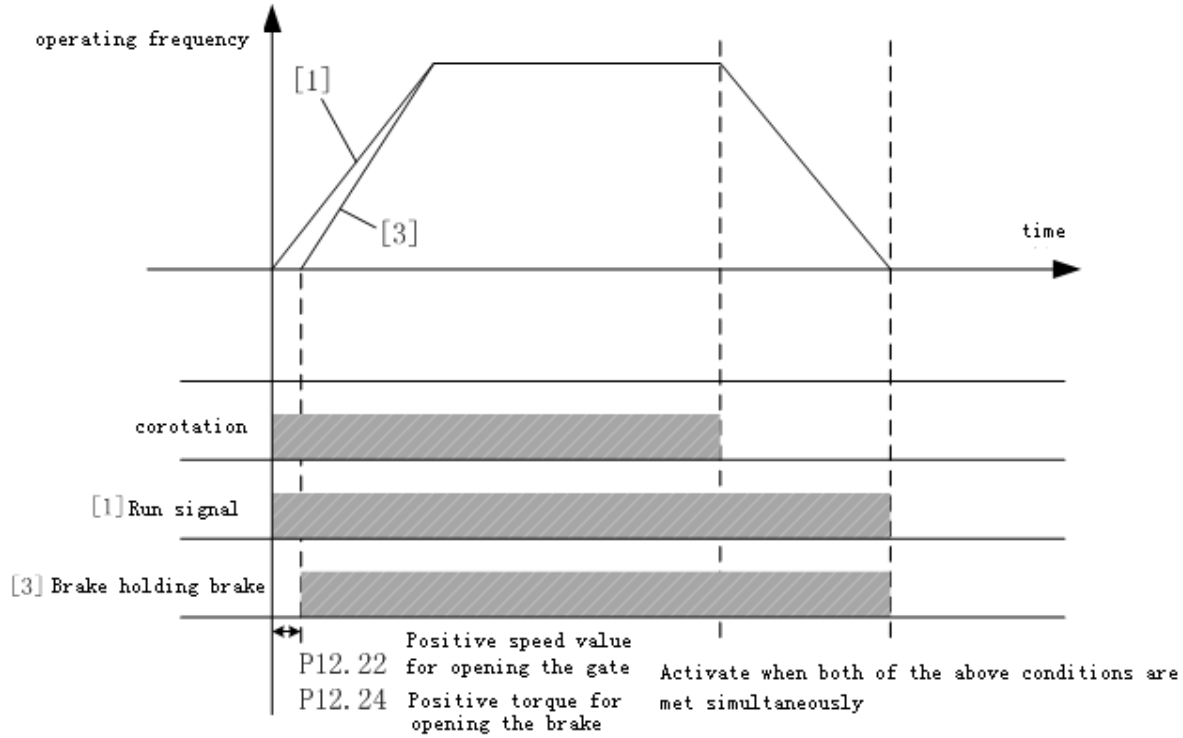
7.2 Digital output terminals

Brake opening control

When the motor is equipped with a brake, the VFD can control the brake on/off signal. Horizontal load brake control signal is set to [1] run signal or [3] brake holding brake; vertical load brake control signal is set to [3] brake holding brake.

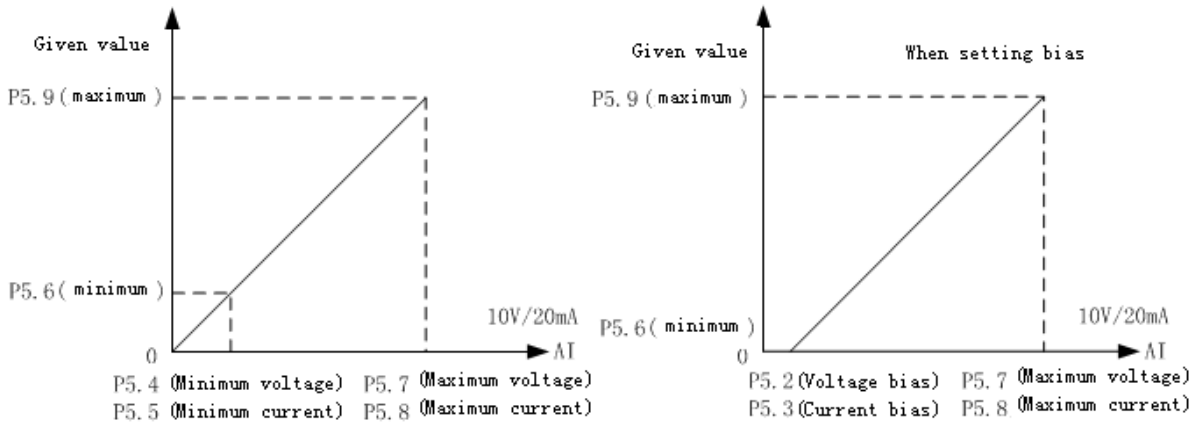
Refer to the following figure for the difference between the output

signal selection [1] Run signal and [3] Brake holding brake:



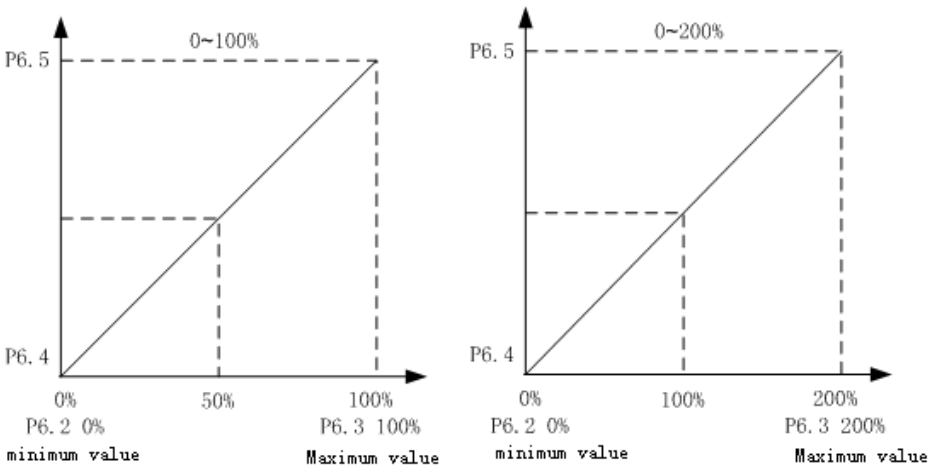
7.3 Analog Inputs

The analog input settings are shown in the figure below:

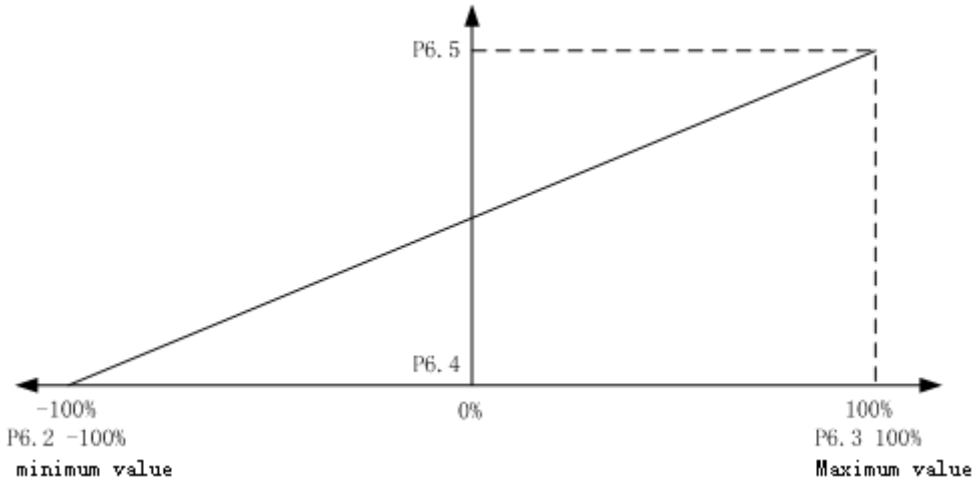


7.4 Analog output

The analog output settings are shown in the figure below:



(a) Output setting range 0~100% (b) Output setting range 0~200%



(c) Output setting range -100 to 100%

7.5 Protection parameters

(1) Current Limit Function

P7.0, P7.1, P7.2, P7.3 Current Limit Function: Limits the motor from flowing a high current. This function is activated when the motor current exceeds the limit value.

(2) Overcurrent protection function

P7.4, P7.5, P7.6, P7.7 overcurrent protection function: this function is activated when the motor current exceeds the value of parameter P7.4 multiplied by parameter P16.4 (motor rated current), which will cut off the VFD output. This value is a percentage of the rated motor current.

(3) Zero sequence current protection

P7.8, P7.9, P7.10, P7.11 Zero sequence current protection value: VFD output three-phase current and: $I_a + I_b + I_c$; motor rated current: P16.4. When $\frac{(I_a + I_b + I_c)}{3} > P7.8 \times P16.4 \times 1.414$, this function is activated and the VFD output is cut off.

Note: Zero sequence current fault will be reported when there is a short circuit or grounding in the three phases of the motor.

(4) Busbar over-voltage and under-voltage protection

P7.12, P7.13 bus over-voltage or under-voltage protection function: when the bus voltage of the frequency converter exceeds the value of parameter P7.12, this function is activated and the output of the frequency converter is cut off. When the bus voltage of the frequency converter is lower than the value of P7.13, this function is activated and the output of the frequency converter is cut off. It is recommended to set it according to the default value.

(5) temperature protection

P7.14 Over-temperature fault function: when the IGBT temperature of the VFD exceeds the value of parameter P7.14, this function is activated and the output of the VFD is cut off, and the VFD reports over-temperature fault.

P7.15 Over-temperature alarm function: This function is activated when the IGBT temperature of the VFD exceeds the value of parameter P7.15 when the VFD is in the shutdown state.

(6) overspeed protection

P7.19, P7.20, P7.21, P7.22 overspeed fault function: this function is activated and the output of the VFD is cut off when the motor speed exceeds

the value of parameter P7.19. The values of P7.19 to P7.22 are the percentage of the rated motor speed.

(7) Open-loop vector start protection

The protection of P7.23 only works when the control mode is open-loop vector (P16.11 = 1). this protection is disabled when P7.23 is set to the maximum value. In the open-loop vector control mode, if the starting torque is low or the magnetic field is not well established, the motor speed follows the given setting poorly at the starting moment and the duration exceeds the set value of P7.23, this function is activated and the output of the frequency converter is cut off.

The protection of P7.24 to P7.26 also only works when the control mode is open-loop vector (P17.11=1, P18.11=1, P19.11=1), just for different motors.

(8) Speed anomaly protection

P7.31, P7.32 speed abnormality protection function, only works when the control mode is closed-loop vector (P16.11=2).P7.31 sets the deviation value of speed abnormality, and 100% corresponds to the rated frequency of the motor.P7.32 sets the detection time of speed abnormality. When the difference between the encoder detected speed and the given speed exceeds the speed value set in P7.31 and runs for the time set in P7.32, this function is activated and the VFD output is cut off.

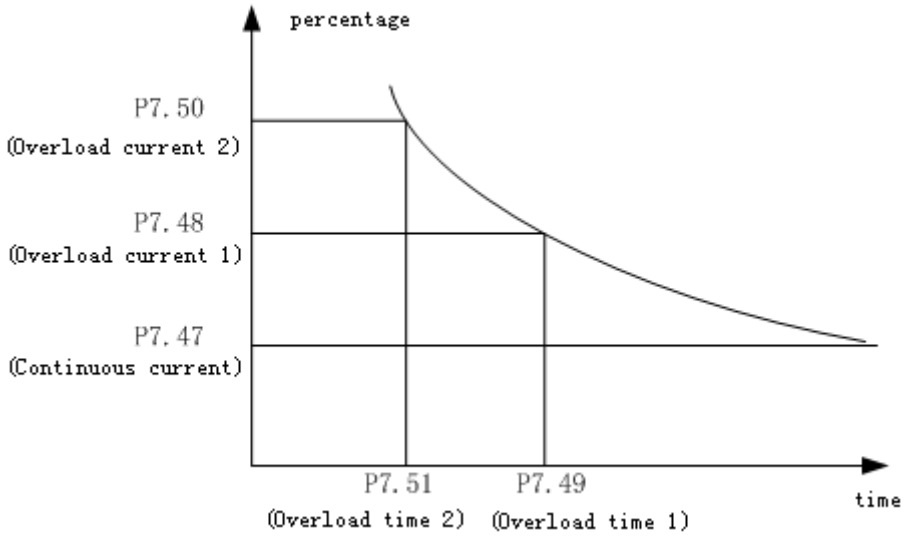
(9) self-tuning protection

P7.33 sets the self-tuning failure time, which acts during static self-tuning operation; when the time for static self-tuning exceeds P7.33, this function is activated and static self-tuning is terminated.

(10) Overload protection function

P7.48, P7.50 Overload protection function: when the motor current

exceeds the current protection value, this function is activated and the output of the VFD is cut off. The protection parameters are shown below:



(11) Built-in brake unit

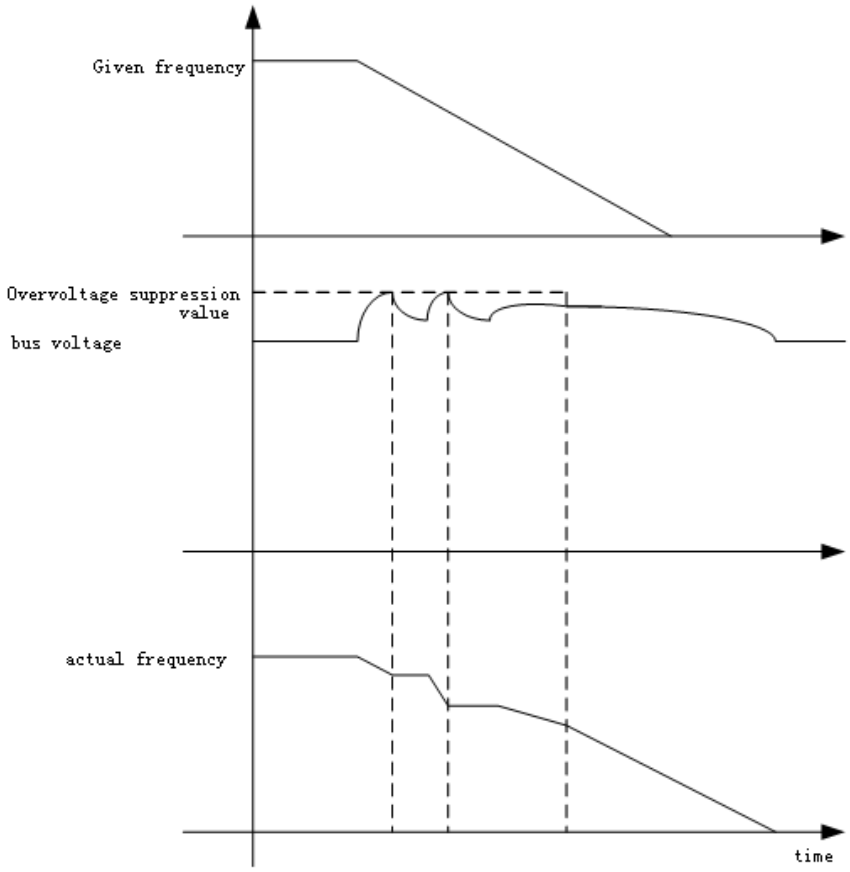
The parameters of P7.64, P7.65 and P7.66 are only effective when the VFD has a built-in braking unit, i.e., the 11KW-90KW power band in the GF630N02 series of VFDs works. This function is enabled after P7.64 is set to 1. The built-in braking unit starts to work when the bus voltage is higher than the braking start voltage value, which is determined by parameter P7.65. The value of brake full turn-on voltage is determined by parameter P7.66, and the value of brake full turn-on voltage must not be less than the value of brake start voltage, therefore, it is required that P7.66 ≥ P7.65. The input voltage of P16.0 is set to 380 V, and the value of brake start voltage is 647 V when P7.65 is 50 V; and the value of brake full turn-on voltage is 697 V when P7.66 is 100 V. The calculation formula is as follows is as follows:

Brake starting voltage value $=1.075\times\sqrt{2}\times P16.0+20+P7.65$;

Brake full turn-on voltage value $=1.075\times\sqrt{2}\times P16.0+20+P7.66$.

(12) Overvoltage suppression

The parameters of P7.69, P7.70 and P7.71 will affect the actual deceleration time of the motor when they work. when the default value of P7.69 is [0], the frequency converter must be connected to the braking unit and resistor. when the input voltage of P16.0 is set to 380V, and the input voltage of P7.70 is 100V, the over-voltage rejection value will be 711V. the formula for calculating this value is: over-voltage rejection value $=1.1\times\sqrt{2}\times P16.0+20+P7.70$. See the following diagram for details:



When P7.71 is set to enable, the software automatically adjusts the deceleration time and increases the excitation to realize over-voltage suppression; when P7.71 is set to disable, the software automatically adjusts the deceleration time to realize over-voltage suppression.

7.6 Motor start/stop control parameters

(1) Parking options:

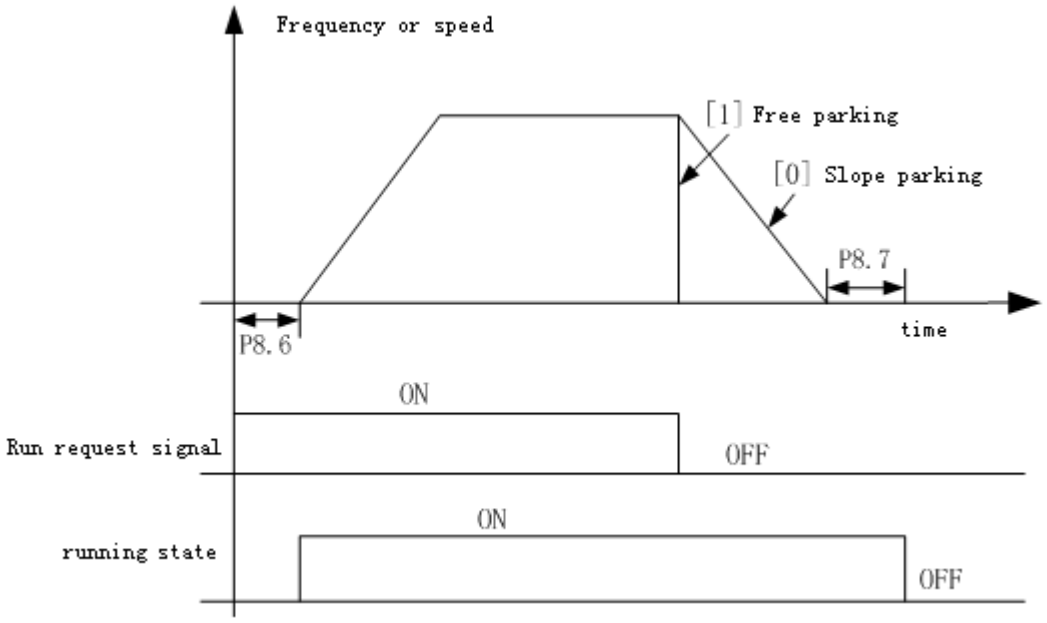
P8.3 Parking method: Set the method of decelerating the motor speed during parking. See the figure below.

[0] Ramp stop: The motor speed will slowly decelerate to zero according to the set deceleration time.

[1] Free stop: The VFD output voltage is cut off immediately while the stop mode is implemented.

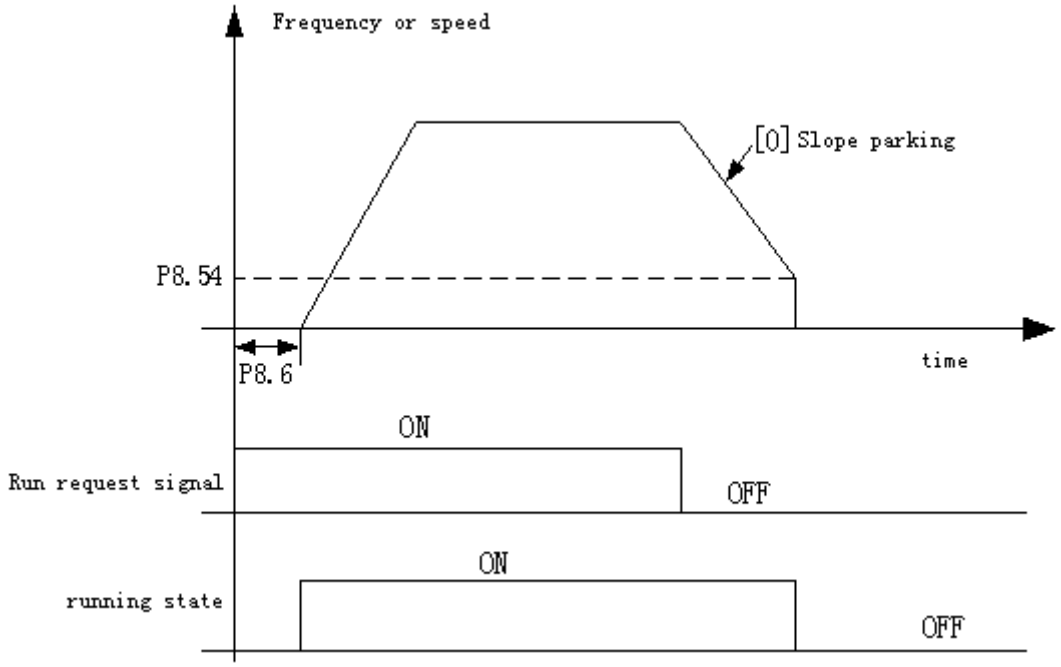
P8.6 Running delay time: the VFD starts from the moment of issuing the start command and maintains the stop state for a certain period of time within the time set in P8.6 before it realizes the start mode. Refer to the following figure.

