SLANVERT

HOPE530-H Crane-specific Frequency Drive Manual

Tackle heavy loads effortlessly	Master the heights with stability	Light and elegant as a flying swan	Safety and stability

HOPE SENLAN SCIENCE AND
TECHNOLOGY HOLDING CORP., LTD.

Preface

Thank you for purchasing the SLANVERT Hope530-H series crane-specific frequency converter!

Hope530-H is a new generation crane-specific frequency converter independently developed by HOPE SENLAN SCIENCE AND TECHNOLOGY HOLDING CORP., LTD. This series of frequency converters achieves high torque, high precision, and wide-range speed control of the motor through the use of high-performance vector control technology, featuring significant characteristics such as large starting torque and rapid response. In addition, it also includes built-in logic control for brake release, anti-sway, fault protection, and other complex crane process controls, making the product highly functional and reliable. This series of products is applicable for driving asynchronous motors and conical motors, and is extensively used in driving and control occasions like lifting, translation and slewing in hoisting machinery.

This manual provides users with installation wiring, parameter setting, daily maintenance, fault diagnosis and troubleshooting, etc. Before installing, setting up, running and maintaining the frequency converter, please be sure to read all the contents of the User Manual of this product in detail, memorize the relevant knowledge and safety precautions of the frequency converter, and ensure the correct use and give full play to its superior performance. The technical specifications of this product may change. If there are any modifications, please pay attention to the relevant information released on our official website and WeChat official account below in a timely manner. No further notice will be given.

(1) Scan the QR code to follow the "SLANVERT" official account → click "Product Service" → select "User Manual" → choose the "Frequency Converter" model, and click to download and view.

(2) Open the browser and enter "www.chinavvvf.com" to visit the official website of SLANVERT → click "Products & Services" → select "Data Download" → choose "Manual Download" → select the "Frequency Converter" model, and click to download and view.

Manual Description

For first-time users of this product, please read this manual carefully. If you have any doubts about some functions and performance, please consult our technical support personnel for assistance, which will be beneficial for the correct use of this product.

Version Change History

Revision Date	Release Version	Change Content
2020-08	A00	The first edition was released
2021-03	A01	The quick setup application macro Fd-90 for European-style crane was added to the product

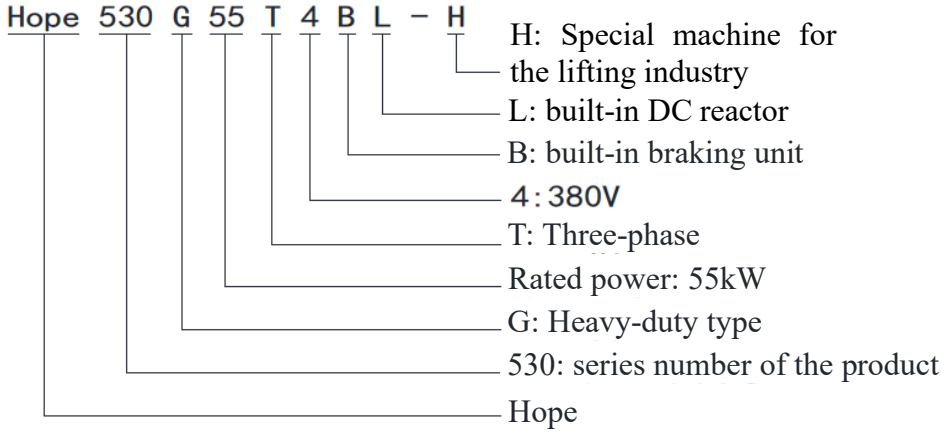
		The content of function code groups F8 and Fd, along with the appendix titled "Communication Addresses" was modified The installation and wiring section in Chapter 3 was modified The content of 5.1~5.5 in Chapter 5 was modified The content of the encoder interface board in Chapter 9 was updated
2021-11	A02	Parameter identification function was optimized and function code group FA was updated
2022-03	A03	Minor errors were modified
2023-05	A04	Part of the content for function code group F8 was added Function debugging instructions for 5.6, 5.7, 5.8, 5.10, 5.11, and 5.12 in Chapter 5 were added
2024-03	A05	The content and countermeasures for frequency converter faults in Chapter 7 were modified The quick setup application macros for other cranes were added in Fd-90
2024-08	A06	Encoder rope length measurement and anti-sway functions were added Part of the content for function code group Fd was updated Debugging instructions for 5.9 in Chapter 5 were added Minor errors were modified

Precautions for Unpacking Inspection

When unpacking, please confirm the following items carefully. In case of any problem, please contact us or the Supplier directly.

Confirmation Item	Confirmation Method
Is it in line with your order?	Confirm whether the nameplate on the side of frequency converter is consistent with your order
Is there any damage to the product?	Check the overall appearance of the product to confirm whether it is damaged during transportation

Model Description of Frequency Converter



Frequency Converter Nameplate Description: (taking Hope530G55T4-H as an example)

SLANVERT Frequency Converter			
Product model:	Hope 530G55T4-H	Executive standard:	GB/T12668.2
Rated input:	3-phase 380V 50/60Hz	Product No.:	1234567
Rated output:	3-phase 0~380V 0~650Hz		
Rated current:	112A		
Rated power:	55kW		
SLANVERT		HOPE SENLAN SCIENCE AND TECHNOLOGY HOLDING CORP., LTD.	

Definition of Safety Signs

For safety-related contents in this manual, please use the following signs, and the contents with safety signs must be followed.

Danger: wrong use or operation not according to the requirements may cause damage to the frequency converter or casualties.

Attention: Failure to operate as required may cause the system to work abnormally. In extreme cases, it may result in damage to the frequency converter or machinery.

Contents

1 Safety and Precautions

1.1 Safety Matters

I. Installation

Do not install the frequency converter at the place with or near combustible materials, or there will be a fire risk.

■ The frequency converter shall be installed on a smooth and solid surface, away from Humid, hot and condensed environment.

II. Wiring

Make sure that the high-voltage indicator light is completely off and the voltage of both positive and negative buses is below 36V, otherwise there may be danger of electric shock.

■ Make sure that the input power supply is completely disconnected before wiring, otherwise it may cause electric shock.

■ Do not directly connect a braking resistor between the DC+ and DC- terminals, as there is a risk of fire.

■ The voltage of the input power terminal shall not exceed the rated voltage range, otherwise the frequency converter will be damaged.

■ The grounding terminal (PE) of the frequency converter must be reliably and correctly grounded (resistance to ground less than or equal to 10Ω). Otherwise, it may cause electric shock.

III. Inspection before Power-on

■ The frequency converter door must be closed before power on, otherwise it may cause electric shock and explosion.

■ The frequency converter can control the motor to run at high speed. To run above the rated frequency of the motor, it must first confirm whether the motor and mechanical device can withstand high speed operation.

IV. Power-on and Operation Notes

■ Check whether the parameter setting is correct before test run.

■ Do not open the front door when the input power is connected, for there is high voltage inside and it may cause electric shock.

■ Do not use wet hands to operate the frequency converter, otherwise it may cause electric shock.

■ When the frequency converter is delivered from the factory, the automatic power-on start is enabled. If the terminal control and the running signal is valid, the power-on will start automatically.

■ Do not turn on or off the input power to control the frequency converter operation and stop.

■ When parameter initialization is performed, the parameters shall be reset.

■ When selecting the restart function (such as fault self-reset or instantaneous power failure restart), do not get close to the motor and mechanical load while the frequency converter is waiting for starting.

V. Transportation and Packaging Precautions

■ Quantity of the stacked frequency converter shall not exceed the value specified for packing case.

■ Do not place heavy objects on the frequency converter.

■ Do not open the door when transporting the frequency converter.

■ Operation panel and door shall not be stressed during handling, otherwise personal injury or property loss may be caused.

VI. Scrapping

■ It shall be scrapped as industrial wastes.

■ The electrolytic capacitor inside the frequency converter may explode when burned.

■ The plastic parts of the frequency converter will produce toxic gas when burned.

1.2 Precautions

I. About Motor and Mechanical Load

■ Compared with power frequency operation

The Hope530-H series frequency converter is a PWM voltage-source type. Its output voltage contains certain harmonics. When it is used to drive a motor, compared with the power frequency power supply, it will result in increased motor losses, higher temperature rise and elevated noise levels.

When the input voltage is high or the motor connection distance is long, the dielectric strength of cable and motor must be considered.

■ Constant-torque and low-speed operation

When the frequency converter drives the common motor to run at low speed for a long time, the temperature of the motor will rise due to the poor heat dissipation effect of the motor. If running at low speed constant torque for a long time is needed, it must use frequency conversion motor or forced air cooling.

■ Overload protection of motors

When the adaptive motor is selected, the frequency converter can protect the motor from overload. If the motor does not match the rated capacity of the frequency converter, the protection value must be adjusted or other protective measures must be taken to ensure the safe operation of the motor.

■ Operation above the frequency of 50Hz

In case of operation exceeding 50Hz, in addition to considering the increase of vibration and noise of the motor, it must also confirm whether the use speed range of the motor bearing and mechanical device is allowed.

■ Lubrication for mechanical device

When the gearbox, gear and other mechanical devices needing to be lubricated are operated at low speed for a long time, they may be damaged due to poor lubrication effect, so they must be confirmed in advance.

■ Regenerative torque load

For the occasion of lifting load, there is often a regenerative torque, the frequency converter often stops due to overvoltage protection, at this time the appropriate specification of the brake components shall be considered.

■ Mechanical resonance point of load device

The frequency converter may encounter the mechanical resonance point of the load device within a certain output frequency range, which can be avoided by setting anti-vibration rubber under the base plate of the motor or by setting the frequency avoidance of the frequency converter.

■ Insulation inspection of motor before being connected with the frequency converter

When the motor is used for the first time and re-used after long time placement, insulation inspection for motor shall be carried out prevent the frequency converter from damage due to insulation failure of the motor winding. Please use 500V voltage megohmmeter for test, and it shall guarantee that the measured insulation resistance is not less than 5MΩ.

II. About Frequency Converter

■ Capacitance or pressure sensitive devices improving the power factor

As the frequency converter outputs PWM voltage, if the output side is installed with capacitance or lightning protection voltage-sensitive resistor for improving power factor, it will cause the frequency converter fault trip or device damage, please be sure to remove it.

■ Contactors and other switching devices installed at the output end of the frequency converter

If switches such as contactors need to be installed between the frequency converter output and the motor, please be sure to switch on and off when the frequency converter has no output, otherwise the frequency converter may be damaged.

■ Occasion for frequent start and stop

Start and stop control shall be achieved for frequency converter via terminals. It is strictly prohibited to use contactors and other switching devices on the input side of the frequency converter for direct and frequent start and stop, or it will cause equipment damage.

■ Use beyond rated voltage

The Hope530-H series frequency converter shall not be operated beyond the allowable input voltage range. If required, a boost or step-down device shall be used for voltage transformation.

■ Lightning impulse protection

The frequency converter is equipped with lightning overvoltage protection device, which has a certain self-protection ability for inductive lightning.

■ Leakage protector

When the frequency converter runs, there is a high-speed switching action, which will inevitably produce high-frequency leakage current, and sometimes lead to the misoperation of leakage protection circuit. When encountering the above problems, in addition to appropriately reducing the carrier frequency and shortening the lead, the leakage protector shall be correctly installed.

When installing the leakage protector, following items shall be followed:

1) The leakage protector shall be set at the input side of the frequency converter, which is more suitable to set it behind the air switch (no fuse circuit breaker).

2) Leakage protector that is insensitive to ultraharmonics or special leakage protector shall be selected for the frequency converter (sensitivity above 30mA). If the ordinary leakage protector is used, the sensitivity shall be above 200mA and the action time shall be above 0.1s.

■ Derating of frequency converter

1) When the ambient temperature exceeds 40°C, the frequency converter shall be derated by 1.5% for every 1°C increase, with a maximum operating temperature of 55°C. If the ambient temperature exceeds 50°C, the company shall be consulted before ordering, and the ambient temperature shall be specified when ordering.

2) For areas with an altitude exceeding 1,000m, the thin air will impair the frequency converter's heat dissipation performance. Operation at a derating of 1% per 100m above 1,000m is necessary.

3) When the set carrier frequency is above the factory default, the frequency converter shall be derated by 5% for every 1kHz increase.

2 Product Specifications

2.1 Technical Specifications for Hope530-H Series Frequency Converter

Item		Item description
Input	Rated voltage and frequency	Three-phase: 380V, 50Hz/60Hz
	Allowable range	Voltage fluctuation range: ±15%; Voltage unbalance: <3%; Frequency: 47Hz~63Hz
Output	Output voltage	Three-phase, 0V~input voltage, error <5%
	Output frequency range	V/F control: 0.00Hz~650.00Hz; Vector control: 0.00Hz~200.00Hz
Basic specifications	Motor control mode	Without PGV/F control, with PGV/F control, without PG vector control, with PG vector control, V/F separation control
	Steady-state speed precision	Without PG vector control: ±0.5%; with PG vector control: ±0.05%
	Starting torque	0.25Hz/150% (without PG vector control), 0Hz/180% (with PG vector control)
	Overload capacity	150％ rated current for 1min, 180% rated current for 15s, 200% rated current for 2s
	Frequency resolution	Digital setting: 0.01Hz; simulation setting: 0.1% of the maximum frequency
	Output frequency accuracy	Simulation setting: ±0.2% of the maximum frequency (25±10°C); Digital setting: 0.01Hz (-10°C~+40°C)
	Run command channel	Operation panel setting, control terminal setting, communication setting, switchable via terminal
	Frequency setting channel	Operation panel, communication, UP/DOWN regulated value, Al1~Al4, PFI, arithmetic unit
	Auxiliary frequency setting	For flexible auxiliary frequency trim and setting frequency synthesis
	Torque boost	Automatic torque boost; manual torque boost
	V/F Curve	Users can define V/F curve, linear V/F curve and 5 reduction torque characteristic curves
	Acceleration/deceleration method	Linear acceleration & deceleration, S curve acceleration & deceleration
	Jog	Jog frequency range: 0.10Hz~50.00Hz; Jog acceleration & deceleration time: 0.1s~60.0s
	Automatic energy-saving operation	Automatically optimize V/F curve according to load condition for automatic energy-saving operation
	Automatic voltage regulation (AVR)	When grid voltage changes within a certain range, automatically maintain a constant output voltage
	Automatic carrier regulation	Automatically regulate carrier frequency according to load characteristic and environment temperature
	Random PWM	Regulate motor timbre when operating
	Droop control	Applicable to the condition when several frequency converters drive the same load
	Instantaneous shutdown processing	When powering down instantaneously, the equipment can continue operating via busbar voltage control
	Dynamic braking capacity	Built-in braking unit
	DC braking capacity	Braking time: 0.0s~60.0s, braking current: 0.0%~100.0% of rated current
	PFI	Maximum input frequency: 50kHz
	PFO	Open-collector pulse square wave signal output with a

		range of 0Hz~50kHz, programmable
	Analog input	2-channel analog signal input (voltage/current optional), supporting positive/negative input and 2-channel analog input expansion
	Analog output	2-channel analog signal output, selectable 0/4mA~20mA or 0/2V~10V each, programmable
	Digital input	5-channel multi-functional digital input (source/sink optional), supporting digital input expansion
	Digital output	2-channel multi-functional digital output; 2-channel multi-functional relay output, supporting digital output extension
	Communication	Built-in RS485 communication interface, supporting Modbus protocol (RTU, TCP), USS instruction, PROFIbus-DP protocol, PROFINET protocol, etc.
Features	Zero-speed hovering	Support zero-speed hovering
	Speed reduction with voltage drop	Maintain the normal output of the frequency converter by reducing the given frequency when the bus voltage remains continuously low
	Multi-stage speed method	Encoding selection, direct selection, overlap selection and number selection method
	Brake timing control	Built-in professional hoist-specific brake timing control
	Motor parameter static identification	Support static identification of all motor parameters
	Torque control function	Control torque/speed via switching terminals, torque setting methods
	Downlink frequency and uplink torque	Provide upward torque during descent to enhance stability under load
	Torque memory	Output reasonable torque during startup to enhance load-carrying capability
	Pre-excitation maintenance during shutdown	Maintaining excitation during shutdown enables quick restart after shutdown
	Brake failure protection	Enable detection of brake effectiveness and implement protective measures
	Stall protection	Detect motor stall conditions and implement protective measures
	Anti-sway function	Implement anti-sway control for translation and rotation mechanisms
	Low voltage protection	Implement rapid shutdown and alarm when the voltage is too low, and automatically restore the alarm when the voltage returns to normal
	Stall protection	Automatically and quickly stop during operation when a hook slippage phenomenon occurs
	Multi-motor switching control	Implement switching control for three motors
	Compatible with tapered motor	Built-in dedicated function macro for conical motors, enabling rapid debugging of conical motors
	Wide voltage input	Compatible with grid voltage fluctuations within ±15% of the rated voltage
Protection function		Over-current, over-voltage, under-voltage, input/output phase loss, output short circuit, overheat, motor overload, external failure, lost connection of analog input, stall prevention, etc.
Optional accessories		Digital I/O expansion board, encoder interface board, analog input expansion board, I/O reactor, electric magnetic interference filter, Profibus-DP module,

		PROFINET module, Chinese/English LCD panel, operation panel mounting box, operation panel extension cable, RS485 communication module, etc.
Environment	Usage location	With elevation below 1,000m, indoor, without direction sunshine, dust, corrosive gas, combustible gas, oil mist, water vapor, water drop, and salt mist, etc.
	Operating environment temperature/humidity	-10°C~+40°C/20%~90%RH, no condensation
	Storage temperature	-20°C~+60°C
	Vibration	<5.9m/s^2 (0.6g)
Structure	IP grade	IP20 (up to IP40 for 11kW~37kW models with shield)
	Cooling method	Forced cooling, with control fan

2.2 Product Series Specifications

The rated value of the Hope530-H series frequency converter is as shown in the following table:

Frequency converter model	Rated Capacity (kVA)	Rated Output Current (A)	Adaptive Motor (kW)	Frequency converter model	Rated Capacity (kVA)	Rated Output Current (A)	Adaptive Motor (kW)
Hope530G0.75T4B*-H	1.6	2.5	0.75	Hope530G55T4B*-H	74	112	55
Hope530G1.5T4B*-H	2.4	3.7	1.5	Hope530G75T4B*-H	99	150	75
Hope530G2.2T4B*-H	3.6	5.5	2.2	Hope530G90T4BL-H	116	176	90
Hope530G4T4B*-H	6.4	9.7	4	Hope530G110T4BL-H	138	210	110
Hope530G5.5T4B*-H	8.5	13	5.5	Hope530G132T4BL-H	167	253	132
Hope530G7.5T4B*-H	12	18	7.5	Hope530G160T4BL-H	200	304	160
Hope530G11T4B*-H	16	24	11	Hope530G200T4L-H	248	377	200
Hope530G15T4B*-H	20	30	15	Hope530G220T4L-H	273	415	220
Hope530G18.5T4B*-H	25	38	18.5	Hope530G250T4L-H	310	475	250
Hope530G22T4B*-H	30	45	22	Hope530G280T4L-H	342	520	280
Hope530G30T4B*-H	40	60	30	Hope530G315T4L-H	389	590	315
Hope530G37T4B*-H	49	75	37	Hope530G375T4L-H	460	705	375
Hope530G45T4B*-H	60	91	45				

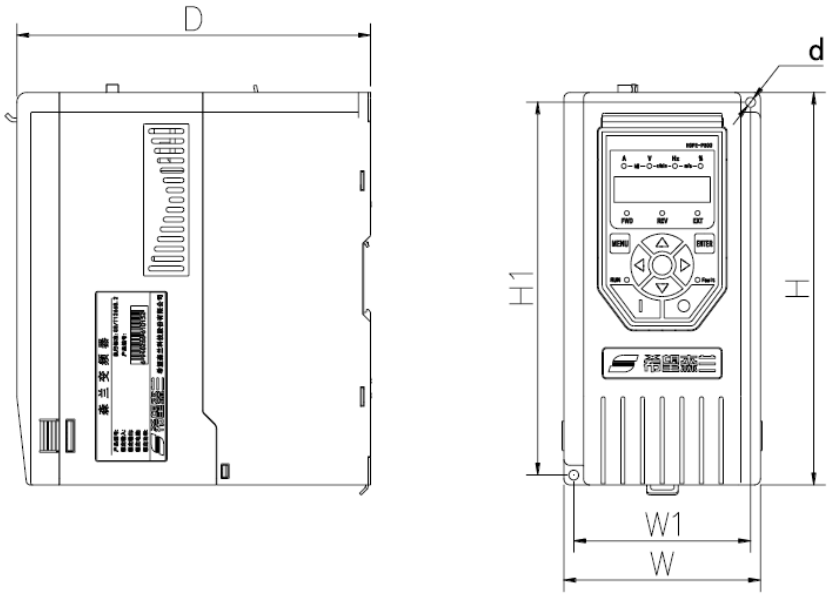
Note 1: The last character of the frequency converter model is defaulted and will be represented by "*". The "*" will change to the letter "L" to indicate a built-in DC reactor.

Note 2: Models 160kW and below come with a built-in braking unit. Models 90kW and above are furnished with a built-in DC reactor, which cannot be optional.

Models 200kW and above are not provided with a built-in braking unit. Select the appropriate braking unit based on the selection table in Chapter 9.

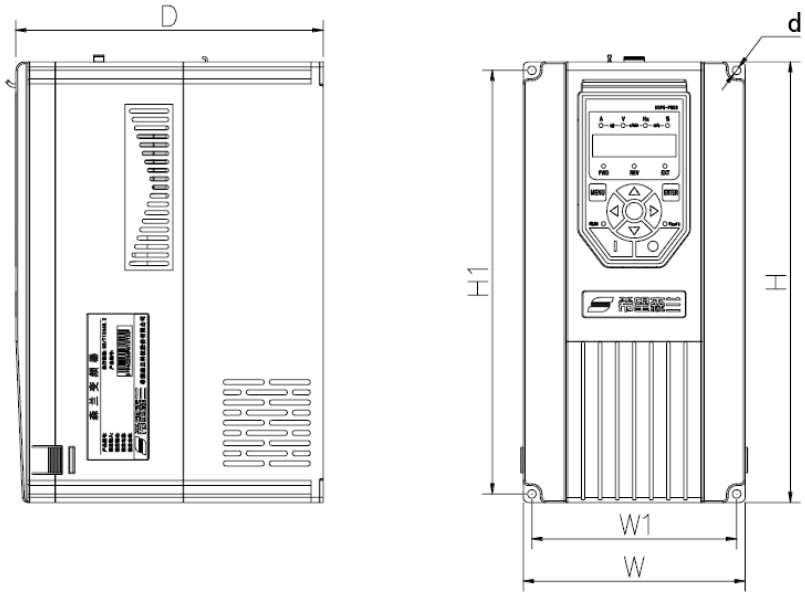
1) Installation Dimensions, Weight, and Outline Drawings for Hope530G0.75T4B-H~Hope530G4T4B-H Models:

Frequency converter model	W (mm)	W1 (mm)	H (mm)	H1 (mm)	D (mm)	d (mm)	Weight with Reactor (kg)	Weight without Reactor (kg)
Hope530G0.75T4B*-H	100	90	200	190	180	5	2.1	1.8
Hope530G1.5T4B*-H	100	90	200	190	180	5	2.1	1.8
Hope530G2.2T4B*-H	100	90	200	190	180	5	2.1	1.8
Hope530G4T4B*-H	100	90	200	190	180	5	2.1	1.8



2) Installation Dimensions, Weight, and Outline Drawings for Hope530G5.5T4B-H~Hope530G7.5T4B-HModels:

Frequency converter model	W (mm)	W1 (mm)	H (mm)	H1 (mm)	D (mm)	d (mm)	Weight with Reactor (kg)	Weight without Reactor (kg)
Hope530G5.5T4B*-H	130	120	260	250	180	5	3.7	3.4
Hope530G7.5T4B*-H	130	120	260	250	180	5	3.7	3.4

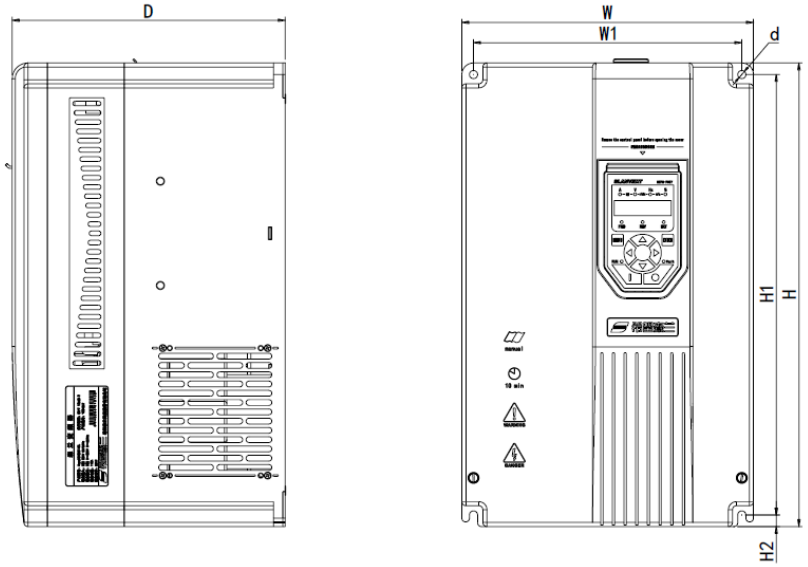


3) Installation Dimensions, Weight, and Outline Drawings for Hope530G11T4B-H~Hope530G37T4B-H Plastic-cased Models:

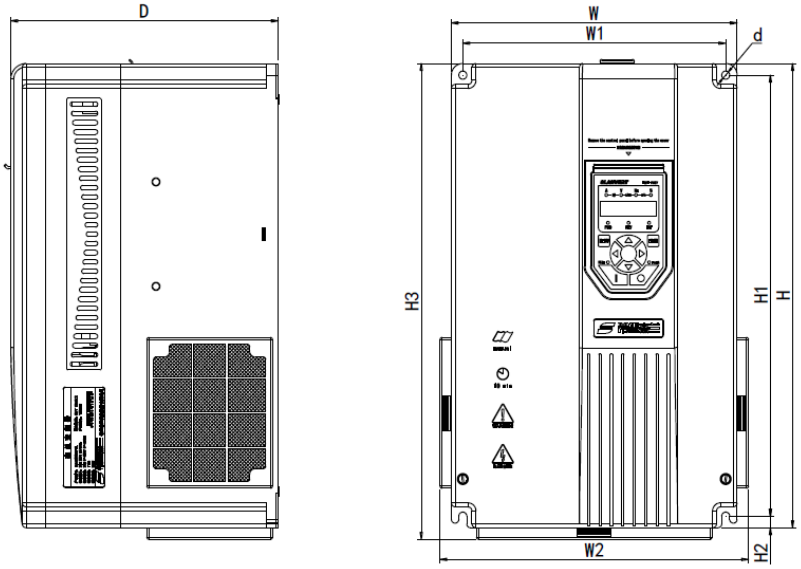
Frequency converter model	W (mm)	W1 (mm)	W2 (mm)	H (mm)	H1 (mm)	H2 (mm)	H3 (mm)	D (mm)	d (mm)	Weight with Reactor (kg)	Weight without Reactor (kg)
Hope530G11T4B*-H	170	160	190	300	290	5	310	192	5	5.7	5.2
Hope530G15T4B*-H	170	160	190	300	290	5	310	192	5	5.7	5.2
Hope530G18.5T4B*-H	208	195	230	352	337	5	360	203	6	10.5	7.6
Hope530G22T4B*-H	208	195	230	352	337	5	360	203	6	11	7.7

Hope530G30T4B*-H	248	230	270	400	382	10	410	234	7	18.5	12.5
Hope530G37T4B*-H	248	230	270	400	382	10	410	234	7	19.5	12.5

Without shield



With shield



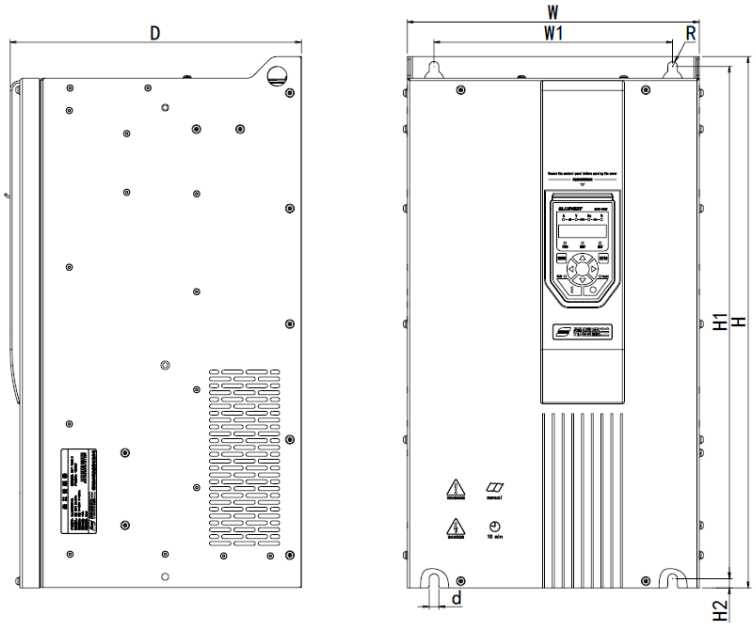
Note: The shield is an optional component. See section of shield in chapter 9 for details.

4) Installation Dimensions, Weight, and Outline Drawings for Hope530G45T4B-H~Hope530G375T4B-H Steel-cased Models:

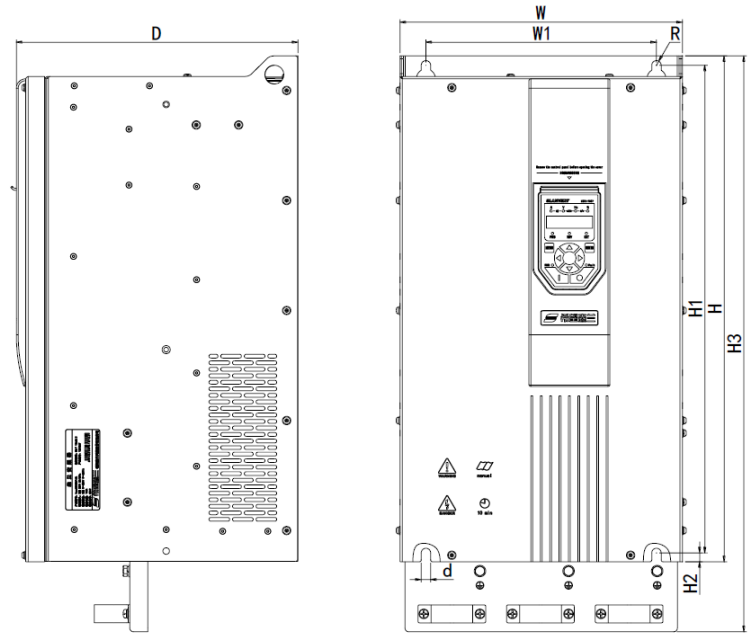
Frequency converter model	W (mm)	W1 (mm)	H (mm)	H1 (mm)	H2 (mm)	H3 (mm)	D (mm)	d (mm)	R (mm)	Weight with Reactor (kg)	Weight without Reactor (kg)
Hope530G45T4B*-H	300	245	545	525	10	620	300	10	5	33.5	29.1
Hope530G55T4B*-H	300	245	545	525	10	620	300	10	5	34.3	29.1
Hope530G75T4B*-H	340	270	580	562	10	676	326	10	5	63.2	50.9
Hope530G90T4BL-H	340	270	580	562	10	676	326	10	5	63.2	-
Hope530G110T4BL-H	340	270	580	562	10	676	326	10	5	63.2	-

Hope530G132T4BL-H	400	320	915	895	10	1013	355	10	5	92.5	-
Hope530G160T4BL-H	400	320	915	895	10	1013	355	10	5	92.5	-

Without cable bracket



With cable bracket



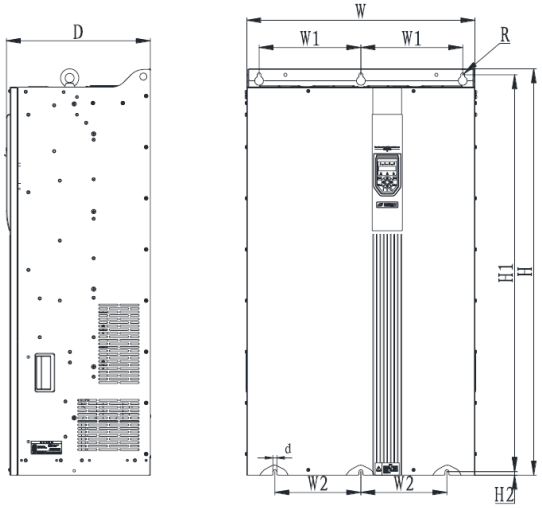
Note: The cable bracket is an optional component. See section of wiring auxiliary kit in chapter 9 for details.

5) Installation Dimensions, Weight, and Outline Drawings for Hope530G200T4B-H~Hope530G375T4B-H Steel-cased Models:

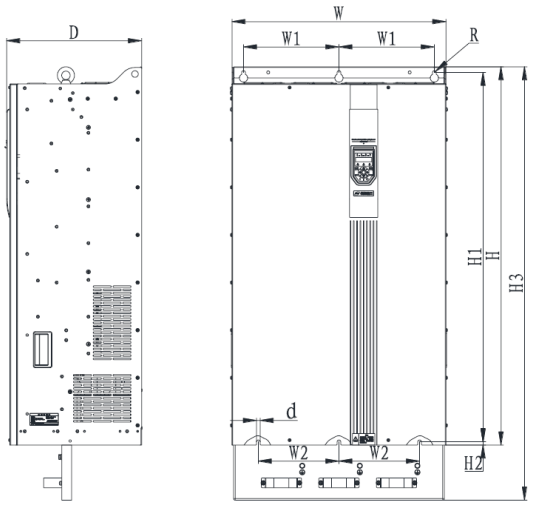
Frequency converter model	W (mm)	W1 (mm)	W2 (mm)	H (mm)	H1 (mm)	H2 (mm)	H3 (mm)	D (mm)	d (mm)	R (mm)	Weight with Reactor (kg)

Hope530G200T4L-H	440	185	150	1000	975	10	1170	405	11	5.5	118
Hope530G220T4L-H	440	185	150	1000	975	10	1170	405	11	5.5	118
Hope530G250T4L-H	485	210	150	1130	1100	12	1300	410	11	5.5	145
Hope530G280T4L-H	485	210	150	1130	1100	12	1300	410	11	5.5	145
Hope530G315T4L-H	650	290	245	1150	1125	10	1320	410	11	5.5	190
Hope530G375T4L-H	650	290	245	1150	1125	10	1320	410	11	5.5	192.5

Hope530G200~375T4L-H Without Cable Bracket



Hope530G200~375T4L-H with Cable Bracket



Note: The cable bracket is an optional component. See section of wiring auxiliary kit in chapter 9 for details.

3 Installation and Wiring

3.1 Installation of Frequency Converter

⚠ **Danger**	**1. The installation of the frequency converter can only be performed by trained professionals.** **2. Do not install or operate the frequency converter if it is damaged or missing components. Otherwise, it may cause fire or personal injury.** **3. During installation, the frequency converter shall be mounted in a position that can withstand its weight. Failure to do so may result in injury or property damage in the event of a fall.** **4. During transportation, avoid exerting force on the operation panel and door. Failure to comply may result in injury or property damage if they fall.**

3.1.1 Installation Environment

1) Ambient temperature: The lifespan of the frequency converter is greatly affected by the surrounding ambient temperature. Ensure that the operating environment temperature does not exceed the permissible range (-10°C~40°C). When the temperature exceeds 40°C, the frequency converter shall be derated by 1.5% per 1°C temperature rise, and external forced heat dissipation must be added;

2) For areas with an altitude exceeding 1,000m, the thin air will impair the frequency converter's heat dissipation performance. Operation at a derating of 1% per 100m above 1,000m is necessary;

3) Avoid installation in locations with direct sunlight, dampness, or water droplets. Humidity shall be below 90%RH, with no condensation of water droplets;

4) Do not install it in places with oil pollution, heavy dust and metal powder;

5) Do not install it in places with corrosive, inflammable and explosive gases in the air;

6) The frequency converter shall be installed in an area with vibration less than $5.9m/s^2$ (0.6g). Special attention shall be paid to keeping it away from devices like punch presses;

7) The frequency converter shall be installed on the surface of a flame-retardant object. The frequency converter will generate a lot of heat when working, so there shall be enough space around for heat dissipation;

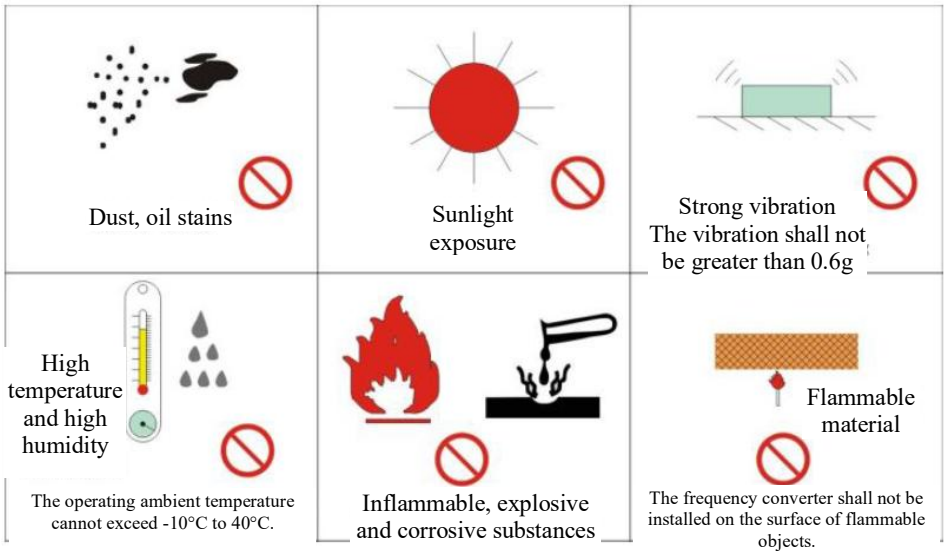


Fig. 3-1 Installation Environment Requirements

8) The frequency converter shall be installed vertically and upward and it is not allowed to be installed inversely, obliquely or horizontally. It shall be fixed on a firm structure using suitable screws;

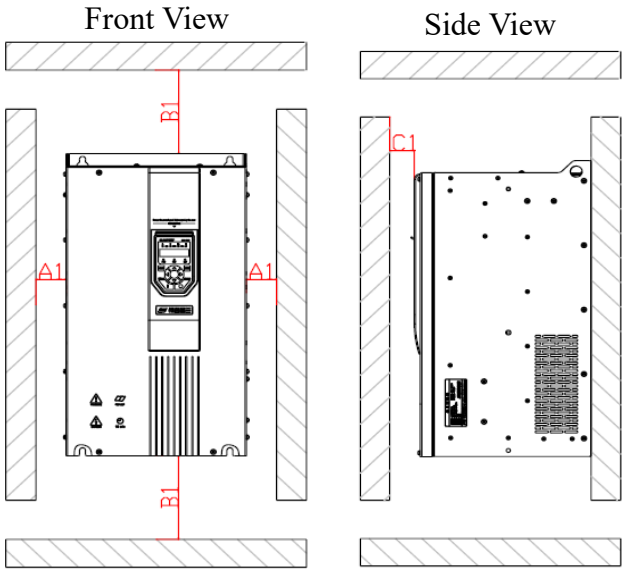
9) The Hope530-H series products are cabinet-mounted units and shall be installed in the final system for use. The final system shall be furnished with appropriate fire-resistant enclosures, electrical protective enclosures and mechanical protective enclosures, and shall meet the requirements of local laws, regulations and relevant IEC standards.

3.1.2 Installation Spacing and Direction

1) Installation Spacing

The surrounding space shall be reserved for the frequency converter according to the different power levels.

■ Installation of single set

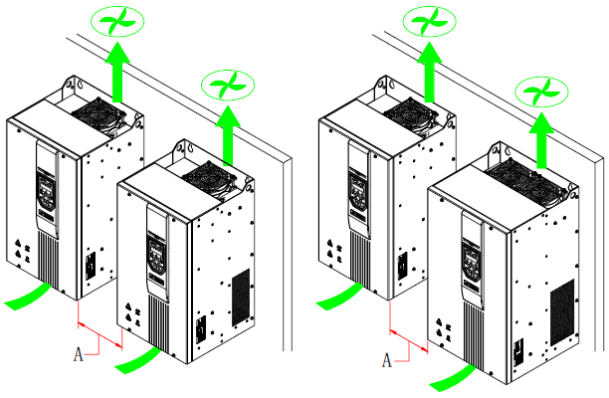


Power Rating	Size Requirements (Unit: mm)		
0.75~37kW	A1≥50	B1≥200	C1≥40
45~375 kW	A1≥50	B1≥300	C1≥40

Fig. 3-2 Installation Spacing for a Single Set
(Hope530G0.75T4-H~Hope530G375T4-H)

■ Installation of multiple sets

Heat dissipates from the bottom to top when the frequency converter is cooling. When multiple frequency converters work, they are usually installed side by side, as shown in the figure below.



Power Rating	Size Requirements (Unit: mm)
0.75~375 kW	A≥50

Fig. 3-3 Side-by-side Installation of Multiple
Hope530G0.75T4-H~Hope530G375T4-H Sets

■ Installation of upper and lower rows

In the place requiring installing frequency converters in upper and lower rows, the heat of lower row of frequency converter will raise the temperature of the frequency converter in the upper row, resulting in overheating/overload fault of upper row of frequency converter, so there shall be a heat insulation guide plate installed between upper row and lower row as shown in figure.

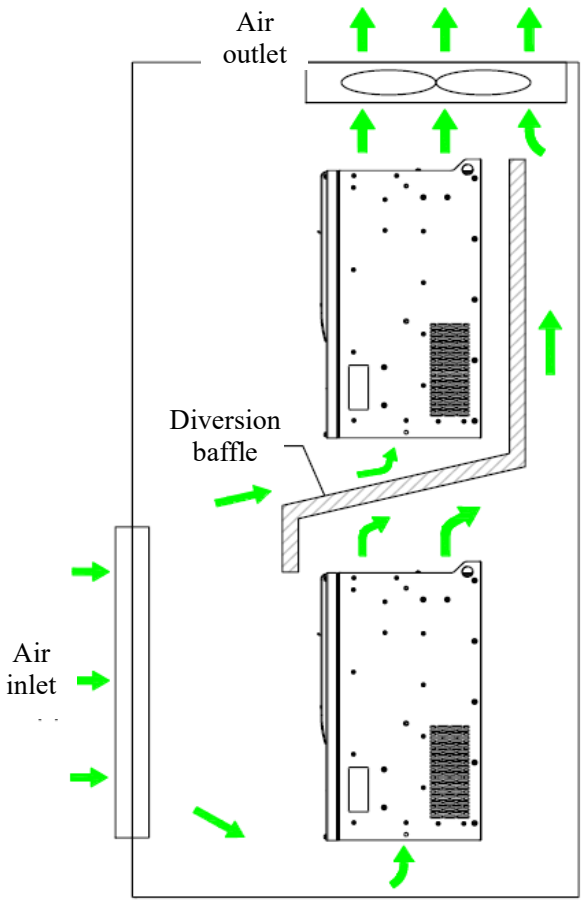


Fig. 3-4 Installation Requirements for Upper and Lower Rows

Note: The area of the air inlet must be larger than the area of air outlet, and the air volume of the air outlet fan must be greater than the sum of the air volume of all the heat dissipation fans of the frequency converter installed at the upper and lower rows. The exhaust air rate of the heat dissipation fan of a single frequency converter with various power levels is shown in the following table:

Rated Power (kW)	0.75	1.5	2.2	4	5.5	7.5	11	15	18.5	22	30	37	45
Exhaust Air Rate (CFM)	25	25	35	35	50	50	80	80	120	120	180	180	200
Rated Power (kW)	55	75	90	110	132	160	200	220	250	280	315	375	-
Exhaust Air Rate (CFM)	200	400	400	550	550	600	750	800	1000	1150	1250	1400	-

2) Installation Direction

The frequency converter shall be installed vertically and upward and it is not allowed to be installed inversely or horizontally or in other ways.

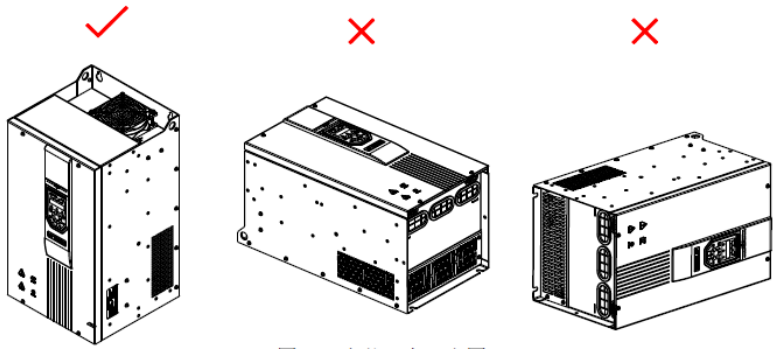


Fig. 3-5 Installation Direction Diagram

3.1.3 Complete Machine Installation for Each Model

Hope530G0.75T4-H~Hope530G7.5T4-H models only support wall-mounted installation. Hope530G11T4-H~Hope530G375T4-H models support wall-mounted installation and optional embedded installation. When installing the product, please follow the installation guide and take into account the specific model and installation application environment.

Notes:

■ Fig. 3-2 shows the installation space requirements. It is required to ensure that the frequency converter has sufficient space for heat dissipation. When reserving space, it is required to consider the heat dissipation conditions of other components in the cabinet;

■ Vertical and upward installation of the frequency converter is conducive to upward heat dissipation. If there are multiple frequency converters in the cabinet, they shall be installed side by side. Fig. 3-4 shows the way to install vertically with heat insulation guide plate;

■ Hanging bars, when required, must be made of flame retardant materials;

■ For applications with metal dust, it is recommended to use the installation cabinet that can completely seal the frequency converter, so that the frequency converter can be isolated from metal dust. At this time, the space in the fully sealed cabinet shall be as large as possible.

1) Wall-mounted Installation

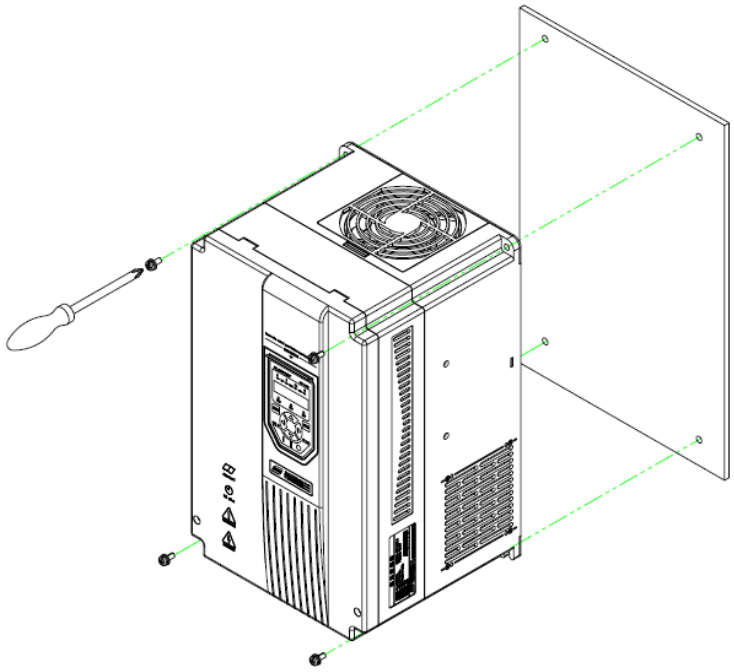


Fig. 3-6 Wall-mounted Installation for Hope530G0.75T4-H~Hope530G37T4-H Models

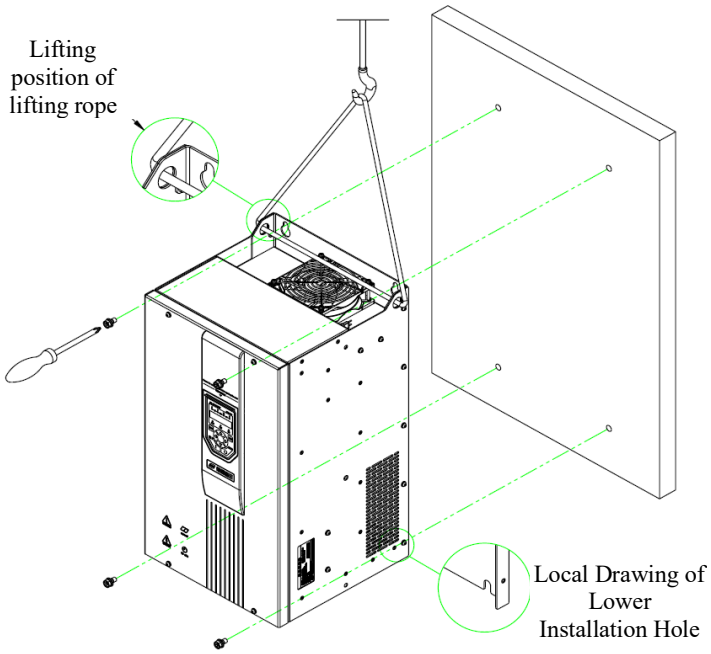


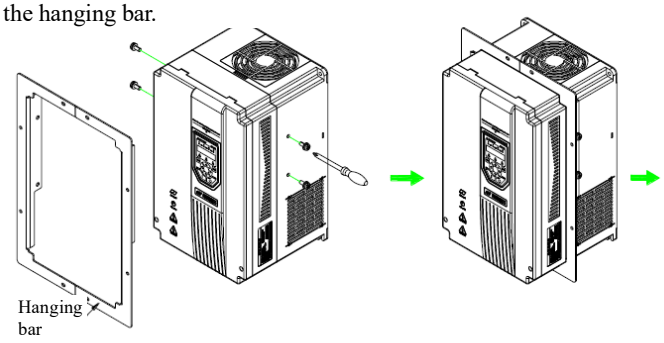
Fig. 3-7 Wall-mounted Installation for Hope530G45T4-H~Hope530G375T4-H Models

Note: As for this installation mode, it is forbidden to fix only the two fixing nuts on the upper end of the frequency converter, otherwise the frequency converter may fall off and be damaged after a long time running.

2) Embedded Installation

1. Slide the hanging bar onto the main body of the frequency converter, and fasten the screws located on the left and right sides of the main body that are used to secure the hanging bar.

2. Install the hanging bars.



3. Fix the frequency converter equipped with hanging bars on the fixed surface of the installation cabinet.

4. Complete the embedded installation.

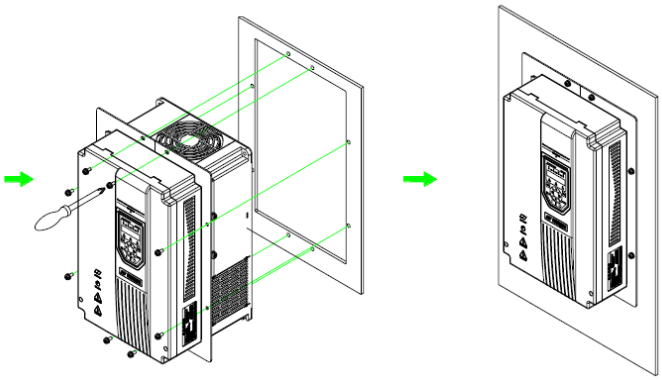
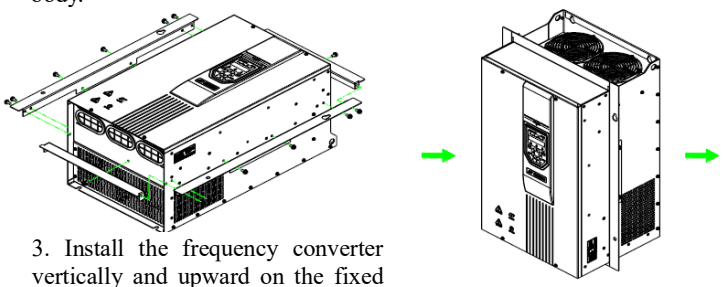


Fig. 3-8 Embedded Installation for Hope530G11T4-H~Hope530G37T4-H Models

1. Respectively fix the hanging bars on 4 sides of the machine body.

2. Install the hanging bars.



3. Install the frequency converter vertically and upward on the fixed surface of the installation cabinet.

4. Complete the embedded installation.

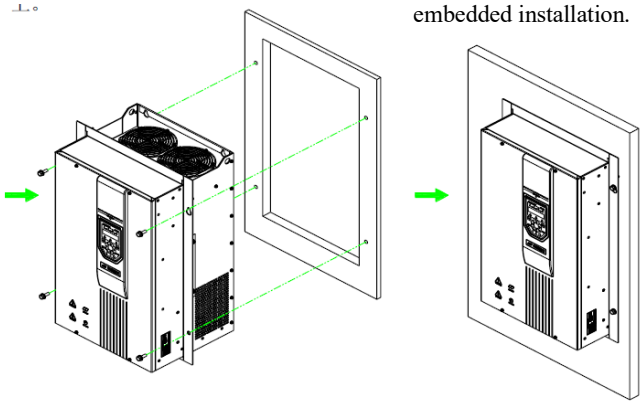


Fig. 3-9 Embedded Installation for Hope530G45T4-H~Hope530G375T4-H Models

Note: Hanging bar is required for embedded installation. See the section of embedded

mounting hanging bar in chapter IX for the selection of hanging bar.

3.1.4 Removal and Installation of Cover Plate

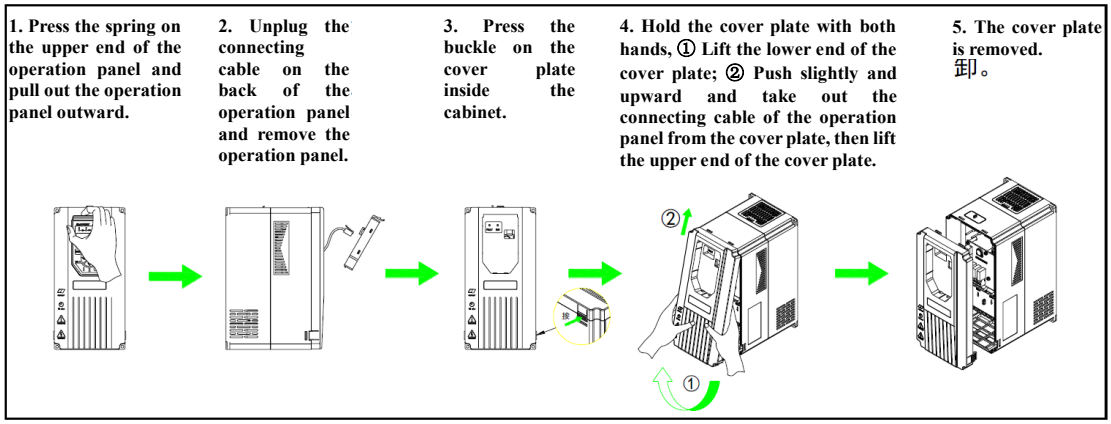
Wiring for main circuit and control circuit of Hope530-H series shall be carried out after the cover plate is removed.

⚠ **Attention:** Please be sure to remove the operation panel of the frequency converter before opening the frequency converter cover plate. Otherwise, the frequency converter may be damaged!

⚠ **Attention:** One end of the operation panel connection cable is provided with a buckle, and the other end is not. The frequency converter mainboard shall be inserted into the end without a buckle!