P8.7 Torque holding after zero speed: Even if the motor speed becomes zero, within the time set by this parameter, the frequency converter will still keep the running mode, at this time there is torque output, and the real sense of stopping will be realized only after this time. See the following figure.



Parking mode control diagram

P8.54 Free running start speed: When this value is set to a value greater than 0 and P8.3 Stopping mode is set to [0] Ramp stop, the frequency converter will become free stopping when the given speed decreases to the value set in P8.54 during stopping.

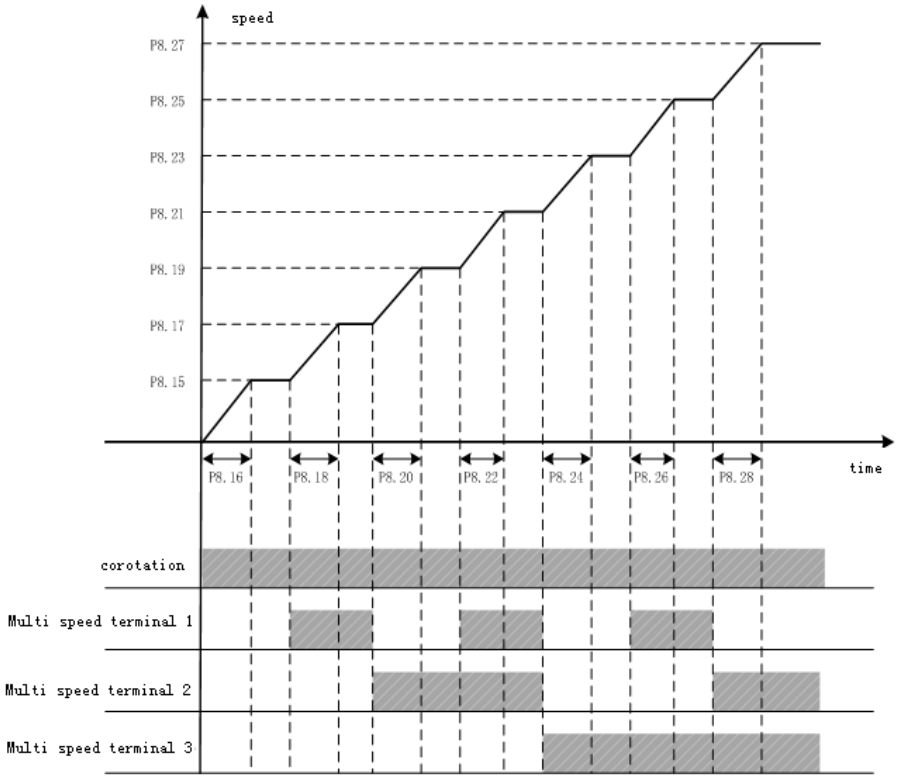


Free-running start speed

(2) Acceleration and deceleration control:

When the VFD is running, the acceleration and deceleration time and the acceleration and deceleration mode can be adjusted.P8.14 adjusts the multiplier of the acceleration time, i.e. the actual acceleration time is the set acceleration time multiplied by the value of P8.14.P8.33 adjusts the multiplier of the deceleration time, i.e. the actual deceleration time is the set deceleration time multiplied by the value of P8.33.P8.33 adjusts the multiplier of the deceleration time.

The acceleration mode is multiband speed as shown below:



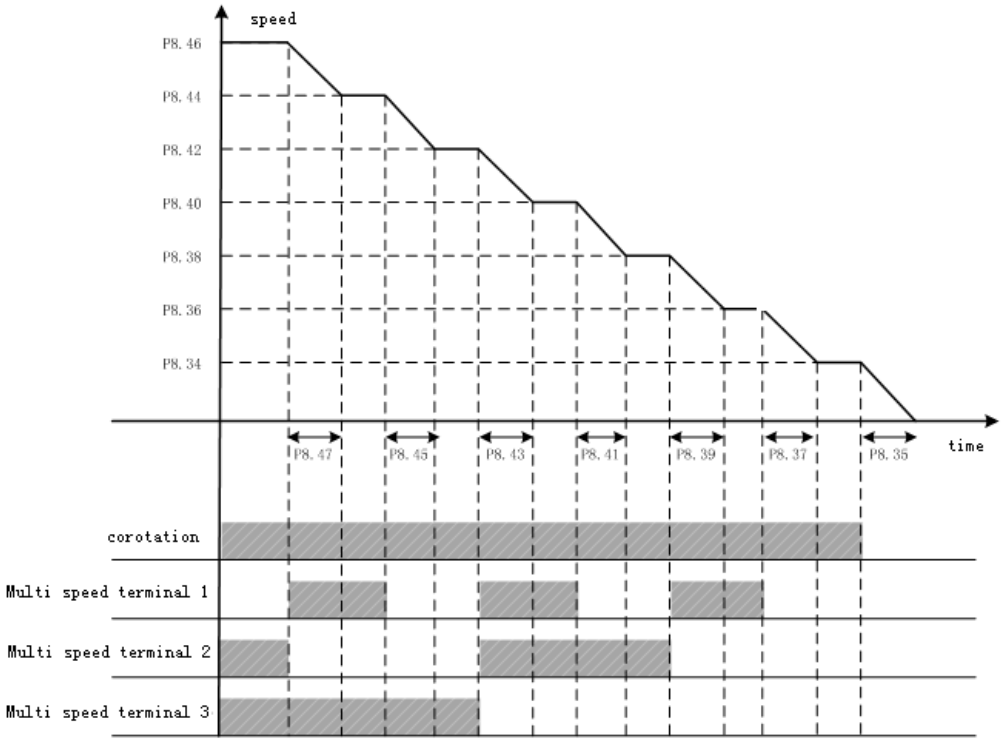
When setting the value of the acceleration zone, follow the requirements below:

P8.15<P8.17<P8.19<P8.21<P8.23<P8.25<P8.27

An example of its parameter setting when the motor is operated at the rated speed:

P8.15	P8.17	P8.19	P8.21	P8.23	P8.25	P8.27
10%	20%	30%	50%	60%	80%	100%

The deceleration mode is multispeed as shown below:



When setting the value of the deceleration zone, follow the requirements below:

P8.34<P8.36<P8.38<P8.40<P8.42<P8.44<P8.46

An example of its parameter setting when the motor is operated at the rated speed:

P8.34	P8.36	P8.38	P8.40	P8.42	P8.44	P8.46
10%	20%	30%	50%	60%	80%	100%

(3) Deceleration time is adjusted by communication:

During operation, the deceleration time multiplier can be modified by PROFIBUS or MODBUS communication, and the source of deceleration time control can be set via P8.32. Optionally, it can be disabled so that this function does not work. Example:

Deceleration time for deceleration zone 1 = P8.33 x P8.35 x (time deceleration multiplier given by the communication x 0.001).

(4) The deceleration time is adjusted by backshifting the handle:

During deceleration, the deceleration time is adjusted by hitting reverse gear with the handle. When P8.53 is set to [0] disable and P8.55 is set to [1] enable, the deceleration time becomes the value of P8.56. When P8.53 is set to [1] enable and P8.55 is set to [1] enable, the deceleration time changes linearly with the reverse gear, corresponding to the intermediate value of P8.56 and the current gear deceleration time.

7.7 Multi-stage motor speed and braking control

(1) Terminal vs. Multi-Speed:

P12.2 to P12.17 Multi-Segment Speed is to set the speed reference value when the VFD carries out multi-segment speed operation. Taking P12.0 = [1] binary as an example, the following table gives the relationship between the multisegment speed terminals and the multisegment speed segments:

operating segment	Multi-speed terminal 1	Multi-Speed Terminal 2	Multi-Speed Terminal 3	Multi-Speed Terminal 4
Multi-speed 1	0	0	0	0
Multi-speed 2	1	0	0	0
Multi-speed 3	0	1	0	0
Multi-speed 4	1	1	0	0
Multi-speed 5	0	0	1	0
Multi-speed 6	1	0	1	0
Multi-Speed 7	0	1	1	0
Multi-Segment Speed 8	1	1	1	0
Multi-speed 9	0	0	0	1
Multi-speed 10	1	0	0	1
Multi-speed 11	0	1	0	1
Multi-speed 12	1	1	0	1
Multi-speed 13	0	0	1	1
Multi-speed 14	1	0	1	1
Multi-speed 15	0	1	1	1

Multi-speed 16	1	1	1	1

0 for multispeed terminal OFF 1 for multispeed terminal ON

(2) Brake open holding brake control:

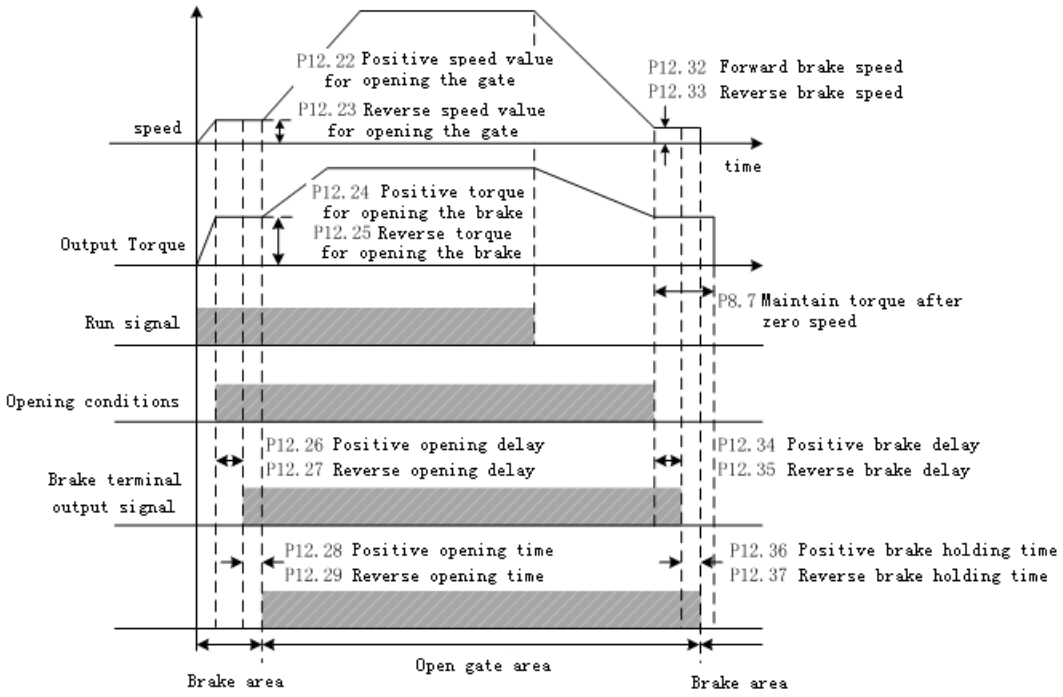
P12.22 to P12.37 Use this function to control the open holding brake when the system uses an electromagnetic brake. The brake control function is effective only when the digital output terminal is set to [3] Brake holding brake.

If the frequency converter receives a running signal when the motor is stopped, it gives the motor its corresponding torque value according to the positive and negative directions. If the two conditions of opening speed value (P12.22 or P12.23) and opening torque (P12.24 or P12.25) are satisfied at the same time, an opening signal is given on the output relay or output terminal for opening holding brake control.

If a stop signal is received while the motor is running, the motor starts to decelerate. If the output frequency reaches the value of parameter P12.32 [Forward holding speed] or P12.33 [Reverse holding speed], a holding signal is applied to its corresponding output terminal.

P12.28 and P12.29 indicate the time when the mechanical gate outputs the open gate command from the VFD brake terminal signal to the completion of the open gate; P12.36 and P12.37 indicate the time when the mechanical gate outputs the hold gate command from the VFD brake terminal signal to the completion of the hold gate.

Note: The torque and speed setting values are based on the motor parameters in group P16.



7.8 Basic motor parameters and V/F control parameters

(1) Motor rating parameters:

P16.0～P16.9 Motor parameters: In order to drive the motor correctly, it is necessary to confirm the parameters on the motor nameplate and input them to the corresponding parameters of the VFD. If the motor parameters are entered incorrectly, the VFD may not work properly and self-tuning will fail.P16.7 The number of motor stages is set according to the following formula: 120×P16.5/P16.6 value rounded up.P16.9 Synchronous speed is set according to the following formula: 120×P16.5/P16.7.

When two motors are connected in parallel, the parameter values P16.2 (rated power) and P16.4 (rated current) are the cumulative values of the nameplate parameters of the two motors.

(2) Carrier Frequency:

P16.12 The carrier frequency is mainly used to improve the noise of motor operation and the interference of the VFD to the outside world.

Advantages of using high carrier frequency: more ideal current waveform,

less current harmonics, less motor noise;

Disadvantages of adopting high carrier frequency: switching loss increases, temperature rise of frequency converter increases, output capacity of frequency converter is affected, meanwhile, leakage current of frequency converter increases, electromagnetic interference to the outside world increases. Under the high carrier frequency, the frequency converter needs to be derated.

Using a low carrier frequency is the opposite of the above.

Note: Too low a carrier frequency will cause low-frequency (0.5Hz~2Hz) or over-frequency (>50Hz) operation instability, torque reduction or even oscillation phenomenon.

The following figure represents a graphical representation of the relationship between the carrier frequency's impact on the environment:

carrier frequency	Electromagnetic noise, noises	leakage current	calorific value
1kHz	The larger the carrier frequency The less electromagnetic noise and clutter	The larger the carrier frequency The higher the leakage current	The larger the carrier frequency The greater the heat generation
5kHz			
10kHz			

The following table represents the relationship table between model and carrier frequency:

models	Carrier frequency (factory value kHz)
11kW～30kW	3.5
37kW～90kW	3

(3) V/F curve selection:

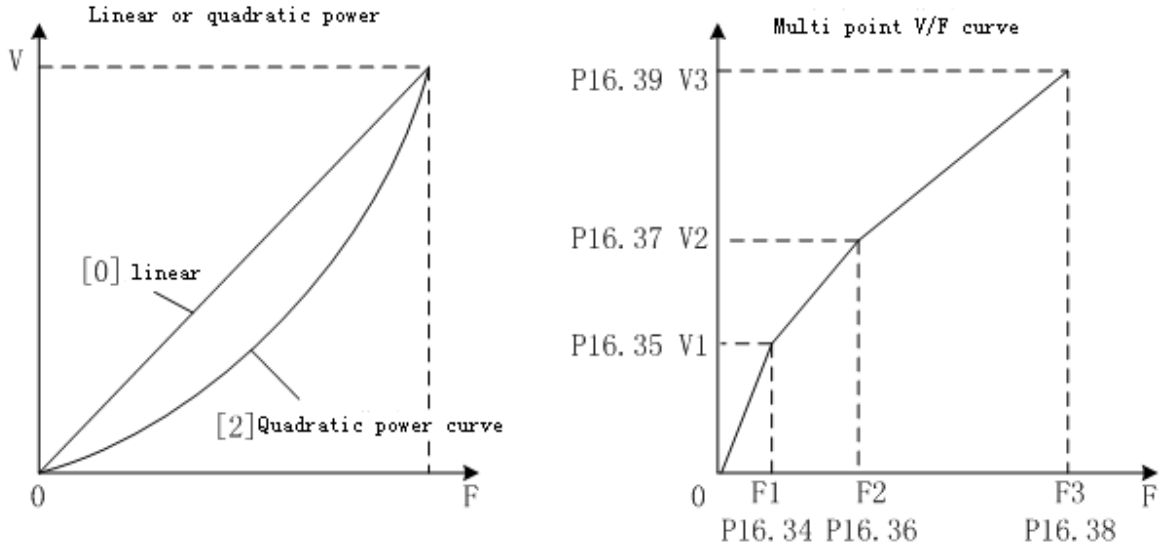
The parameter of P16.14 is valid for V/F control (P16.11=0), not for vector control.

[0] Linear V/F curve. Suitable for normal constant torque loads.

[1] Multi-point V/F curve. The V/F curve can be defined by setting (P16.33 to P16.45).

[2] Quadratic power curve. Applicable to variable torque load occasions, such as: fans, pumps, etc..

The individual curves are shown below:



The twelve parameters from P16.34 to P16.45 define the multi-point V/F curve. the setting value of the V/F curve is usually set according to the load characteristics of the motor. Note: V1＜V2＜V3, F1＜F2＜F3. too high a low-frequency voltage setting may cause the motor to overheat or even burn, and the VFD may stall or overcurrent protect.

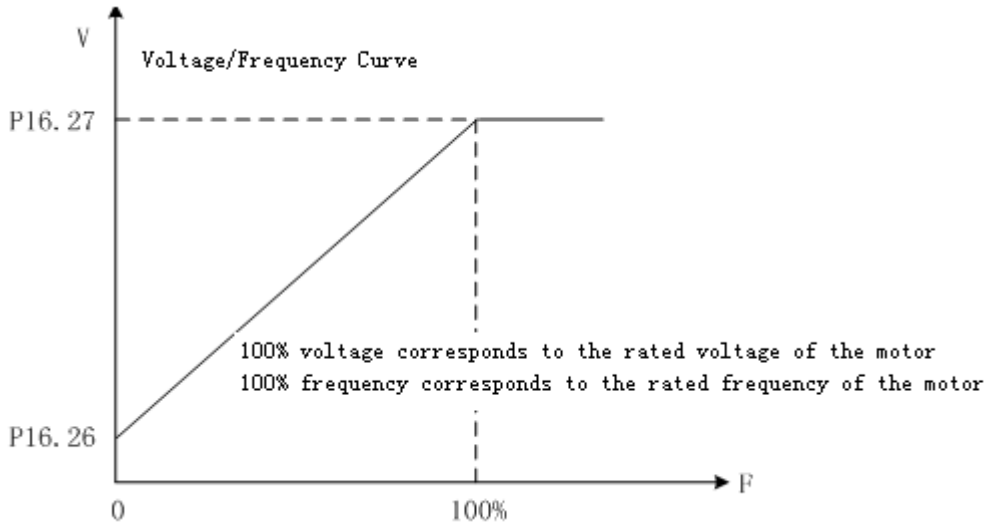
(4) Torque compensation:

P16.15 Torque compensation is only valid in V/F control mode. Enable this parameter when the starting torque is low. However, enable this parameter only after the static self-tuning in V/F control mode is completed. Enabling this parameter increases the starting current and starting voltage, and overcurrent may occur. It is recommended to enable

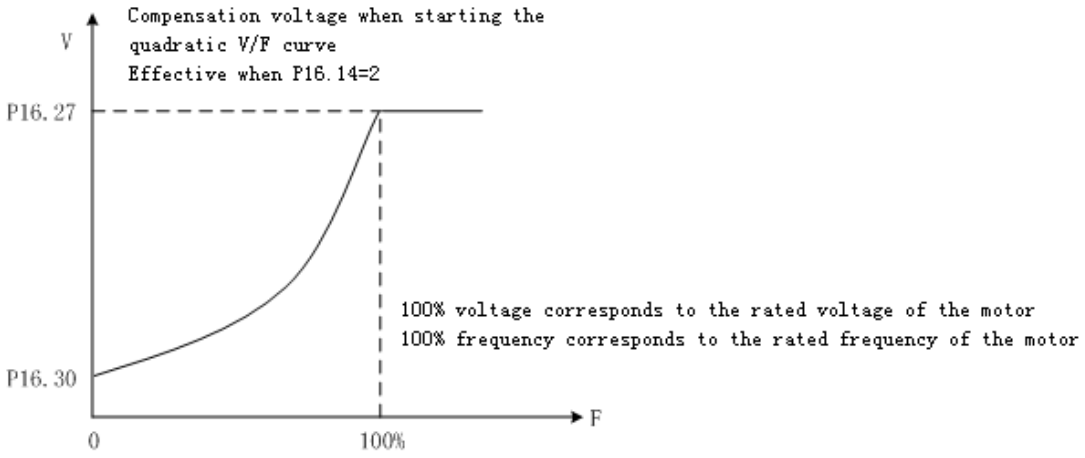
this parameter only when a high starting torque is required (mixers, brick kilns, etc.).

(5) Compensates for voltage at startup:

When P16.14 = [0] linear V/F curve, the V/F startup compensation voltage setting value is P16.26. P16.26 and P16.27 can be set by referring to the following figure:



When P16.14 = [2] power-of-two curve, the V/F startup compensation voltage setting value is P16.30. P16.30 and P16.27 can be set by referring to the following figure:

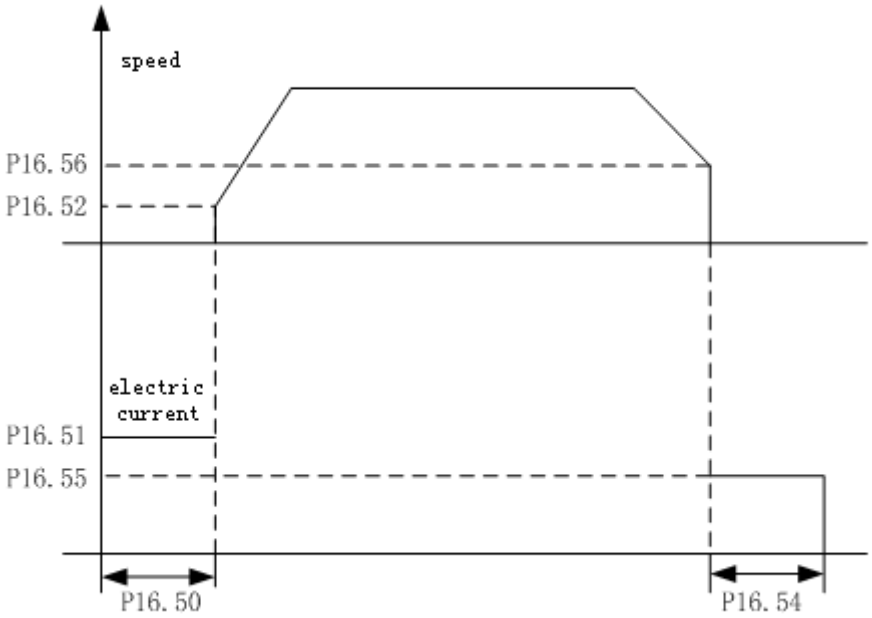


(6) DC braking:

P16.50 to P16.56 are DC braking functions, which are divided into DC braking at start and DC braking at stop. This function works only in V/F control mode.

DC braking at startup: Set the values of P16.50, P16.51, and P16.52 to add DC braking current to the motor that is in free-slip stop, so that the motor stops first and then starts again.

DC braking when stopping: Set the values of P16.54, P16.55 and P16.56 to add DC braking current to the motor that is decelerating to stop the motor. The specific settings are shown in the following figure:



(7) Suppression of resonance:

P16.64 Stabilizing action gain is a parameter that automatically eliminates resonance in the event of mechanical or electrical resonance in the motor. If the setting value is not zero, the stabilizing controller acts to suppress and eliminate the resonance phenomenon caused by mechanical or electrical reasons. If set to zero, the stabilizing controller does not act.

7.9 Motor vector control parameters

(1) Torque and speed switching:

P20.0 is the value to be set for switching between torque control and speed control.

P20.0=0 and P20.1=0, P20.2=0 is speed control mode, it is not possible to switch to torque control mode with this setting.

Torque control mode is available when P20.0=0 and P20.1≠0, P20.2≠0. It is not possible to switch to speed control mode with this setting.

P20.0 = 1 and P20.1 ≠ 0, P20.2 ≠ 0 is the torque control mode when the torque and speed switching signal is set to 1, and is the speed control mode when the torque and speed switching signal is set to 0.

In torque control, when the motor output torque is greater than the load torque, the motor speed will gradually increase to the equilibrium or limit value. When the motor output torque is less than the load torque, the motor speed gradually decreases to the equilibrium or negative limit value. In order to use torque control, make preparations to be able to operate normally when P16.11 is selected as [1] open-loop vector or [2] closed-loop vector mode.

P20.3 Fixed torque value setting: This parameter is valid when parameter P20.1 is set to [4].

(2) Zero Torque Function

Activating this function by terminal or communication sets the given torque to zero in torque control mode. When this signal disappears, the VFD will automatically switch to speed control mode, tracking from the current speed to the given speed. To enable this function, please set P12.24 (open gate forward torque) and P12.25 (open gate reverse torque) to 0%.

(3) Torque limitation:

P20.7 is the setting source for the torque limit, this setting value is valid in both speed control mode and torque control mode.The values of P20.8 and P20.9 are only valid when P20.7 = 1.

(4) Encoder Direction:

P20.15 Encoder phase sequence reversal function: It has the function of making the encoder output A or B phase ahead when the motor rotates positively. If the encoder A and B connections are reversed, or the motor U, V and W connections are reversed, the phase sequence can be changed by changing the parameters without changing the encoder wiring.

When [0] is disabled, the encoder rotation direction is the same as the motor rotation direction;

When [1] is enabled, if the encoder rotates in the opposite direction to the motor, the VFD internally swaps phase A and B for each other to recognize the function.

(5) Synchronized compensation control:

When driving a load with two motors connected non-rigidly, the function of adjusting the speed of one of the motors to keep the two motors in balanced position. This function only works under closed-loop vector control and must be used in conjunction with the GDHF-PGD2 synchronous PG card.

Synchronization compensation control is valid for only one of the VFDs controlling two motors (VFD with GDHF-PGD2 synchronization PG card installed). When DI function "[10] hook mode" is valid or DP control "CW0.9 hook mode" is valid, set the value of P20.26 and P20.27 both greater than 0, the synchronization compensation control will be activated only after both motors open the gate and the speed of the other motor reaches 2% of the rated speed. 2% of the rated speed of the other motor, the synchronization compensation control will be activated.

When P20.34 is set to [0], the synchronization compensation control algorithm 1 minimizes the encoder pulse error for both motors to 0 pulses. Set P20.26 and P20.27 to values greater than 0 to adjust the synchronization compensation control response. It is generally recommended that P20.26 be set to 50% to 100% and P20.27 to 3% to 5%.

When P20.34 is set to [1], the synchronization compensation control algorithm 2 controls the encoder pulse error of both motors to a minimum of 200 pulses. Since this control algorithm is internally fixed, it is sufficient to set P20.26 and P20.27 to any value greater than zero.

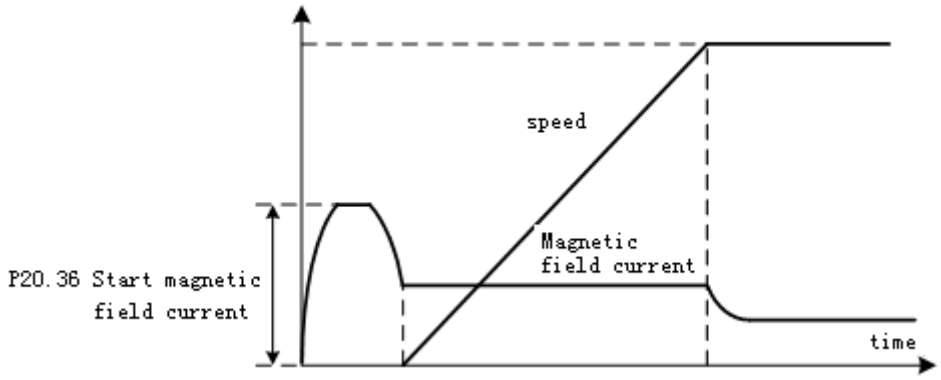
If both VFDs are GF630N02 series VFDs of GUIDE, it is recommended that P20.34 be set to [1]; if one VFD is GF630N02 series VFD of GUIDE and the other one is other brand VFD, it is recommended that P20.34 be set to [0].

(6) DROOP control:

When two motors are rigidly connected to drive a load, this function stabilizes the motor torque and balances the load between the two motors. The DROOP control function of the VFD controlling the two motors must both be active. the DROOP control decelerates the motors when the load torque is too high and accelerates the motors when it is too low, thus maintaining load balance. DROOP control is not effective when P20.60 is set to 0. P20.61 is a parameter for adjusting the response of DROOP control, so increase this setting when vibration and oscillation occur.

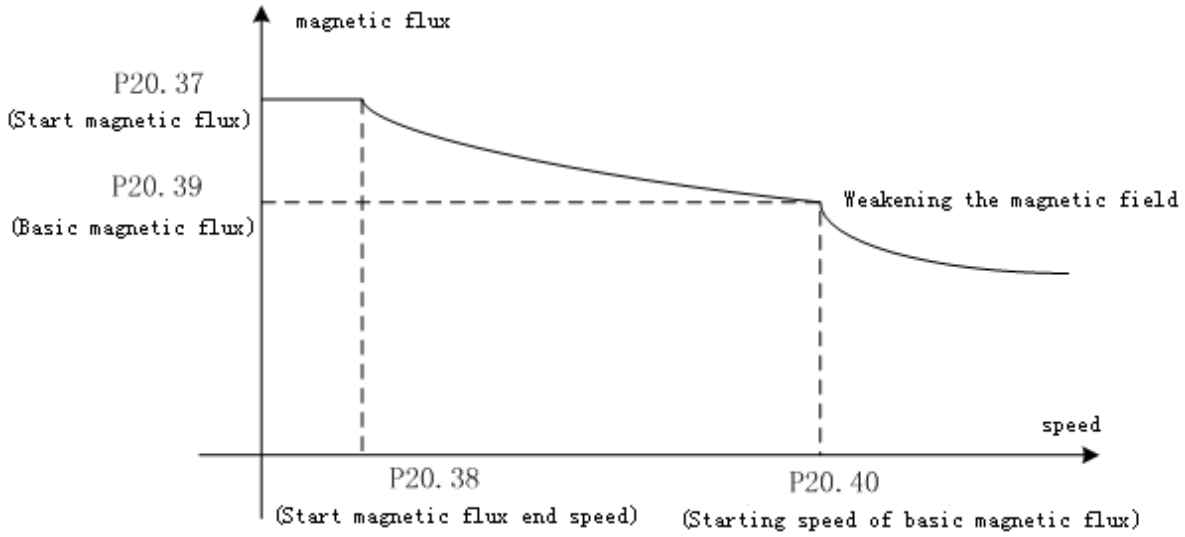
(7) Starting magnetic field current:

P20.36 Startup magnetic field current: This item controls the base limit value of the magnetic field current at startup, and reduces the startup current when vector controlled, as shown below:



(8) Magnetic Flux:

P20.37 to P20.40 set the size of the magnetic field corresponding to the speed as shown below:

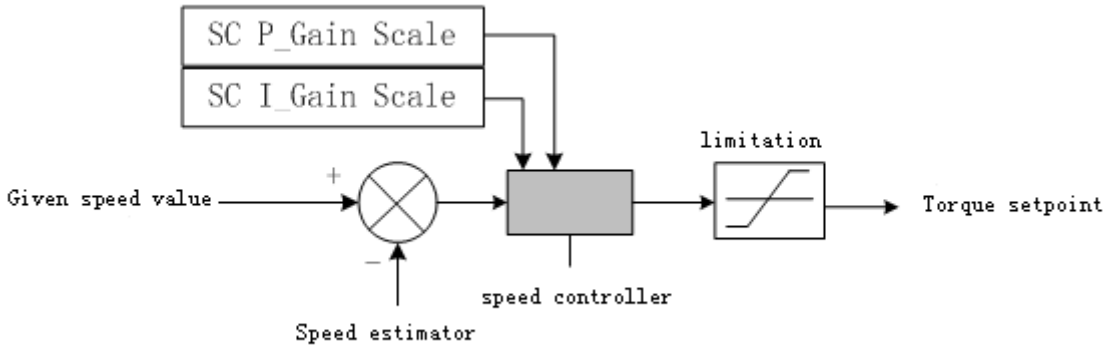


(9) Velocity ring:

P20.55 Speed Tracking Controller Proportional Gain: It has the characteristic that as the speed error rises, the high torque output command becomes larger. If its value is set to a larger value, the speed deviation is quickly reduced.

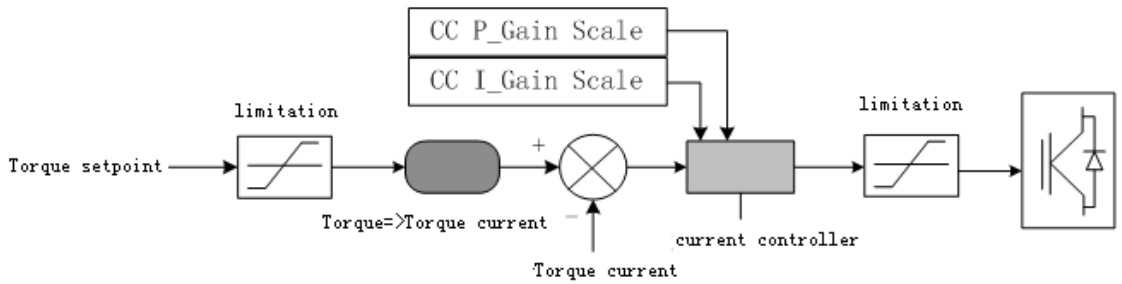
P20.56 Speed Tracking Controller Integral Gain: This is the time it takes for the speed controller to output the rated torque command when a constant speed error persists. If its value is set to a small value the speed deviation is quickly reduced.

The speed controller gain set by percentage (%) can be obtained by auto-tuning, and the speed control block diagram is shown below:



(10) Current loop:

P20.62 and P20.63 are the current loop proportional and integral gains. Sets the percent (%) value of the current controller gain. can be obtained by auto-tuning. The vector control block diagram is shown below:



7.10 Advanced Applications

If a problem such as vibration or misalignment occurs during operation, and a malfunction is caused by the control performance, adjust the parameters in the following table to correspond to the control mode, and only the parameters that are frequently adjusted are recorded in the following table.

Control mode	Parameter name	Performances	Default value	Recommended value	Method of adjustment
V/F control	P16.64 V/F stabilizing action gain	Suppresses mid-speed (10 to 40 Hz) jerky tuning and vibration.	100	80 to 150	In case of insufficient torque for heavy loads: Reduce the value of this parameter; When oscillation occurs with light loads: Increase the value of this parameter.
	P16.12 Carrier frequency setting	Improvement of motor electromagnetic noise	Varies by power	Varies by power (if you change the carrier frequency, it is recommended to do the motor parameter self-tuning all over again)	When the electromagnetic noise of the motor is large: increase the value of this parameter; When vibration occurs at low and medium speeds: Reduce the value of this parameter.
	P16.15 torque compensation	Improvement of motor torque	prohibited	prohibited	In case of heavy load and insufficient torque at low speed: enable this parameter; When oscillating with light load: this parameter is

					disabled
	P16.26 V/F startup voltage bias	Improved low-speed torque	0.75	0.5 to 1.2	When the low-speed torque is insufficient: increase the value of this parameter; when the starting shock is too large: decrease the value of this parameter.
	P7.0 Current Limit Value	Improvement of current inrush	150	150 to 220	When the motor speed response is slow and out of tune under heavy load: increase the value of this parameter; When the motor current shock is large during light load: reduce the value of this parameter.
vector control	P16.12 Carrier frequency setting	Improvement of motor electromagnetic noise	Varies by power	Varies by power (if you change the carrier frequency, it is recommended to do the motor parameter self-tuning all over again)	When the electromagnetic noise of the motor is large: adjust the value of this parameter; when vibration occurs at low and medium speeds: adjust the value of this parameter.
	P7.0 Current Limit Value	Improvement of current inrush	150	150 to 220	When the motor speed response is slow and out of tune under heavy load: increase the value of this

					parameter; When the motor current shock is large during light load: reduce the value of this parameter.
	P20.43 Torque observation time	Improvement of motor vibration and misalignment	75	50-100	When the motor vibrates under load: Increase the value of this parameter; When the motor torque response is slow due to load change: reduce the value of this parameter.
	P20.56 Speed Tracking Integral Gain	Improved speed and torque response to suppress vibration and misalignment	100	80 to 150	When the speed and torque response is too slow: increase the value of this parameter; when the shock is big during starting: decrease the value of this parameter.

8. Abnormal Countermeasures and Inspections

In order to protect the equipment, the VFD has protection functions for overcurrent, overvoltage and undervoltage. When the protection function is activated, the output of the VFD is cut off and the motor is stopped, and this state is maintained until forced reset (reset).

8.1 Warning Codes

Warning code displayed in the stopped state

Warning code	Warning message	Reason for warning	Step
W01	The system's not ready. SYS_NOT_RDY	The VFD is not ready at power-on.	Confirm VFD input voltage, bus voltage
W02	No drive enable signal NO_DRV_ENABLE	When the digital input terminal is set to [Drive Enable], the corresponding conditions are not met; the corresponding control word for communication is not signaled.	Confirm the digital input parameters of parameter group P3, the corresponding external relays and wiring. Checking the status of the control word in communication
W03	Terminal Local Warning LOCAL_EM	When the digital input terminal is set to [Local Emergency Stop Signal], the conditions corresponding to it are met.	Confirm the digital input parameters of parameter group P3, the corresponding external relays and wiring.
W04	Terminal Remote Warning REMOTE_EM	When the digital input terminal is set to [Remote Emergency Stop Signal], the corresponding conditions are met.	Confirm the digital input parameters of parameter group P3, the corresponding external relays and wiring.
W06	overheating OT	The frequency converter overheats and the radiator temperature rises to the	Confirm case temperature, cooling fan, load current

Warning code	Warning message	Reason for warning	Step
		value of parameter P7.14 (over-temperature fault)	
W09	DP communication warning P/BALARM	DP card communication external warning	Checking the status of the corresponding control bit for DP communication
W10	MODBUS communication warning MODBUS ALARM	External warning for Modbus communication	Confirmation of the status of the corresponding control bits for Modbus communication
W15	Parameter setting error PARAMETER ERROR	Parameter setting error	Verify that the parameter settings are not out of range
W18	Temperature detection abnormality Temp_Sensing Fail	Temperature Detection Abnormal Warning	Confirm temperature sampling connection cable

8.2 Fault Codes

Fault codes are displayed in the operating state.

Trouble code	Error message (computing)	Failure causes and measures
[E052]	U-phase IGBT fault (not resettable) ERR_UT not reset	Confirm that this IGBT is normal Confirm that the IGBT driver cable and driver circuit are normal. Power back on after power failure
[E054]	V-phase IGBT fault (non-resettable) ERR_UT not reset	Confirm that this IGBT is normal Confirm that the IGBT driver cable and driver circuit are normal. Power back on after power failure
[E055]	W-phase IGBT fault (non-resettable) ERR_UT not reset	Confirm that this IGBT is normal Confirm that the IGBT driver cable and driver circuit are normal. Power back on after power failure
[E057]	Built-in brake unit (non-resettable) ERR_DB not reset	Verify that the brake IGBT is functioning properly Confirm that the brake IGBT drive cable and drive circuit are normal.

		Power back on after power failure
[E100]	overpressurization OV	Confirmation of braking resistor Confirm parameter P8.35 (Deceleration time 1) and adjust its timing. Confirmation of parameter P7.12 (busbar overvoltage)
[E105]	phase sequence UV	Drop in bus voltage to its limit value due to a drop in input voltage or input voltage out of phase Confirmation of input voltage Confirm the electromagnetic contactor on the input side of the VFD Confirmation of parameter P7.13 (Bus undervoltage)
[E106]	Holding brake feedback abnormality 1 Brake abnormal 1	Confirm DI terminal wiring Verify that the motor brake brake control is functioning properly
[E107]	Holding brake feedback abnormality 2 Brake abnormal 2	Confirm DI terminal wiring Verify that the motor brake brake control is functioning properly
[E108]	DC contactor failure DC switch open	Check DC contactor connection wires Verify that the DC contactor is functioning properly
[E110]	overcurrent OC	Check motor load; check for open gate Confirmation of acceleration and deceleration times Confirm that the motor and its wiring are normal Verify that the encoder and wiring are correct Confirmation of parameter P7.4 (Overcurrent protection)
[E111]	overloaded OL	VFD output current exceeds parameter P7.48 (overload current 1) and time exceeds P7.49 (overload time 1) Check motor load Confirmation of load current Confirmation parameters P7.48, P7.49 Confirm that the motor and its wiring are normal
[E112]	short circuit to ground ZC	Confirmation parameter P7.8 Confirm that the motor is not short-circuited Confirm that the VFD ground wire is

		connected Verify that the current sensor is wired properly
[E113]	Input out of phase MIP	Confirm that the VFD input line wiring is normal Verify that the control wires on the linear filter board are connected properly.
[E114]	Output Out-of-Phase MOP	Confirm that the VFD output line to the motor is normal
[E115]	overspeed OS	Motor speed exceeds parameter P7.19 Confirmation parameter P7.19 Confirm the encoder is good or bad and there is no interference in the wiring.
[E116]	Open-loop vector control error SLVC Fail	Verify that the acceleration and deceleration times are not too short Confirmation parameter P7.23
[E117]	motor stalling MOTOR STALL	Check brake connections If there is an encoder, make sure that the encoder is connected and that parameters P20.14 and P20.15 are set correctly.
[E118]	Encoder Error PG ERROR	Verify that the electrical connection of the encoder and the settings of parameters P20.14 and P20.15 are correct.
[E119]	speed anomaly (geology) SPEED ABNORMAL	Verify that the electrical connection of the encoder and the settings of parameters P20.14 and P20.15 are correct. Confirmation parameters P7.31, P7.32
[E120]	VFD IGBT overheating OT	Confirmation of external and internal temperatures Confirm the VFD cooling fan Confirmation of load current
[E138]	Temperature Sampling Fault TEMP_SENSING FAIL	Confirm temperature sampling connection cable
[E152]	U-phase IGBT failure PDP[U]	Confirm that this IGBT is normal Confirm that the IGBT driver cable and driver circuit are normal. Confirm that the output wiring or motor is normal
[E154]	V-phase IGBT failure PDP[V]	Confirm that this IGBT is normal Confirm that the IGBT driver cable and driver circuit are normal. Confirm that the output wiring or motor is normal
[E155]	W-phase IGBT failure	Confirm that this IGBT is normal Confirm that the IGBT driver cable and