1) Removal and Installation of Cover Plate for Hope530G0.75T4-H~Hope530G7.5T4-H Models

Removal Steps



Installation Steps

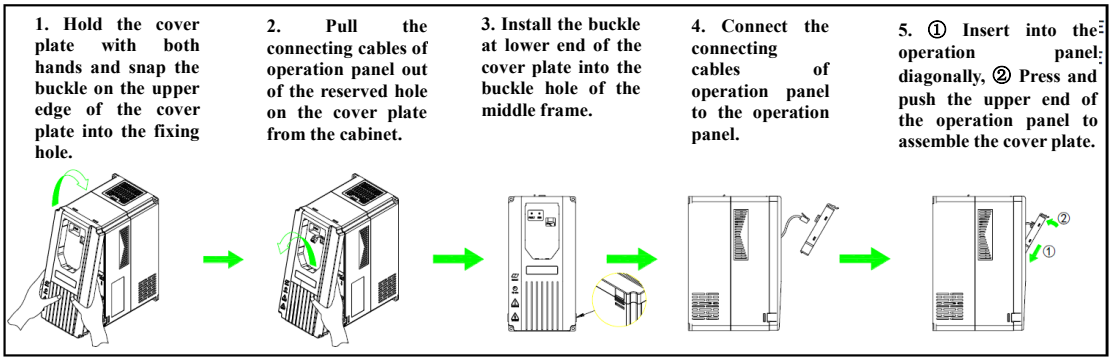


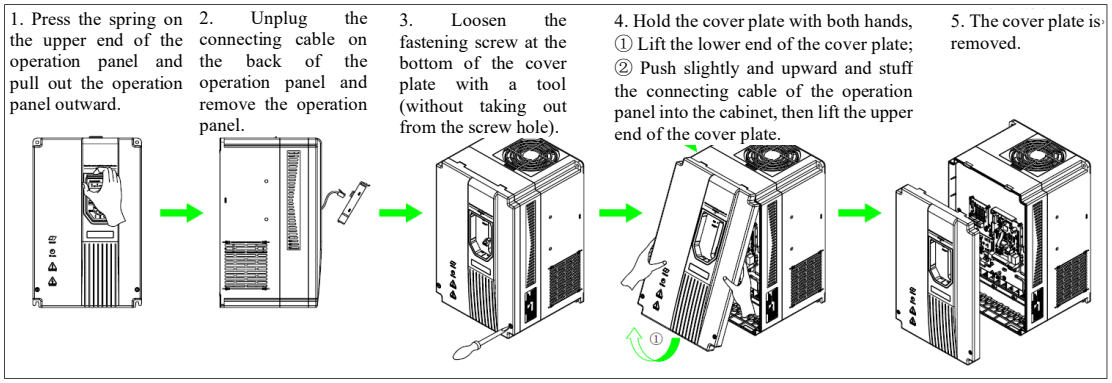
Fig. 3-10 Removal and Installation Steps of Cover Plate for Hope530G0.75T4-H~Hope530G7.5T4-H Models

⚠ **Attention:** Please be sure to remove the operation panel of the frequency converter before opening the frequency converter cover plate. Otherwise, the frequency converter may be damaged!

⚠ **Attention:** One end of the operation panel connection cable is provided with a buckle, and the other end is not. The frequency converter mainboard shall be inserted into the end without a buckle!

2) Removal and Installation of Cover Plate for Hope530G11T4-H~Hope530G37T4-H Models

Removal Steps



Installation Steps

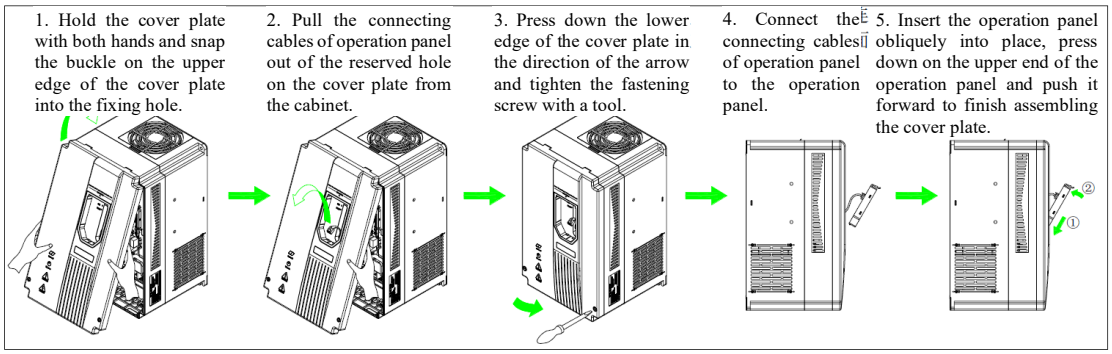


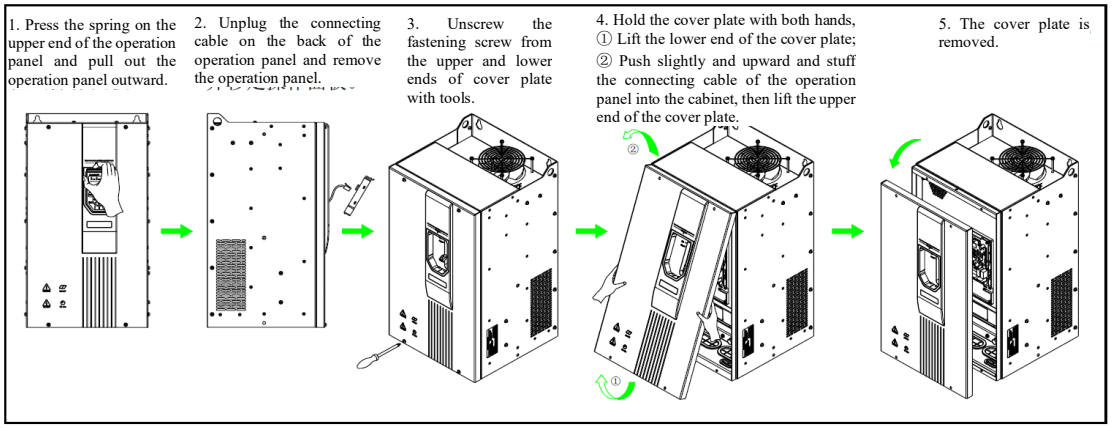
Fig. 3-11 Removal and Installation Steps of Cover Plate for Hope530G11T4-H~Hope530G37T4-H Models

⚠ **Attention:** Please be sure to remove the operation panel of the frequency converter before opening the frequency converter cover plate. Otherwise, the frequency converter may be damaged!

⚠ **Attention:** One end of the operation panel connection cable is provided with a buckle, and the other end is not. The frequency converter mainboard shall be inserted into the end without a buckle!

3) Removal and Installation of Cover Plate for Hope530G45T4-H~Hope530G375T4-H Models

Removal Steps



Installation Steps

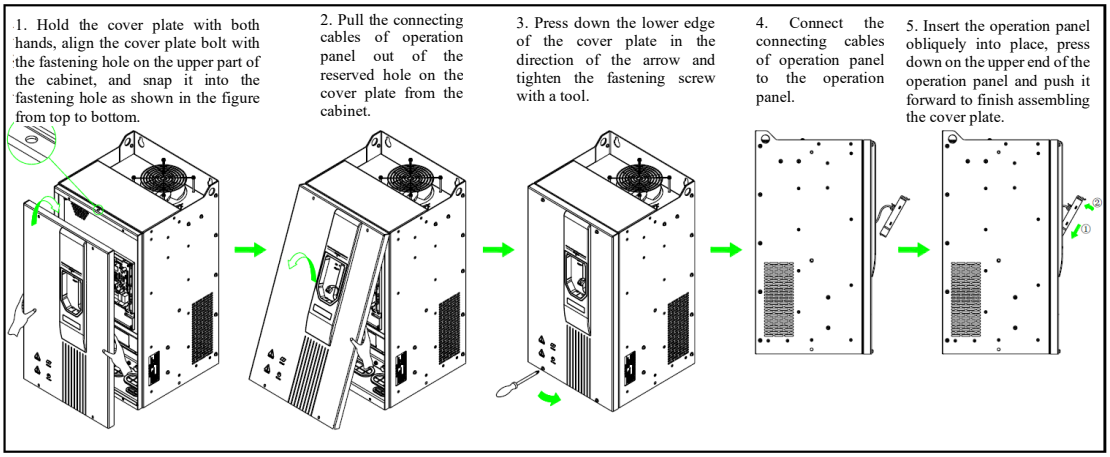


Fig. 3-12 Removal and Installation Steps of Cover Plate for Hope530G45T4-H~Hope530G375T4-H Models

3.1.5 Removal and Installation of Other Components

(I) The assembly diagram of the rubber plug for the external lead of the Hope530G0.75~7.5T4-H operation panel is as follows:

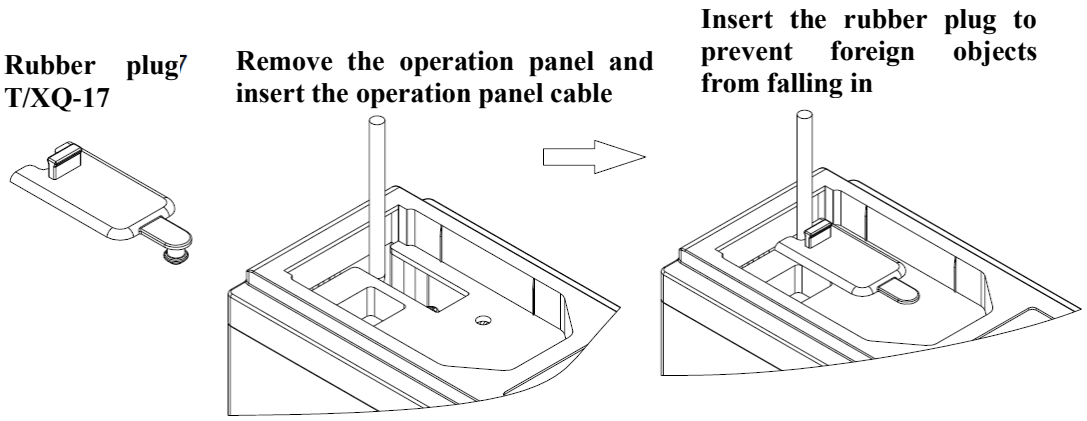


Fig. 3-13 Assembly Diagram of Rubber Plug for External Lead of Hope530G0.75~7.5T4-H Operation Panel

3.2 Wiring of Frequency Converter

⚠ Danger
1. frequency converter wiring can only be carried out by trained personnel. **2. The door of the frequency converter can be opened only more than 10 minutes later after the power supply of the converter is reliably cut off and all the indicator lights of the operation panel are off.** **3. Internal wiring can only be performed after verifying that the voltage between the main circuit terminals DC+ and DC- inside the frequency converter is 36V or lower.** **4. The frequency converter must be grounded reliably, otherwise an electric shock or fire may occur.** **5. Do not short-circuit DC+ with DC-. Otherwise, there is a risk of fire and property damage.** **6. It is forbidden to connect the power cable to U, V and W.** **7. Before powering on, it shall be carefully verified that the rated input voltage of the frequency converter is consistent with the voltage level of the AC power supply. Otherwise, it may cause personal injury and equipment damage.** **8. The main circuit terminal and the wire cold press terminal must be firmly connected.** **9. U, V and W output terminals must be wired in strict accordance with the phase order.** **10. It is forbidden to connect a surge-absorbing capacitor and voltage dependent resistor to the leading-out terminal of the frequency converter.**

3.2.1 Main Circuit Terminal Wiring and Configuration

For the connection between frequency converter and peripheral equipment, see the figure below:

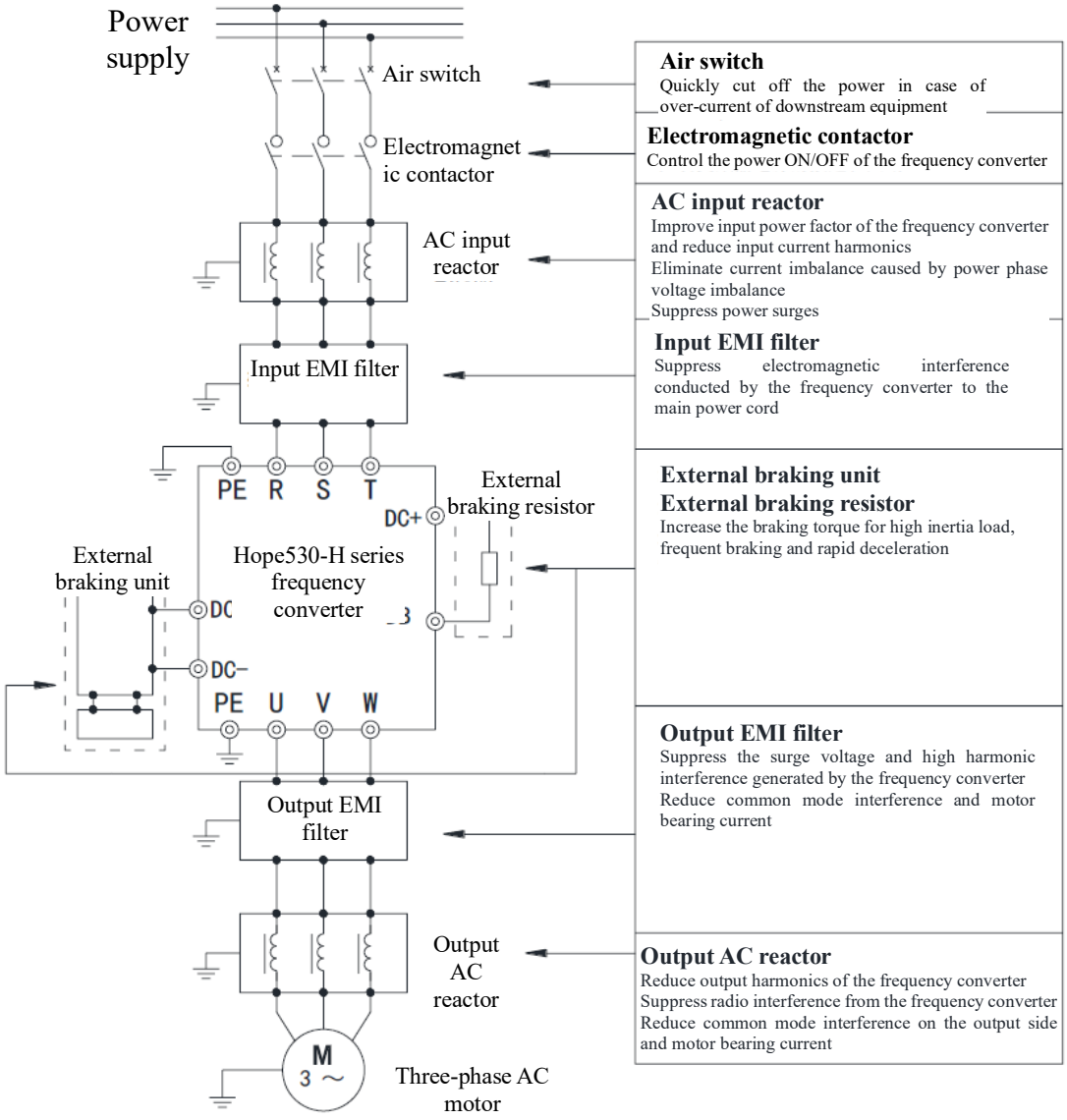


Fig. 3-14 Connection Diagram of Hope530-H Series Frequency Converter System

Recommended Selection of Air Switch Capacity and Input/Output Copper-core Insulated Conductors

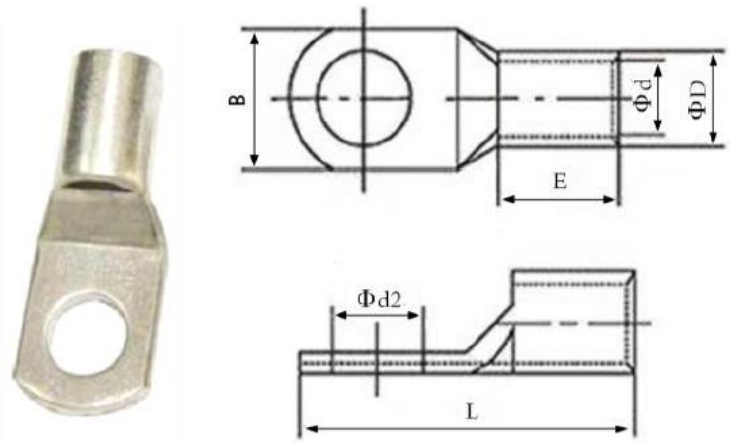
Frequency converter model	Air Switch (A)	Input/Output Copper Wire Range (mm^2)	Recommended Input/Output Copper Wire Model (mm^2)	Recommended Terminal Block Model	Screw Specification	Tightening Torque (N·m)
Hope530G0.75T4B*-H	10	2.5	2.5	-	-	2~3
Hope530G1.5T4B*-H	16	2.5	2.5	-	-	2~3
Hope530G2.2T4B*-H	25	2.5	2.5	-	-	2~3
Hope530G4T4B*-H	32	2.5	2.5	-	-	2~3
Hope530G5.5T4B*-H	40	4	4	-	-	2~3
Hope530G7.5T4B*-H	40	6	6	-	-	2~3
Hope530G11T4B*-H	63	6	6	SC6-5	M5	2~3
Hope530G15T4B*-H	63	6	6	SC6-5	M5	2~3

Hope530G18.5T4B*-H	100	10~16	16	SC16-6	M6	3~6
Hope530G22T4B*-H	100	16~25	25	SC25-6	M6	3~6
Hope530G30T4B*-H	125	16~25	25	SC25-6	M6	3~6
Hope530G37T4B*-H	160	25~35	35	SC35-6	M6	3~6
Hope530G45T4B*-H	200	35~50	50	SC50-8	M8	8~11
Hope530G55T4B*-H	200	35~50	50	SC50-8	M8	8~11
Hope530G75T4B*-H	315	70~95	95	SC95-10	M10	17~22
Hope530G90T4BL-H	315	70~95	95	SC95-10	M10	17~22
Hope530G110T4BL-H	400	95	95	SC95-10	M10	17~22
Hope530G132T4BL-H	400	95~185	120	SC120-12	M12	30~39
Hope530G160T4BL-H	500	120~185	150	SC150-12	M12	30~39
Hope530G200T4L-H	630	2X (75~95)	2X95	SC95-12	M12	30~39
Hope530G220T4L-H	630	2X (95~120)	2X120	SC120-12	M12	30~39
Hope530G250T4L-H	850	2X (95~120)	2X120	SC120-12	M12	30~39
Hope530G280T4L-H	850	2X (95~120)	2X120	SC120-12	M12	30~39
Hope530G315T4L-H	1000	2X (120~185)	2X150	SC150-12	M12	30~39
Hope530G375T4L-H	1200	2X (150~185)	2X150	SC150-12	M12	30~39

Recommended Selection of Grounding Cables

Frequency converter model	Grounding Copper Wire Range (mm^2)	Recommended Grounding Copper Wire Model (mm^2)	Recommended Terminal Block Model	Screw Specification	Tightening Torque (N•m)
Hope530G0.75T4B*-H	2.5	2.5	-	-	2~3
Hope530G1.5T4B*-H	2.5	2.5	-	-	2~3
Hope530G2.2T4B*-H	2.5	2.5	-	-	2~3
Hope530G4T4B*-H	2.5	2.5	-	-	2~3
Hope530G5.5T4B*-H	4	4	-	-	2~3
Hope530G7.5T4B*-H	6	6	-	-	2~3
Hope530G11T4B*-H	6	6	SC6-5	M5	2~3
Hope530G15T4B*-H	6	6	SC6-5	M5	2~3
Hope530G18.5T4B*-H	10~16	16	SC16-6	M6	3~6
Hope530G22T4B*-H	10~16	16	SC16-6	M6	3~6
Hope530G30T4B*-H	10~16	16	SC16-6	M6	3~6
Hope530G37T4B*-H	10~16	16	SC16-6	M6	3~6
Hope530G45T4B*-H	16~25	25	SC25-8	M8	8~11
Hope530G55T4B*-H	16~25	25	SC25-8	M8	8~11
Hope530G75T4B*-H	35~50	50	SC50-8	M8	8~11
Hope530G90T4BL-H	35~50	50	SC50-8	M8	8~11
Hope530G110T4BL-H	35~50	50	SC50-8	M8	8~11
Hope530G132T4BL-H	50~70	70	SC70-8	M8	8~11
Hope530G160T4BL-H	70~95	95	SC95-8	M8	8~11
Hope530G200T4L-H	2X50	2X50	SC50-8	M8	8~11
Hope530G220T4L-H	2X (50~70)	2X70	SC70-8	M8	8~11
Hope530G250T4L-H	2X70	2X70	SC70-8	M8	8~11
Hope530G280T4L-H	2X70	2X70	SC70-8	M8	8~11
Hope530G315T4L-H	2X (70~95)	2X95	SC95-10	M10	17~22
Hope530G375T4L-H	2X (70~95)	2X95	SC95-10	M10	17~22

SC crimping terminal appearance is shown below:



List of model and dimension of SC terminal:

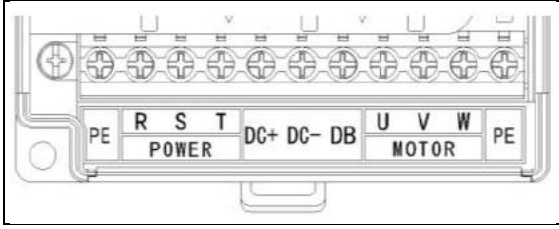
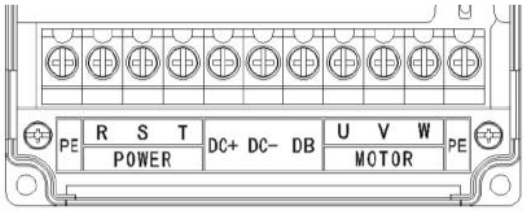
Model	Dimension (mm)						Model	Dimension (mm)					
ITEM NO.	Φd2	B	L	ΦD	Φd	E	ITEM NO.	Φd2	B	L	ΦD	Φd	E
SC1.5-4	4.2	8	16	3.7	1.8	5	SC50-6	6.5	17.8	45	12.4	9.5	16
SC1.5-5	5.2	10	17				SC50-8	8.4	17.8	45			
SC1.5-6	6.5	10	18				SC50-10	10.5	17.8	45			
SC2.5-4	4.2	8	18	4	2.4	7	SC50-12	13	20	45			
SC2.5-5	5.2	10	20				SC50-14	15	22	46			
SC2.5-6	6.5	10	20				SC50-16	17	24	47			
SC2.5-8	8.4	12.5	23				SC70-8	8.4	21	52	14.7	11.2	20
SC4-4	4.2	10	20	4.8	3.1	7	SC70-10	10.5	21	52			
SC4-5	5.2	10	20				SC70-12	13	21	52			
SC4-6	6.5	10	20				SC70-14	15	21	52			
SC4-8	8.4	12.5	23				SC70-16	17	25	53			
SC6-4	4.2	10	24	5.5	3.8	9	SC95-8	8.4	25	58	17.4	13.5	23
SC6-5	5.2	10	24				SC95-10	10.5	25	58			
SC6-6	6.5	12	24				SC95-12	13	25	58			
SC6-8	8.4	12.5	26				SC95-14	15	25	58			
SC6-10	10.5	15	28	6.2	4		SC95-16	17	25	58			
SC10-5	5.2	12	25	6.2	4.5	9	SC120-8	8.4	28	63	19.4	15	22
SC10-6	6.5	12	25				SC120-10	10.5	28	63			
SC10-8	8.4	12.5	27				SC120-12	13	28	63			
SC10-10	10.5	15	29				SC120-14	15	28	63			
SC10-12	13	17	31				SC120-16	17	28	63			
-	-	-	-	-	-	-	SC120-20	21	28	63			
SC16-5	5.2	12	30	7.1	5.4	12	SC150-8	8.4	30.6	70	21.2	16.5	26
SC16-6	6.5	12	30				SC150-10	10.5	30.6	70			
SC16-8	8.4	12.5	30				SC150-12	13	30.6	70			
SC16-10	10.5	16	33				SC150-14	15	30.6	70			
SC16-12	13	17	35				SC150-16	17	30.6	70			
SC25-5	5.2	13	33	8.8	6.8	12	SC150-20	21	30.6	70			
SC25-6	6.5	13	33				SC185-10	10.5	34	75	23.5	18.5	32
SC25-8	8.4	15	33				SC185-12	13	34	75			
SC25-10	10.5	18	34				SC185-14	15	34	75			
SC25-12	13	18	35				SC185-16	17	34	75			
SC25-14	15	20	38				SC185-20	21	34	75			
SC35-5	5.2	16	38	10.6	8.2	14	SC240-10	10.5	38.6	90	26.5	21	38
SC35-6	6.5	16	38				SC240-12	13	38.6	90			
SC35-8	8.4	16	38				SC240-14	15	38.6	90			
SC35-10	10.5	18	39				SC240-16	17	38.6	90			

SC35-12	13	19	40.5				SC240-18	19	38.6	90			
SC35-14	15	20	42				SC240-20	21	38.6	90			

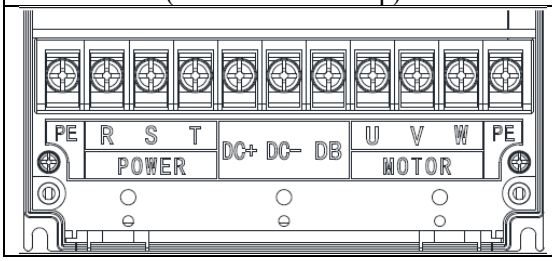
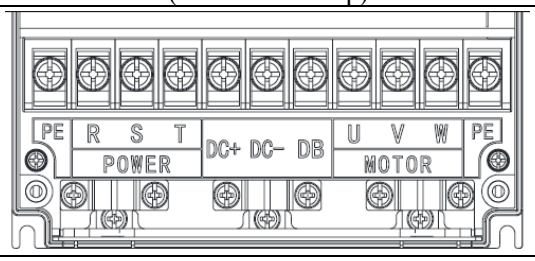
Description on main circuit terminal function:

Terminal symbol	Terminal name	Description
R, S, T	Input power terminal	Connect to the three-phase 380V power supply
U, V, W	Frequency converter output terminal	Connect to the three-phase motor
DC+, DC-	DC bus terminal	Connect the braking unit between DC+ and DC-
DB	Brake output terminal	Connect the braking resistor between DC+ and DB
PE	Grounding terminal	Grounding terminal on frequency converter case shall be grounded

The arrangement of the main circuit terminals for the Hope530G0.75T4-H~Hope530G7.5T4-H series frequency converter is as follows:

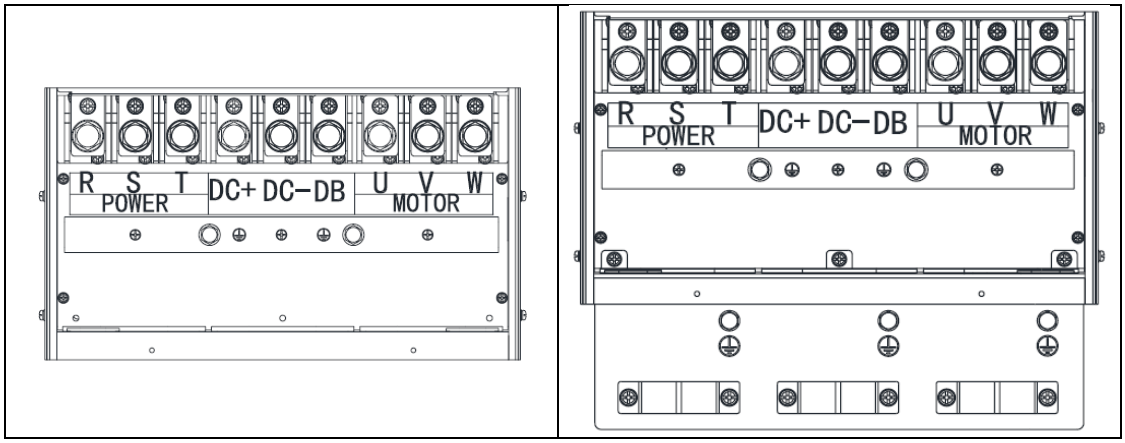
Main Circuit Terminal Distribution Diagram (0.75~4kW)	Main Circuit Terminal Distribution Diagram (5.5~7.5kW)
	

The arrangement of main circuit terminals for the Hope530G11T4-H~Hope530G37T4-H series frequency converter is as follows:

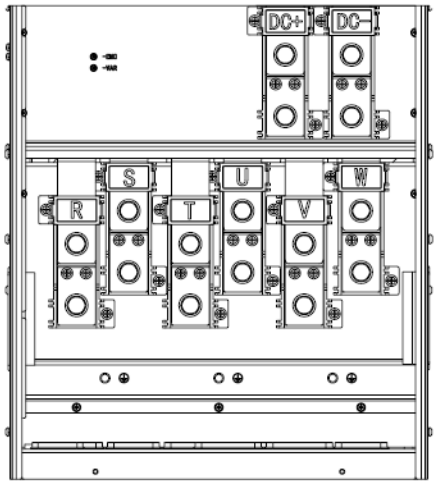
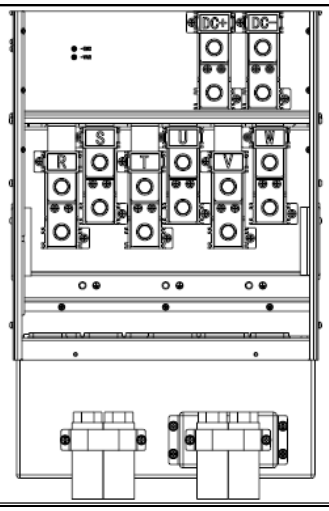
Main Circuit Terminal Distribution Diagram (without wire clamp)	Main Circuit Terminal Distribution Diagram (with wire clamp)
	

The arrangement of the main circuit terminals for the Hope530G45T4-H~Hope530G160T4-H series frequency converter is as follows:

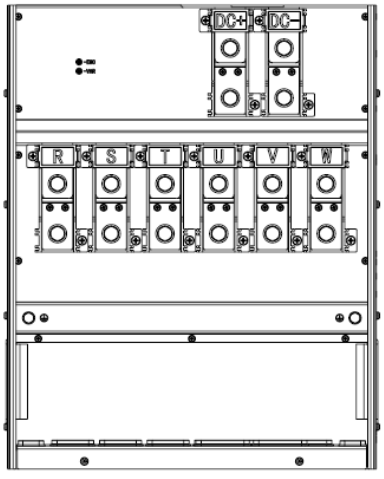
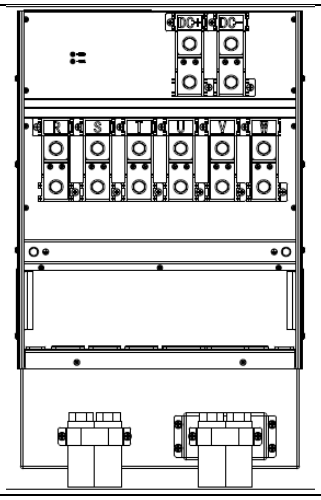
Main Circuit Terminal Distribution Diagram (without cable bracket and cable clamp)	Main Circuit Terminal Distribution Diagram (with cable bracket and cable clamp)



The arrangement of the main circuit terminals for Hope530G200T4L-H and Hope530G220T4L-H is as follows:

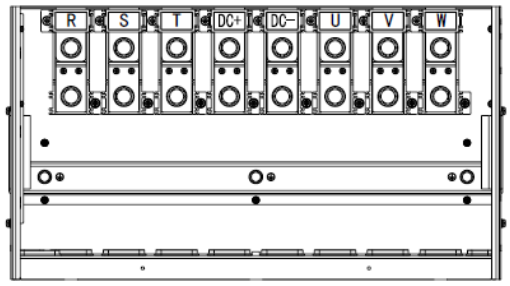
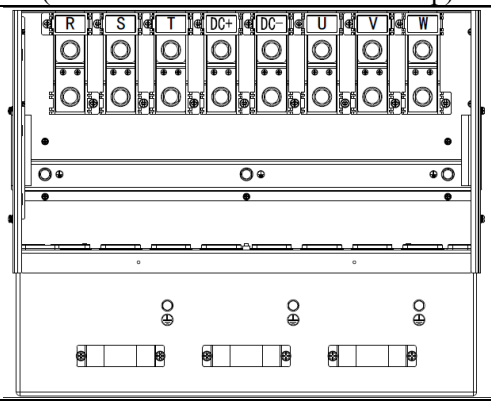
Main Circuit Terminal Distribution Diagram (without cable bracket and cable clamp)	Main Circuit Terminal Distribution Diagram (with cable bracket and cable clamp)
	

The arrangement of the main circuit terminals for Hope530G250T4L-H and Hope530G280T4L-H is as follows:

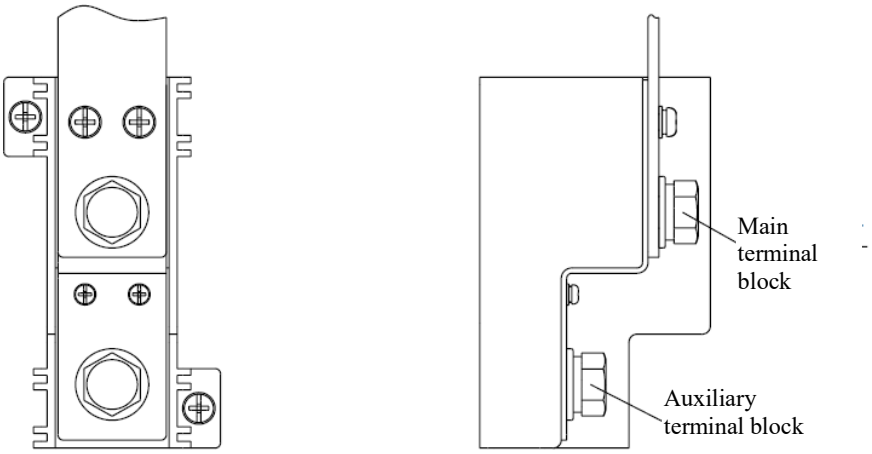
Main Circuit Terminal Distribution Diagram (without cable bracket and cable clamp)	Main Circuit Terminal Distribution Diagram (with cable bracket and cable clamp)
	

The arrangement of the main circuit terminals for Hope530G315T4L-H and

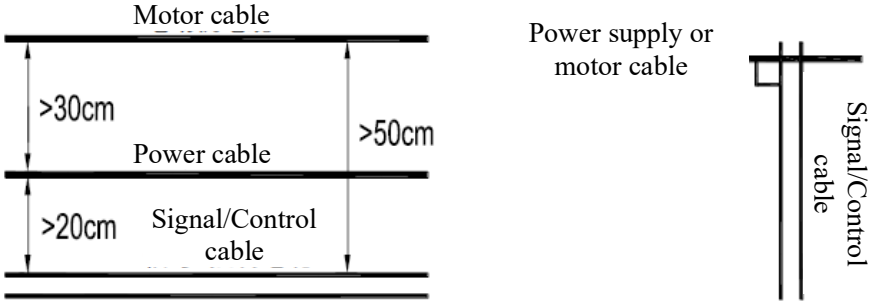
Hope530G375T4L-H is as follows:

Main Circuit Terminal Distribution Diagram (without cable bracket and cable clamp)	Main Circuit Terminal Distribution Diagram (with cable bracket and cable clamp)
	

⚠ **Attention:** Each terminal block of the Hope530G200~375-H models includes an upper main terminal block and a lower auxiliary terminal block. During wiring, users must prioritize connecting wires to the main terminal blocks, as illustrated in the following figure.



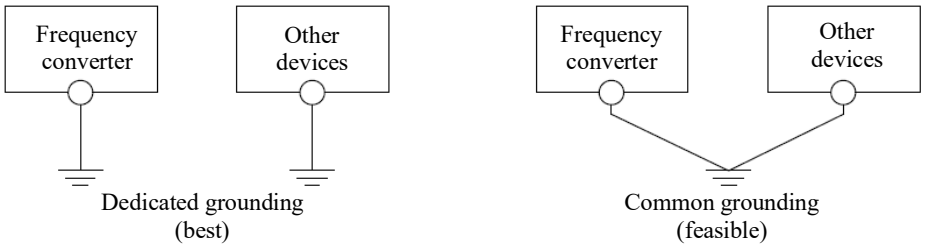
Control cable, power cable and motor cable shall be applied separately to avoid interference due to intercoupling, and enough far distance shall be maintained between them, especially, when cables are installed in a parallel manner and with long extension distance. If signal cable has to cross power cable, the vertical crossing method shall be applied, shown as follows:



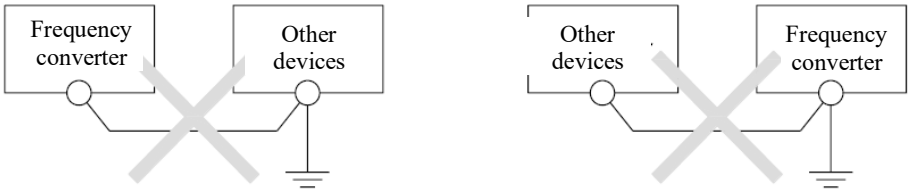
Direct earth capacitance becomes larger and intercoupling interference becomes stronger if motor cable is longer or cross sectional area of motor cable is bigger,

therefore, cable with specified cross sectional area shall be applied, and its length shall be as short as possible.

See following figure for recommended earthing method when wiring:



The following earthing methods are not allowed:



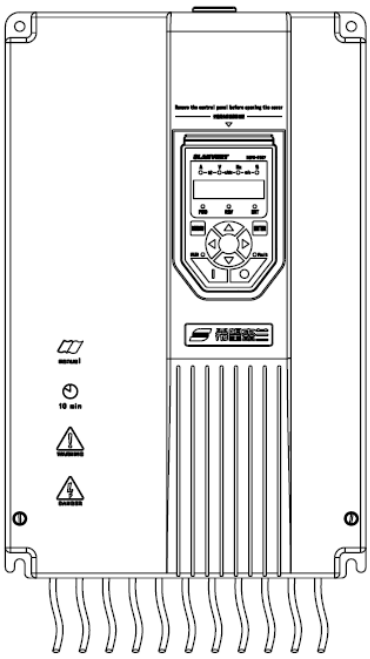
3.2.2 Incoming and Outgoing Line Methods of Frequency Converter

A bottom-in and bottom-out wiring method is used for the Hope530G0.75T4-H~Hope530G375T4-H models.

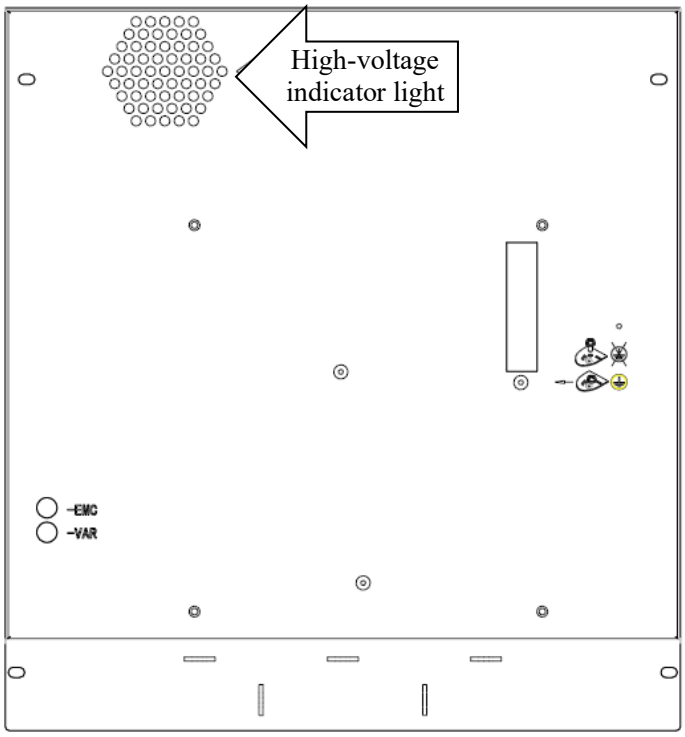
Specifically, the wiring effect of the complete machine for the Hope530G11T4-H~Hope530G37T4-H models without cable brackets is illustrated in the left figure below.

The frequency converter of 45kW and above power grade is provided with an internal high-voltage indicator light inside at the top left corner of pallet on mainboard, which is below the hexagonal transparent hole composed of multiple circular holes. The transparent hole is shown in the right figure below, which is for reference before wiring. Internal wiring can only be performed after the high-voltage indicator light is extinguished and the voltage between the main circuit terminals DC+ and DC- is verified (via voltmeter measurement) to be 36V or lower.

Wiring Effect Diagram of Complete Machine

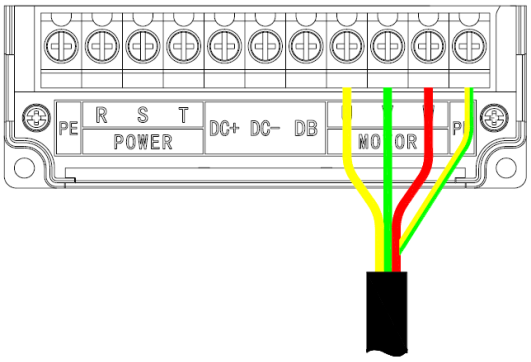


Schematic Diagram of Relative Positions of Light Transmission Holes

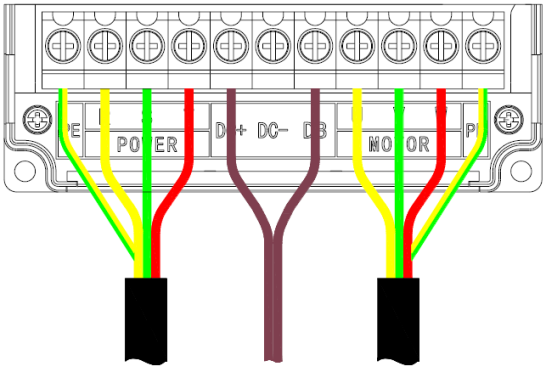


The main circuit terminal wiring for the Hope530G0.75T4-H~Hope530G7.5T4-H series frequency converter is as follows:

Wiring Effect Diagram of Main Circuit Terminal Output Terminals



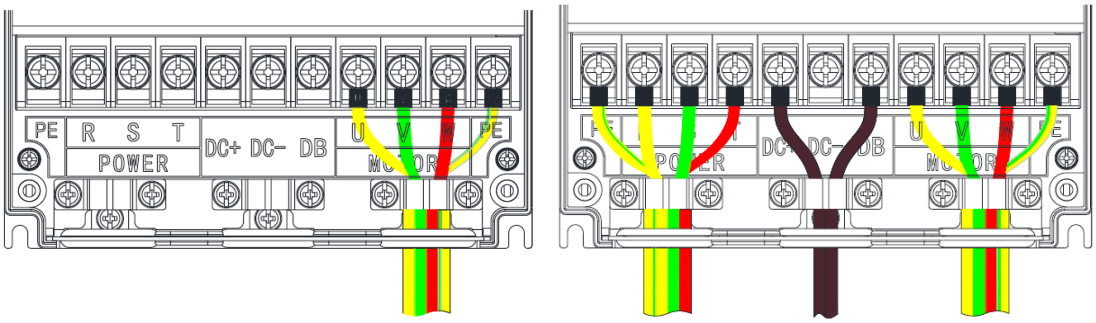
Overall Wiring Effect Diagram of Main Circuit Terminals



The main circuit terminal wiring for the Hope530G11T4-H~Hope530G37T4-H series frequency converter is as follows:

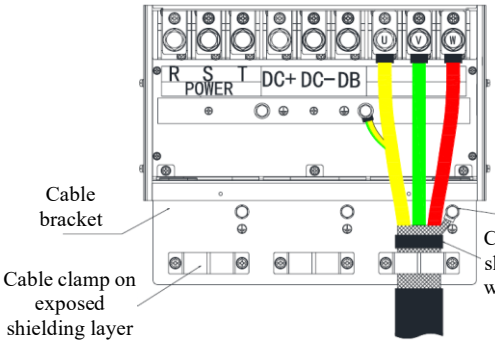
Wiring Effect Diagram of Main Circuit Terminal Output Terminals

Overall Wiring Effect Diagram of Main Circuit Terminals

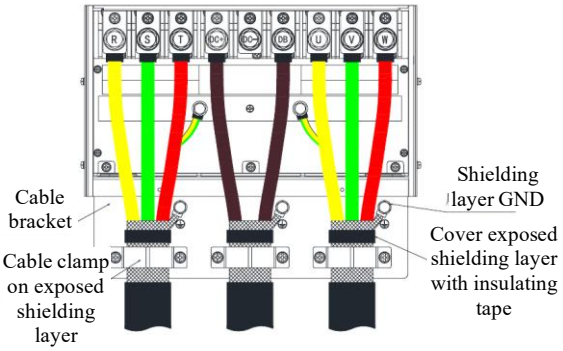


The main circuit terminal wiring for the Hope530G45T4-H~Hope530G160T4-H series frequency converter is as follows:

Wiring Effect Diagram of Main Circuit Terminal Output Terminals

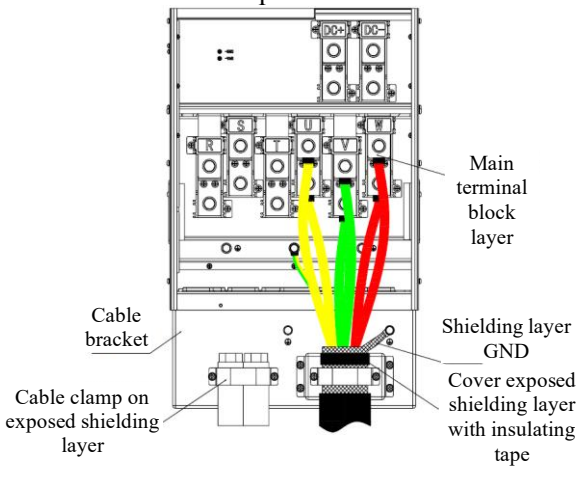


Overall Wiring Effect Diagram of Main Circuit Terminals

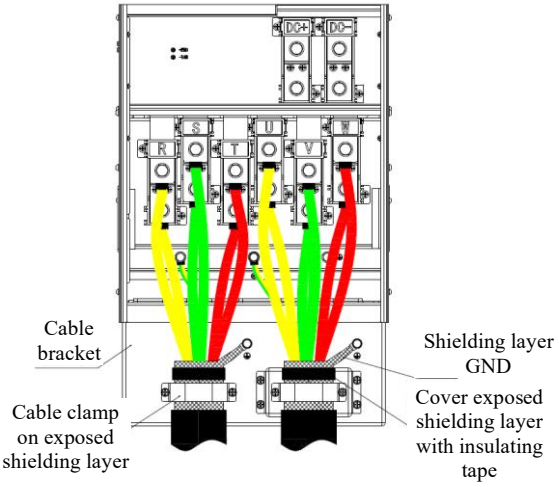


The main circuit terminal wiring for Hope530G200T4L-H and Hope530G220T4L-H is as follows:

Wiring Effect Diagram of Main Circuit Terminal Output Terminals

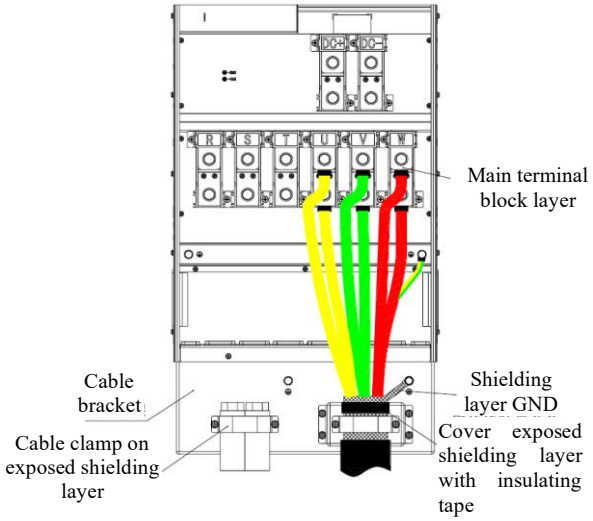


Overall Wiring Effect Diagram of Main Circuit Terminals

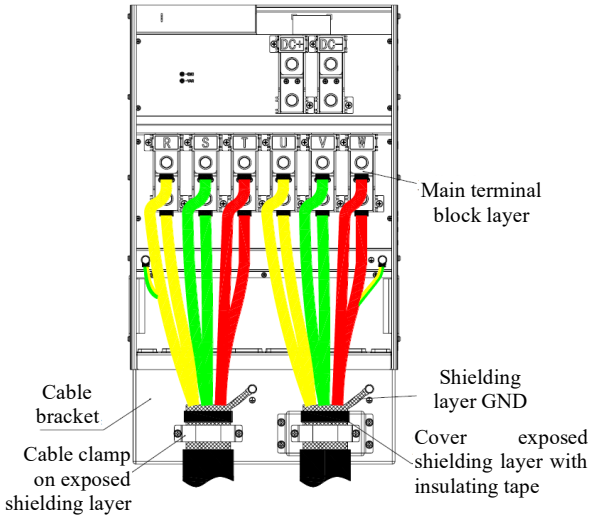


The main circuit terminal wiring for Hope530G250T4L-H and Hope530G280T4L-H is as follows:

Wiring Effect Diagram of Main Circuit Terminal Output Terminals

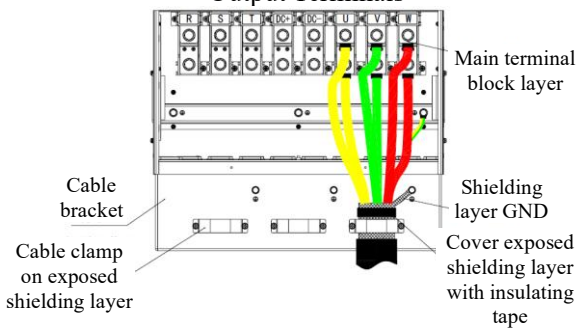


Overall Wiring Effect Diagram of Main Circuit Terminals

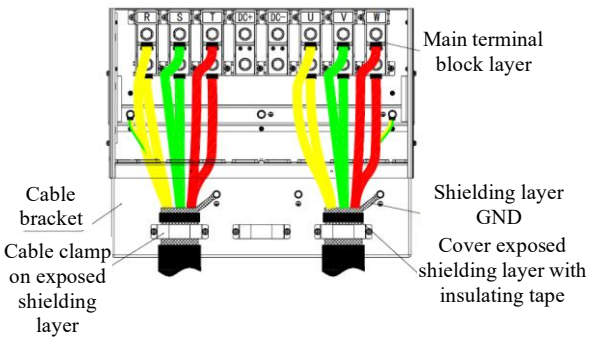


The main circuit terminal wiring for Hope530G315T4L-H and Hope530G375T4L-H is as follows:

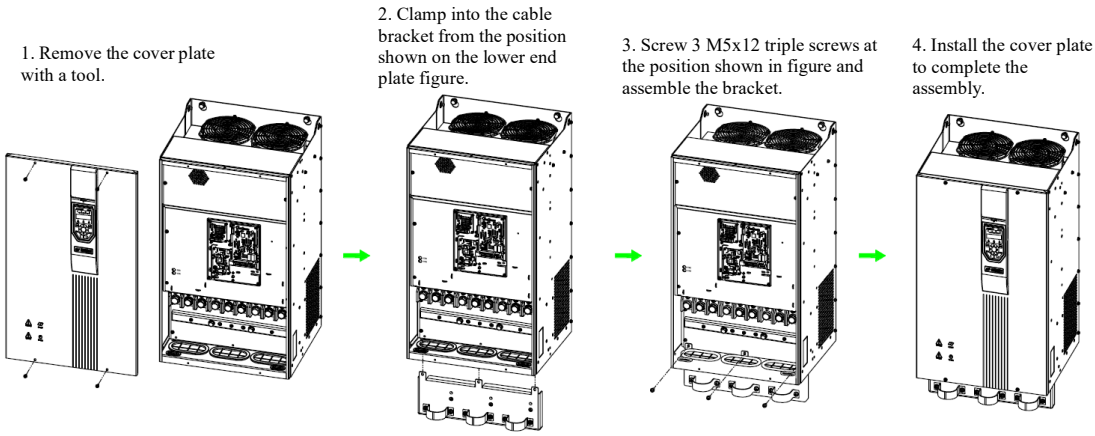
Wiring Effect Diagram of Main Circuit Terminal Output Terminals



Overall Wiring Effect Diagram of Main Circuit Terminals



For the Hope530G45T4-H~Hope530G375T4-H models, the cable bracket shown in the main circuit terminal wiring diagram is an optional accessory and shall be purchased separately. The installation steps are as follows:



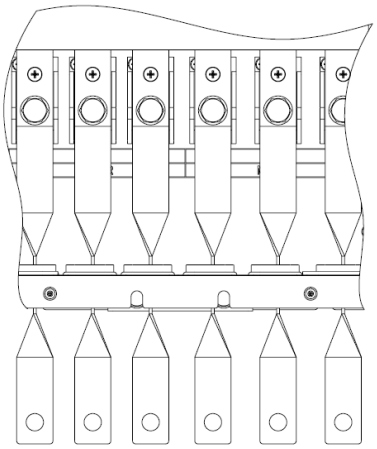
If copper bars are used to connect the terminal blocks of the steel-cased chassis frequency converter to peripheral equipment, please note the following points to ensure

the electrical safety distance between the copper bars and the chassis grounding wire (PE):

① Copper bars must be covered with heat shrink tubing;

② The copper bar must be twisted 90° to pass through the chassis. After passing through the chassis, the user can decide whether to twist it another 90° to connect with peripheral equipment based on the site conditions. The copper bar is first twisted 90° to pass through the chassis, and then twisted another 90° to connect with peripheral equipment, as shown below:

Schematic Diagram of Twisted Copper Bar



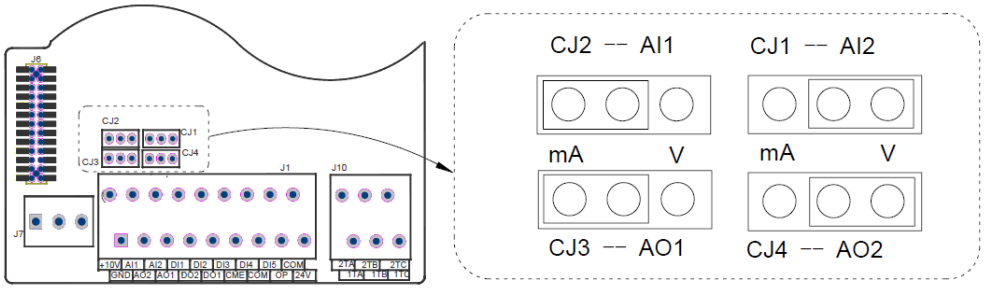
Schematic Diagram of Wiring Effect of Twisted Copper Bar on the Complete Machine

3.2.3 Control Board Terminal, Jumper and Wiring

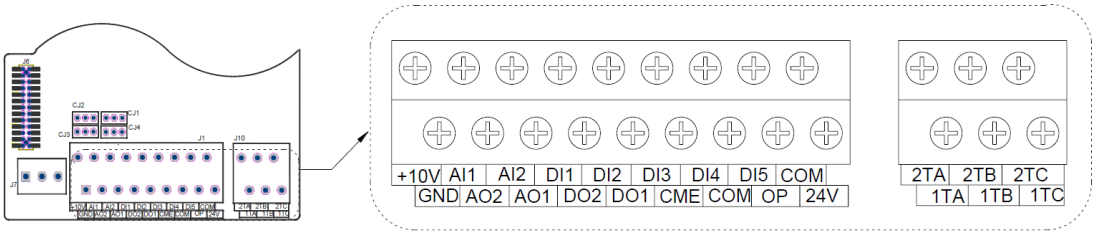
See the following table for functions of control board jumper:

Label	Name	Functions & Settings	Factory Settings
CJ1	AI2	AI2 input type selection V: Voltage type mA: Current type	V
CJ2	AI1	AI1 input type selection V: Voltage type mA: Current type	mA
CJ3	AO1	AO1 output type selection V: 0~10V voltage signal mA: 0/4~20mA current signal	mA
CJ4	AO2	AO2 output type selection V: 0~10V voltage signal mA: 0/4~20mA current signal	V

Control board jumper connection schematic diagram:



Terminal arrangement of Hope530-H series control board (recommended to use 1mm^2 copper conductor):



The functions of the control board terminals for Hope530-H series are shown in the following table:

Terminal symbol	Terminal name	Terminal Function & Description	Technical Specifications
+10V	+10V reference power supply	+10V power supply provided to the users	+10V: Maximum output current 15mA, voltage accuracy >2%
GND	Ground	Grounding terminals for analog input/output, communication, and +10V power supply	GND is internally isolated from COM, OP and CME
AI1	Analog input 1	Function selection: See the description of parameters F6-00~F6-19 for details Select voltage or current output form via jumper CJ2, CJ1	Input voltage range: -10~+10V Input current range: -20~+20mA Input impedance: voltage input: 110kΩ Current input: 250Ω
AI2	Analog input 2		
AO1	Multifunctional analog output 1	Function selection: see description for parameters F6-20 and F6-24 Select voltage or current output form via jumpers CJ4 and CJ3	Current type: 0~20mA, load ≤500Ω Voltage type: 0~10V, output ≤10mA
AO2	Multifunctional analog output 2		
DI1	DI1 digital input terminal	See F4 menus for function selection and settings.	Optocoupler-isolated Support bi-directional input Input impedance: >3k Ω Input voltage range: <30V Sampling period: 1ms High level: voltage difference with OP >10V Low level: Voltage difference with OP <3V
DI2	DI2 digital input terminal		
DI3	DI3 digital input terminal		
DI4	DI4 digital input terminal		
DI5	DI5 digital input terminal		
	Pulse frequency input (PFI)	DI5 can be reused for pulse frequency input. See the description of parameters F6-28～F6-30 for details	0~50kHz, input impedance 1.5 kΩ High level: >6V; Low level: <3V Maximum input voltage: 30V
OP	Digital input common terminal	Common terminal of DI1~DI5 terminals	Internally isolated from COM and 24V and OP is in short connection with adjacent 24V when delivering
CME	DO1 and DO2 common terminal	Common terminal of DO2 (when COM and CME are short-circuited) and DO1 digital outputs	DO1: Optocoupler-isolated bidirectional open-collector output DO2: Optocoupler-isolated unidirectional open-collector output Specification: 24Vdc/50mA Output action frequency: <500Hz
DO1	DO1 digital output terminal ****	See F5 menu for function selection and settings	
DO2	DO2 digital output terminal		

	****		Break-over voltage: <2.5V (relative to CME) CME short connected to the adjacent COM at the time of delivery
	PFO pulse frequency output	DO2 can be reused as a Pulse Frequency Output (PFO) terminal, refer to F6-31 to F6-36 for details	0～50kHz, open-circuit collector output specification: 24V/50mA
24V	24V power terminal	24V power supply provided to the user	24V maximum output current 80mA
COM		24V power ground	
1TA	Output terminal of relay 1	See F5 menu for function selection and settings	TA-TB: normally open TB-TC: normally closed Contact specification: 250VAC/3A 24VDC/5A
1TB			
1TC			
2TA	Output terminal of relay 2		
2TB			
2TC			

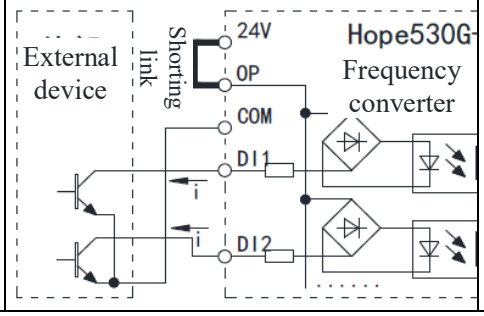
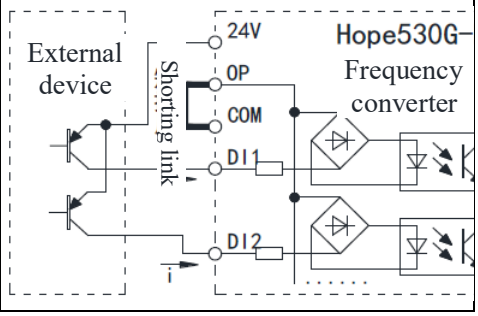
1) Analog input terminal wiring

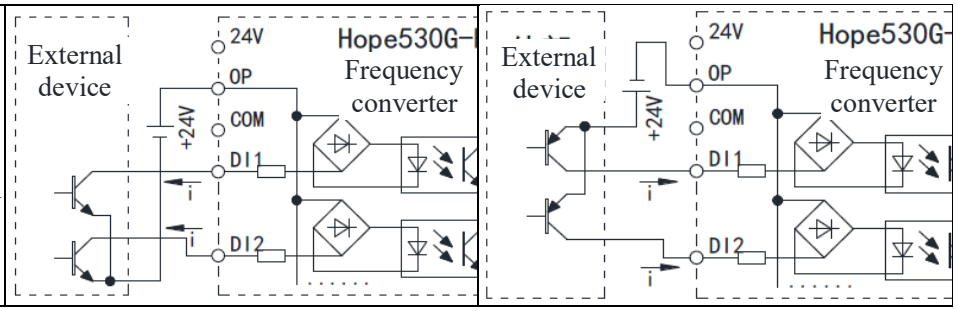
Using analog signal for remote operation requires the length of the control line between the operator and the frequency converter to be less than 30m. Since the analog signal is easily interfered, the analog control line shall be separated from the strong current circuit, relay, contactor, etc. The wiring shall be as short as possible and the connecting wire shall be shield twisted pair. One end of the shield wire shall be connected to the GND terminal of the frequency converter.