	PDP[W]	driver circuit are normal. Confirm that the output wiring or motor is normal
[E156]	hardware overcurrent Hardware OC	Check motor load; check for open gate Confirmation of acceleration and deceleration times Confirm that the motor and its wiring are normal Confirm that the VFD output current is not too large
[E157]	Failure of built-in brake unit PDP[DB]	Confirm that this power device is functioning properly Confirm that the power device driver cable and driver circuit are normal.
[E167]	CAN communication error CAN_ERR	Confirm that the VFD communication is normal
[E170]	Failure of self-tuning MOTOR TUNING FAIL	Confirm motor nameplate parameters Confirmation parameter P7.33
[E200]	terminal local fault LOCAL_EM	When the digital input terminal is set to [Local emergency stop signal], the corresponding terminal is signaled. Confirm the digital input parameters of parameter group P3, the corresponding external relays and wiring.
[E201]	Terminal Remote Fault REMOTE_EM	When the digital input terminal is set to [Remote emergency stop signal], the corresponding terminal is signaled. Confirm the digital input parameters of parameter group P3, the corresponding external relays and wiring.
[E202]	Modbus communication failure MODBUS EMERGENCY	Modbus communication control word CW0.4 has a signal to confirm its status
[E203]	No drive control signal DRIVE DISABLED	No signal for the corresponding control word in DP communication; no signal for the corresponding terminal in terminal control.
[E204]	DI Function Setup Repeat ERR DUPLICATE DI SET	Confirm DI terminal settings
[E210]	Keyboard Operator Malfunction Panel Error	Verify that the operating keyboard is connected properly
[E220]	Memory CRC checksum error MEMORY CRC ERR	Replacement of control board
[E221]	parameter error PARAMETER ERROR	Confirm that the parameter settings meet the requirements

8.3 Troubleshooting

Fault phenomenon		Inspection matters	Step
electrical machinery incapable revolve	No output from VFD	-Is the digital input terminal assigned -Whether the run command signal is ON -Is the forward or reverse terminal in good contact with the COM terminal	-Check digital input terminal assignment -Run command signal is set to ON -Please connect the forward or reverse terminal and COM terminal (selected as terminal mode)
		-Is the input three-phase power supply normal?	-Check the tightness of the terminal screws. -Measurement of input three-phase terminal voltage
		-Is the operation panel power light on. If yes, check again if the operation signal lamp is on.	-If the power light on the operation panel does not turn on and there is no improvement after plugging the panel cable back in, please consult your agent or our company. -If the operation panel power lamp is on but the run signal lamp is not, give the run command again.
		-If a warning or error message has been displayed on the Operation panel	-Run after reset
		-Is the operating mode and command value of the VFD correct?	-Check the VFD operation mode parameters
	The VFD has an output	-Is the motor in a holding condition or is the load too heavy?	-Release the holding brake and lighten the load -Try running the motor separately
		-If the motor is equipped with a brake, does the brake operate normally?	-Cautiously open the gate before running
		-Is the motor wired properly or is there a phase loss in the motor?	-Check the connection status of VFD output and motor output.
		-Is the VFD output current greater than or equal to the current limit value?	-Confirm that the parameter settings are correct and try to adjust the acceleration and deceleration times to slowly increase the speed.
		-Is the contactor status ON when there is an electromagnetic contactor between the VFD and the motor?	-Confirm the ON status of the electromagnetic contactor and the wiring status.
When the motor steering is reversed		-Is the wiring between the VFD output three-phase and the motor normal?	-Interchange V-phase and W-phase
		-The terminals connected to the control circuit and their parameter settings	-Check forward/reverse direction terminal wiring and parameter

Fault phenomenon	Inspection matters	Step
	are normal.	values
When motor speed cannot be increased	-Is the load too heavy	-Lighten the load -If it is overloaded, it activates its limiting function, so that the speed falls below its speed setting. Unloading or relieving the load
	-Speed command signal is normal	-Check control circuit wiring or signals and setpoints
Motor jerks during operation	-Is there too much load variation -Is there a large change in the input voltage -Does it occur at a particular frequency	-Raising the power of motors and VFDs by one notch -Reduces load and input voltage variations -Fine-tune its output frequency setting
When the motor current exceeds the rated current	-Is the input voltage dropping back	-Check the VFD input power
	-Is the load too large	-Discharge or lighten the load
	-Is the motor in a holding state	-Release the motor from the holding state
	-Whether the load is dynamic (its weight is variable)	Re-confirmation of VFD power calculation
	-Is motor self-tuning completed properly	-Re-implementation of motor self-tuning

9. Maintenance and care

 distress
1. Do not touch the VFD's terminals; there is a high voltage on the terminals. There is a risk of electrocution. 2. Be sure to install the terminal cover before energizing, and when removing the cover, be sure to disconnect the power supply. There is a risk of electrocution. 3. Cut off the main circuit power supply and confirm that the light-emitting diode is off before carrying out maintenance and inspection. Danger of residual voltage on electrolytic capacitors. 4. Do not perform maintenance or inspection work by non-specialized technicians. There is a risk of electrocution.
 take note of
1. CMOS integrated circuits are installed on the operation panel board, control circuit board, and driver circuit board, so be careful when using them. By touching the board directly with your fingers, electrostatic induction may damage the integrated chips on the board. 2. Do not change the wiring or disassemble the terminal wires while the power is on. There is a risk of electrocution. 3. Do not check signals during operation. can damage the device.

9.1 Care and maintenance instructions

Since VFD is a typical product combining power electronic technology and microelectronic technology, it has the dual characteristics of industrial equipment and microelectronic devices. Changes in the environment in which the VFD is used, such as the influence of temperature, humidity, smoke, etc., as well as the aging of the VFD's internal components and other factors may lead to a variety of faults in the VFD. Therefore, in order to make this product run normally for a long time, it is necessary to carry out daily inspection and regular (at least once every

six months) maintenance and repair of the frequency converter during storage and use.

9.2 Routine maintenance

In order to prevent the frequency converter from malfunctioning, ensure the normal operation of the equipment and extend the service life of the frequency converter, it is necessary to carry out routine maintenance of the frequency converter, and the contents of the routine maintenance are indicated as follows:

Inspection items	Inspection content	Criterion
Operating environment	1. Temperature, humidity 2. Dust, gas	1. When the temperature > 40 ℃ should be shut down or reduce the ambient temperature Humidity < 95%, no condensation 2. No odor, no flammable, explosive gas
Cooling system	1. Installation environment 2. VFD body fan	1. The installation environment is well ventilated and the air ducts are not blocked. 2. The body fan runs normally, no abnormal noise
VFD body	1. Vibration, temperature rise 2. Noise 3. Wires, terminals	1. Smooth vibration, normal air temperature at the air outlet 2. No abnormal noise, no odor 3. Fastening screws are not loose
Electrical machinery	1. Vibration, temperature rise 2. Noise	1. Smooth operation and normal temperature 2. No abnormal, uneven noise
Input and output parameters	1. Input Voltage 2. Output current	1. Input voltage within the specified range 2. Output current below rated value

9.3 Regular maintenance

In order to prevent the VFD from malfunctioning and to ensure its long

time high performance and stable operation, the user must check the VFD regularly (within half a year), and the content of the check is expressed as follows:

Inspection items	Inspection content	Methods of elimination
Screws for external terminals	Loose screws or not	tighten
power component	Dust, dirt	Complete removal of debris with dry compressed air
car radiator	Dust, dirt	Complete removal of debris with dry compressed air
electrolytic capacitor	Discoloration and odor	Replacement of electrolytic capacitors
fan (loanword)	Abnormal noise and vibration Whether the cumulative time exceeds 20,000 hours	1. Clearance of debris 2. Replacement of the fan
PCB board	Dust, dirt	Complete removal of debris with dry compressed air

9.4 Replacement of wearing parts

The fan and electrolytic capacitors in the VFD are easily damaged parts, and their life span is closely related to the use of the environment and maintenance conditions. The general life time of the fragile components is as follows:

Fan: Replacement is required after more than 5 years of use. If the VFD is used in a critical position, then please replace the fan in time when it first starts to make abnormal noise. Fan spare parts are available from Wuhan Guide Technology Co.,Ltd.

Electrolytic capacitors: must be replaced after more than 5 years of use. For details, please contact Wuhan Guide Technology Co.,Ltd. or call our national unified service hotline (400-0077-570).

Note: Life time is the time when used under the following conditions.

(1) Ambient temperature: 40° C;

(2) Load factor: 80%;

(3) Operating rate: 24 hours/day.

9.5 Storage and warranty

After the VFD is purchased and not used temporarily or stored for a long period of time, the following matters should be noted:

(1) Avoid storing the VFD in places with high temperature, humidity or vibration, metal dust, and ensure good ventilation.

(2) If the frequency converter is not used for a long time, it should be energized once every six months to restore the characteristics of the filter capacitor and check the function of the frequency converter at the same time. Energized should be through an autotransformer gradually increase the voltage, and energized time is not less than 5 hours.

During the warranty period, a repair fee shall be charged for faults caused by

① Malfunctions caused by use not in accordance with the operation manual or use beyond standard specifications.

② Malfunctions caused by self-repair or modification without permission.

③ Malfunctions caused by poor storage.

④ Malfunctions caused when the VFD is used for non-normal functions.

⑤ Damage to the machine caused by fire, salt corrosion, gas corrosion, earthquake, storm, flood, lightning, abnormal voltage or other force majeure.

Even if the warranty period is exceeded, the company provides a lifetime paid maintenance service.

Appendix A: Introduction to the MODBUS Protocol

A1 Transmission mode

The MODBUS protocol has two transmission modes: ASCII mode and RTU mode.

All devices on the same MODBUS network must select the same transmission mode.

GUIDE series VFDs support RTU mode only.

A2 CRC checksum

CRC or Cyclic Redundancy Check: is one of the most commonly used error checking codes in the field of data communication, characterized by the fact that the lengths of the information field and the check field can be chosen arbitrarily. Cyclic Redundancy Check (CRC) is a data transmission error checking function that performs a polynomial computation on the data and attaches the result obtained to the frame, and the receiving device performs a similar algorithm to ensure the correctness and integrity of the data transmission.

The basic principle of cyclic redundancy check code (CRC) is that the K-bit information code is followed by splicing the R-bit check code, and the whole length of the code is N-bit, therefore, this code is also called (N, K) code. For a given (N, K) code, it can be shown that there exists a polynomial G(x) with the highest power of N-K = R. The polynomial G(x) is the same as the polynomial G(x). A checksum code with K bits of information can be generated from G(x), which is called the generating polynomial of this CRC code. The specific process of generating the checksum code is as follows: assuming that the message to be sent is represented by the polynomial C(x), shift C(x) to the left by R bits (which can be expressed as C(x) × 2R) so that the right side of C(x) is left empty by R bits, which is the location of the checksum code. The remainder obtained by dividing C(x) × 2R by the generating polynomial G(x) is the checksum.

In practice, the data is calculated bit by bit, or a table is looked up to obtain the CRC check digit.

The data is calculated bit by bit to find the CRC check digit, the method, which requires more CPU calculations, is not applicable by calculating the CRC check digit bit by bit when the CPU processing load of other tasks is high or when the task execution time requirement is short. However, the calculation process has less instruction code, which is highly practical in applications where CPU code storage space is tight.

The lookup table method, with its simple computation process and fast processing time, is the best choice for obtaining the CRC check digit using the lookup table method in applications where the task execution time requirement is short and the code storage space is ample.

The following code is a C language implementation of the CRC 16-bit check digit lookup table method for user reference only.

```
INT16U CRC16 (const INT8U *nData, INT16U wLength)
{
static const INT16U wCRCTable[] = {
    0x0000, 0xc0c1, 0xc181, 0x0140, 0xc301, 0x03c0, 0x0280, 0xc241.
    0xc601, 0x06c0, 0x0780, 0xc741, 0x0500, 0xc5c1, 0xc481, 0x0440.
    0xcc01, 0x0cc0, 0x0d80, 0xcd41, 0x0f00, 0xcfc1, 0xce81, 0x0e40.
    0x0a00, 0xcac1, 0xcb81, 0x0b40, 0xc901, 0x09c0, 0x0880, 0xc841.
    0xd801, 0x18c0, 0x1980, 0xd941, 0x1b00, 0xdbc1, 0xda81, 0x1a40.
    0x1e00, 0xdec1, 0xdf81, 0x1f40, 0xdd01, 0x1dc0, 0x1c80, 0xdc41.
    0x1400, 0xd4c1, 0xd581, 0x1540, 0xd701, 0x17c0, 0x1680, 0xd641.
    0xd201, 0x12c0, 0x1380, 0xd341, 0x1100, 0xd1c1, 0xd081, 0x1040.
    0xf001, 0x30c0, 0x3180, 0xf141, 0x3300, 0xf3c1, 0xf281, 0x3240.
    0x3600, 0xf6c1, 0xf781, 0x3740, 0xf501, 0x35c0, 0x3480, 0xf441.
```

```
    0x3c00, 0xfcc1, 0xfd81, 0x3d40, 0xff01, 0x3fc0, 0x3e80, 0xfe41.
    0xfa01, 0x3ac0, 0x3b80, 0xfb41, 0x3900, 0xf9c1, 0xf881, 0x3840.
    0x2800, 0xe8c1, 0xe981, 0x2940, 0xeb01, 0x2bc0, 0x2a80, 0xea41.
    0xee01, 0x2ec0, 0x2f80, 0xef41, 0x2d00, 0xedc1, 0xec81, 0x2c40.
    0xe401, 0x24c0, 0x2580, 0xe541, 0x2700, 0xe7c1, 0xe681, 0x2640.
    0x2200, 0xe2c1, 0xe381, 0x2340, 0xe101, 0x21c0, 0x2080, 0xe041.
    0xa001, 0x60c0, 0x6180, 0xa141, 0x6300, 0xa3c1, 0xa281, 0x6240.
    0x6600, 0xa6c1, 0xa781, 0x6740, 0xa501, 0x65c0, 0x6480, 0xa441.
    0x6c00, 0xacc1, 0xad81, 0x6d40, 0xaf01, 0x6fc0, 0x6e80, 0xae41.
    0xaa01, 0x6ac0, 0x6b80, 0xab41, 0x6900, 0xa9c1, 0xa881, 0x6840.
    0x7800, 0xb8c1, 0xb981, 0x7940, 0xbb01, 0x7bc0, 0x7a80, 0xba41.
    0xbe01, 0x7ec0, 0x7f80, 0xbf41, 0x7d00, 0xbdc1, 0xbc81, 0x7c40.
    0xb401, 0x74c0, 0x7580, 0xb541, 0x7700, 0xb7c1, 0xb681, 0x7640.
    0x7200, 0xb2c1, 0xb381, 0x7340, 0xb101, 0x71c0, 0x7080, 0xb041.
    0x5000, 0x90c1, 0x9181, 0x5140, 0x9301, 0x53c0, 0x5280, 0x9241.
    0x9601, 0x56c0, 0x5780, 0x9741, 0x5500, 0x95c1, 0x9481, 0x5440.
    0x9c01, 0x5cc0, 0x5d80, 0x9d41, 0x5f00, 0x9fc1, 0x9e81, 0x5e40.
    0x5a00, 0x9ac1, 0x9b81, 0x5b40, 0x9901, 0x59c0, 0x5880, 0x9841.
    0x8801, 0x48c0, 0x4980, 0x8941, 0x4b00, 0x8bc1, 0x8a81, 0x4a40.
    0x4e00, 0x8ec1, 0x8f81, 0x4f40, 0x8d01, 0x4dc0, 0x4c80, 0x8c41.
    0x4400, 0x84c1, 0x8581, 0x4540, 0x8701, 0x47c0, 0x4680, 0x8641.
    0x8201, 0x42c0, 0x4380, 0x8341, 0x4100, 0x81c1, 0x8081, 0x4040 };

INT8U nTemp.
INT16U wCRCWord = 0xFFFF;

    while (wLength--)
```

```
    {
        nTemp = *nData++ ^ wCRCWord.
        wCRCWord >>= 8;
        wCRCWord ^= wCRCTable[nTemp];
    }
    return wCRCWord.
} // End: CRC16
```

A3 MODBUS protocol

This protocol defines a structure of messages that a controller can recognize as being used, regardless of the network over which they are communicated. It describes how a controller requests access to other devices, how it responds to requests from other devices, and how it detects and logs errors. It establishes a common format for message field patterns and content.

When communicating on a MODBUS network, this protocol dictates that each controller needs to know their device address, recognize messages sent by address, and decide what action to generate. If a response is required, the controller will generate a feedback message and send it out using the MODBUS protocol. All devices on the same MODBUS network must select the same transmission mode.

MODBUS master and slave devices, both query and respond with MODBUS message frames.A typical MODBUS message frame contains an address field, a function field, a data field, and a frame checksum field.In RTU mode, the message frame sends start with a pause interval of at least 3.5 character times. With diverse character times at network baud rates, this is the easiest to achieve (as shown in T3.5 of the following table). The first field transmitted is the device address. The

transmission characters that can be used are the hexadecimal 0... .9, A... F. The network device constantly detects the network bus, including during the pause interval. When the first field (address field) is received, each device decodes it to determine if it is addressed to itself. After the last transmitted character, a pause of at least 3.5 character time marks the end of the message. A new message may begin after this pause.

The entire message frame must be transmitted as a continuous stream. If there is a pause of more than 1.5 characters before the frame is complete, the receiving device will refresh the incomplete message and assume that the next byte is the address field of a new message. Similarly, if a new message follows the start of the previous message in less than 3.5 character time, the receiving device will assume that it is a continuation of the previous message. This will result in an error because the value in the last CRC field cannot be correct.

The following table shows the detailed composition structure of a typical MODBUS message frame:

MODBUS Typical Message Frames

Message frame start	Address field	Functional domain	Data domain	Frame CRC check digit	End of message frame
T3.5	1Byte	1Byte	NBytes	2Bytes	T3.5

Address Field: Indicates the address of a MODBUS device, valid range 1 ~ 247. 0 address is the broadcast address, the address after 247 is the protocol reserved address;

Function domain: indicates the function code of the message frame, i.e. the specific function of the message, GUIDE series VFD supports function codes F01, F02, F03, F04, F06, F16. For the meanings of other specific

function codes, please check the MODBUS official protocol document.

Data field: The definition of the corresponding byte bits of the data field is not the same for different function codes, see the official MODBUS protocol document for detailed definition.

Frame CRC check field: contains a 16-bit CRC check code, the check code is from the beginning of the message frame address field, until the end of the data field more data to do CRC16 calculations and get a frame check code, used to ensure that the entire message transmission after the message error detection.

A4 MODBUS communication protocol frame structure

Function code: 0x01 (HEX), Read Coils:

The format of the message frame that the host is asking for:

Frame byte order	Data definition	Descriptive
0	slave address	1 ~ 247
1	function code	0x01, read coil
2	Coil start address [high]	Starting address of the coil to be read
3	Coil start address [low]	
4	Number of coils read [high]	Number of coils <N>
5	Number of coils read [low]	
6	CRC check digit [low]	CRC16 check digit
7	CRC check digit [high]	
Total length of message frame: 8 bytes		

The message frame format of the slave response:

Frame byte order	Data definition	Descriptive
0	slave address	1 ~ 247
1	function code	0x01
2	Number of data bytes	N / 8
3	Coils [8-0]	coil value
4	Coils [16-9]	

.....	CRC check digit [low]	CRC16 check digit
.....	CRC check digit [high]	
Total length of message frame: (N / 8 + 5) bytes		

Function code: 0x02 (HEX), Read Discrete Inputs:

The format of the message frame that the host is asking for:

Frame byte order	Data definition	Descriptive
0	slave address	1 ~ 247
1	function code	0x02, read discrete input
2	Discrete Input Start Address [High]	Starting address of the coil to be read
3	Discrete Input Start Address [Lower]	
4	Number of discrete inputs read [high]	Number of Inputs<N>
5	Number of discrete inputs read [low]	
6	CRC check digit [low]	CRC16 check digit
7	CRC check digit [high]	
Total length of message frame: 8 bytes		

The message frame format of the slave response:

Frame byte order	Data definition	Descriptive
0	slave address	1 ~ 247
1	function code	0x02
2	Number of data bytes	N / 8
3	Input[8-0]	Input value
4	Input [16-9]	
.....	CRC check digit [low]	CRC16 check digit
.....	CRC check digit [high]	
Total length of message frame: (N / 8 + 5) bytes		

Function code: 0x03 (HEX), Read Holding Registers (Read Holding Registers):

The format of the message frame that the host is asking for:

Frame byte order	Data definition	Descriptive
0	slave address	1 ~ 247
1	function code	3, Read Holding Register
2	Register Start Address [High]	Starting address of the register to be read
3	Register Start Address [Lower]	
4	Number of registers read [high]	Number of registers <N>
5	Number of registers to be read [low]	
6	CRC check digit [low]	CRC16 check digit
7	CRC check digit [high]	
Total length of message frame: 8 bytes		

The message frame format of the slave response:

Frame byte order	Data definition	Descriptive
0	slave address	1 ~ 247
1	function code	3
2	Number of data bytes	2 × N
3	Register 1 [High]	First register value
4	Register 1 [low]	
5	Register 2 [High]	Second register value
6	Register 2 [low]	
.....	.....	.....
2 x N+1	Register N [high]	Nth register value
2×N+2	Register N [low]	
2×N+3	CRC check digit [low]	CRC16 check digit
2×N+4	CRC check digit [high]	
Total length of message frame: (2 x N + 5) bytes		

Function code: 0x06 (HEX), Write Single Holding Registers:

The format of the message frame that the host is asking for:

Frame byte order	Data definition	Descriptive
0	slave address	1 ~ 247
1	function code	6, Write Single Register
2	Register Address [High]	register address
3	Register Address [Lower]	
4	Register 1 [High]	register value
5	Register 1 [low]	
6	CRC check digit [low]	CRC16 check digit
7	CRC check digit [high]	
Total length of message frame: 8 bytes		

The message frame format of the slave response:

Frame byte order	Data definition	Descriptive
0	slave address	1 ~ 247
1	function code	6
2	Register Address [High]	register address
3	Register Address [Low]	
4	Register 1 [High]	register value
5	Register 1 [low]	
6	CRC check digit [low]	CRC16 check digit
7	CRC check digit [high]	
Total length of message frame: 8 bytes		

Function code: 0x10 (HEX), Write Multiple Holding Registers (Write Multiple

Holding Registers):

The format of the message frame that the host is asking for:

Frame byte order	Data definition	Descriptive
0	slave address	1 ~ 247
1	function code	16, write multiple registers
2	Register Start Address [High]	Register Starting Address
3	Register Start Address [Lower]	
4	Number of registers [high]	Number of registers <N>
5	Number of registers [low]	
6	Number of data bytes	2 x N
7	Register 1 [High]	First register value
8	Register 1 [low]	
9	Register 2 [High]	Second register value
10	Register 2 [low]	
.....	.....	.....
2 x N + 5	Register N [high]	Nth register value
2 x N + 6	Register N [low]	
2 x N + 7	CRC check digit [low]	CRC16 check digit
2 x N + 8	CRC check digit [high]	
Total length of message frame: (2 x N + 9) bytes		

The message frame format of the slave response:

frame byte order	data definition	descriptive
0	slave address	1 ~ 247
1	function code	16
2	Register Start Address [High]	Register Starting Address
3	Register Start Address [Lower]	
4	Number of registers [high]	Number of registers <N>
5	Number of registers [low]	
6	CRC check digit [low]	CRC16 check digit
7	CRC check digit [high]	
Total length of message frame: 8 bytes		

A5 MODBUS Protocol Address Table

Function code 0x01, Coils		
Address	Name	Descriptive
0	run stop (temporarily or permanently)	0: Stop 1: Run
1	orientations	0: positive rotation 1: Inversion
2	Local Remote Switching	Write 1: Switching
3	fault reset	Write 1: Fault Reset
4	external fault	0: None 1: External faults
5	External Alarms	0: None 1: External alarms
6	Motor Selection	00: Motor 1 01: Motor 2 10: Motor 3 11: Motor 4
7		
8	Zero Torque Enable	0: Disable 1: Enable
9	Orientation Enable	0: Disable 1: Enable
63	system reboot	Write 1: Restart

Function code 0x02, Discrete Input		
Address	Name	Descriptive
0	System ready.	0: Busy 1: System ready
1	run stop (temporarily or permanently)	0: Stop 1: Run
2	malfunctions	0: Normal 1: Failure
3	Motor Brake	0: Holding brake 1: Not holding the brake
4	warning	0: None 1: Failure
5	orientations	0: positive rotation 1: Inversion
10	Local/Remote	0: Remote 1: Local
11	Motor Selection	00: Motor 1 01: Motor 2 10: Motor 3 11: Motor 4
12		

13	Driver Enable	0: not enabled 1: Enabling

Function code 0x03, Holding Regs		
Address	Name	Descriptive
0	DO	[R/W] : DO
50	AO 1	[R/W] : 10 => 1.0 [%]
51	AO 2	[R/W] : 10 => 1.0 [%]
60	Error Code	[07..00] : ERROR CODE [15..08] : WARNING CODE
62	Parameter Error	[07..00] : ERROR CODE [15..08] : WARNING CODE
100	Speed Set [Hz] @Modbus	[R/W] : ±10 => ±1.0 [Hz]
101	Speed Set [rpm] @Modbus	[R/W] : ±1 => ±1[rpm]
102	Speed Set [%] @Modbus	[R/W] : ±10 => ±1.0 [%]
103	Torque Set [%] @Modbus	[R/W] : ±10 => ±1.0 [%]
104	Torque Limit Set [%] @Modbus	[R/W] : ±10 => ±1.0 [%]
105	Active Current Set [%] @Modbus	[R/W] : ±10 => ±1.0 [%]
106	Reactive Current Set [%] @Modbus	[R/W] : ±10 => ±1.0 [%]
107	Accel_Time Multiplier	[R/W] : 1000 => 1.0, [0.05 ~ 10.0]
108	Decel_Time Multiplier	[R/W] : 1000 => 1.0, [0.05 ~ 10.0]
4500	Speed [Hz]	[R] : ±10 => ±1.0 [Hz]
4501	Speed [rpm]	[R] : ±1 => ±1.0 [rpm], @100ms
4502	Speed [%]	[R] : ±10 => ±1.0 [%]
4503	Output Current	[R] : ±10 => ±1.0 [A], @100ms
4504	Output Voltage	[R] : ±10 => ±1.0 [V], @100ms
4505	DC-Link Voltage	[R] : ±10 => ±1.0 [V], @100ms
4506	Output Torque	[R] : ±10 => ±1.0[%], @100ms
4507	Load Torque	[R] : ±10 => ±1.0[%], @100ms
4508	Output Power	[R] : ±10 => ±1.0 [kW], @250ms
4509	Temperature	[R] : 10 => 1.0 [° C]
4510	Speed_e [Hz]	[R] : ±10 => ±1.0 [Hz]
4511	Speed_e [rpm]	[R] : ±1 => ±1.0 [rpm]
4512	Speed_e [%]	[R] : ±10 => ±1.0 [%]
4513	Speed Set [Hz]	[R] : ±10 => ±1.0 [Hz]
4514	Speed Set [rpm]	[R] : ±1 => ±1.0 [rpm]
4515	Speed Set [%]	[R] : ±10 => ±1.0 [%]
4516	Speed Set [Hz] @Ramp	[R] : ±10 => ±1.0 [Hz]

4517	Speed Set [rpm] @Ramp	[R] : ±1 => ±1.0 [rpm]
4518	Speed Set [%] @Ramp	[R] : ±10 => ±1.0 [%]
4519	Torque Set [%]	[R] : ±10 => ±1.0 [%]

Function Code 0x04, Input Regs		
Address	Name	Descriptive
0	DI	[R]
50	AI 1 [V]	[R] : 100 => 1.0[V], -10 ~ +10[V]
51	AI 1 [I]	[R] : 100 => 1[mA], 0 ~ 20[mA]
52	AI2 [V]	[R] : 100 => 1.0[V], -10 ~ +10[V]
53	AI2 [I]	[R] : 100 => 1[mA], 0 ~ 20[mA]

Appendix B: Optional Accessories

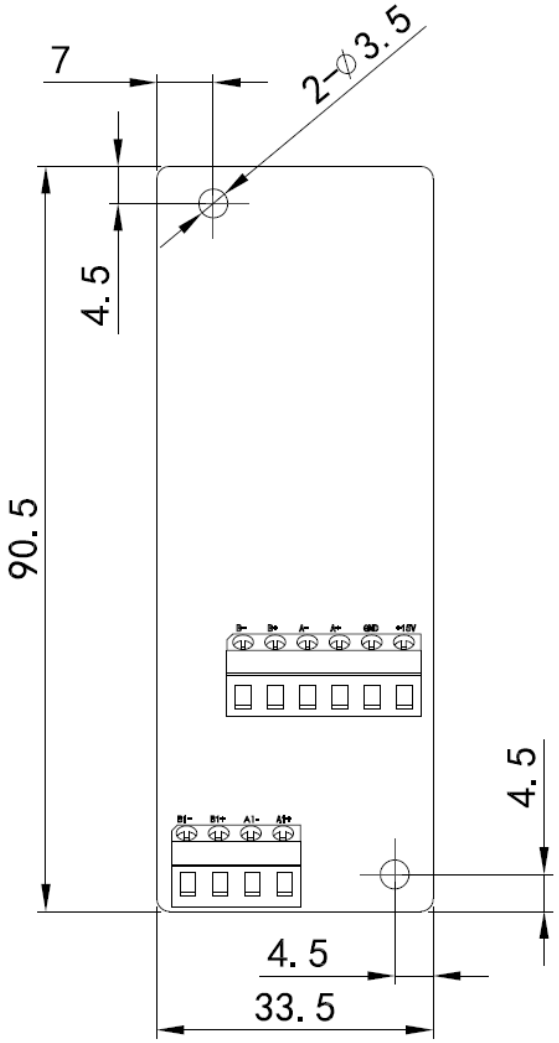
B1 PG card

B1.1 Models and specifications

1.1.1 Model Description

The Synchronous PG card model of the Conti VFD is GDHF-APGX1.

1.1.2 Dimensions and Installation



PG Card External Dimensions

B1.2 Instructions for use

1.2.1 Functions

When the user needs to have the synchronization function of speed sensor vector control, the synchronization PG card must be selected. The standard configuration of the synchronous PG card includes: processing circuitry for four quadrature encoder signals, which can receive signals from push-pull, open collector, and voltage encoder outputs; and the provision of an encoder power supply (fixed at +15V output).

1.2.2 Terminal Description

The PG card has a total of 10 user terminals, see below.

B-	B+	A-	A+	GND	+15V

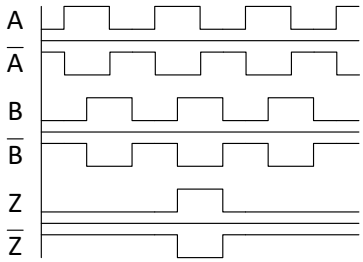
B1-	B1+	A1-	A1+

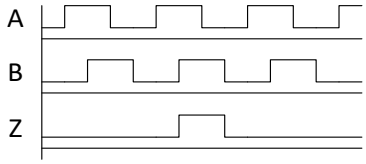
Schematic diagram of wiring terminals

Among them, +15V, GND is the encoder working power input; A+, A-, B+, B-, A1+, A1-, B1+, B1- is the encoder signal input terminal; PE is the shielding wire shielding layer terminal (users must connect PE to the earth when using).

1.2.3 Encoder signal phase

The two output channels of an incremental encoder, typically labeled A and B or 1 and 2, have a signal phase difference of 90 degrees electrical angle. When it is turned clockwise, most (but not all) will produce the signals shown, with channel 1 overrunning channel 2. Refer to the encoder manual or use an oscilloscope to determine the signal phase.



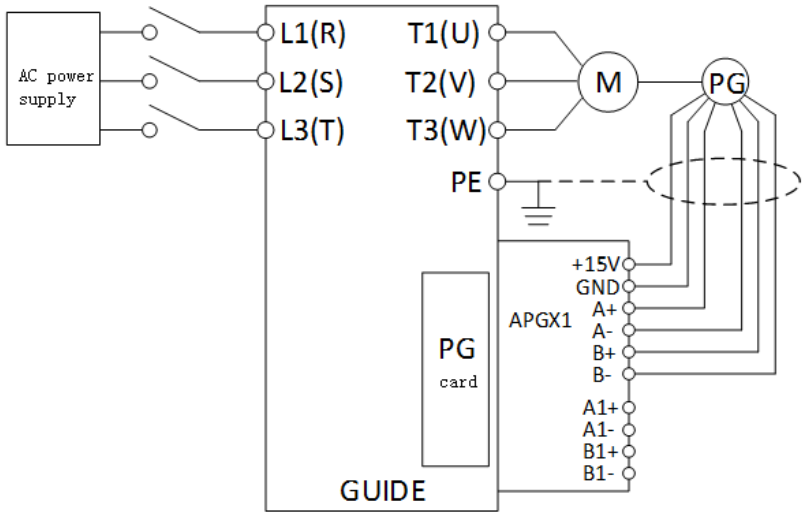


Encoder differential output signals Encoder single-ended output signals

When the drive is running in the positive direction, the output channel where the signal phase is ahead should be connected to input A, and the other channel is connected to input B.

The zero reference output channel (generally labeled Z, N, or 0) needs to be connected only for position control; the GDHF-APGX1 does not receive this signal.

1.2.4 Schematic diagram of wiring principle



Wiring Notes:

PG card signal lines should be arranged separately from power lines, and parallel routing is prohibited;

To avoid interference with the encoder signals, use shielded cables for the PG card signal cables;

The shield of the encoder shield cable should be connected to earth (e.g.

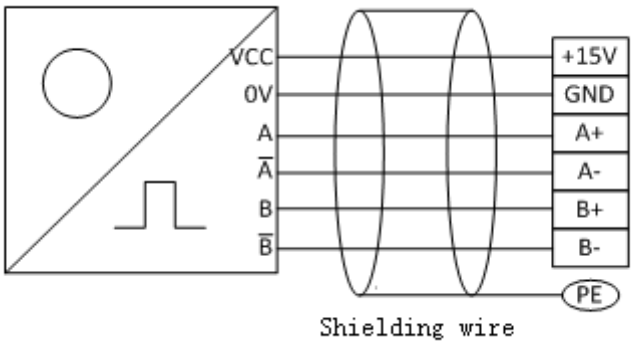
PE end of the VFD) and must be connected to earth at one end to avoid signal interference.

B1.3 Application Connectivity

For encoders used in the field, the first step is to determine the output method. The Quanti PG card supports push-pull, open collector, and voltage types.

1.3.1 Encoder output type: push-pull output

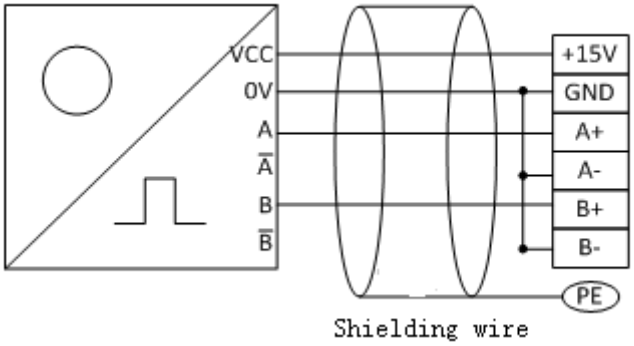
Differential wiring method



Examples of common push-pull output (differential wiring method) encoder applications:

branding	Encoder Model
Watanabe	HLE45-1024L-6F.AC
Pepperl+Fuchs (Swedish physicist)	rhi90n-onak1r61n-1024
Hibiscus	EC120P45-H6PR-1024

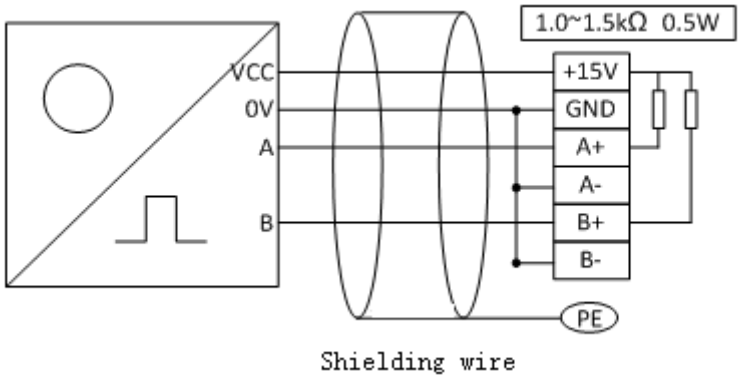
Single-ended wiring method



Examples of encoder applications with commonly used push-pull outputs (single-ended wiring method):

branding	Encoder Model
Watanabe	hle45-6001-3f.ac
Pepperl+Fuchs (Swedish physicist)	rvi78n-10cala31n-1024
Hibiscus	EC120P45-P6PR-1024

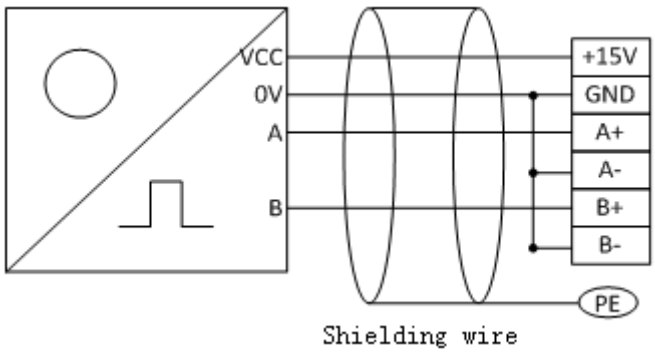
1.3.2 Encoder output type: open collector output



Examples of common open collector output encoder applications:

Branding	Encoder Model
Watanabe	hle45-1024l-3oc.ac
Hibiscus	eb38a6-c4pr-1024

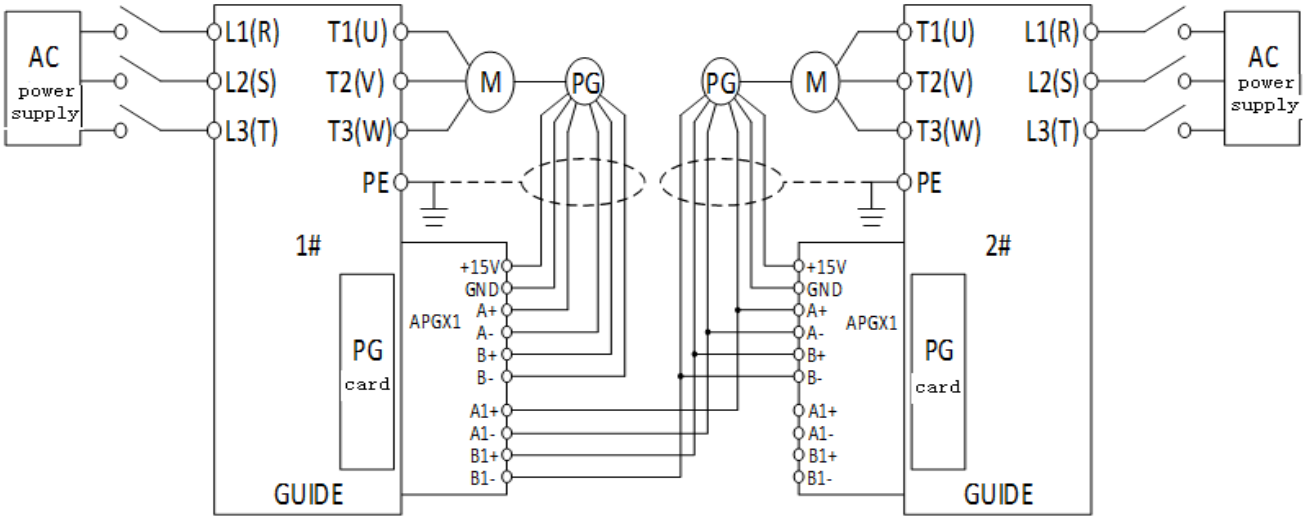
1.3.3 Encoder output type: voltage output



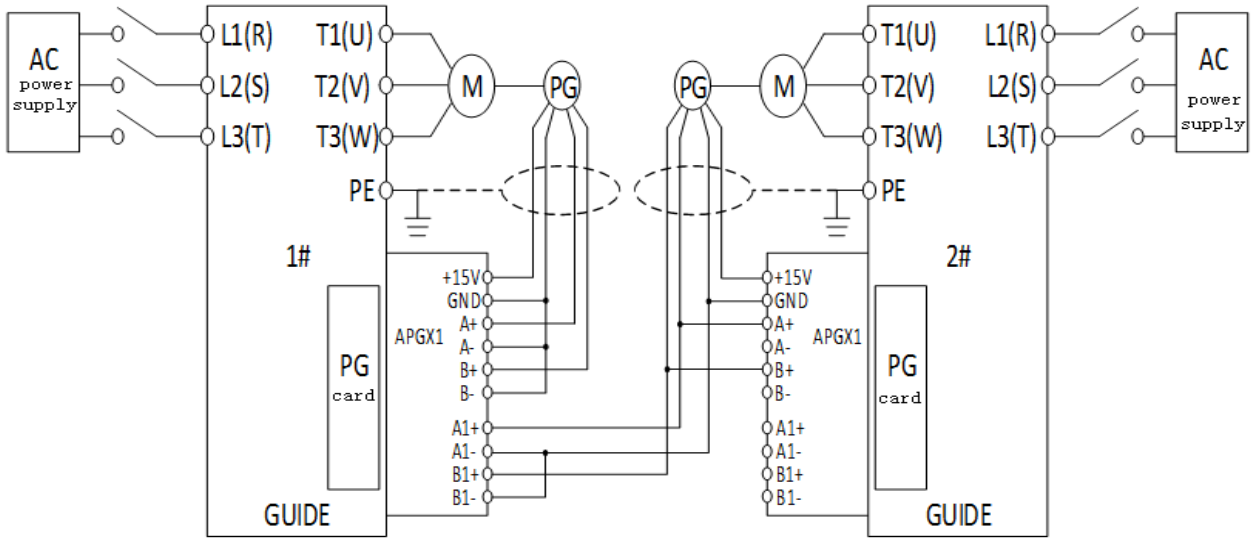
Examples of common voltage output encoder applications:

Branding	Encoder Model
Watanabe	HLE45-600L-3R.AC
Hibiscus	eb50a8-n4pr-1024

1.3.4 Synchronization function connection:



Wiring diagram for encoder with differential output signals

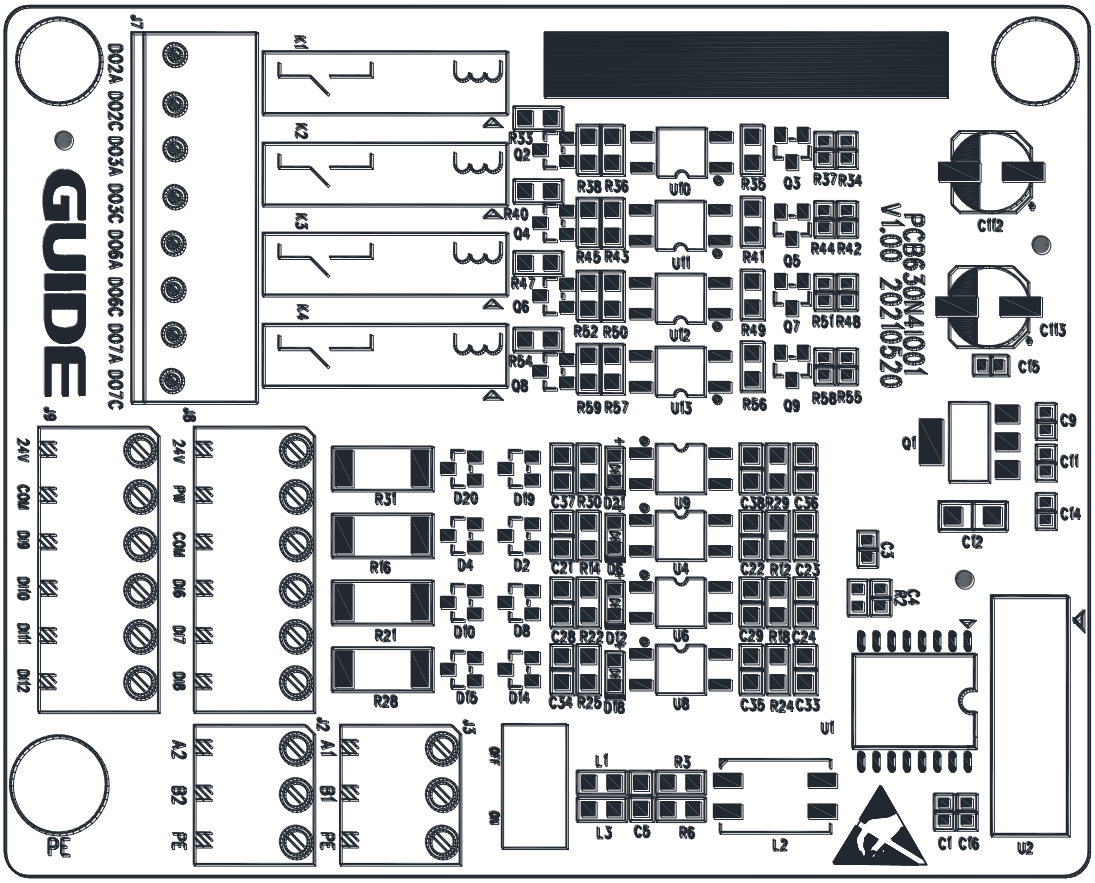


Wiring diagram for encoder with single-ended output signal

B2 IO Expansion Card 1

Model Description: The model number of the IO expansion card for the GDHF VFD is GDHF-AIOX1 expansion card.