2) Wiring for multi-function input terminals DI1~DI5, and multi-function output terminals DO1 and DO2

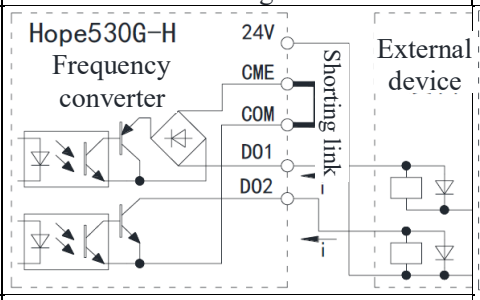
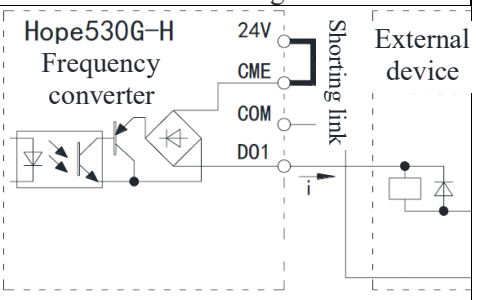
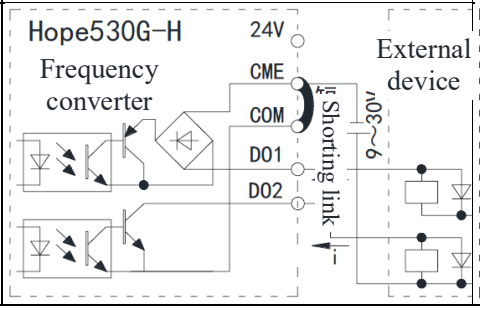
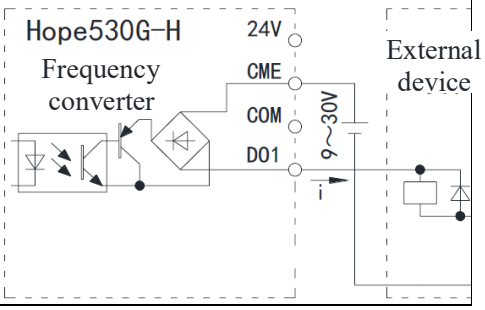
Hope530-H series frequency converter multi-function input terminals and output terminals are available in two types: sink logic and source logic. The interface mode is flexible and convenient. Typical wiring methods are as follows:

Connection of multi-function input terminal and external device:

	Sink logic	Source logic
When using the internal power supply of the frequency converter		

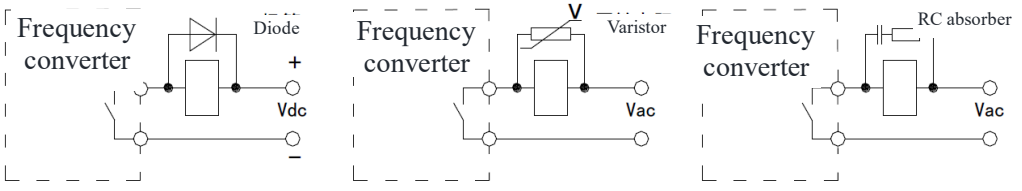
It is required to take down terminal short-connected piece when using external power supply	

Connection of multi-function output terminal and external device:

	Sink logic	Source logic
When using the internal power supply of the frequency converter		
It is required to take down terminal short-connected piece when using external power supply		

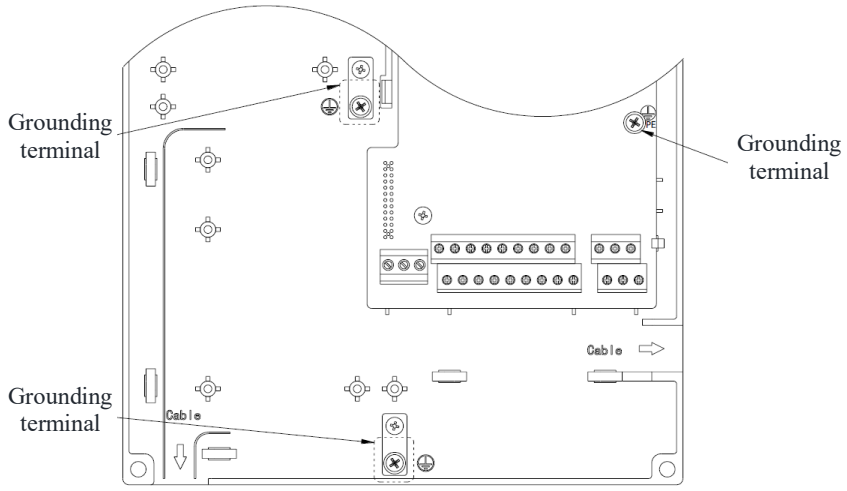
3) Wiring of relay output terminals TA, TB, TC

For driving inductive loads (such as electromagnetic relays, contactors, electromagnetic brakes), surge voltage absorbing circuits, varistor or freewheeling diodes (for DC electromagnetic circuits, must pay attention to polarity when installing) shall be installed. The components of the snubber circuit shall be installed close to the coils of the relay or contactor as shown below:

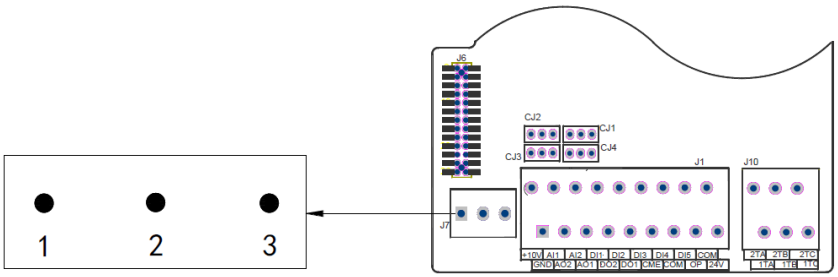


4) Ground terminal of control board

The control board and corresponding expansion board shall be grounded reliably. The grounding between the board and the shell is shown in the figure below:



Hope530-H series control board COMM1 communication port:



Pins of COMM1 communication port are defined as below:

Pin No.	Terminal name
1	485+
2	485-
3	Not connected

Note: The terminals of the COMM1 communication port can also be replaced with RJ45 connectors. If needed, please contact the manufacturer. Only the physical interface corresponds to the COMM1 communication port, and the other ports on the expansion board correspond to the COMM2 communication port.

Note: The LCD display panel occupies the COMM1 communication interface, which is no longer externally available; for communication purposes, a communication expansion card must be configured.

3.3 Suppression Method for Electric Magnetic Interference of Frequency Converter

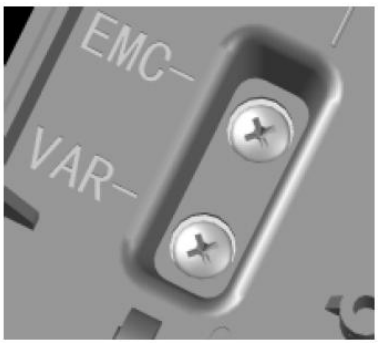
Working principle of the frequency converter determines that it will produce certain interference, which may bring EMC (electric magnetic compatibility) problems to the equipment or system. As electronic equipment, the frequency converter will also be affected by external electric magnetic interference. The followings are some installation design methods meeting EMC specifications for reference in field installation and wiring of frequency converters.

I. Measures for suppression of electric magnetic interference are shown below:

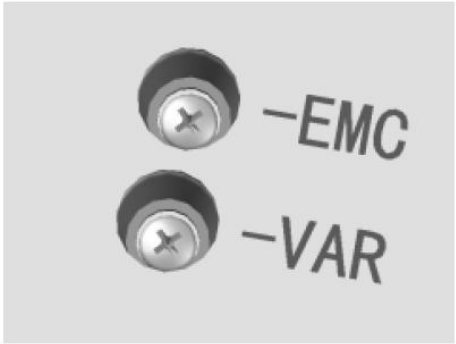
Interference propagation	Mitigation measures

path	
Leakage current Ground loop	When peripheral devices form a closed loop through the wiring of the frequency converter, the leakage current of the frequency converter ground wire will cause misoperation of equipment. If the equipment is not grounded, misoperation will be reduced.
Power line propagation	When peripheral device and the frequency converter share the same power supply, the interference generated by the frequency converter will result in inverse power line propagation, which will make other devices in the same system misoperate. The following measures can be taken: (1) The EMI filter or ferrite common-mode filter (magnetic ring) shall be installed on input side of the frequency converter; (2) The noise of other equipment shall be controlled with isolation transformer or power filter.
Motor line radiation Power line radiation Frequency converter radiation	When measuring instruments, radio devices, sensors and other weak signal equipment or signal lines are installed in the same cabinet as the frequency converter and the line is very close to each other, they are prone to space interference and misoperation. The following measures shall be taken: (1) Easily affected equipment and signal lines shall be installed as far away from the frequency converter as possible. Shielded wires shall be used as signal lines with shielding layer grounded. Signal cables shall be encased in metal tubes, and shall be far away from the frequency converter and frequency converter input and output lines. If it is inevitable for signal cables to pass through the power cable, they shall be vertical; (2) The EMI filter or ferrite common-mode filter (magnetic ring) shall be installed on input and output side of the frequency converter respectively; (3) The motor cable shall be placed in a barrier of greater thickness, such as in a pipe of greater thickness (more than 2mm) or buried in a cement tank. The power line shall be encased in metal tubes, and shielded and grounded (the motor cables shall be 4-core cables, one of which shall be grounded on the frequency converter side, and the other side shall be connected to the motor shell).
Electrostatic induction Electromagnetic induction	(1) The signal line and power line shall not be arranged in parallel. The signal line shall not be bundled up with the power line; (2) Easily affected equipment and signal lines shall be away from frequency converter and its input and output lines; (3) Both signal cables and power cables adopt shielded cables and are respectively wrapped into metal tubes, with a distance between tubes of at least 20cm between them.

Note: When using this product in the power grid system with ungrounded neutral points, loosen the two cross screws corresponding to VAR and EMC shown in the figure below shall be loosened (this screw is provided with a position-limit mechanism. The screw can be loosened but do not try to screw it out) to cut off the electric connection. Besides, filter shall not be installed otherwise personal injury or frequency converter damage may be caused.



Schematic Diagram of Stop Screws for Plastic



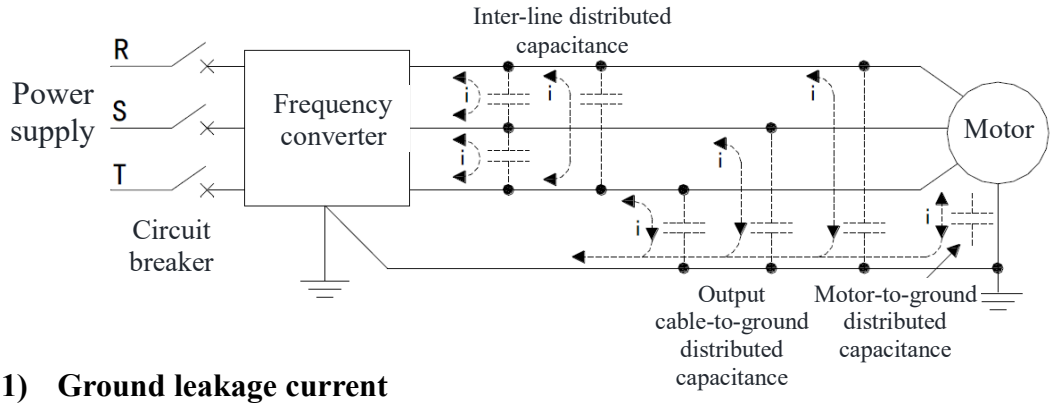
Schematic Diagram of Stop Screws for Iron Case

Case Cabinet	Cabinet

II. Leakage Current and Solution

Leakage current will occur due to the existence of the ground capacitance of the input and output cables of the frequency converter, the inter-line capacitance and the ground capacitance of the motor. Leakage current includes ground leakage current and inter-line leakage current, which depends on the size of distributed capacitance and carrier frequency.

Leakage current path is shown below:



1) Ground leakage current

The leakage current not only flows into the frequency converter system, but also may flow into other equipment through the ground wires. These leakage currents may cause mis-operation of leakage circuit breakers, relays or other equipment. The higher the carrier frequency of the frequency converter is, the greater the leakage current will be and the longer the motor cable is, the greater the leakage current will be.

Suppression measures:

Reduce the carrier frequency, but the motor noise will increase;

Motor cables shall be as short as possible;

The frequency converter system and other rest systems adopt the leakage circuit breaker designed for high harmonics and surge leakage currents.

2) Inter-line leakage current

AS for the leakage current that flows through the distributed capacitance between the cables at the output side of the frequency converter, its high harmonics may result in mis-operation of the external thermal relay, especially small-capacity frequency converter. When the wiring is very long (above 50m), the leakage current will increase a lot, which will easily make the external thermal relay misoperate. It is recommended to directly monitor the motor temperature with a temperature sensor or replace the external thermal relay with the motor overload protection function of the frequency converter.

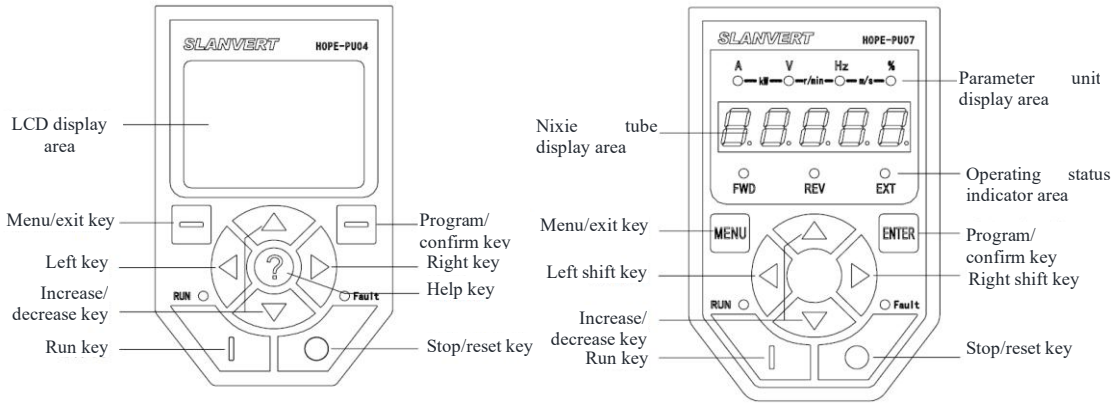
Suppressing measures: reduce carrier frequency, install electric reactor at output side.

4 Operation and Trial Run of Frequency Converter

4.1 Operation and Display of Frequency Converter

4.1.1 Functions of Operation Panel

The operation panel enables parameter setting/monitoring, operation control, and fault display. The standard configuration is HOPE-PU07, while HOPE-PU04 or HOPE-PU10 can be optionally provided based on customer requirements. Additionally, optional accessories allow cabinet-panel installation of HOPE-PU07 (LED panel), HOPE-PU04 (LCD panel), or HOPE-PU10 (LED panel with potentiometer). Outside view of HOPE-PU04 and HOPE-PU07 operation panel is shown below:

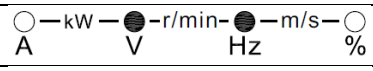
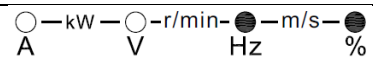
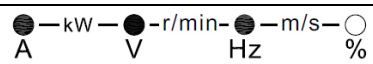
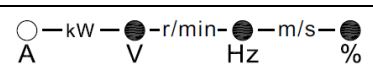


Functions of keys on HOPE-PU07 operation panel are shown below:

Key label	Key name	Function
MENU	Menu/exit key	Return to the previous menu; Enter/exit the monitoring state
ENTER	Program/confirm key	Enter the next-level menu; storage parameters; clear alarm information
△	Increase key	The number increases progressively, and increases faster when long pressing it down
▽	Decrease key	The number decreases progressively, and decreases faster when long pressing it down
◁	Left shift key	Select the bit to be modified; in monitoring mode, the monitored parameters can be displayed cyclically
▷	Right shift key	
	Run key	Run command
	Stop/reset key	Shutdown, fault reset

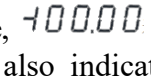
The various combinations of unit indicator lights represent the following units:

Display	Unit	Description
●—kW—○-r/min-○—m/s—○ A V Hz %	A	A
○—kW—●-r/min-○—m/s—○ A V Hz %	V	V
○—kW—○-r/min-●—m/s—○ A V Hz %	Hz	Hz
○—kW—○-r/min-○—m/s—● A V Hz %	%	Percentage
●—kW—●-r/min-○—m/s—○ A V Hz %	kW	kW (lights A and V are on at the same time)

	r/min	RPM (lights V and Hz are on at the same time)
	m/s	m/s (lights Hz and % are on at the same time)
	Length	m or mm (lights A, V and Hz are on at the same time)
	Time	h, min, s, ms (lights V, Hz and % are on at the same time)

The corresponding relationship between the symbols displayed on the LED operation panel and the actual symbols is as follows:

LED display symbols	Actual symbols	LED display symbols	Actual symbols	LED display symbols	Actual symbols
	0		9		H
	1		A		I
	2		b		L
	3		c		n
	4		C		o
	5		d		P
	6		E		r
	7		F		u
	8		G		U

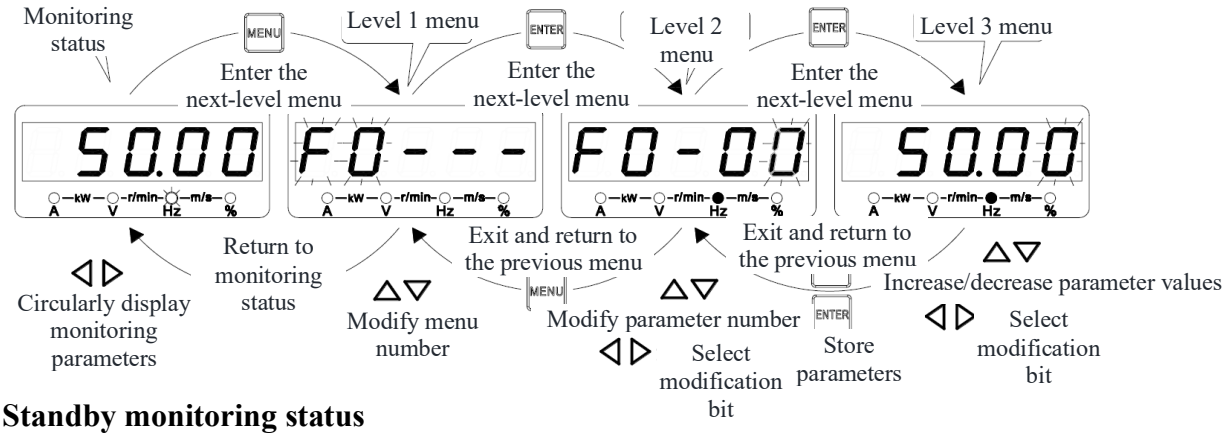
Note: When the highest bit of the LED operation panel displays  , it indicates that the number is negative, for example,  presents -100.00. If the lowest bit is displayed with a decimal point, it also indicates that the number is negative, for example,  presents -20000.

The following table shows the five status indicator lights on the operation panel, i.e., FWD, REV, EXT, RUN and Fault:

Indicator light	Display status	Indicated current status of the frequency converter
RUN indicator	Off	Standby status
	On	Stable operating status
	Flashing	Accelerating or decelerating
FWD indicator	Off	Set direction and current running direction are reversed
	On	Set direction and current running direction are forward
	Flashing	Set direction and current operation direction are inconsistent
EV indicator	Off	Set direction and current running direction are forward
	On	Set direction and current running direction are reversed
	Flashing	Set direction and current operation direction are inconsistent
EXT indicator	Off	Operation panel control status
	On	Terminal control status
	Flashing	Communication control status
Fault indicator	Off	Fault-free status
	On	Fault status

4.1.2 Display Status and Operation of Operation Panel

The display status of Hope530-H series frequency converter operation panel includes monitoring status (including standby monitoring status, running monitoring status), parameter editing status, fault status, alarm status, etc. The conversion relationship of each state is shown below:



Standby monitoring status

Press ◁ and ▷ under the state to enable the operation panel to circularly display different standby state parameters (defined in FC-02~FC-08).

Operation monitoring status

Press ◁ and ▷ under the state to circularly display different operation state parameters (defined in FC-02~FC-12).

Parameter editing status

Press MENU under the monitoring state to enter editing state that is displayed as a level 3 menu in sequence of parameter group number→parameter group serial number→parameter value. Press ENTER to enter next level and press MENU to return to previous menu (return to monitoring state if at level 1 menu). Change parameter group number, parameter group serial number or parameter value by pressing △ and ▽. Under level 3 menu, the bit that can be modified will flash, and the bit can be changed by pressing ◁ and ▷, and the modification results can be saved by pressing ENTER, and it will return to level 2 menu and point to next parameters.

When FC-00 is set to 1 (only user parameters are displayed) or 2 (only parameters different from the factory defaults are displayed), the level 1 menu is not displayed to facilitate user operations.

Password verification status

If there is a user password (F0-16 is not zero), enter the password verification status before entering parameter editing. The device shows "____" at this time, and users can enter password by pressing △, ▽, ◁ and ▷, during which the "____" will be displayed all the time. Then, password protection can be released by pressing ENTER. If the password is not correct, the keyboard will flash and display "Err". At the time, press MENU to return to the verification status and press MENU again to exit password

verification status.

After the password protection is removed, the password protection automatically takes effect if pressing ENTER+◁ in the monitoring state or pressing no keys within 2min.

When the value of FC-00 is 1 (only user parameters are displayed), user parameters are not protected by passwords. However, user password is required when changing the value of FC-00.

Fault display status

Once detecting fault signal, the frequency converter will enter fault display status with fault code flashing. Faults can be reset by entering reset commands (○, control terminal or communication command on operating panel). If the fault still exists, the fault code will be still displayed, during which improper parameters can be modified and set to eliminate the fault.

Alarm display status

If the frequency converter detects the alarm information, the Nixie tube will display flashing alarm code. In case of multiple alarm signals, they will be displayed alternately, and the alarm display can be temporarily shielded by pressing MENU or ◁. The frequency converter automatically detects the alarm value, and automatically clears the alarm signal if it returns to normal state. The frequency converter will not stop when alarming.

4.2 First Energization

Please connect cables according to the technical requirements provided in section 3.2 "Frequency Converter Wiring" of this Manual.

After checking the wiring and power supply, close the AC power supply air switch at the input side of the frequency converter to supply power for the frequency converter. The frequency converter operation panel will display "8.8.8.8.8" first. Once the contactor inside the frequency converter is normally closed, the words displayed by LED Nixie tube at the given frequency, it indicates that the frequency converter has been initialized. In case of abnormalities during the power-on process, turn off the air switch on the input side to check the cause and eliminate such abnormalities.

4.3 Quick Commissioning Guide

This section gives the common and necessary commissioning steps for the speed regulation in the general mode of Hope530-H series frequency converter based on the default values.

4.3.1 Common Parameter Settings for Each Control Mode

1. Select the control mode: Select control mode according to the application conditions and requirements. For details, see F0-12 "Motor Control Mode" for details;

2. Select the frequency set channel and set the frequency: see F0-01 "main given channel for ordinary operation" for details;

3. Select run command channel: see F0-02 "run command channel selection" for details;

4. Correctly set F0-06 "maximum frequency", F0-07 "upper limit frequency", F0-08 "lower limit frequency";

5. Motor running direction: confirm the motor wiring phase sequence and set F0-09 "direction locking" according to mechanical load requirements;

6. Acceleration and deceleration time: set as long as possible under the premise of meeting needs. If it is too short, it will produce too much torque, which may damage load or cause overcurrent;

7. Start and stop mode: see F1-19 "start mode" and F1-25 "stop mode" for details;

8. Parameters of motor on nameplate: rated power, number of motor poles, rated current, rated frequency, rated speed, rated voltage;

9. Motor overload protection: see Fb-00 "heat dissipation condition of motor", Fb-01 "motor overload protection value" and Fb-02 "motor overload protection action selection" for details.

4.3.2 V/F Control Quick Commissioning

V/F control quick commissioning methods based on the condition without PGV/F control are introduced below. If "with PGV/F control" is adopted, set encoder parameters according to the encoder parameter description of this Manual.

1. V/F curve setting;

2. Torque boost selection;

3. Motor parameters self-tuning: see FA-00 for details. "Static self-tuning" is only required to be executed for V/F control.

V/F control optimization adjustment:

1. F2-09 "vibration damping": it is used to eliminate motor oscillation under light load. If the motor oscillates, adjust the parameter from small to large until the oscillation is eliminated, but it shall not be too large;

2. F2-02 "manual torque boost amplitude": If the starting current is too large, the value of this parameter can be reduced;

3. Automatic torque boost: in order to increase the starting torque of the frequency converter and the output torque during low speed operation, automatic torque boost is recommended (F2-01 "torque boost option" = 2). Automatic torque boost requires correct setting of motor nameplate parameters and motor static self-tuning is also required;

4. Slip compensation: speed drop caused by load can be reduced. Slip compensation is effective only when automatic torque boost is effective. Settings required: F2-05 "slip compensation gain", F2-06 "slip compensation filtering time", and slip compensation amplitude limiting.

4.3.3 Vector Control Quick Commissioning

Vector control quick commissioning methods based on the condition without PG vector control are introduced below. If "with PG vector control" is adopted, set encoder parameters according to the encoder parameter description of this Manual.

1. F3-22 "magnetic flux intensity": Adjust the magnetic flux intensity to make the current of motor under no-load operation at low speed (non-flux weakening field) under vector control is close to the no-load current of the motor;

2. Motor parameter self-tuning: no-load and complete motor self-tuning is required for vector control. If no-load complete self-tuning is not possible, correct motor parameters must be manually input, including FA-08 "motor stator resistance", FA-09 "motor leakage inductive reactance", FA-10 "motor rotor resistance", and FA-11 "motor mutual inductive reactance";

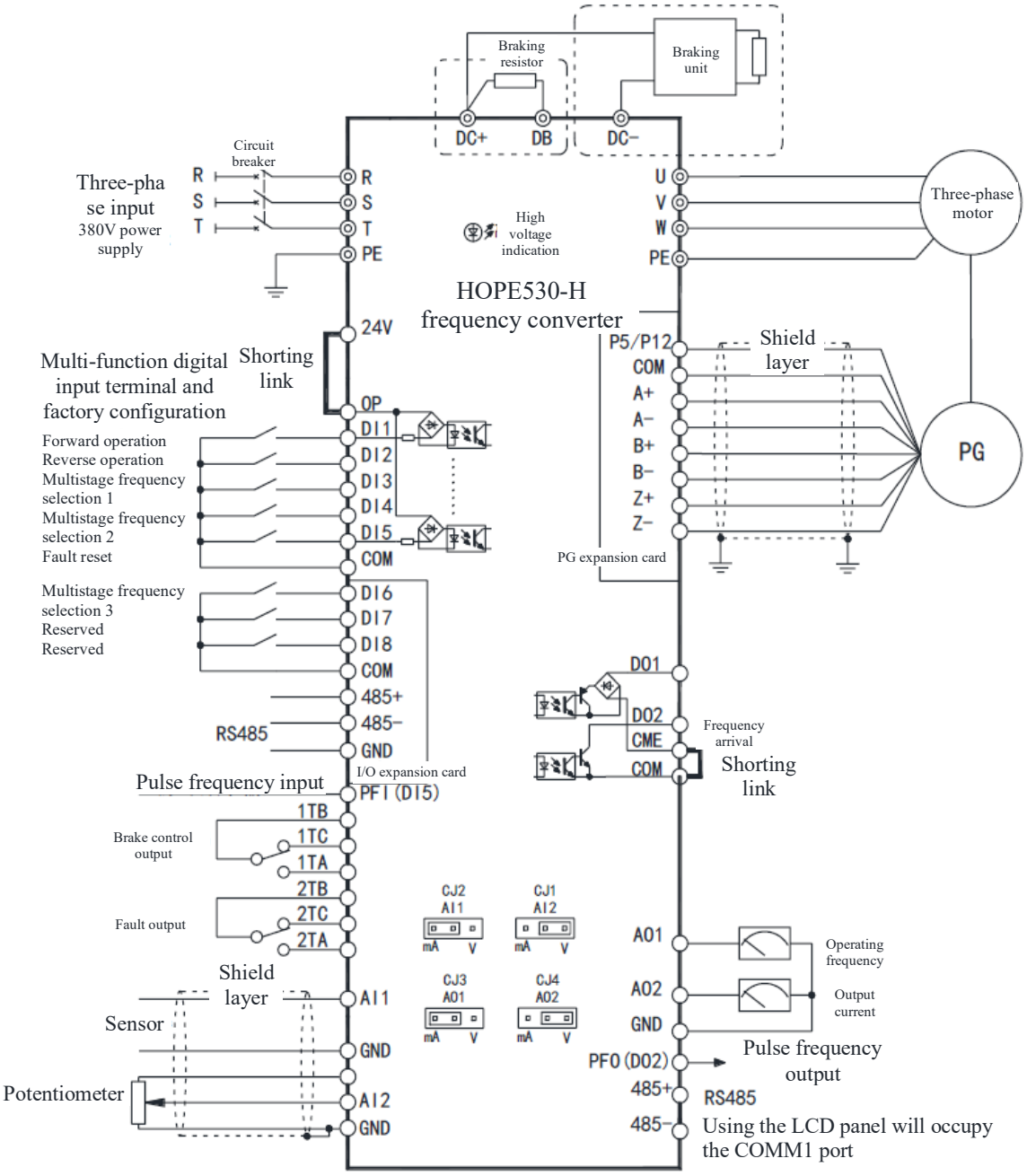
3. Speed regulator setting;

4. For vector control, F2-12 "basic frequency" must be set as the same as FA-04 "motor rated frequency".

5 Crane Function Application

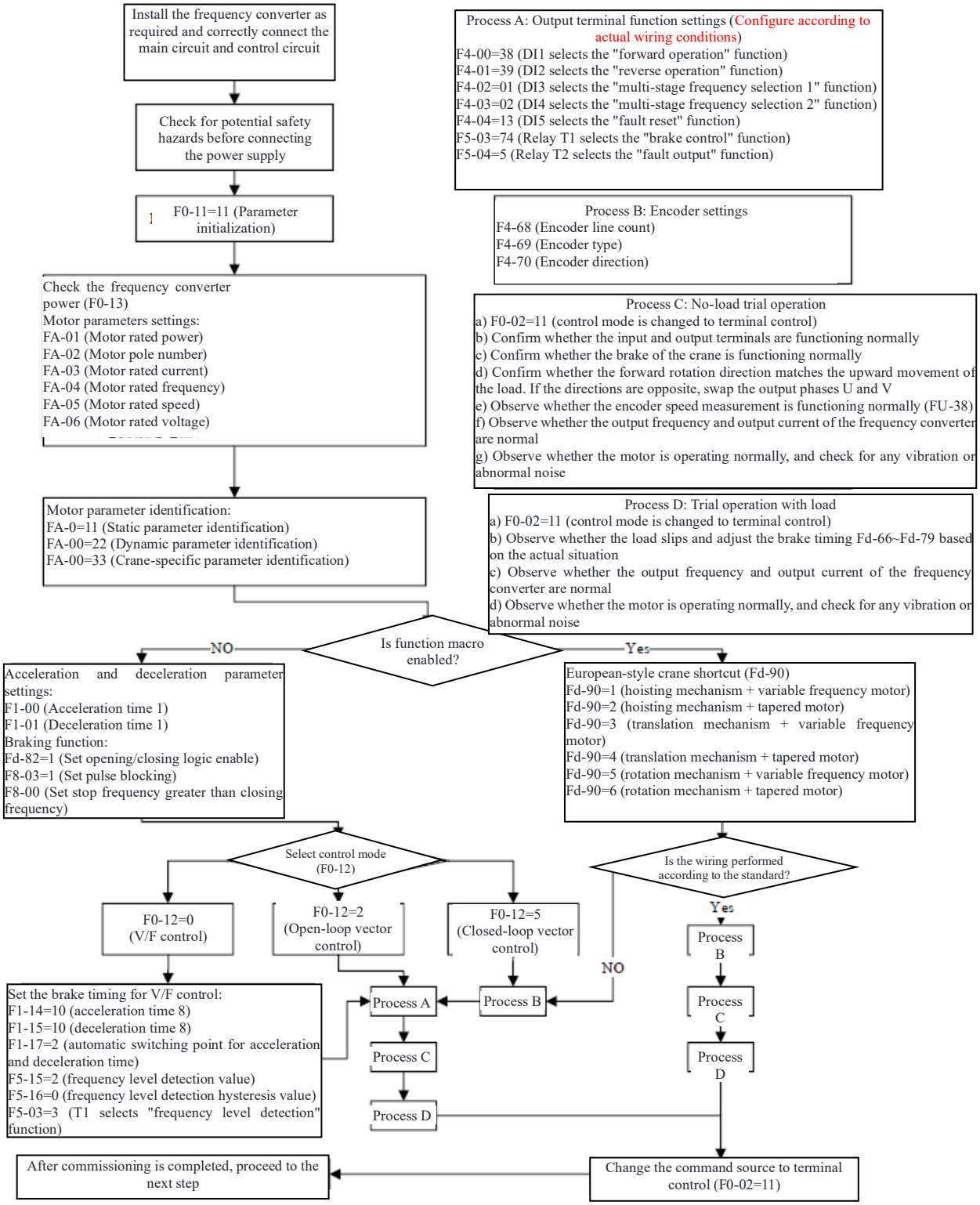
5.1 Hoisting Function Commissioning Guide

The control wiring diagram for the hoist is shown below (recommended):



The flowchart below mainly describes the commissioning steps for the hoisting function of the HOPE530-H series crane-specific frequency converter, including the frequency command setting of the frequency converter and the control of startup and brake timing.

The trial operation of a crane-specific motor controlled by a frequency converter can be achieved based on the following content.



Note: During trial operation, ensure the forward rotation of the frequency converter aligns with the upward movement of the load. If the directions are opposite, swap the output phases U and V. It is strictly prohibited to reverse the direction by modifying the parameter "F0-09".

The European-style crane quick-setting function macro is primarily used for rapid commissioning of European-style electric hoists. Its pre-configured function parameters have been optimized to meet the requirements of most European-style crane applications on-site and generally require no adjustment. If modifications are needed,

fine-tune them according to the functional instructions in this chapter or contact the manufacturer.

■ European-style crane hoisting variable frequency motor function macro parameter (Fd-90=1)

Function code	Name	Set value	Unit
F0-02	Run command channel selection	11	-
F0-12	Motor control mode	2	-
F1-00	Acceleration time 1	3.0s	0.1s
F1-01	Deceleration time 1	3.0s	0.1s
F3-61	Feed-forward switch	1	-
F3-62	Feed-forward value	50.0%	0.1%
F3-65	Demagnetization time	0.000s	0.001s
F4-19	Multi-stage speed selection	1	-
F5-03	T1 relay output function	74	-
F5-04	T2 relay output function	5	-
F8-12	Speed reduction trigger point with voltage drop	9285	-
F8-15	Crane-specific fault action protection mode 1	11111	-
F8-16	Crane-specific fault action protection mode 2	11110	-
F8-18	Bus undervoltage protection forced shutdown	400V	1V
Fb-26	Power-on self-start allowed	0	-
Fd-82	Closing enabling switch	1	-
Fd-84	Downward frequency upward torque enable	01	-

■ European-style crane hoisting tapered motor function macro parameter (Fd-90=2)

Function code	Name	Set value	Unit
F0-02	Run command channel selection	11	-
F0-12	Motor control mode	0	-
F1-00	Acceleration time 1	2.0s	0.1s
F1-01	Deceleration time 1	2.0s	0.1s
F1-20	Starting frequency	2.00Hz	0.01Hz
F4-19	Multi-stage speed selection	1	-
F5-03	T1 relay output function	1	-
F5-04	T2 relay output function	5	-
F8-12	Bus voltage speed reduction trigger	9285	-
F8-18	Bus undervoltage protection forced shutdown	400V	1V
Fb-26	Power-on self-start allowed	0	-
Fd-01	Tapered motor control enable	011	-

■ Standard crane translation/rotation variable frequency motor function macro parameter (Fd-90=3/5)

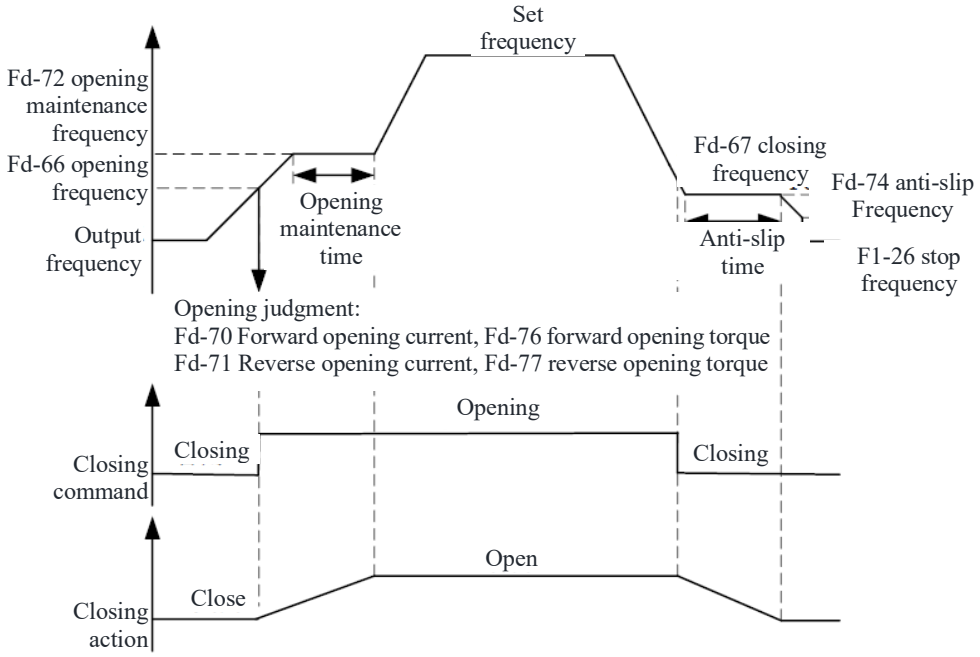
Function code	Name	Set value	Unit
F0-02	Run command channel selection	11	-
F0-12	Motor control mode	0	-
F1-00	Acceleration time 1	2.0s	0.1s
F1-01	Deceleration time 1	2.0s	0.1s
F1-20	Starting frequency	0.50Hz	0.01Hz

F4-19	Multi-stage speed selection	1	-
F5-03	T1 relay output function	75	-
F5-04	T2 relay output function	5	-
Fb-26	Power-on self-start allowed	0	-

■ Standard crane translation/rotation tapered motor function macro parameter (Fd-90=4/6)

Function code	Name	Set value	Unit
F0-02	Run command channel selection	11	-
F0-12	Motor control mode	0	-
F1-00	Acceleration time 1	2.0s	0.1s
F1-01	Deceleration time 1	2.0s	0.1s
F1-20	Starting frequency	2.00Hz	0.01Hz
F4-19	Multi-stage speed selection	1	-
F5-03	T1 relay output function	75	-
F5-04	T2 relay output function	5	-
F8-12	Speed reduction trigger point with voltage drop	9285	-
F8-18	Bus undervoltage protection forced shutdown	400V	1V
Fb-26	Power-on self-start allowed	0	-
Fd-01	Tapered motor control enable	11	-

5.2 Brake Timing



5.2.1 Function Code Setting Instructions

■ Method to enable closing logic

1) Set Fd-82 to 1 to enable the closing logic function;

2) Select 74 for the control relay T output function of the solenoid gate;

3) If the closing status has hardwired feedback, set the corresponding input DI terminal to fixed value 63 and configure Fd-80 for normally open/closed contacts. Skip this step if the closing status has no hardwired feedback;

■ **Opening setting instructions**

Following forward releasing conditions must be met at the same time:

1) The current acceleration/deceleration ramp frequency is greater than Fd-66 (forward opening frequency, unit: Hz);

2) The current output torque is greater than Fd-76 (forward opening torque, set value of 100.0 corresponds to 100% rated torque);

3) The current output current is greater than Fd-70 (forward opening current, set value of 100.0 corresponds to 100% rated current);

Following reverse opening conditions must be met at the same time:

1) The current acceleration/deceleration ramp frequency is greater than Fd-68 (reverse opening frequency, unit: Hz);

2) The current output torque is greater than Fd-77 (reverse opening torque, set value of 100.0 corresponds to 100% rated torque);

3) The current output current is greater than Fd-71 (reverse opening current, set value of 100.0 corresponds to 100% rated current);

Note: The opening frequency setting must be less than or equal to the current command frequency; otherwise, opening will fail. In case of sliding when opening, the opening torque and the set current value can be appropriately increased.

■ **Closing setting instructions**

Following forward closing conditions must be met at the same time:

1) Stop command is received;

2) The current operating frequency is less than or equal to Fd-67 (forward closing frequency, unit: Hz);

Following reverse closing conditions must be met at the same time:

1) Receives the stop command;

2) The current operating frequency is less than or equal to Fd-69 (reverse closing frequency, unit: Hz);

Note: The set closing frequency shall be lower than or equal to the minimum frequency at which the system operates.

5.2.2 Closing-related Function Parameters

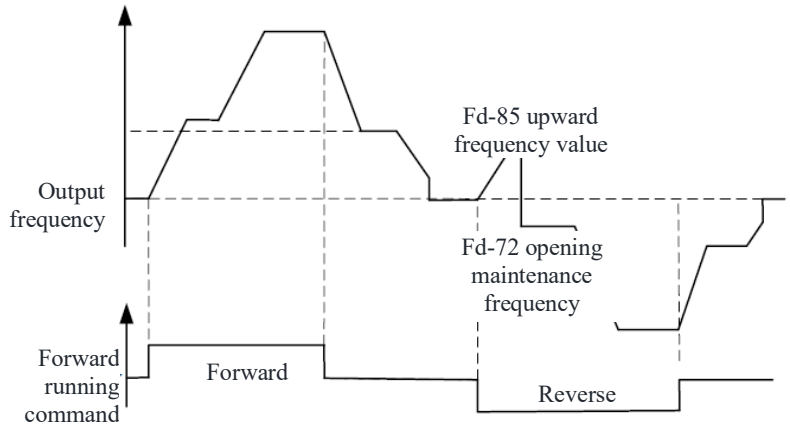
Function code	Name	Set value	Unit
Fd-66	Forward opening frequency	2.00Hz	0.01Hz
Fd-67	Forward closing frequency	2.00Hz	
Fd-68	Reversal opening frequency	2.00Hz	
Fd-69	Reversal closing frequency	2.00Hz	
Fd-70	Forward opening current threshold	10.0%	0~100.0%
Fd-71	Reversal opening current threshold	3.0%	0~100.0%
Fd-72	Opening maintenance frequency	3.00Hz	0.01Hz

Fd-73	Opening maintenance time	0.25s	1s
Fd-74	Anti-slip frequency	2.00Hz	0.01Hz
Fd-75	Anti-slip action time	0.30s	1s
Fd-76	Forward opening torque threshold	6.0%	0~100.0%
Fd-77	Reversal opening torque threshold	0.0	0~100.0%
Fd-78	Closing state switching time	0.5s	1s
Fd-79	Anti-slip end delay stop time	10s	1s
Fd-80	Closing feedback signal switch contact status	2	-
Fd-81	Zero-crossing closing enable switch	0	-
Fd-82	Closing enabling switch	1	-
Fd-83	Zero-crossing closing frequency threshold	2.00Hz	0.01Hz
Fd-84	Downward frequency upward torque enable	1	-
Fd-85	Upward frequency value	4.00Hz	0.01Hz
Fd-86	Downward frequency upward torque limit value	50.0%	0.1%
Fd-87	Stall saturation time	250ms	1ms
Fd-88	Stall saturation enable	1	-
Fd-89	Frequency lower limit associated closing frequency enable	1	-
Fd-90	Crane function macro	1	-

5.3 Downward Frequency Upward Torque

When the downward frequency upward torque function is enabled, the frequency reference is first set to positive to maintain upward force, then switched to negative to ensure the load does not slip during downward startup.

■ **Timing Diagram of Downward Frequency Upward Torque**



■ **Function realization**

1) This function is only effective when running downward;

2) This function requires the control method to be vector control;

3) To enable this function, configure the settings according to the following table;

4) Adjust Fd-85 to set the startup upward frequency value;

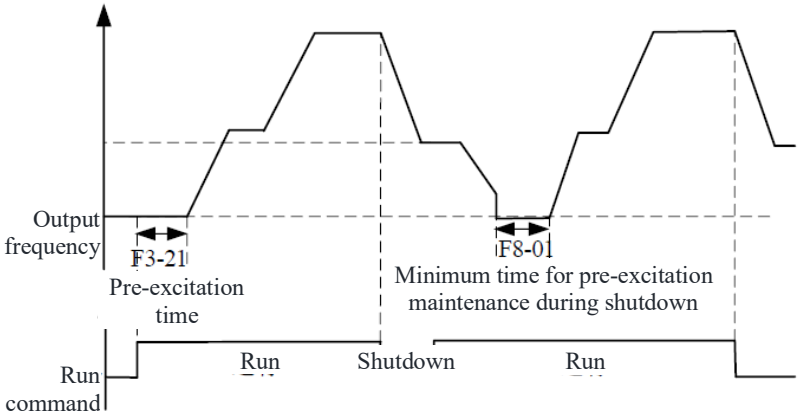
■ **Related function parameters**

Function code	Name		Set value	Unit
Fd-72	Opening maintenance frequency		3.00Hz	0.01Hz
Fd-73	Opening maintenance time		0.25s	1s
Fd-84	Downward frequency upward torque enable	Units digit: Downward frequency upward switch 0: Off 1: On	01	-
		Tens digit: Frequency value after the ramp when switching to downward operation 0: Fd-72 1: Starting frequency		
Fd-85	Upward frequency value		4.00Hz	0.01Hz
Fd-86	Downward frequency upward torque limit value		50.0%	0~100.0%

5.4 Pre-excitation maintenance during shutdown

Pre-excitation maintenance during shutdown refers to the process during deceleration when, after slowing down to the braking frequency F1-26, the frequency converter does not immediately block the output but instead maintains the motor in an excited state. This eliminates the need for pre-excitation during subsequent restarts, thereby improving restart speed.

■ Timing Diagram of Pre-excitation during Shutdown



■ Function realization

1) This function requires the control method to be vector control;

2) The function requires simultaneous activation of DC braking and pre-excitation, with the specific parameter settings as shown in the table below;

3) Adjust F1-28 to set the duration of pre-excitation maintenance during shutdown;

4) Adjust F8-02 to set the minimum time for pre-excitation maintenance during shutdown;

■ Related function parameters

Function code	Name	Set value	Unit
F1-25	Shutdown method	2	-
F1-26	Shutdown/DC braking/pre-excitation maintenance frequency during shutdown	0.50Hz	0.00Hz
F1-27	Shutdown/DC braking/waiting time for pre-excitation maintenance during shutdown	0	0.00s
F1-28	Shutdown/DC braking/pre-excitation	10.0s	0.0s

	maintenance time during shutdown		
F8-00	Low-frequency deceleration forced shutdown frequency	4.00Hz	0.01Hz
F8-01	Minimum time for pre-excitation maintenance during shutdown	400ms	1ms
F8-02	Pre-excitation maintenance mode during shutdown	1	-
F8-03	Up-down switching pulse blocking selection	1	-

Note: To enable the shutdown pre-excitation function, set F1-25=2 (activating shutdown/ DC braking/pre-excitation maintenance during shutdown). Otherwise, the shutdown pre-excitation function cannot be implemented.

5.5 Torque memory

■ Function Overview

During the startup or shutdown phase of a crane, hook slippage is most likely to occur. By recording the torque from the previous operation and feeding it back to the startup torque of the current operation, this prevents both hook slippage (due to insufficient output torque during startup) and brake grinding (due to excessive output torque).

■ Function realization

1) This function requires the control method to be vector control;

2) The torque feed-forward will not be updated if the current output torque is less than F8-05 or greater than F8-06; the torque memory function only takes effect when the output torque is within the range of F8-05 to F8-06;

3) This function requires simultaneous activation of torque memory and torque feed-forward, with the specific parameter settings as shown in the table below;

4) You can monitor F3-62 to check whether the torque feed-forward value changes;

■ Related function parameters

Function code	Name		Set value	Unit
F3-61	Feed-forward switch		1	-
F3-62	Feed-forward value	Do not enable torque memory F8-04=0	30.0%	0.1%
		Enable torque memory F8-04=1	Based on changes in output torque	
F3-63	Feed-forward attenuation coefficient		998	-
F3-64	Feed-forward direction		0	-
F8-04	Automatic torque memory		1	-
F8-05	Automatic torque memory lower limit		30.0%	0.1%
F8-06	Automatic torque memory upper limit		100.0%	0.1%

5.6 Speed Reduction with Load

■ Function Overview

When the set upper limit frequency is greater than the rated frequency of the motor, this function can automatically limit the maximum operating frequency of the motor under heavy load. F8-07 defines the maximum output torque at the rated frequency of the motor. Based on the load weight, the frequency converter calculates the maximum allowable operating frequency under these conditions, ensuring stable output and

enhanced system operational stability even in overload scenarios.

■ **Function realization**

1) This function requires the control method to be vector control or V/F control;

2) This function requires setting F0-06 and F0-07 to values greater than the rated frequency of the motor, with specific parameters as shown in the table below;

3) Adjust F8-07 to change the magnitude of speed reduction with load;

■ **Related function parameters**

Function code	Name	Set value	Unit
F0-00	Given frequency	60.00Hz	0.01Hz
F0-06	Maximum frequency	60.00Hz	0.01Hz
F0-07	Upper limit frequency	60.00Hz	0.01Hz
F8-07	Speed Reduction with Load	80.0%	0.1%
FU-10	Given torque	-	0.1%

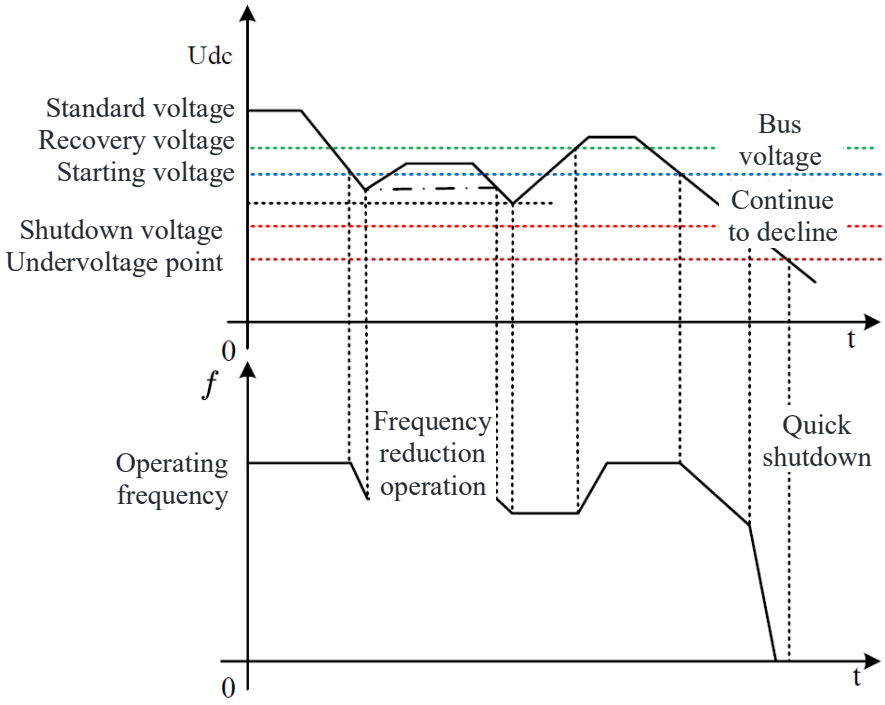
Note: This function only takes effect when the FU-10 given torque exceeds 30%.

5.7 Speed reduction with voltage drop

■ **Function Overview**

Frequency reduction with voltage drop refers to the function where the frequency converter automatically lowers the output frequency to maintain torque output when the grid or DC bus voltage is abnormally low.

■ **Speed Reduction Curve with Voltage Drop**



■ **Function realization**

1) This function requires the control method to be vector control or V/F control;

2) When F8-12 > 0, it indicates that this function is enabled, and commissioning

parameters can be set according to the table below;

3) If the DC bus voltage falls below the startup threshold, the frequency converter will reduce the output frequency to maintain stable power output;

4) When the DC bus voltage continuously drops to the shutdown threshold F8-18, the frequency converter will perform a rapid shutdown according to the deceleration time set in F1-11 and trigger the AL.SA1 alarm, which automatically clears once the voltage recovers;

■ **Related function parameters**

Function code	Name	Set value	Unit
F1-11	Deceleration time 6	0.5s	0.1s
F8-12	Speed reduction with voltage drop	9285	-
F1-11	Trigger function deceleration time	0.5s	0.1s
F8-18	Bus undervoltage protection threshold	400V	1V
Fb-19	DC bus undervoltage point	370V	1V
FU-07	DC bus voltage	-	0.1V

Note: The reference standard for DC bus voltage is set at 538V.

5.8 Stationary Complete Parameter Identification

■ **Function Overview**

Vector control requires motor parameter identification; otherwise, operation instability or faults such as overcurrent may occur during motor operation. It is also recommended for users to perform parameter identification (e.g., speed tracking, overcurrent suppression, torque boost) for VF control, as completing parameter self-learning can achieve better control performance.