The IO expansion card is used in conjunction with the GF630N02 series VFD from GUIDE. The IO expansion card has 7 digital inputs, 4 relay outputs, and 1 485 communication.



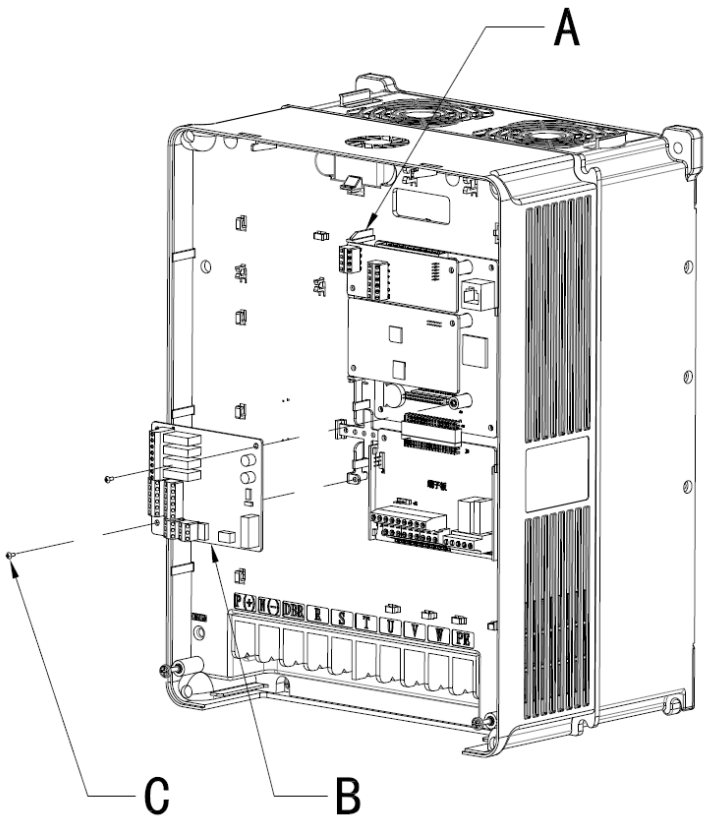
IO Expansion Card Option GDHF-AIOX1 Layout Diagram

B2.1 Mechanical installations

Align the IO Expansion Card Option GDHF-AIOX1 with the two fixing screw holes and the signal jacks of the control board J25, insert the IO Expansion Card Option GDHF-AIOX1 into the signal jacks of the control board, and secure the IO Expansion Card Option GDHF-AIOX1 with the screws.

Note: In order to fulfill the EMC requirements and to ensure that the IO Expansion Card Option GDHF-AIOX1 works properly, make sure that the two metal fixing screws of the IO Expansion Card are securely fixed in the corresponding screw holes, and make sure that the IO Expansion Card is well connected to the protective ground of the VFD.

The IO expansion card is installed as shown below.



A-VFD Grounding bracket
B-IO expansion card
C-screw

IO Expansion Card Installation

B2.2 IO Expansion Card 1 Interface

On IO Expansion Card 1, the following types of wiring ports are available:

Terminal Category	Terminal Marking	Terminal Name	Terminal Description
Power supply	24V	24VDC power supply	24VDC power supply, default connection to the 24V power supply on the control board terminals, can also be connected to external 24V power supply.
	COM	Reference ground corresponding to 24VDC	Reference ground for 24VDC power supply
	PW	Input Common Terminal	Shorted to 24V
Digital input	DI6-PW	Digital Input 6	1、 Optocoupler isolation, compatible with bipolar input; 2. Input impedance: 3.3KΩ;
	DI7-PW	Digital Input 7	
	DI8-PW	Digital Input 8	

	DI9-PW	Digital Input 9	Input voltage range: 9~30V.
	DI10-PW	Digital Input 10	
	DI11-PW	Digital Input 11	
	DI12-PW	Digital Input 12	
Relay output	DO2A-DO2C	Relay Output 2	Normally open contacts; contact actuation capability: AC 250V,3AC,COSØ=0.4. DC 30V,1A
	DO3A-DO3C	Relay Output 3	
	DO6A-DO6C	Relay output 6	
	DO7A-DO7C	Relay output 8	
	DO9A-DO9C	Relay output 9	
	DO10A -DO10C	Relay Output 10	

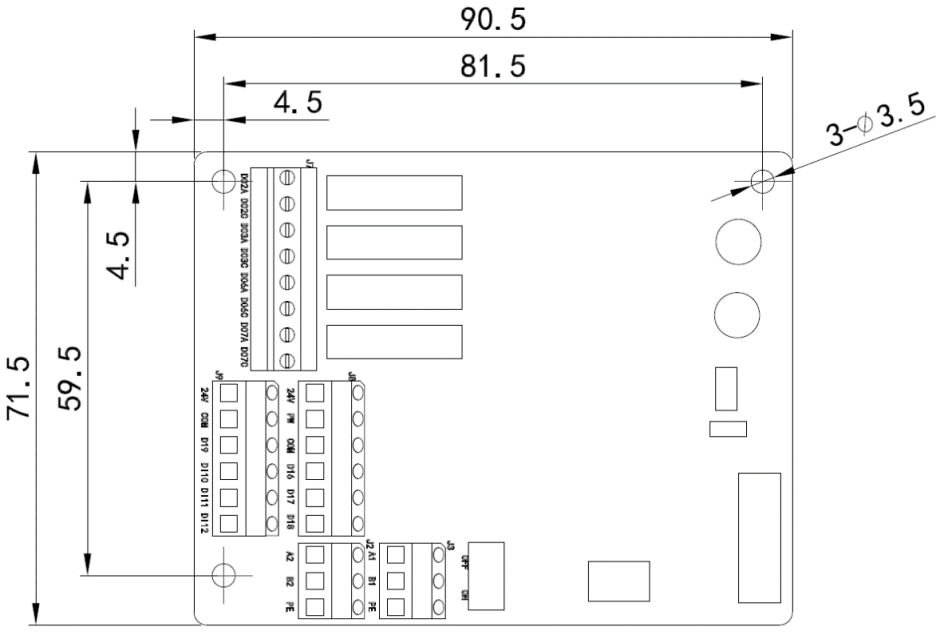
On the terminals, PW should be shorted to 24V;

On the terminal block, 24V is connected to 24V on the control board terminals; the

On the terminal block, COM is connected to COM on the control board terminal; the

B2.3 Technical data

Mechanical dimensions:



IO Expansion Card Option GDHF-AIOX1 Dimensions (in mm)

Installation: Plug into the appropriate socket on the VFD control board.

Environmental conditions: See the relevant content on environmental conditions in the "VFD User's Manual of GUIDE".

Hardware Setup: Connect the signal wires of each port.

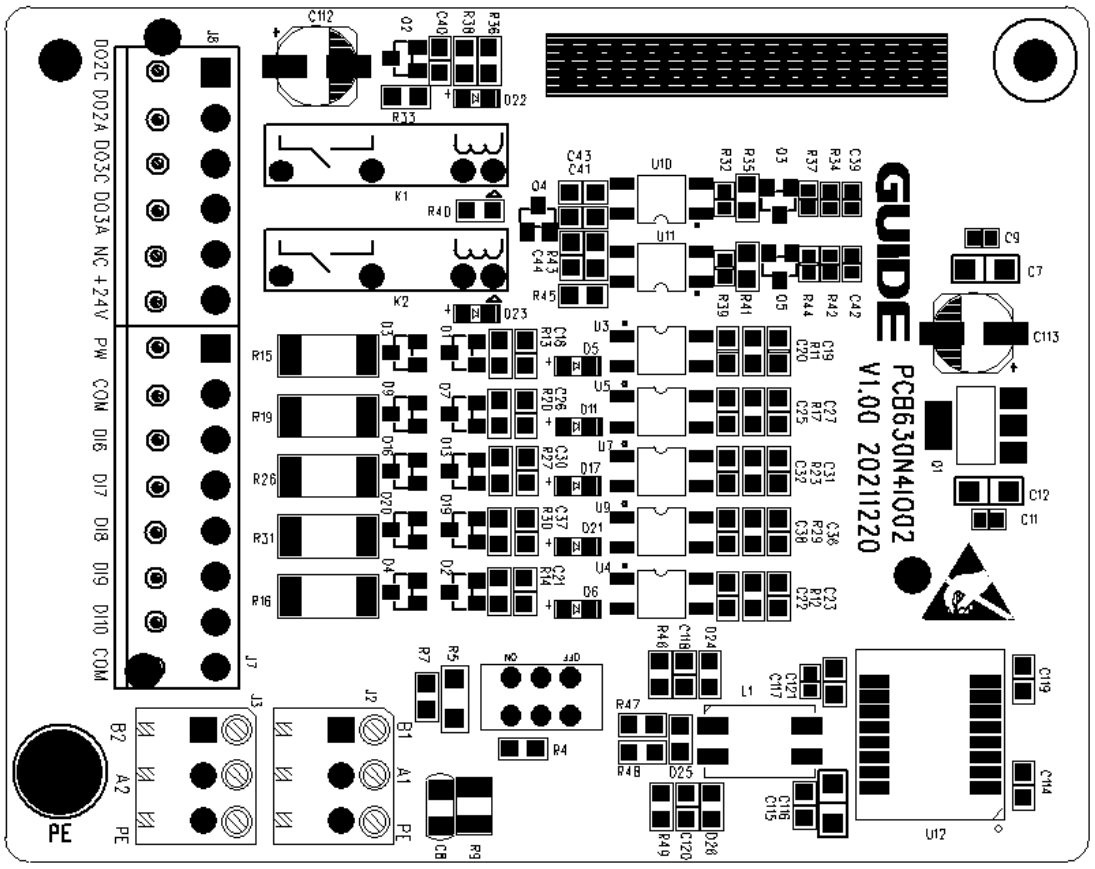
Software Settings:

- DI signal setting, signal normally open and normally closed type setting
- DO signal setting
- Limit switch speed limit value setting
- Various delay time settings

B3 IO Expansion Card 2

Model Description: The model number of the IO expansion card for the Conti VFD is GDHF-AIOX2 expansion card.

The IO expansion card is used in conjunction with the GF630N02 series VFD from GUIDE. The IO expansion card has 5 digital inputs and 2 relay outputs.



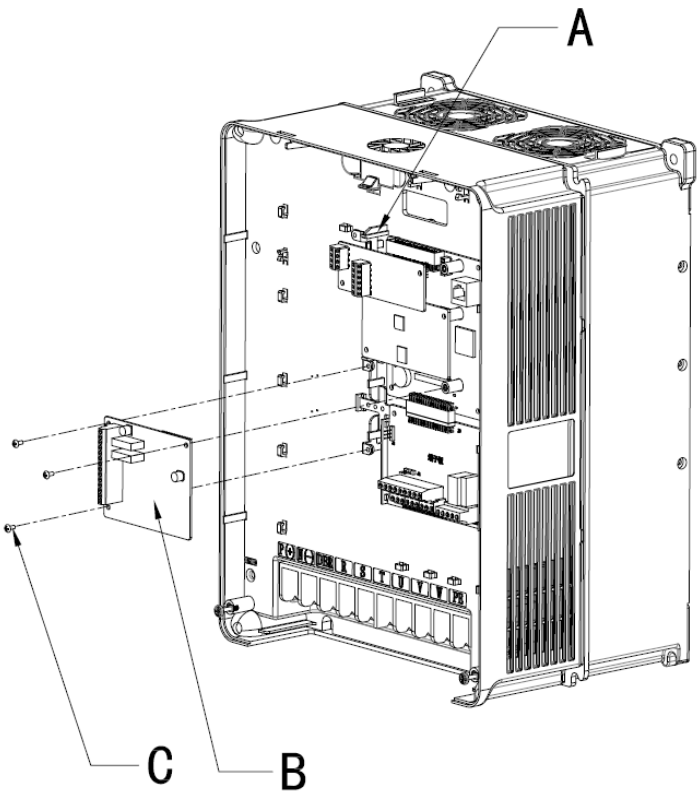
Layout of IO expansion card option GDHF-AIOX2

B3.1 Mechanical Installation

Align the IO Expansion Card Option GDHF-AIOX2 with the two fixing screw holes and the signal jacks of the control board J25, insert the IO Expansion Card Option GDHF-AIOX2 into the signal jacks of the control board, and secure the IO Expansion Card Option GDHF-AIOX2 with the screws.

Note: In order to fulfill the EMC requirements and to ensure that the IO Expansion Card Option GDHF-AIOX2 works properly, make sure that the two metal fixing screws of the IO Expansion Card are securely fixed in the corresponding screw holes, and make sure that the IO Expansion Card is well connected to the protective ground of the VFD.

The IO expansion card is installed as shown below.



A-VFD Grounding bracket
B-IO expansion card
C-screw

IO Expansion Card Installation

B3.2 IO Expansion Card 2 Interface

On the IO Expansion Card 2, the following types of wiring ports are available:

Terminal Category	Terminal Marking	Terminal Name	Terminal Description
power supply	24V	24VDC power supply	24VDC power supply, default connection to the 24V power supply on the control board terminals, can also be connected to external 24V power supply.
	COM	Reference ground corresponding to 24VDC	Reference ground for 24VDC power supply
	PW	Input Common Terminal	Shorted to 24V

digital input	DI6-PW	Digital Input 6	1、 Optocoupler isolation, compatible with bipolar input; 2. Input impedance: 3.3KΩ; Input voltage range: 9~30V.
	DI7-PW	Digital Input 7	
	DI8-PW	Digital Input 8	
	DI9-PW	Digital Input 9	
	DI10-PW	Digital Input 10	
relay output	DO2A-DO2C	Relay Output 2	Normally open contacts; contact actuation capability: AC 250V,3AC,COSØ=0.4. DC 30V,1A
	DO3A- DO3C	Relay Output 3	

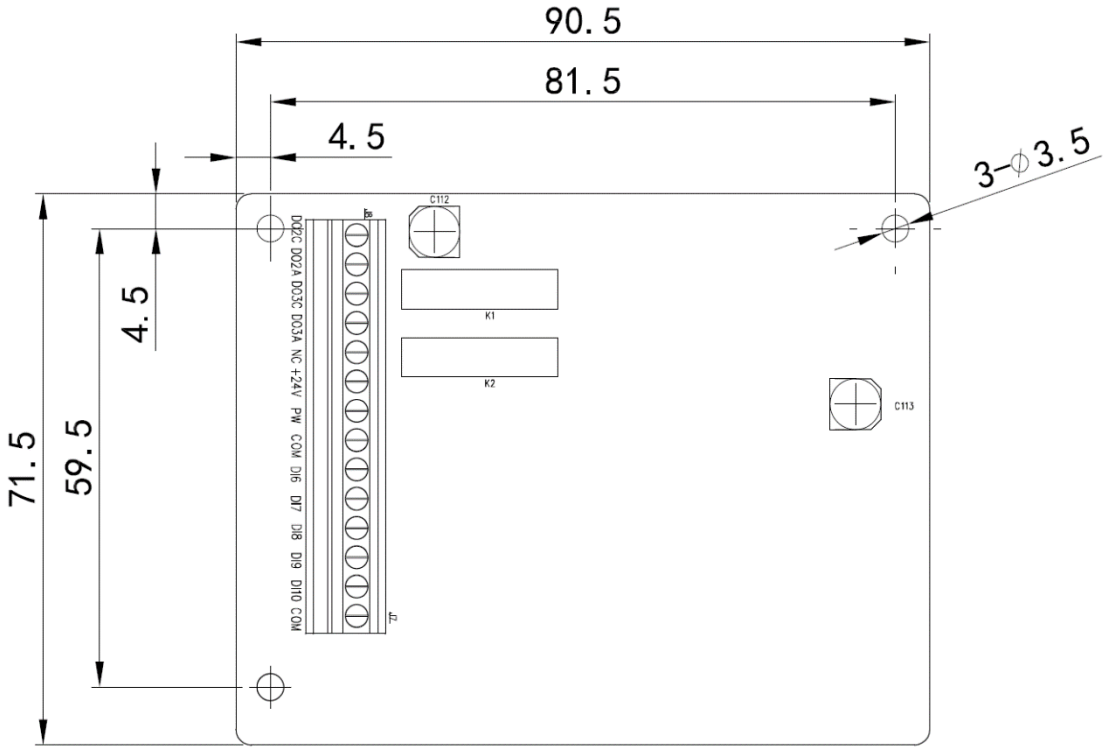
On the terminals, PW should be shorted to 24V;

On the terminal block, 24V is connected to 24V on the control board terminals; the

On the terminal block, COM is connected to COM on the control board terminal; the

B3.3 Technical data

Mechanical dimensions:



IOExpansion Card Option GDHF-AIOX2 Dimensions (in mm)

Installation: Plug into the appropriate socket on the VFD control board.

Environmental conditions: See the "VFD User's Manual" for environmental conditions.

Hardware Setup: Connect the signal wires of each port.

Software Settings:

- DI signal setting, signal normally open and normally closed type setting
- DO signal setting
- Limit switch speed limit value setting
- Various delay time settings

B4 CAN card

B4.1 CANOpen Standard

Model Description: The model number of the CAN card for the Conti VFD is GDHF-ACNX1 Expansion Card.

CANOpen is a high-level protocol based on the CAN bus. This CANOpen communication GDHF-ACNX1 bus card only supports the CANOpen slave protocol.

CAN (Controller Area Network) fieldbus only defines the first layer (physical layer, see ISO11898-2 standard), layer 2 (data link layer, see ISO11898-1 standard); and in the actual design, these two layers are completely realized by the hardware, the designers do not need to develop the relevant software (Software) or firmware (Firmware). (Firmware), as long as you know how to call the relevant interfaces and registers, you can complete the control of CAN.

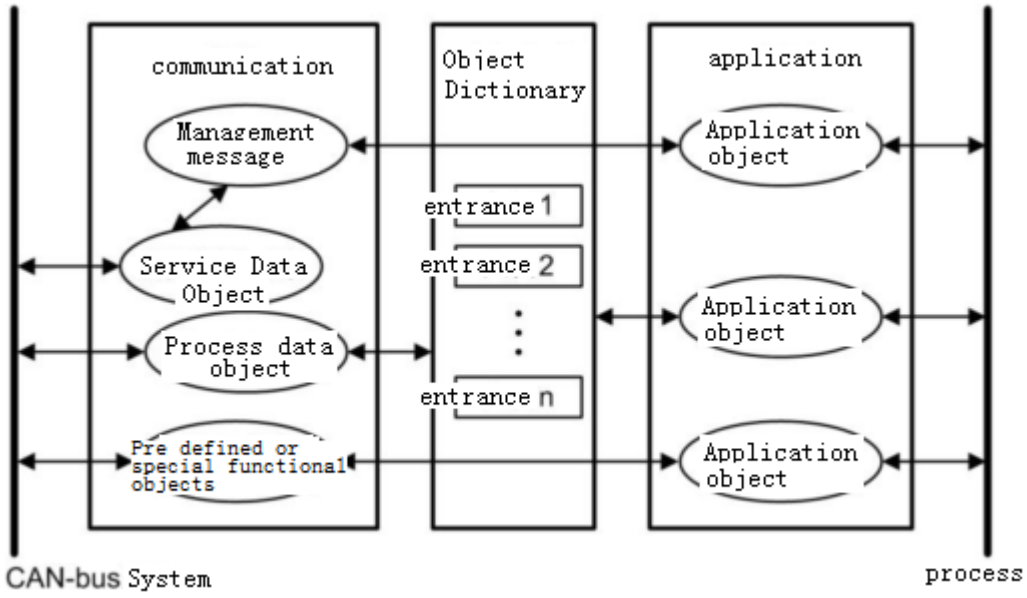
CAN does not specify an application layer. That is, it does not specify the logic related to the actual application, such as switching inputs and

outputs, analog inputs and outputs. So in itself it is incomplete for the application.