Parameter identification method	Usage	Effect
Asynchronous motor static parameter identification	Situations where the motor and load cannot be easily separated, and dynamic self-learning operation is not permitted	Average
Asynchronous motor dynamic complete parameter identification	Situations where the motor can be easily decoupled from the application system, but the brake must be released	Optimal
Asynchronous motor static complete parameter identification	Situations where the motor and load cannot be easily separated, but all motor parameters can be completely identified statically	Relatively good

■ **Precautions**

1) Before performing parameter identification, the run command channel shall be selected as the panel control;

2) During static complete parameter identification, the operation time of the frequency converter is relatively long, and the parameter identification is only considered complete after the operation indicator light on the handheld box turns off;

■ **Function realization**

1) After initialization is completed, set the command source to panel control (F0-02=10) and input the motor nameplate parameters into FA-01~FA-06;

2) Set FA-00=33 to perform static complete parameter identification, then press the RUN key to start the process, which will last approximately 3~5 minutes;

3) When the RUN operation indicator light turns off, it indicates that the parameter identification is complete;

■ **Related function parameters**

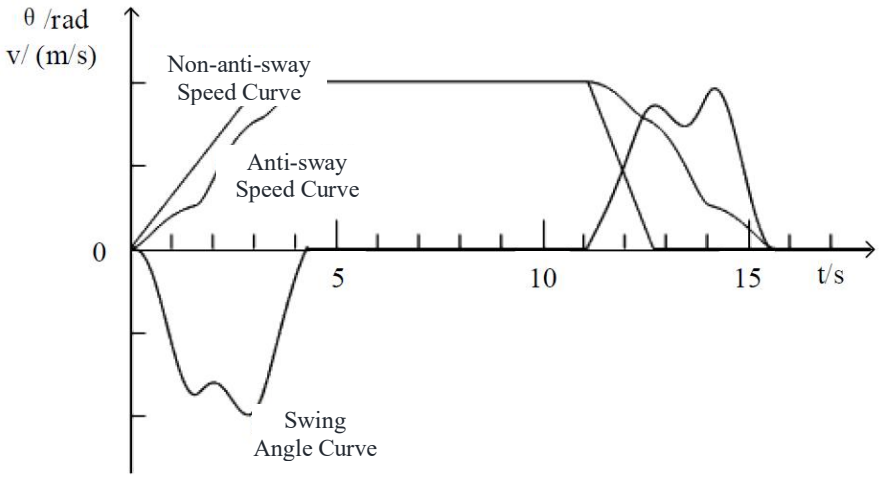
Function code	Name	Set value	Unit
FA-00	Motor parameters self-tuning	33	-
FA-01	Rated power of motor	Model determination	0.40~500.00 kW
FA-02	Motor pole number	4	2~48
FA-03	Rated current of motor	Model determination	0.5~1200.0A
FA-04	Rated frequency of motor	50.00Hz	1.00~650.00 Hz
FA-05	Rated speed of motor	Model determination	125~40000rpm
FA-06	Rated voltage of motor	380V	150~500V
FA-07	Motor no-load current	Model determination	0.1A~FA-03 "motor rated current"
FA-08	Motor stator resistance	Model determination	0.00~50.00%
FA-09	Motor leakage inductive reactance	Model determination	0.00~50.00%
FA-10	Motor rotor resistance	Model determination	0.00~50.00%
FA-11	Motor mutual inductive reactance	Model determination	0.0~2000.0%

5.9 Anti-swing function

■ **Function Overview**

The anti-sway function is a specialized feature developed specifically for the hoisting industry, built entirely on the underlying software of the frequency converter. By knowing the rope length and operating speed, the hoisting anti-sway function is enabled to effectively eliminate over 95% of swing, offering simple commissioning and high practicality. The operation process of a crane is similar to a simple pendulum motion. The anti-sway system estimates the length from the hook to the motor using an encoder, calculates the current swing angle of the hook, and employs an anti-sway algorithm to adjust the output curve of the frequency converter, thereby controlling the actual operating speed of the mechanism to achieve the goal of suppressing hook swing.

When the anti-sway function is enabled, the frequency converter adjusts the acceleration and deceleration curves of the output frequency to achieve anti-sway control, with the curve roughly as follows:



5.9.1 Implementation and Commissioning Steps of Anti-sway Function

■ **Function realization**

1) Setting Fd-50 to 041 indicates enabling the anti-sway function;

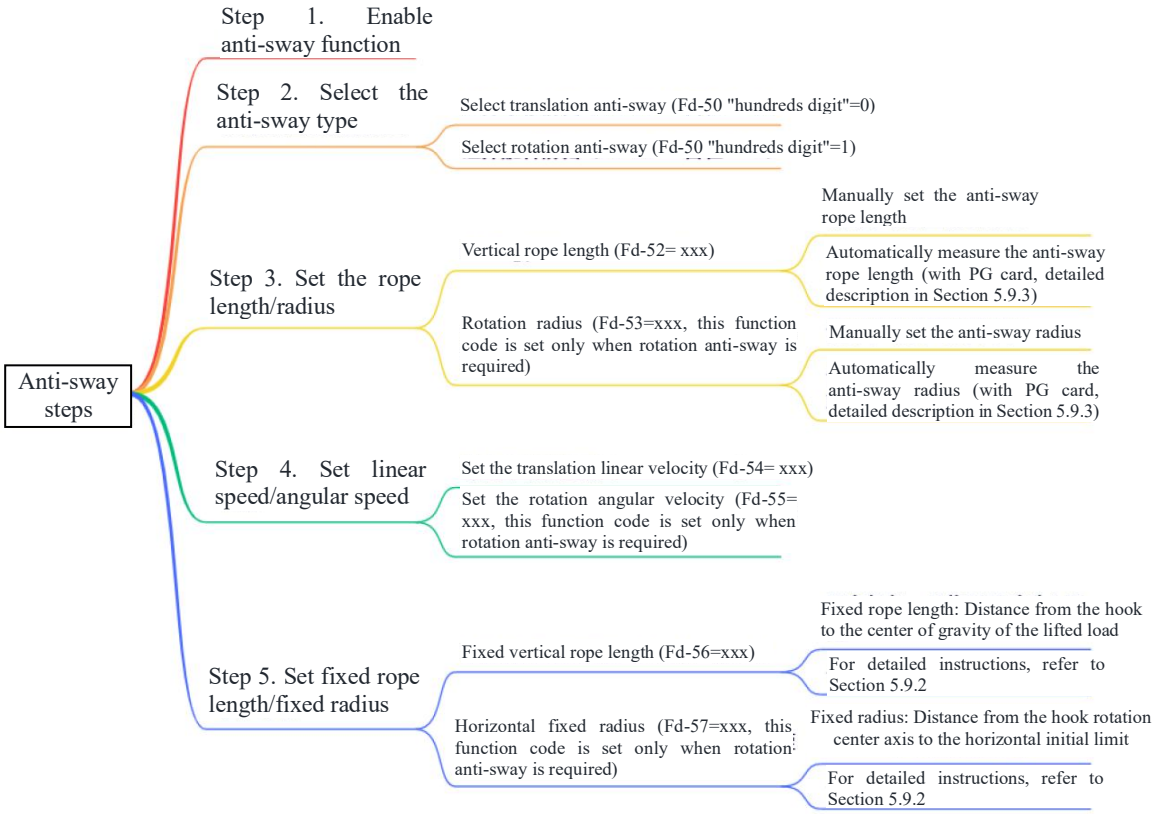
2) The hundreds digit of Fd-50 indicates whether to select translation anti-sway or rotation anti-sway: 0 in the hundreds digit represents translation anti-sway mode, while 1 in the hundreds digit of Fd-50 represents rotation anti-sway mode (e.g., Fd-50=011 means enabling translation mode 1 anti-sway, and Fd-50=111 means enabling rotation mode 1 anti-sway)

3) Correctly set the vertical rope length or rotation radius;

4) Properly set the translation linear velocity and rotation angular velocity;

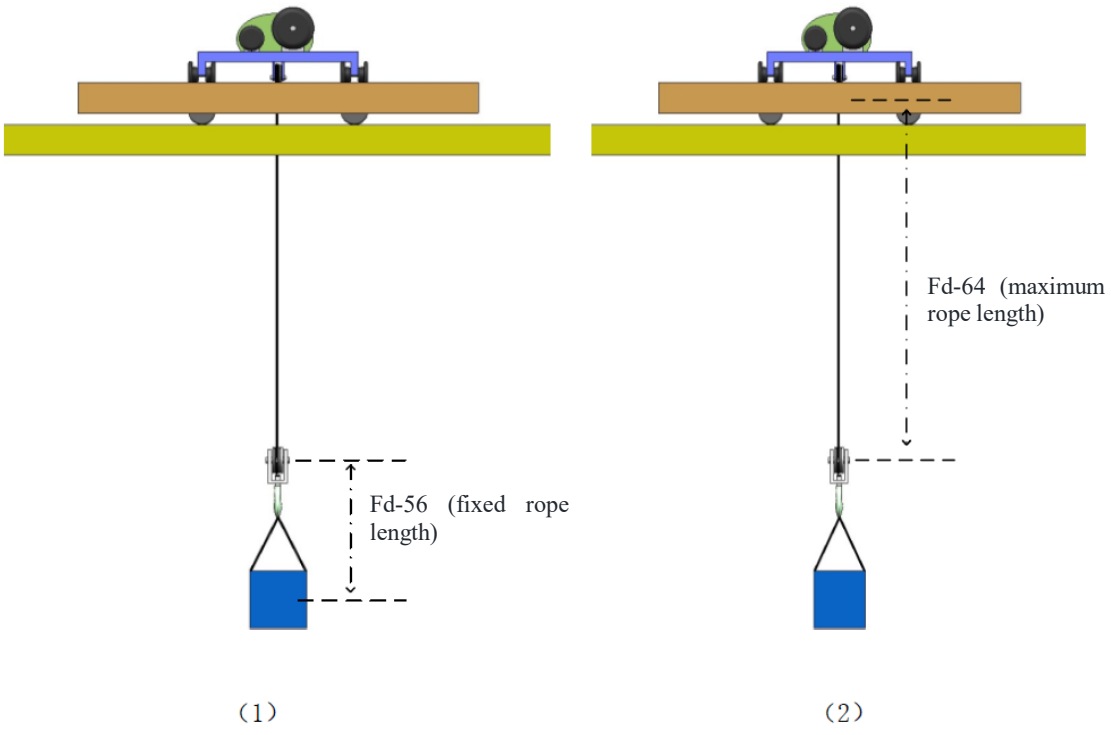
5) Properly set the fixed rope length and fixed radius;

■ **Anti-sway steps**

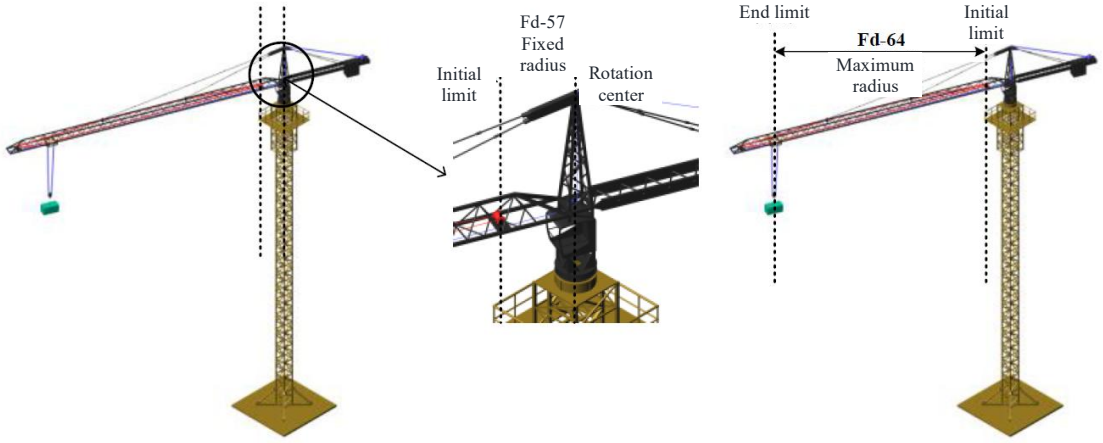


5.9.2 Fixed Rope Length/Fixed Radius and Maximum Rope Length/Maximum Radius

■ Fixed rope length and maximum rope length



■ Fixed radius and maximum radius



（3） （4）

Note: Fixed rope length only takes effect in translation variable frequency mode, while fixed radius is only applicable to rotation variable frequency mode.

5.9.3 Anti-sway Rope Length Setting

■ **Manual setting of anti-sway rope length/radius**

Rope length:

1) Manually input the rope length value in the anti-sway variable frequency Fd-52;

2) Anti-sway variable frequency Fd-65 "tens digit" = 0;

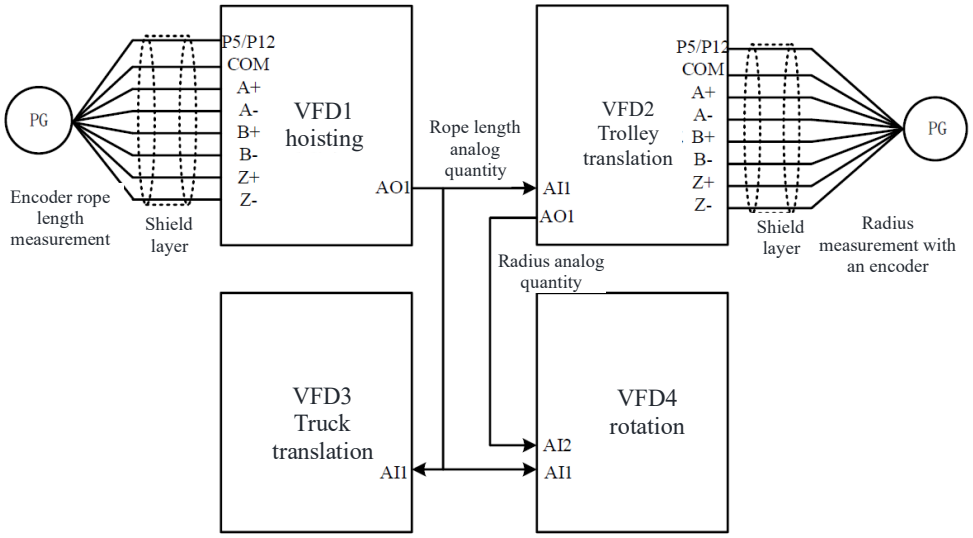
Radius:

1) Manually input the rope length value in the anti-sway variable frequency Fd-53;

2) Anti-sway variable frequency Fd-65 "hundreds digit" = 0;

■ **Automatic measurement of anti-sway rope length/radius**

1. Wiring method for automatic rope length measurement with an encoder



2. Steps for measuring rope length with an encoder

1) When measuring the rope length, the crane shall be in an unloaded hook state;

2) Enter the maximum rope length (i.e., the distance between the trolley position and the lower limit position of the hook in the vertical direction) into Fd-64;

3) Function code Fd-65=1 indicates that the rope length measurement with an encoder is enabled, and the handheld control box displays Ad.nEr. Raise the hook to the upper limit (if there is no upper/lower limit feedback DI signal, set the "thousands digit" of Fd-65 to 1 when the hook reaches the highest position). When the hook reaches the upper limit, the handheld control box displays Ad.FAr. Then lower the hook to the lower limit (if there is no upper/lower limit feedback DI signal, set the "ten-thousands digit" of Fd-65 to 1 when the hook reaches the lowest position). Once the hook reaches the lower limit, the handheld control box display returns to normal, indicating that the rope length self-tuning is complete;

4) Cumulative error elimination: During operation, when the upper limit is triggered or when the hook is at the upper lifting limit, changing the thousands digit of function code Fd-65 to 1 will eliminate the accumulated daily errors;

3. Steps for measuring radius with an encoder

1) When measuring the radius, the crane shall be in an unloaded hook state;

2) Enter the maximum radius (the distance from the initial limit to the end limit) into Fd-64;

3) Function code Fd-65=1 indicates that the encoder is enabled to measure the radius, and the handheld box displays Ad.nEr. Move the trolley to the start limit (if there is no horizontal start/end limit feedback DI signal, set the "thousands place" of Fd-65=1 when the hook reaches the start limit). When the trolley reaches the start limit, the handheld box displays Ad.FAr, then move to the end limit (if there is no horizontal start/end limit feedback DI signal, set the "thousands place" of Fd-65=1 when the hook reaches the end limit). When the trolley reaches the end limit, the handheld box display returns to normal, indicating that the radius self-tuning is complete;

4) Cumulative error elimination: During operation, when the initial limit is triggered or when the hook is at the rotation start limit, changing the thousands digit of function code Fd-65 to 1 will eliminate the accumulated daily errors;

Note: If the rope length/radius measurement is unsuccessful, set Fd-65=2 to disable the rope length/radius self-learning function, then set Fd-65=1 to restart the rope length/radius self-tuning process.

5.9.4 Anti-sway Type Selection

If translation anti-sway translation is selected (Fd-50 "hundreds digit"=0)

1) Enter the trolley linear speed at rated frequency into Fd-54;

2) Enter the fixed rope length between the hook and the load center into Fd-56;

3) Enter the maximum rope length into Fd-64;

If rotation anti-sway is selected (Fd-50 "hundreds digit"=1)

1) Enter the rotation angular velocity at rated frequency in Fd-55;

2) Enter the fixed radius from the rotation center to the initial limit in Fd-57;

3) Enter the maximum radius in Fd-64;

The anti-sway function will be achieved once the above operations are completed.

■ **Related function parameters**

Function code	Name	Description and unit value	Default value
Fd-50	Anti-sway enable and mode selection	**Units digit: Anti-sway function enable** 0: Off 1: On **Tens digit: Anti-sway mode selection** 1: Mode I 2: Mode II 3: Mode III 4: Mode IV 5: Mode V **Hundreds digit: Select translation or rotation anti-sway** 0: Translation anti-sway 1: Rotation anti-sway	000
Fd-51	Gravitational acceleration	Minimum unit: 0.001m/s^2	9.800m/s^2
Fd-52	Vertical rope length	Minimum unit: 0.001m	7.000m
Fd-53	Rotation radius	Minimum unit: 0.001m	5.000m
Fd-54	Translation linear velocity	Translation linear velocity at rated frequency	1.000m/s
Fd-55	Rotation angular velocity	Rotation angular velocity at rated frequency 0.001rad/s	0.500rad/s
Fd-56	Fixed rope length	Minimum unit: 0.001m	1.000m
Fd-57	Fixed radius	Minimum unit: 0.001m	1.000m
Fd-58	Damping value	Display range: 0~65535	13
Fd-59	Acceleration factor	Translation/rotation acceleration coefficient at rated frequency	800
Fd-60	The high 16 bits of the encoder pulse count recorded during power loss	Display range: -32767~32767	0
Fd-61	The low 16 bits of the encoder pulse count recorded during power loss	Display range: -32767~32767	0
Fd-62	The high 16 bits of the encoder pulse count recorded during rope length self-learning	Display range: -32767~32767	0
Fd-63	The low 16 bits of the encoder pulse count recorded during rope length self-learning	Display range: -32767~32767	0
Fd-64	Maximum rope length or radius	The user sets the maximum vertical rope length and rotation radius with a minimum unit of 0.001m	10.000m
Fd-65	Rope length/radius self-learning enable	**Rope length/radius self-learning enable** Units digit: 0: No action 1: Enable rope length self-learning 2: Forced stop of rope length self-learning process or forced clearing of self-learning results	00000

		Tens digit: Rope length source 0: Use Fd-52 1: Automatically measure rope length 2: Use AI1 to receive rope length 3: Use AI2 to receive rope length Hundreds digit: Radius source 0: Use Fd-53 1: Automatically measure rope length 2: Use AI1 to receive rope length 3: Use AI2 to receive rope length Thousands digit: Manual rope length auto-learning or correction of manual upper limit signal Ten-thousands digit: Manual rope length auto-learning or correction of manual lower limit signal	

5.10 Brake failure protection

■ Function Overview

This function operates under vector control conditions, detecting the encoder's rotation angle during shutdown. If the detected rotation angle exceeds the limit value without a run command, it is determined as brake failure. The frequency converter immediately outputs a protection frequency to prevent load dropping, with the T2 relay outputting a fault signal and the panel displaying the AL.SA0 alarm.

■ Function realization

1) This function requires the use of an encoder; first, check whether the encoder settings are correct and test-run the encoder to ensure it can measure speed normally (FU-38);

2) When F8-10> 0, it indicates that this function is enabled;

3) Adjust F8-10 and F8-11 to set the trigger threshold and handling measures for brake failure protection;

4) If the detected encoder rotation angle exceeds the F8-10 brake failure protection angle threshold, the frequency converter will operate at the frequency set in F8-11, the T2 relay will close, and the panel will display the AL.SA0 alarm;

■ Related function parameters

Function code	Name	Set value	Unit
F4-68	PG pulse number per revolution	Encoder determination	-
F4-69	PG type	Encoder determination	-
F4-70	PG direction selection	Encoder determination	-
F5-04	T2 relay output function	5	-
FU-38	PG detection frequency	-	0.1Hz
F8-10	Brake failure protection angle	60°	1°
F8-11	Brake failure protection frequency	0.00Hz	0.01Hz

5.11 Stall Protection Function

■ **Function Overview**

For cranes, the brake is needed to control the release and engagement of the brake. Sometimes, if the brake fails to release, it can cause the motor to stall, generating extremely high current that leads to motor overheating and damage. Therefore, the stall protection function shall be set up. When F8-08≠0, this function is activated. If the frequency converter detects that the encoder speed is lower than the F8-09 motor stall protection frequency and the duration exceeds F8-08, it will report a stall fault Er.SP0 and shut down.

■ **Function realization**

1) This function requires the control method to be vector control;

2) This function requires the use of an encoder; first, check whether the encoder settings are correct and test-run the encoder to ensure it can measure speed normally (FU-38);

3) When F8-08> 0, it indicates that this function is enabled;

4) Adjust F8-08 and F8-09 to set the trigger threshold for stall protection;

5) If the detected encoder speed is lower than the F8-09 motor stall protection frequency and the duration exceeds F8-08, a stall fault Er.SP0 will be reported;

6) The shutdown method for this fault can be selected via F8-15;

■ **Related function parameters**

Function code	Name	Set value	Unit
F4-68	PG pulse number per revolution	Encoder determination	-
F4-69	PG type	Encoder determination	-
F4-70	PG direction selection	Encoder determination	-
FU-38	PG detection frequency	-	0.1Hz
F8-08	Motor stall protection time	2000ms	1ms
F8-09	Motor stall protection frequency	3.00Hz	0.01Hz
F8-15	Fault stop selection	11111	-

5.12 Overload protection

■ **Function Overview**

This function provides protection when the load is too heavy, preventing the motor from operating under overload conditions for extended periods, which may reduce the motor's service life or cause damage. When the given torque exceeds the set value F8-13, the overload protection is activated, and the frequency converter reports an Er.SP1 overload fault and shuts down.

■ **Function realization**

1) This function requires the control method to be vector control;

2) This function only takes effect when the operating frequency is greater than 10Hz;

3) When F8-13> 0, it indicates that this function is enabled;

4) If the given torque exceeds the torque limit, the frequency converter will first shut down and then report the Er.SP1 overload fault;

5) The shutdown method for this fault can be selected via F8-15;

6) After the function is triggered, reset it on the operation panel, at which point upward movement is not possible;

7) After resetting on the operation panel, downward movement is required to complete the reset;

■ **Related function parameters**

Function code	Name	Set value	Unit
F8-13	Overload protection torque limit value	120.0%	0.1%
F8-15	Fault stop selection	11111	-
FU-10	Given torque	-	-

5.13 Brake torque detection

■ **Function Overview**

The brake is a crucial device for cranes. After prolonged use, the brake torque may become insufficient, leading to hook slippage. Brake torque detection refers to that the frequency converter directly outputs a sufficiently large torque during shutdown to determine whether the motor rotates based on the encoder feedback angle, thereby assessing whether the brake torque is adequate. This function provides an on-site warning for insufficient brake torque, alerting personnel to adjust the brake torque or replace the brake.

■ **Function realization**

1) This function requires the control method to be vector control;

2) When F8-14> 0, it indicates that this function is enabled and the frequency converter immediately outputs the set torque;

3) If the encoder feedback indicates motor rotation and the output torque exceeds 60%, the frequency converter will report an Er.SP2 brake torque detection fault and shut down according to the method selected in F8-15;

■ **Related function parameters**

Function code	Name	Set value	Unit
F8-14	Brake torque detection torque percentage	120.0%	0.1%
F4-68	PG pulse number per revolution	Encoder determination	-
F4-69	PG type	Encoder determination	-
F4-70	PG direction selection	Encoder determination	-
FU-38	PG detection frequency	-	0.1Hz
F8-15	Fault stop selection	11111	-

5.14 Fault shutdown mode selection

■ **Function Overview**

Because improper handling of the shutdown method for cranes can lead to hook slippage, which is extremely dangerous, it is essential to design several shutdown method options for certain faults. This function provides two options for the shutdown method of certain faults, allowing customers to determine the appropriate choice based

on actual conditions.

■ **Function realization**

1) The function shall be used in accordance with actual conditions;

2) Customers shall select the shutdown method according to the following table;

■ **Precautions**

1) The shutdown selection for motor overload faults only takes effect when Fb-02=2;

2) The shutdown selection for motor overload faults only takes effect when the tens digit of Fb-03 is 2;

3) The shutdown selection for motor underload faults only takes effect when Fb-06=2;

4) The shutdown selection for motor analog input disconnection faults only takes effect when Fb-10=3;

5) The shutdown selection for input phase loss faults only takes effect when the units digit of Fb-12 is 2;

■ **Related function parameters**

Function code	Name	Setting description	Default value
F8-15	Fault stop selection 1	**Units digit: Stall protection fault** **Tens digit: Overload protection fault** **Hundreds digit: Brake torque detection fault** **Thousands digit: Frequency converter overload fault** **Ten-thousands digit: Motor overload fault** 0: Free stop 1: Deceleration stop	00000
F8-16	Fault stop selection 2	**Units digit: External fault** **Tens digit: Motor overload fault** **Hundreds digit: Motor underload fault** **Thousands digit: Analog input disconnection fault** **Ten-thousands digit: Input phase loss fault** 0: Free stop 1: Deceleration stop	00000

6 Function Parameter List

Notes:

Change: "○" means that both standby and operation state can be changed, "×" means that only the operation state cannot be changed, and "△" means read-only.

6.1 F0 basic parameters

Parameter	Name	Setting Range and Description	Factory default	Change
F0-00	Digital setting frequency	0.00Hz～F0-06 "maximum frequency"	50.00Hz	○
F0-01	Main given channel for normal operation	**Tens and units digit: Given channel 1** **Thousands and hundreds digit: Given channel 2** 0: F0-00 digital setting 1: COMM1 communication setpoint 2: COMM2 communication setpoint 3: AI1 4: AI2 5: AI3 6: AI4 7: UP/DOWN adjustment value 8: PFI	0300	○
F0-02	Run command channel selection	**Units digit: Command channel 1 selection** **Tens digit: Command channel 2 selection** 0: Operation panel 1: Virtual terminal 1 (FWD1/REV1) 2: Virtual terminal 2 (FWD2/REV2) 3: COMM1 control 4: COMM2 control	10	×
F0-06	Maximum frequency	F0-07~650.00Hz(V/F)/200.00Hz (vector control)	50.00Hz	×
F0-07	Upper limit frequency	F0-08 "lower limit frequency"~F0-06 "maximum frequency"	50.00Hz	×
F0-08	Lower limit frequency	0.00Hz~F0-07 "upper limit frequency"	0.00Hz	×
F0-09	Direction locking	0: Forward and reverse directions allowed 1: Forward direction locked 2: Reverse direction locked	0	○
F0-10	Parameter write protection	0: No protection, 1: Except for F0-00 and F7-04, 2: Full protection	0	○
F0-11	Parameter initialization	11: Initialization, 22: Initialization, except for communication parameters	00	×
F0-12	Motor control mode	0: Without PGV/F control 1: With PGV/F control 2: No PG vector control 3: With PG vector control 4: V/F separation control 5: With PG vector control 2	0	×
F0-13	Rated power of frequency converter	Minimum unit: 0.01kW	Model determination	△
F0-14	Software version	0.00~99.99	Version determination	△
F0-15	Selection of IO accessories	**Units digit: IO module** 0: No accessories 1: Digital I/O expansion board 1 2: Digital I/O expansion board 2 3: Digital I/O expansion board 3	000	×

		4: Analog I/O expansion board 1 **Tens digit: Communication module** 0: No accessories 1: Isolated RS485 communication expansion board 1 2: Isolated RS485 communication expansion board 2 (supports TCP) 3: Profibus-DP or PROFINET communication expansion board **Hundreds digit: PG card** 0: No accessories 1: Encoder expansion board		

The models for digital I/O expansion board 1 include SL510-DIO1 and SL530-DIO1; The models for digital I/O expansion board 2 include SL510-DIO2 and SL530-DIO2; The models for digital I/O expansion board 3 include SL510-DIO3; The models for analog I/O expansion board 1 includes SL510-AIO1 and SL530-AIO1.