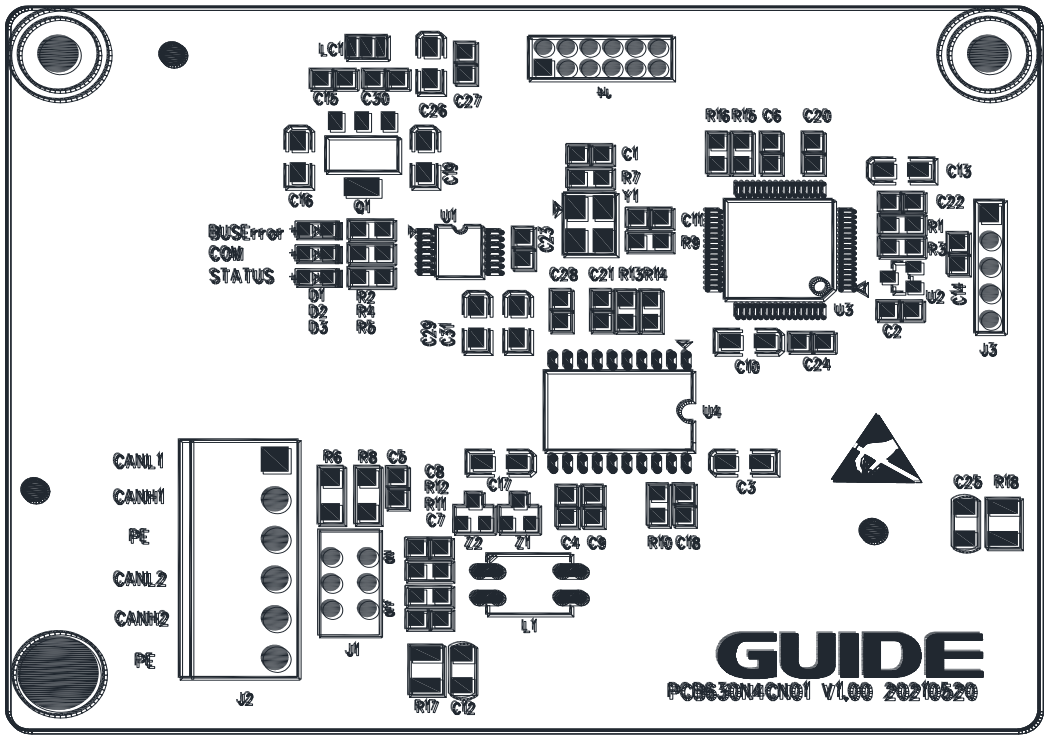
Therefore, basically every CAN application in every industry needs a high-level protocol to define the use of 11/29-bit identifiers, 8-byte data in CAN messages. However, in the industrial automation application of CAN bus, due to the increasing demand for interoperability and interconnection of devices, an open and standardized high-level protocol is needed: this protocol supports the interoperability and interchangeability of devices from a variety of CAN vendors, and enables the provision of a standard, unified system communication mode in the CAN network, provides a device function description method, and performs network management functions.

The CANopen protocol is usually divided into three parts: the user application layer, the object dictionary, and communication. The most central of these is the object dictionary, which describes the relationship between application objects and CANopen messages.

CANopen communication is the key part, which defines the CANopen protocol communication rules and the correspondence with the CAN controller driver.



GDHF-ACNX1 Bus Card



GDHF-ACNX1 Bus Card Layout Diagram

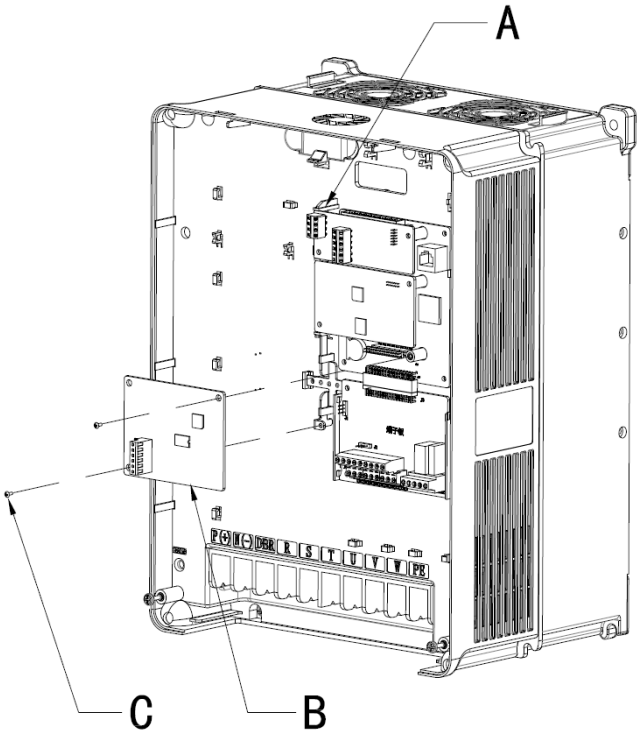
The CANOpen communication card bus option GDHF-ACNX1 bus card is an optional device for the complete range of VFDs from Quanti, which connects the VFD to a CANOpen network. On the CANOpen network, the frequency converter is treated as a slave device. With the CANOpen communication GDHF-ACNX1 Bus Card, it is possible to:

- Send control commands to the VFD (start, stop, allow to run, etc.).
- Sends a speed or torque feed signal to the VFD.
- Sends a process actual or process given signal to the PID regulator of the VFD.
- Reading status signals and actual values from the VFD.
- Changes the parameter values in the VFD.
- Perform a fault reset on the VFD.

The CANOpen communication card bus option GDHF-ACNX1 bus card is connected to the J25 jack on the control board inside the VFD.

Note: In order to fulfill the EMC requirements as well as to ensure that the GDHF-ACNX1 bus card can work properly, a CAN communication line range with a shield should be used, good contact should be maintained, and the grounding stub should be connected to the VFD's protective ground with a corresponding wire, well connected.

Connect the grounding point using the supplied grounding wire. The installation and grounding of the bus card are shown below.



A-VFD Grounding bracket
B-CAN card
C-screw

B4.2 CANOpen connection

The cable is connected to CAN1 or CAN2 corresponding to J9 of the GDHF-ACNX1 bus card.

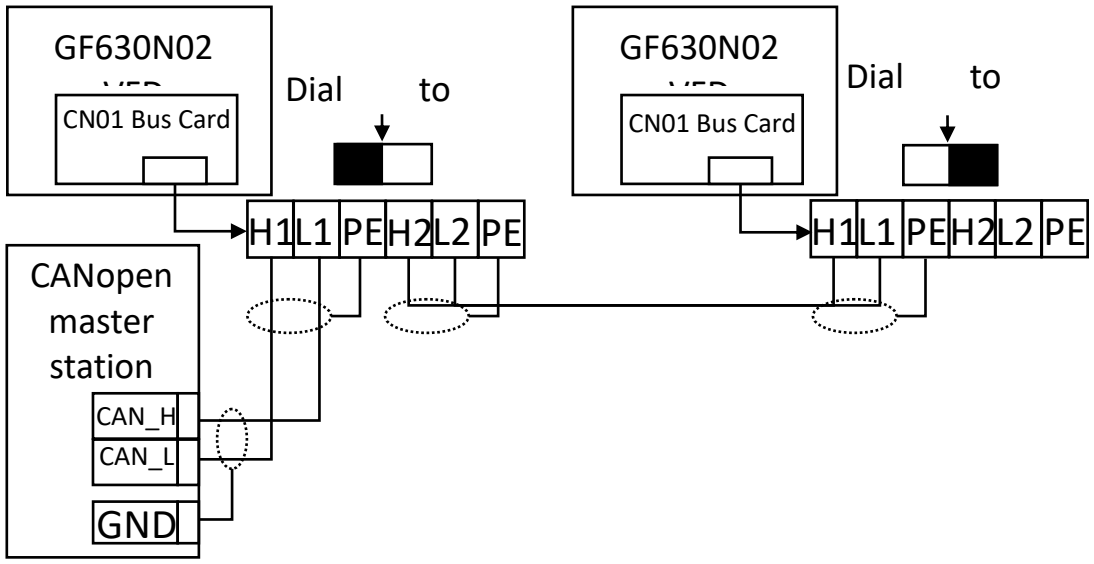
The connection terminals are assigned as follows:

terminals	clarification
CANH1	CAN interface 1, CAN_H signal
CANL1	CAN interface 1, CAN_L signaling
PE	reserve

CANH2	CAN Interface 2, CAN_H Signal
CANL2	CAN Interface 2, CAN_L Signal
PE	reserve

According to the configuration settings of the master programming software, insert the network cable into the network port A or B accordingly.

Example of CANOpen wiring: The cable is a standard Category 5E network cable with a shield, compliant with TIA/EIA-568-B standard.



Standard CANOpen cable wiring diagram

B4.3 CANOpen communication configuration

To establish communication between the GDHF-ACNX1 bus card and the VFD, you first need to configure the CANOpen communication parameters in the VFD. The options for these parameters are described in detail below.

Note: The newly set parameters only take effect when the bus card is powered up again.

B4.4 CANOpen Parameter Configuration

Function code	Name	Explanation	Setting range	Default value
P31.0	CAN bus enable	[0] Prohibition [1] Enable	0 to 1	0
P31.1	CANopen Slave ID	CANopen Slave ID	1 to 127	0
P31.2	Baud rate selection	CAN bus baud rate		
P31.3	CAN bus fault detection time	Fault detection time in seconds	0 to 60	0
P31.4	CAN bus status	Bus Status		

B4.5 CANOpen communication function enable

This parameter is the communication enable selection. Select [0] to not enable CANOpen communication , select [1] to enable CANOpen communication.

CANopen Slave ID

In a CANOpen network, each device corresponds to a unique ID.

Baud rate selection

Select the CAN bus baud rate in this parameter, range: 20Kbps ~ 1000Kbps.

CAN bus fault detection time

The time for detecting a bus failure, when the bus failure exceeds this time, the VFD will indicate the failure and shut down. When this value is set to 0, this detection function is turned off.

CAN bus status

The bus has 4 states: initialization; stop; run; and pre-operation.

The CANOpen communication card bus option GDHF-ACNX1 bus card supports

the CANOpen protocol.

COB-ID

The identification of the communication object, as defined below, is used to define the CAN message ID of the individual messages in the Canopen protocol.

COB-ID										
function code				Slave ID						
10	9	8	7	6	5	4	3	2	1	0

Recipient of a communication	Function code (binary)	COB-ID (hexadecimal)
NMT	0	0x00
SYNC	1	0x80
EMERGENCY	1	0x81 ~ 0xFF
PDO1 TX	11	0x181 ~ 0x1FF
PDO1 RX	100	0x201 ~ 0x27F
PDO2 TX	101	0x281 ~ 0x2FF
PDO2 RX	110	0x301 ~ 0x37F
PDO3 TX	111	0x381 ~ 0x3FF
PDO3 RX	1000	0x401 ~ 0x47F
PDO4 TX	1001	0x481 ~ 0x4FF
PDO4 RX	1010	0x501 ~ 0x57F
SDO TX	1011	0x581 ~ 0x5FF
SDO RX	1100	0x601 ~ 0x67F
Node protection	1110	0x701 ~ 0x77F

Canopen Object Dictionary

Object dictionary					
Indexing (HEX)	Subindex	Descriptive	Interviews scope of one's jurisdiction	Data type	Default value
1000	0	Equipment type	RO	UNSIGNED32	0x0000 0000
1001	0	error register	RO	UNSIGNED8	
1003		Error Code Register			
	0	Number of subindexes	RW	UNSIGNED32	
	1	error code	RO	UNSIGNED32	
1005	0	COB-ID SYNC	RW	UNSIGNED32	0x80
1006	0	communication cycle	RW	UNSIGNED32	0x80
1008	0	Manufacturer's equipment name	CONST	String	GD_CANopen
1009	0	hardware version	CONST	String	V1.00
100A	0	software version	CONST	String	V1.00
100C	0	protection time	RW	UNSIGNED16	0
100D	0	life cycle	RW	UNSIGNED8	0
100E	0	COB-ID	RW	UNSIGNED32	NodeID+0x700
1016		Consumer Heartbeat Time			
	0	Number of subindexes	RO	UNSIGNED8	1
	1	Consumer Heartbeat Time	RW	UNSIGNED32	0
1017	0	Producer heartbeat time	RW	UNSIGNED16	0
1400		PDO1 RX communication parameters			
	0	Maximum subindex	RO	UNSIGNED8	5
	1	COB-ID	RW	UNSIGNED32	NodeID+0x200
	2	Transmission type	RW	UNSIGNED8	254
	3	inhibit time	RW	UNSIGNED16	100
	5	Eventtimer	RW	UNSIGNED16	0
1401		PDO2 RX Communication Parameters			

	0	Maximum subindex	RO	UNSIGNED8	5
	1	COB-ID	RW	UNSIGNED32	NodeID+0x300
	2	Transmission type	RW	UNSIGNED8	254
	3	inhibit time	RW	UNSIGNED16	100
	5	Eventtimer	RW	UNSIGNED16	0
1402		PDO3 RX communication parameters			
	0	Maximum subindex	RO	UNSIGNED8	5
	1	COB-ID	RW	UNSIGNED32	NodeID+0x400
	2	Transmission type	RW	UNSIGNED8	254
	3	inhibit time	RW	UNSIGNED16	100
	5	Eventtimer	RW	UNSIGNED16	0
1403		PDO4 RX Communication Parameters			
	0	Maximum subindex	RO	UNSIGNED8	5
	1	COB-ID	RW	UNSIGNED32	NodeID+0x500
	2	Transmission type	RW	UNSIGNED8	254
	3	inhibit time	RW	UNSIGNED16	100
	5	Eventtimer	RW	UNSIGNED16	0
1600		PDO1 RX Mapping Parameters			
	0	Number of mapped objects	RO	UNSIGNED8	4
	1	The first mapping object	RO	UNSIGNED32	
	2	The second mapping object	RO	UNSIGNED32	
	3	The third mapping object	RO	UNSIGNED32	
	4	The fourth mapping object	RO	UNSIGNED32	
1601		PDO2 RX Mapping Parameters			
	0	Number of mapped objects	RO	UNSIGNED8	4
	1	The first mapping object	RO	UNSIGNED32	
	2	The second mapping object	RO	UNSIGNED32	
	3	The third mapping object	RO	UNSIGNED32	

	4	The fourth mapping object	RO	UNSIGNED32	
1602		PDO3 RX Mapping Parameters			
	0	Number of mapped objects	RO	UNSIGNED8	4
	1	The first mapping object	RO	UNSIGNED32	
	2	The second mapping object	RO	UNSIGNED32	
	3	The third mapping object	RO	UNSIGNED32	
	4	The fourth mapping object	RO	UNSIGNED32	
1603		PDO4 RX Mapping Parameters			
	0	Number of mapped objects	RO	UNSIGNED8	4
	1	The first mapping object	RO	UNSIGNED32	
	2	The second mapping object	RO	UNSIGNED32	
	3	The third mapping object	RO	UNSIGNED32	
	4	The fourth mapping object	RO	UNSIGNED32	
1800		PDO1 TX Communication Parameters			
	0	Maximum subindex	RO	UNSIGNED8	5
	1	COB-ID	RW	UNSIGNED32	NodeID+0x180
	2	Transmission type	RW	UNSIGNED8	254
	3	inhibit time	RW	UNSIGNED16	100
	5	Eventtimer	RW	UNSIGNED16	0
	6	SYNC start value	RW	UNSIGNED8	1
1801		PDO2 TX Communication Parameters			
	0	Maximum subindex	RO	UNSIGNED8	5
	1	COB-ID	RW	UNSIGNED32	NodeID+0x280
	2	Transmission type	RW	UNSIGNED8	254
	3	inhibit time	RW	UNSIGNED16	100
	5	Eventtimer	RW	UNSIGNED16	0

	6	SYNC start value	RW	UNSIGNED8	1
1802		PDO3 TX Communication Parameters			
	0	Maximum subindex	RO	UNSIGNED8	5
	1	COB-ID	RW	UNSIGNED32	NodeID+0x380
	2	Transmission type	RW	UNSIGNED8	254
	3	inhibit time	RW	UNSIGNED16	100
	5	Eventtimer	RW	UNSIGNED16	0
	6	SYNC start value	RW	UNSIGNED8	1
1803		PDO4 TX Communication Parameters			
	0	Maximum subindex	RO	UNSIGNED8	5
	1	COB-ID	RW	UNSIGNED32	NodeID+0x480
	2	Transmission type	RW	UNSIGNED8	254
	3	inhibit time	RW	UNSIGNED16	100
	5	Eventtimer	RW	UNSIGNED16	0
	6	SYNC start value	RW	UNSIGNED8	1
1A00		PDO1 TX Mapping Parameters			
	0	Number of mapped objects	RO	UNSIGNED8	4
	1	The first mapping object	RW	UNSIGNED32	
	2	The second mapping object	RW	UNSIGNED32	
	3	The third mapping object	RW	UNSIGNED32	
	4	The fourth mapping object	RW	UNSIGNED32	
1A01		PDO2 TX Mapping Parameters			
	0	Number of mapped objects	RO	UNSIGNED8	4
	1	The first mapping object	RW	UNSIGNED32	
	2	The second mapping object	RW	UNSIGNED32	
	3	The third mapping object	RW	UNSIGNED32	
	4	The fourth mapping object	RW	UNSIGNED32	

1A02		PDO3 TX Mapping Parameters			
	0	Number of mapped objects	RO	UNSIGNED8	4
	1	The first mapping object	RW	UNSIGNED32	
	2	The second mapping object	RW	UNSIGNED32	
	3	The third mapping object	RW	UNSIGNED32	
	4	The fourth mapping object	RW	UNSIGNED32	
1A03		PDO4 TX Mapping Parameters			
	0	Number of mapped objects	RO	UNSIGNED8	4
	1	The first mapping object	RO	UNSIGNED32	
	2	The second mapping object	RO	UNSIGNED32	
	3	The third mapping object	RO	UNSIGNED32	
	4	The fourth mapping object	RO	UNSIGNED32	

The object dictionary defines the register mapping for each RPD operation, which can be set accordingly during the master configuration to complete the operation and monitoring of the VFD in the application program.

The functions and representations of the registers in the mapping object are shown in the following table:

MODBUS register address assignment table						
Processor register	Name	Accurate	Fill out or in (information on a form) scope of one's jurisdiction	Unit (of measure)	Register Min.	Maximum values
register_0	run stop (temporarily or permanently)	×1	W/R	N/A	0	1
register_1	Operation direction switching	×1	W/R	N/A	0	1
register_2	given frequency	×10	W/R	Herz (Hz) or cycles per second, unit of frequency	0	3000
register_3	Torque Setting	×10	W/R	percentage	0	2000
register_4	Torque limit value setting	×10	W/R	percentage	0	3000
register_5	Torque direction switching	×1	W/R	N/A	0	1
register_6	Active current setting	×10	W/R	percentage	0	2000
register_7	Reactive current setting	×10	W/R	percentage	0	2000
register_8	Acceleration Time Multiplier	×1000	W/R	N/A	50	10000

register_9	Deceleration Time Multiplier	×1000	W/R	N/A	50	10000
register_10	fault reset	×1	W/R	N/A	0	1
register_11	system reset	×1	W/R	N/A	0	1
register_12	DI	×1	R	N/A		
register_13	DO	×1	R	N/A		
register_14	AI1	×100	R	conceal oneself		
register_15	AI1	×100	R	milliampere (mA)		
register_16	AI2	×100	R	conceal oneself		
register_17	AI2	×100	R	milliampere (mA)		
register_18	AI1	×100	R	percentage		
register_19	AI2	×100	R	percentage		
register_20	AO1	×1	R	percentage		
register_21	AO2	×1	R	percentage		
register_22	dc voltage	×10	R	conceal oneself		
register_23	Current RMS @Filter	×10	R	Amp_RMS		
register_24	RMS value of phase A current	×10	R	Amp_RMS		
register_25	RMS value of phase B current	×10	R	Amp_RMS		
register_	RMS phase C	×10	R	Amp_RMS		

26	current					
register_27	electrical frequency	×100	R	Herz (Hz) or cycles per second, unit of frequency		
register_28	Rotor frequency @given	×10	R	Herz (Hz) or cycles per second, unit of frequency		
register_29	Encoder speed	×10	R	rpm		
register_30	Rotor Speed_Estimation	×10	R	rpm		
register_31	Output Voltage @Filter	×10	R	Volt_RMS		
register_32	Active power after filtering	×10	R	kilowatt (unit of electric power)		
register_33	Reactive power after filtering	×10	R	kilowatt (unit of electric power)		
register_34	given torque	×10	R	percentage		
register_35	Torque_filter @ load	×10	R	percentage		
register_36	Phase voltage amplitude (AFE)	×10	R	Volt_RMS		
register_37	Frequency (AFE)	×100	R	Herz (Hz) or cycles per		

				second, unit of frequency		
register_38	Motor switching options	×1	R	N/A		
register_39	Positive torque source selection	×1	R	N/A		
register_40	control method	×1	R	N/A		
register_41	highest temperature	×10	R	degree (angles, temperature etc)		
register_42	T1	×10	R	degree (angles, temperature etc)		
register_43	T2	×10	R	degree (angles, temperature etc)		
register_44	device status	×1	R	N/A		
register_45	Error@parameter	×100	R	N/A		
register_46	warnings	×1	R	N/A		
register_47	Error@Operation	×1	R	N/A		
register_48	Gate drive error state	×1	R	N/A		
register_49	Gate drive error status @ latch	×1	R	N/A		
register_50	Hardware Error Status @Read	×1	R	N/A		

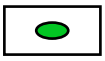
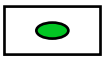
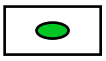
register_51	Output torque	×1	R	N/A		
register_52	Encoder 1 position counting	×1	R	N/A		
register_53	Encoder 2 position counting	×1	R	N/A		
register_54	Encoder1_32-bit Count_LSW	×1	R	N/A		
register_55	Encoder1_32-bit Count_MSW	×1	R	N/A		
register_56	Encoder2_32-bit Count_LSW	×1	R	N/A		
register_57	Encoder2_32-bit Count_MSW	×1	R	N/A		
register_58	Phase A Current @ Slave 1	×10	R	Amp_RMS		
register_59	Phase A current @ slave 2	×10	R	Amp_RMS		
register_60	Phase A current @ slave 3	×10	R	Amp_RMS		
register_61	Error @slave1	×1	R	N/A		

B4.6 Troubleshooting

LED display

The GDHF-ACNX1 communication card has 3 bus status display LEDs. for the location of these LEDs, please refer to the communication card layout diagram.

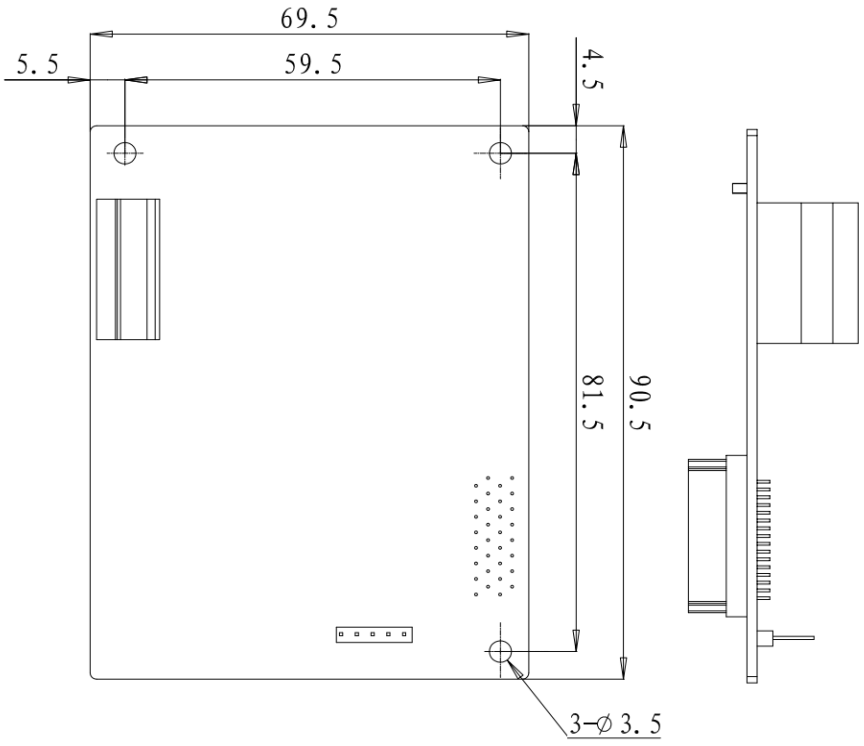
The functions of these LEDs are as follows:

LED status indicator		
		
RUN	COM	BUSError

Name	Color	Functional Description
Operational state (RUN)	Green	Fast blinking: Bus communication abnormality (blinking frequency 10Hz) Slow blinking: Bus initialization (flashing frequency 1Hz) Always on: Bus is normal Frequently off: Abnormal connection between communication card and control board
Receive instructions (RX)	Green	Lights up: The communication card is receiving a message frame Out: No receive operation on the bus
Send instructions (TX)	Green	Lights up: The card is sending a message frame. Out: No transmit operation on the bus

B4.7 Technical data

Mechanical dimensions:



GDHF-ACNX1 Communication Card Dimensions (in mm)

Installation: Insert into the appropriate socket on the VFD control board.

Environmental conditions: See the relevant section on environmental conditions in the "VFD User's Manual for Gondi VFDs".

Hardware settings: DIP switches for bus terminal selection.

Software Settings:

- Module Enable
- Bus Interface Parameter Setting
- Site number setting
- Fault Detection

B5 MOUDBUS communication card

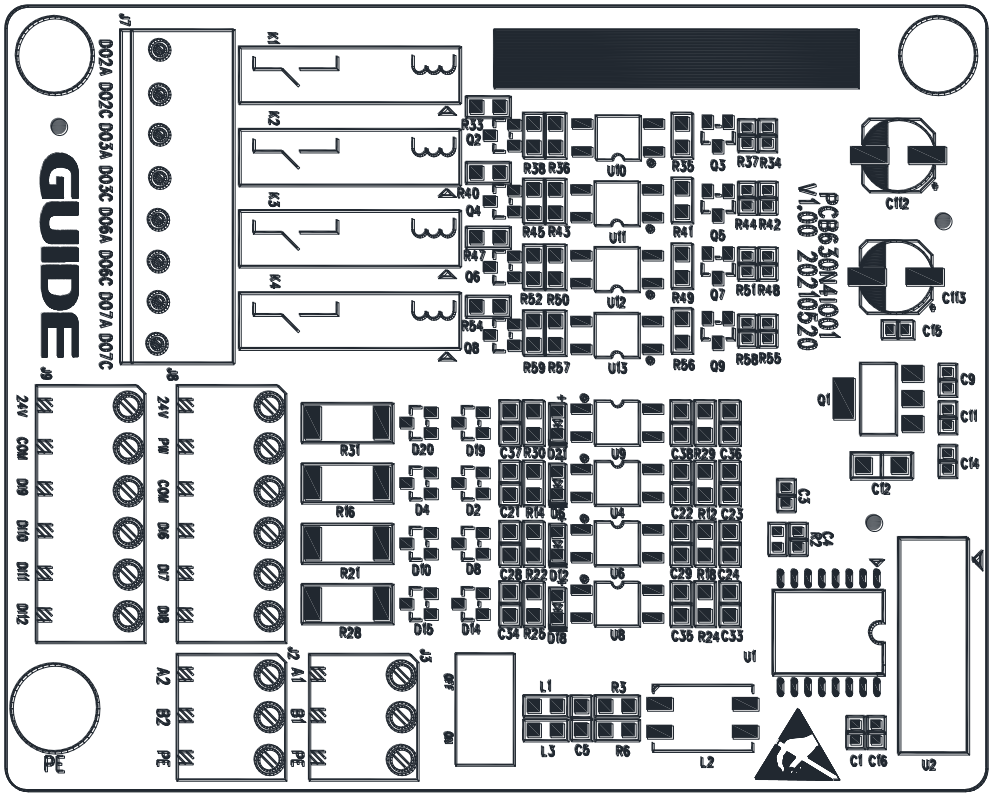
B5.1GDHF-AMBX1 Communication Card

Model Description: The model number of the MB communication card for the GDHF VFD is GDHF-AMBX1 communication.

The MODBUS-RTU serial bus option GDHF-AMBX1 communication card is an optional device for the GF630N02 VFD from Quanti that connects the VFD to a MODBUS network. On the MODBUS network, the VFD acts as a slave. With the GDHF-AMBX1 communication card, it is possible to:

- Control commands (start, stop, allow to run, etc.) are sent to the VFD.
- Sends a given signal such as speed or torque to the VFD.
- Sends a process actual or process given signal to the PID regulator of the VFD.
- Read status signals and actual values from the VFD.
- Perform a fault reset on the VFD.

The MODBUS-RTU serial bus option GDHF-AMBX1 communication card is connected to the J25 jack on the control board inside the VFD.



GDHF-AMBX1 Communication Card Layout Diagram

mounting

Align the GDHF-AMBX1 communication card with the two fixing screw holes and the signal jacks of the control board J25, insert the GDHF-AMBX1 communication card into the signal jacks of the control board, and secure the GDHF-AMBX1 communication card with the screws.

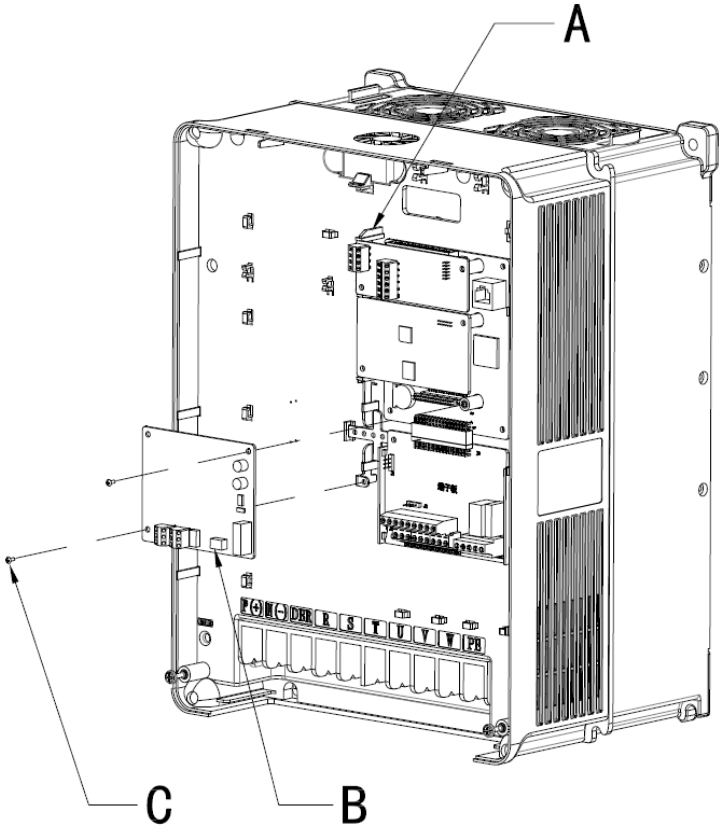
Installation Steps:

- Carefully insert the GDHF-AMBX1 communication card into the appropriate jack.
- Using the set screws, securely fasten the GDHF-AMBX1 communication card.
- Set the bus termination switch of the communication card to the desired position.

Note: In order to fulfill the EMC requirements and to ensure that the GDHF-

AMBX1 communication card can work properly, the shield of the communication cable should be connected to the PE port of the GDHF-AMBX1 communication card connection terminal. Ensure that the shield of the communication cable is well connected to the protective ground of the VFD.

The communication card is installed as shown below.



A-VFD Grounding bracket
B-communication card
C-screw

Installation of communication cards

B5.2 Bus terminator

The J1 switch on the printed circuit board on the bottom of the MODBUS communication card is used to turn on the RS485 bus terminator and the A2 and B2 signals. The bus terminator provides the RS485 bus with a terminating resistor that prevents signal reflection at the cable end of the RS485 bus.The A2 and B2 signals are used to connect other MODBUS devices. If the module is the last module or the first module in the network, the bus terminator must be set to ON.

B5.3 MODBUS bus connection

The bus cable is connected to terminals J2 and J3 of the GDHF-AMBX1 communication card.

The connection terminals are assigned as follows:

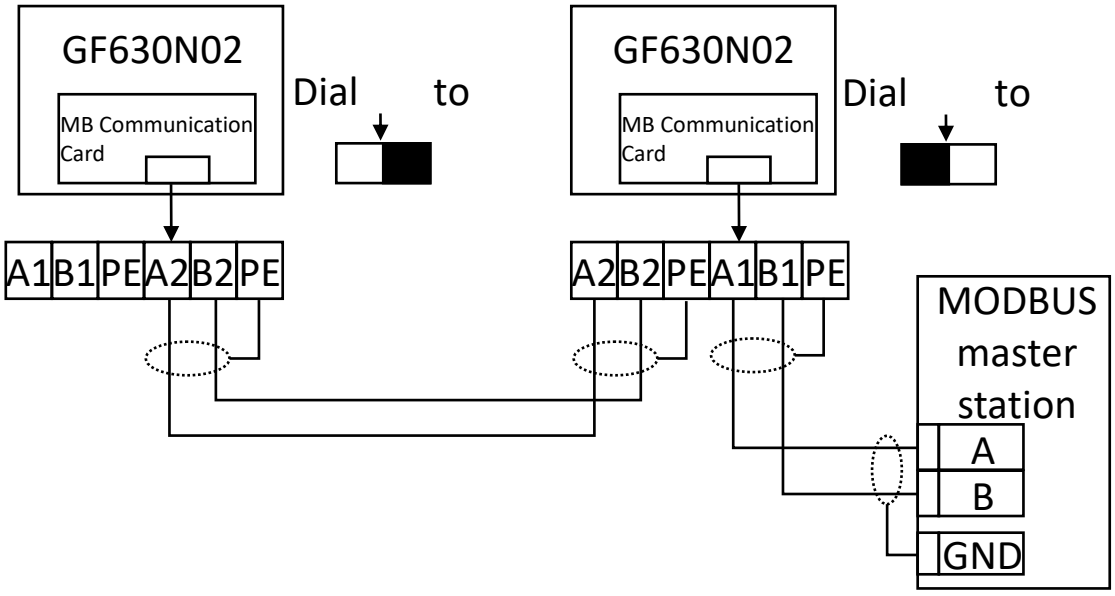
Terminals	Clarification
A2	RS485_A2
B2	RS485_B2
PE	reserve
A1	RS485_A1
B1	RS485_B1
PE	reserve

Attention:

If the M-type cable holder on the VFD has been used for shield ground connection, the PE terminal can be used without connecting the MODBUS cable shield.

MODBUS wiring example:

The MODBUS cable shield is directly connected at all nodes to the GND terminal of the corresponding signal port of the communication card.



Standard MODBUS RS485 Cable Wiring Diagrams

B5.4 MODBUS communication configuration

To establish communication between the GDHF-AMBX1 communication card and the VFD, you first need to configure the MODBUS communication parameters in the VFD. The options for these parameters are described in detail below.

Note: The newly set parameters take effect immediately.

Table 1 MODBUS Parameter Configuration

Parameter number	Name	Explanation	Setting range	Default value
P2.5	MODBUS ID number	Configure the settings according to the actual application	1 to 247	1
P2.6	MODBUS baud rate	[0] 9600BPS [1] 14400BPS [2] 19200BPS [3] 38400BPS [4] 56000BPS [5] 57600BPS [6] 115200BPS [7] 128000BPS [8] 256000BPS	0 to 8	3
P2.7	MODBUS communication type	[0] RS232 [1] RS485	0 to 1	1

1. MODBUS slave ID

   In a MODBUS network, each device corresponds to a unique node address, and this slave address is set according to the actual application.

2. Baud rate selection

   Select the baud rate of the bus port, which must be consistent with the baud rate set by the MODBUS master according to the actual application.

3. MODBUS communication type

   Select here. [1] RS485.

B5.5 Register Data Values and Precision

In the control board register data accessed by the GDHF-AMBX1 communication card, some parameter data contains certain decimal places, and the MODBUS register value is an integer with a length of 2 bytes, and it does not represent a floating-point number that contains a decimal point, so we introduced the data precision as a calculated quantity when defining

the effective value of the register data. That is: **register value = actual parameter value × precision.**

Data accuracy, in the following, is expressed in the following format:

Accurate	Hidden meaning
×1	The actual parameter has no decimal places
×10	The actual parameter has 1 decimal place
×100	The actual parameter has 2 decimal places
×1000	The actual parameter has 3 decimal places

The procedure for converting register values, actual parameter values and accuracy is shown in the table below:

MODBUS register value	Actual parameter values	Accurate
1	1	×1
1	0.1	×10
1	0.01	×100
1	0.001	×1000

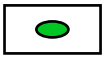
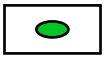
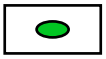
For example, if the given frequency register, unit is Hz, precision× 10, the value of the actual given frequency should be 49.9Hz, then the register value written to this register by the GDHF-AMBX1 communication card should be 49.9× 10 = 499. Write the value of 499 to this register address, and the value of this parameter of the actual given frequency will be modified to 49.9Hz.

B5.6 Troubleshooting

LED display

The GDHF-AMBX1 communication card has 3 bus status display LEDs. for the location of these LEDs, please refer to the communication card layout diagram.

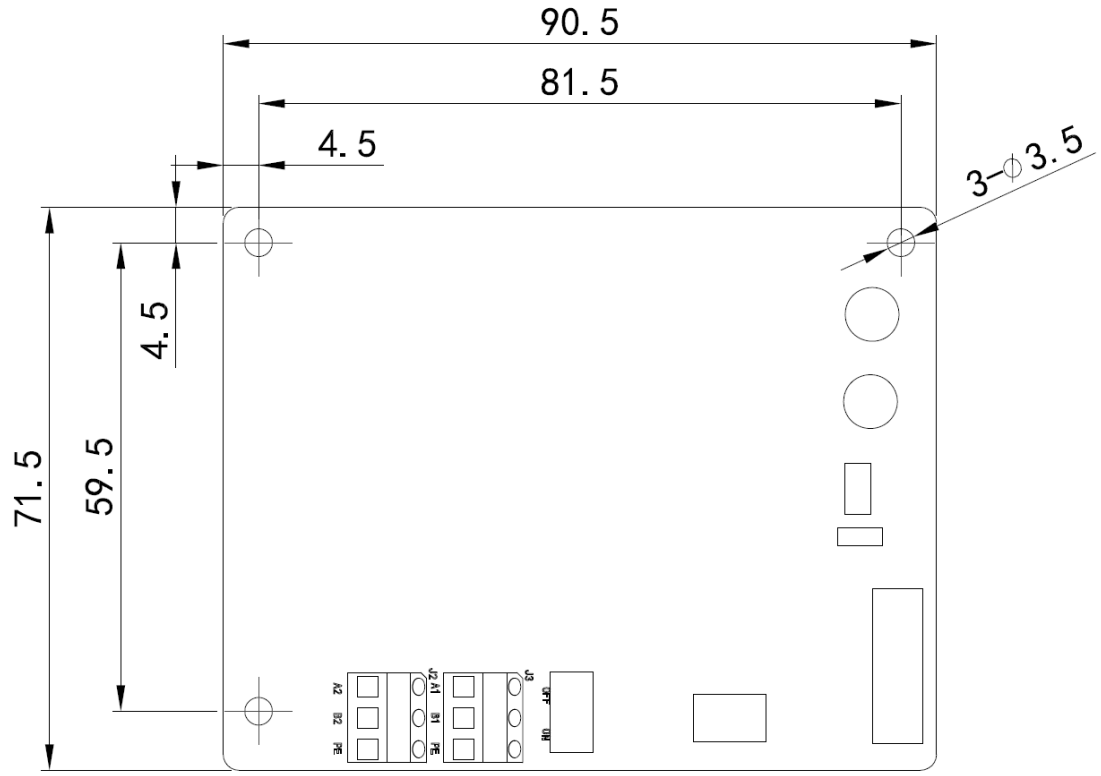
The functions of these LEDs are as follows:

LED status indicator		
		
RUN	RX	TX

Name	Color	Functional Description
Operational state (RUN)	Green	Fast blinking: MODBUS bus communication abnormality (flashing frequency 10Hz) Slow flashing: Normal operation (flashing frequency 1Hz) Frequently extinguished: Abnormal connection between communication card and control board
Receive instructions (RX)	Green	Lights up: The communication card is receiving a message frame Out: No receive operation on the bus
Send instructions (TX)	Green	Lights up: The card is sending a message frame. Out: No transmit operation on the bus

B5.7 Technical data

Mechanical dimensions:



GDHF-

AMBX1 Communication Card Dimensions (in mm)

Installation: Insert into the appropriate socket on the VFD control board.

Environmental conditions: See the relevant section on environmental conditions in the "VFD User's Manual for Gondi VFDs".

Hardware settings: DIP switches for bus terminal selection.

Software Settings:

- Module Enable
- Bus Interface Parameter Settings
- Site number setting
- Fault detection time setting

B5.8 Serial links

Compatible Devices: All devices following the MODBUS protocol with interfaces following the EIA/TIA 485-A specification.

Number of connections: RS485: 127 stations, including repeaters (31 stations and 1 repeater per segment)

Medium: Twisted pair RS-485 cable with shielding

Terminator: Inside the module.

Technical specifications:

RS485 interface			
Parameters	LINE A	LINE B	Unit (of measure)
Probationer	135~165(3~20MHz)	100~130(f>100KHz)	W
Capacitors	<30	<60	PF/m
(electrical) impedance	<110	--	Ω/Km
Line number	>0.64	>0.53	mm
Conductor core cross section	>0.34	>0.22	mm^2
Maximum Bus Length			
Transmission rate Kbit/s	<93.75	115.2	
LINE A (meters)	1200	1000	
LINE B (meters)	1200	600	

Topology: RS485: multipoint

Serial type communication type: RS485: asynchronous, half-duplex

Transmission rates: 9.6kbit/s, 14.4kbit/s, 19.2kbit/s, 38.4kbit/s, 56kbit/s, 57.6kbit/s, 115.2kbit/s

Protocol: MODBUS RTU

GUIDE VFD GF630N02 Series

Instruction manual version: 1.03

Precautions

1. Be sure to read this manual before using the inverter product.
2. For safety, ask professionals to carry out commissioning and wiring.
3. The contents of this manual are subject to change without prior notice.

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GDGF630N02-DOC-UM-Rev1.03
2024.10