The models for isolated RS485 communication expansion board 1 include SL510-COMM1 and SL530-COMM1; The models for isolated RS485 communication expansion board 2 (supports TCP) include SL510-COMM2 and SL530-COMM2; The models for Profibus-DP or PROFINET communication expansion board include SL510-DP, SL510-PN, and SL530-PN.

The models for encoder expansion board include SL510-PG0, SL530-PG0, and SL530-PG1.

See Chapter 9 for selection of IO accessories.

Parameter	Name	Setting Range and Description	Factory default	Change
F0-16	User password setting	0000~9999, 0000 indicates that no password is set	0000	○

After setting password, the password will take effect if no keys pressed within 2min. Under monitoring state, the password will take effect immediately if pressing ENTER+◁ at the same time.

Parameter	Name	Setting Range and Description	Factory default	Change
F0-17	Administrator password setting	0000~9999, 0000 indicates that no password is set	0000	○

After setting password, the password will take effect if no keys pressed within 2min. Under monitoring state, the password will take effect immediately if pressing ENTER+◁ at the same time.

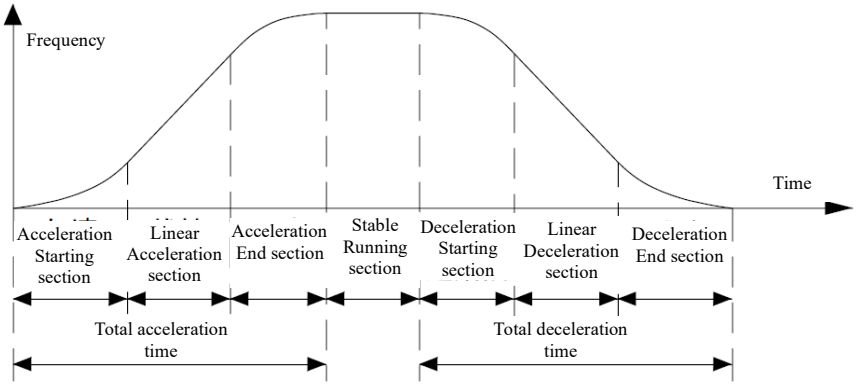
6.2 F1 acceleration & deceleration, start, stop and jog parameters

Parameter	Name	Setting Range and Description	Factory default	Change
F1-00	Acceleration time 1	0.01~3600.0s Acceleration time: the time required to increase the frequency by 50Hz Deceleration time: the time required to reduce the frequency by 50Hz Note: 22kW and below models are set to be 6.0s when delivering 30kW and above models are set to be 20.0s when delivering Note: The minimum unit is determined by F1-16	Model determination	○
F1-01	Deceleration time 1			
F1-02	Acceleration time 2			
F1-03	Deceleration time 2			
F1-04	Acceleration time 3			
F1-05	Deceleration time 3			
F1-06	Acceleration time 4			
F1-07	Deceleration time 4			
F1-08	Acceleration time 5			
F1-09	Deceleration time 5			
F1-10	Acceleration time 6			
F1-11	Deceleration time 6			
F1-12	Acceleration time 7			
F1-13	Deceleration time 7			
F1-14	Acceleration time 8			
F1-15	Deceleration time 8			
F1-16	Minimum unit of acceleration and deceleration time	0: 0.01s 1: 0.1s	1	○
F1-17	Automatic acceleration/deceleration time switching point	0.00~650.00Hz, below this point is the acceleration/deceleration time 8	0.00Hz	×
F1-18	Emergency shutdown deceleration time	0.01~3600.0s, the minimum unit is determined by F1-16	10.0s	○
F1-19	Starting method	0: Start from the starting frequency 1: First DC braking and then starting from the starting frequency 2: Speed tracking start	0	×
F1-20	Starting frequency	0.00~60.00Hz	0.50Hz	○
F1-21	Starting frequency retention time	0.0~60.0s	0.0s	○
F1-22	Voltage soft start	0: Invalid, 1: Valid	1	×
F1-23	Starting DC braking time	0.0~60.0s	0.0s	○
F1-24	Starting DC braking current	0.0~100.0%, the rated current of the frequency converter is 100%	0.0%	○
F1-25	Shutdown method	0: Deceleration stop, 1: Free stop 2: Deceleration + DC braking/pre-excitation maintenance during shutdown 3: Deceleration + closing delay	0	○
F1-26	Shutdown/DC braking/pre-excitation maintenance frequency during shutdown	0.00~60.00Hz	0.50Hz	○
F1-27	Shutdown/DC braking/waiting time for pre-excitation maintenance during shutdown	0.00~10.00s	0.00s	○
F1-28	Shutdown/DC braking/pre-excitation maintenance time during	0.0～60.0s, as closing delay time at stop	0.0s	○

	shutdown			
F1-29	Stop DC braking current	0.0~100.0%, the rated current of the frequency converter is 100%	0.0%	○
F1-30	Zero speed delay time	0.0~60.0s	0.0s	○
F1-31	Selection of acceleration and deceleration modes	0: Linear acceleration & deceleration, 1: S curve acceleration & deceleration	0	×
F1-32	S curve acceleration start time	0.01~10.00s	0.20s	×
F1-33	S curve acceleration end time			
F1-34	S curve deceleration start time	0.01~10.00s	0.20s	×
F1-35	S curve deceleration end time			

S curve acceleration/deceleration function: During acceleration/deceleration, the gradual acceleration is gradual and speed change is smooth, which can enhance the comfort degree of elevator when operating, prevent objects from tipping on the conveying equipment and reduce the impact on machinery when starting and stopping.

After setting S curve time, the total acceleration/deceleration time is extended as shown below:



The total acceleration/deceleration time is calculated according to formula below:

Total acceleration/deceleration time=acceleration/deceleration time without S curve+(time of initial section+time of ending section)÷2

However, if the total acceleration/deceleration time calculated in the above formula is less than the sum of the initial section and ending section, then:

Total acceleration/deceleration time=time of initial section+time of ending section

The S-curve function is automatically invalid when the automatic acceleration/deceleration time switching function is valid (F1-17 "automatic acceleration/deceleration time switching point" ≠0).

Parameter	Name	Setting Range and Description	Factory default	Change
F1-36	Forward and reverse rotation dead time	0.0~3600.0s	0.0s	×
F1-37	Jog running frequency	0.10~50.00Hz	5.00Hz	○
F1-38	Jog acceleration time	0.1~60.0s	Model	○

			determination	
F1-39	Jog deceleration time	0.1~60.0s	Model determination	○

Under terminal control and in standby mode, digital inputs 14 "forward jog operation command" and 15 "reverse jog operation command" can achieve jog operation; when both signals are simultaneously active or simultaneously inactive, the jog operation is invalid.

Auxiliary setting and PID frequency correction are invalid during jog operation.

The start and stop mode of jog operation is set to be starting from starting frequency and stop by means of deceleration stop.

When the hundreds place of FC-01 "key function and automatic lock"=1 and current running command channel is operation panel, the operation panel can be used for jog operation (only unidirectional jog operation can be achieved via the operation panel).

6.3 F2V/F Control Parameters

Parameter	Name	Setting Range and Description	Factory default	Change
F2-00	V/F curve settings	0: Custom 1: Linear, 2: Reduced torque V/F curve 1 3: Reduced torque V/F curve 2, 4: Reduced torque V/F curve 3 5: Reduced torque V/F curve 4, 6: Reduced torque V/F curve 5	1	×
F2-01	Torque boost selection	0: None, 1: Manual boost 2: Automatic boost 3: Manual boost + automatic boost	1	×
F2-02	Manual torque boost amplitude	0.0%~ maximum value determined by model, the minimum unit is 0.1%	Model determination	○
F2-03	Manual torque boost end point	0.0%~100.0%, taking F2-12 as 100%	50.0%	○
F2-04	Automatic torque boost degree	0.0~100.0%	80.0%	×
F2-05	Slip compensation gain	0.0~300.0%	0.0%	○
F2-06	Slip compensation filtering time	0.1~25.0s	1.0s	×
F2-07	Electric slip compensation amplitude limiting	0~250%, taking the motor rated slip frequency as 100%	200%	×
F2-08	Regenerative slip compensation amplitude limiting	0~250%, taking the motor rated slip frequency as 100%	200%	×
F2-09	Vibration damping	0~200	Model determination	○
F2-10	AVR function settings	0: Invalid, 1: Always valid, 2: Invalid only when decelerating	1	×
F2-11	Automatic energy saving operation selection	0: Invalid, 1: Valid	0	○
F2-12	Fundamental frequency	1.00~650.00 Hz	50.00Hz	×
F2-13	Maximum output voltage	150~500V	380V	×
F2-14	V/F frequency value F4	F2-16~F2-12	0.00Hz	×
F2-15	V/F voltage value	F2-17~100.0%, taking F2-13 as 100%	0.0%	×

	V4			
F2-16	V/F frequency value F3	F2-18~F2-14	0.00Hz	×
F2-17	V/F voltage value V3	F2-19~F2-15, taking F2-13 as 100%	0.0%	×
F2-18	V/F frequency value F2	F2-20~F2-16	0.00Hz	×
F2-19	V/F voltage value V2	F2-21~F2-17, taking F2-13 as 100%	0.0%	×
F2-20	V/F frequency value F1	0.00Hz~F2-18	0.00Hz	×
F2-21	V/F voltage value V1	0.0%~F2-19, taking F2-13 as 100%	0.0%	×
F2-22	V/F separation voltage input selection	0: F2-23 1: |AI1| 2: |AI2| 3: |AI3| 4: |AI4| 5: |UP/DOWN regulation value | 6: |PFI| 7: |Arithmetic unit 1| 8: |Arithmetic unit 2| 9: |Arithmetic unit 3| 10: |Arithmetic unit 4|	0	×
F2-23	V/F separation voltage digital settings	0.0~100.0%	100.0%	○
F2-24	V/F voltage coefficient	0: 100.0% 1: |AI1| 2: |AI2| 3: |AI3| 4: |AI4| 5: |UP/DOWN regulation value | 6: |PFI| 7: |Arithmetic unit 1| 8: |Arithmetic unit 2| 9: |Arithmetic unit 3| 10: |Arithmetic unit 4|	0	×

6.4 F3 Speed, Torque and Flux Control Parameters

Parameter	Name	Setting Range and Description	Factory default	Change
F3-00	High-speed ASR proportional gain	0.00~200.00	5.00	×
F3-01	High-speed ASR integration time	0.010~30.000s	1.000s	×
F3-02	Low-speed ASR proportional gain	0.00~200.00	10.00	×
F3-03	Low-speed ASR integration time	0.010~30.000s	0.500s	×
F3-04	ASR parameter switching point	0.00~650.00Hz	5.00Hz	×
F3-05	ASR filtering time	0.000~2.000s	0.010s	×
F3-06	Acceleration compensation differential time	0.000~20.000s	0.000s	×
F3-07	Torque limitation selection	0: Determined by F3-08, F3-09 1: |AI1|×2.5 2: |AI2|×2.5 3: |AI3|×2.5 4: |AI4|×2.5 5: |Arithmetic unit 1|×2.5 6: |Arithmetic unit 2|×2.5 7: |Arithmetic unit 3|×2.5 8: |Arithmetic unit 4|×2.5	0	×
F3-08	Electric torque limitation	0.0%~290.0%, taking the motor rated torque as 100%	180.0%	×
F3-09	Regenerative torque limitation	Note: for vector control only	180.0%	×
F3-10	ASR output	0.0%~20.0%, only for these with PGV/F	10.0%	×

	frequency limitation	control		
F3-11	Sag	0.00~50.00Hz	0.00Hz	○
F3-12	Sag starting torque	0.0%~100.0%, taking the motor rated torque as 100%	0.0%	○
F3-13	Torque control selection	0: Digital input 48 selection 1: Valid all the time	0	×
F3-14	Torque given selection	0:F3-15 setting 1:AI1×2.5 2: AI2×2.5 3: AI3×2.5 4: AI4×2.5 5: PFI×2.5 6: UP/DOWN regulating value×2.5 7: Arithmetic unit 1×2.5 8: Arithmetic unit 2×2.5 9: Arithmetic unit 3×2.5 10: Arithmetic unit 4×2.5	0	×
F3-15	Digital torque setting	-290.0%~290.0%, taking the motor rated torque as 100%	0.0%	○
F3-16	Torque control speed limit selection	0: Determination of given frequency 1: Determination of F3-17 and F3-18	0	○
F3-17	Forward limit of torque control speed	0.00Hz~F0-07 "upper limit frequency"	5.00Hz	○
F3-18	Inverse limit of torque control speed	0.00Hz~F0-07 "upper limit frequency"	5.00Hz	○
F3-19	Torque given increase or decrease time	0.000~10.000s	0.020s	×
F3-20	Speed/torque control switching delay time	0.001~1.000s	0.050s	×
F3-21	Pre-excitation time	0.10~5.00s	Model determination	×
F3-22	Magnetic flux intensity	50.0~150.0%	94.0%	×
F3-23	Low-speed flux lifting	0~50%	0%	×
F3-24	Weak magnetic regulator integration time	0.100~3.000s	0.150s	×
F3-25	Electric power limit	0.0~250.0%, taking the rated power of the frequency converter as 100%	120.0%	×
F3-26	Regenerative power limit	0.0~250.0%, taking the rated power of the frequency converter as 100%	120.0%	×
F3-27~ F3-60	Reserved		-	-
F3-61	Feed-forward switch	0: Off 1: On	0	×
F3-62	Feed-forward value	It represents the percentage of the motor's rated torque. Minimum unit: 0.1%, Range: 0~100.0%	30%	×
F3-63	Feed-forward attenuation coefficient	0~100.0%	99.8%	×
F3-64	Feed-forward	0: Forward 1: Reverse	0	×

	direction			
F3-65	Demagnetization time	Minimum unit: 0.001s	Model determination	○

6.5 F4 Digital Input Terminal and Multi-stage Speed

Parameter	Name	Setting Range and Description		Factory default	Change
F4-00	DI1 digital input terminal function	0: Not connected to the following signals 1. Multi-stage frequency selection 1 2: Multi-stage frequency selection 2 3: Multi-stage frequency selection 3 4: Multi-stage frequency selection 4 5: Multi-stage frequency selection 5 6: Multi-stage frequency selection 6 7: Multi-stage frequency selection 7 8: Multi-stage frequency selection 8 9: Acceleration/deceleration time selection 1 10: Acceleration / deceleration time selection 2 11: Acceleration/deceleration time selection 3 12: External fault input 13: Fault reset 14: Forward jog operation 15: Reverse jog operation 16: Emergency shutdown 17: Frequency converter operation prohibited 18: Free shutdown 19~21: Reserved 22: Forward limit 23: Reverse limit 24: Deceleration limit	25~31: Reserved 32: Auxiliary given channel forbidden 33: Operation interruption 34~37: Reserved 38: Internal virtual FWD1 terminal 39: Internal virtual REV1 terminal 40: Internal virtual FWD2 terminal 41: Internal virtual REV2 terminal 42: Run command channel 1/2 switch 43: Reserved 44: Main given frequency channel switching 45: Simultaneous switching of main given frequency channel and run command channel 46: Acceleration & deceleration prohibited 47: Analog quantity given frequency retention 48: Speed/torque control selection 49~57: Reserved 58: Total fan running time reset 59: Reserved 60: Motor changeover switch 1 61: Motor changeover switch 2 62: Reserved 63: Closing confirmation signal 64~68: Reserved 69: Anti-sway control prohibited	38	×
F4-01	DI2 digital input terminal function			39	
F4-02	DI3 digital input terminal function			1	
F4-03	DI4 digital input terminal function			2	
F4-04	DI5 digital input terminal function			13	

Multi-stage speed selection:

F4-19=0 "code selection": Use binary coding of multi-stage frequency selections 1~5 to select multi-stage frequencies 1~31. For example: DI1~DI5 are respectively set to be "multi-stage frequency selection 1~5", then the corresponding coding selection relation is shown below. In the table, "0" refers to invalid case, and "1" refers to valid case:

DI5	DI4	DI3	DI2	DI1	Selection result	DI5	DI4	DI3	DI2	DI1	Selection result
0	0	0	0	0	Given frequency for normal operation	1	0	0	0	0	F4-35 multi-stage frequency 16
0	0	0	0	1	F4-20 multi-stage frequency 1	1	0	0	0	1	F4-36 multi-stage frequency 17
0	0	0	1	0	F4-21 multi-stage	1	0	0	1	0	F4-37 multi-stage

					frequency 2						frequency 18
0	0	0	1	1	F4-22 multi-stage frequency 3	1	0	0	1	1	F4-38 multi-stage frequency 19
0	0	1	0	0	F4-23 multi-stage frequency 4	1	0	1	0	0	F4-39 multi-stage frequency 20
0	0	1	0	1	F4-24 multi-stage frequency 5	1	0	1	0	1	F4-40 multi-stage frequency 21
0	0	1	1	0	F4-25 multi-stage frequency 6	1	0	1	1	0	F4-41 multi-stage frequency 22
0	0	1	1	1	F4-26 multi-stage frequency 7	1	0	1	1	1	F4-42 multi-stage frequency 23
0	1	0	0	0	F4-27 multi-stage frequency 8	1	1	0	0	0	F4-43 multi-stage frequency 24
0	1	0	0	1	F4-28 multi-stage frequency 9	1	1	0	0	1	F4-44 multi-stage frequency 25
0	1	0	1	0	F4-29 multi-stage frequency 10	1	1	0	1	0	F4-45 multi-stage frequency 26
0	1	0	1	1	F4-30 multi-stage frequency 11	1	1	0	1	1	F4-46 multi-stage frequency 27
0	1	1	0	0	F4-31 multi-stage frequency 12	1	1	1	0	0	F4-47 multi-stage frequency 28
0	1	1	0	1	F4-32 multi-stage frequency 13	1	1	1	0	1	F4-48 multi-stage frequency 29
0	1	1	1	0	F4-33 multi-stage frequency 14	1	1	1	1	0	F4-49 multi-stage frequency 30
0	1	1	1	1	F4-34 multi-stage frequency 15	1	1	1	1	1	F4-50 multi-stage frequency 31

F4-19=1 "direct selection": "Multi-stage frequency selection 1"~"multi-stage frequency selection 8" directly correspond to "multi-stage frequency 1"~"multi-stage frequency 8". When multiple selection signals are valid, the selection signal with the smaller number is valid. For example: If DI1∽DI8① are respectively set to be "multi-stage frequency selection 1"~"multi-stage frequency selection 8", the corresponding relationship is shown in the table below, in which, "0" refers to invalid case, "1" refers to valid case and "-" refers to any state:

DI8	DI7	DI6	DI5	DI4	DI3	DI2	DI1	Selection result
0	0	0	0	0	0	0	0	Given frequency for normal operation
-	-	-	-	-	-	-	1	F4-20 multi-stage frequency 1
-	-	-	-	-	-	1	0	F4-21 multi-stage frequency 2
-	-	-	-	-	1	0	0	F4-22 multi-stage frequency 3
-	-	-	-	1	0	0	0	F4-23 multi-stage frequency 4
-	-	-	1	0	0	0	0	F4-24 multi-stage frequency 5
-	-	1	0	0	0	0	0	F4-25 multi-stage frequency 6
-	1	0	0	0	0	0	0	F4-26 multi-stage frequency 7
1	0	0	0	0	0	0	0	F4-27 multi-stage frequency 8

F4-19=2 "overlapping selection": The given frequency is the sum of all selected multi-stage frequencies (limited by upper and lower frequencies).

For example, if only "multi-stage frequency selection 1", "multi-stage frequency selection 3", and "multi-stage frequency selection 4" are valid, then: given frequency = multi-stage frequency 1 + multi-stage frequency 3 + multi-stage frequency 4

F4-19=3 "number selection": The number of valid signals among "multi-stage frequency selection 1"~"multi-stage frequency selection 8" determines that multi-stage frequency is selected for setting value. For example: if any 3 of them are valid, then given frequency=multi-stage frequency 3.

Acceleration/deceleration time selection:

If the encoder selects acceleration/deceleration time 1~8, and three of DI1~DI5 are set as "acceleration/deceleration time selection 1~3", then, the corresponding encoding selection relationship is shown in the table below, where "0" indicates invalid and "1" indicates valid:

Acceleration and deceleration time selection 3	Acceleration and deceleration time selection 2	Acceleration and deceleration time selection 1	Acceleration/Deceleration time selected
0	0	0	Acceleration/deceleration time 1 (F1-00, F1-01)
0	0	1	Acceleration/deceleration time 2 (F1-02, F1-03)
0	1	0	Acceleration/deceleration time 3 (F1-04, F1-05)
0	1	1	Acceleration/deceleration time 4 (F1-06, F1-07)
1	0	0	Acceleration/deceleration time 5 (F1-08, F1-09)
1	0	1	Acceleration/deceleration time 6 (F1-10, F1-11)
1	1	0	Acceleration/deceleration time 7 (F1-12, F1-13)
1	1	1	Acceleration/deceleration time 8 (F1-14, F1-15)
Note: Acceleration and deceleration time selection is invalid in case of jog operation and emergency shutdown			

Multi-motor switching:

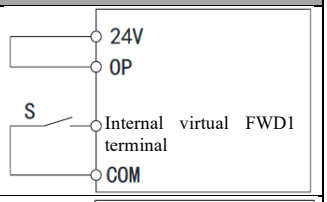
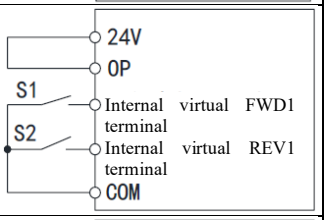
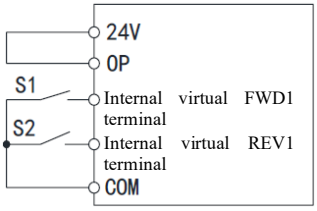
IF the encoder selects multi-motor switching 1~3, and two of DI1~DI5 are set as "motor switching switch 1~2", then the corresponding encoding selection relationship is shown in the table below, where "0" indicates invalid and "1" indicates valid:

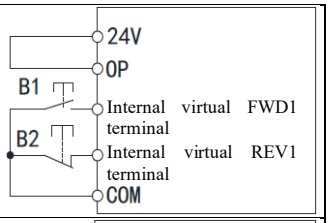
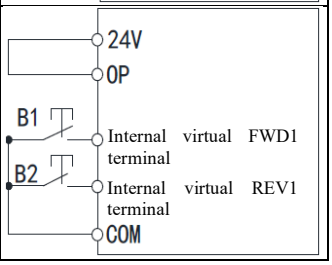
Motor changeover switch 2	Motor changeover switch 1	Selected motor No.
0	0	1# motor
0	1	2# motor
1	0	3# motor
1	1	3# motor

Parameter	Name	Setting Range and Description	Factory default	Change
F4-05	Positive and negative	**Ten-thousands digit: DI5 Thousands digit:**	00000	×

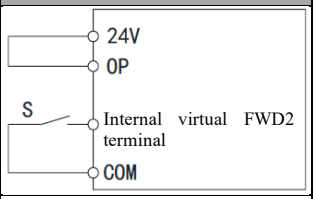
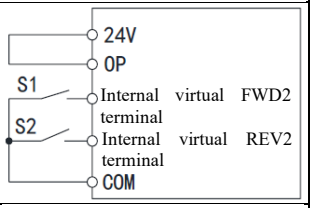
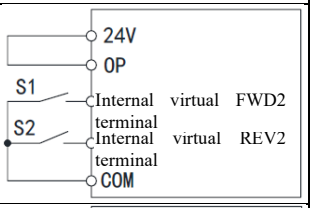
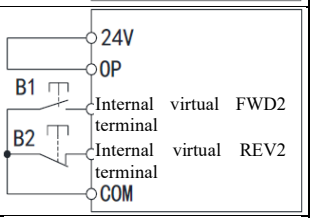
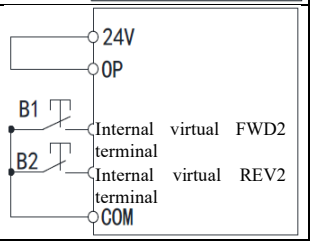
	logic 1 of input terminal	**DI4 Hundreds digit: DI3 Tens digit: DI2 Units digit: DI1** 0: Positive logic, valid if circuit is powered and invalid if circuit is not powered 1: Negative logic, invalid if circuit is powered and valid if circuit is not powered		
F4-06	Shake elimination time of digital input terminal	0~2000ms	10ms	○
F4-07	DI1 input delay	0.00~650.00s	0.00s	○
F4-08	DI1 disconnection delay		0.00s	○
F4-09	DI2 input delay		0.00s	○
F4-10	DI2 disconnection delay		0.00s	○
F4-11	DI3 input delay	0.00~650.00s	0.00s	○
F4-12	DI3 disconnection delay		0.00s	○
F4-13	FWD1/REV1 and FWD2/REV2 operation mode	**Tens digit: FWD2/REV2 operation mode (0~4)** **Units digit: FWD1/REV1 operation mode (0~4)** 0: Single-line type (start/stop) 1: Two-line type 1 (forward, reverse) 2: Two-line type 2 (start/stop, direction) 3: Two-line type 3 (start, stop) 4: Two-line type 4 (single-pulse start/stop)	01	×

The table below lists the logic and diagrams of various operating modes of FWD1/REV1. In the table, S stands for valid level. B is valid edge:

<table>
<tr><th>F4-13 units digit</th><th>Mode name</th><th colspan="3">Running logics</th><th>Diagram</th></tr>
<tr><td>0</td><td>Single-line type (start/stop)</td><td colspan="3">S: Running switch, run when valid
Note: The direction is determined by the direction of the given frequency</td><td> 
</td></tr>
<tr><td rowspan="5">1</td><td rowspan="5">Two-line type 1 (forward, reverse)</td><td>S2 (revere)</td><td>S1 (forward)</td><td>Meaning</td><td rowspan="5"> 
</td></tr>
<tr><td>Invalid</td><td>Invalid</td><td>Stop</td></tr>
<tr><td>Invalid</td><td>Valid</td><td>Forward</td></tr>
<tr><td>Valid</td><td>Invalid</td><td>Reverse</td></tr>
<tr><td>Valid</td><td>Valid</td><td>Stop</td></tr>
<tr><td rowspan="5">2</td><td rowspan="5">Two-line type 2 (start/stop, direction)</td><td>S2 (direction)</td><td>S1 (start/stop)</td><td>Meaning</td><td rowspan="5"> 
</td></tr>
<tr><td>Invalid</td><td>Invalid</td><td>Stop</td></tr>
<tr><td>Invalid</td><td>Valid</td><td>Forward</td></tr>
<tr><td>Valid</td><td>Invalid</td><td>Stop</td></tr>
<tr><td>Valid</td><td>Valid</td><td>Reverse</td></tr>
</table>

3	Two-line type 3 (start, stop)	B1: Run button (normally on) B2: Stop button (normally off) Note: The direction is determined by the direction of the given frequency	
4	Two-wire type 4 (single-pulse start/stop)	B1: Forward start/stop button (normally on) B2: Reverse start/stop button (normally on)	

The table below lists the logic and diagrams of various operating modes of FWD2/REV2. In the table, S stands for valid level. B is valid edge:

<table>
<tr><th>F4-13 tens digit</th><th>Mode name</th><th colspan="3">Running logics</th><th>Diagram</th></tr>
<tr><td>0</td><td>Single-line type (start/stop)</td><td colspan="3">S: Running switch, run when valid
Note: The direction is determined by the direction of the given frequency</td><td>  </td></tr>
<tr><td>1</td><td>Two-line type 1 (forward, reverse)</td><td>S2 (revere)</td><td>S1 (forward)</td><td>Meaning</td><td>  </td></tr>
<tr><td></td><td></td><td>Invalid</td><td>Invalid</td><td>Stop</td><td></td></tr>
<tr><td></td><td></td><td>Invalid</td><td>Valid</td><td>Forward</td><td></td></tr>
<tr><td></td><td></td><td>Valid</td><td>Invalid</td><td>Reverse</td><td></td></tr>
<tr><td></td><td></td><td>Valid</td><td>Valid</td><td>Stop</td><td></td></tr>
<tr><td>2</td><td>Two-line type 2 (start/stop, direction)</td><td>S2 (direction)</td><td>S1 (start/stop)</td><td>Meaning</td><td>  </td></tr>
<tr><td></td><td></td><td>Invalid</td><td>Invalid</td><td>Stop</td><td></td></tr>
<tr><td></td><td></td><td>Invalid</td><td>Valid</td><td>Forward</td><td></td></tr>
<tr><td></td><td></td><td>Valid</td><td>Invalid</td><td>Stop</td><td></td></tr>
<tr><td></td><td></td><td>Valid</td><td>Valid</td><td>Reverse</td><td></td></tr>
<tr><td>3</td><td>Two-line type 3 (start, stop)</td><td colspan="3">B1: Run button (normally on)
B2: Stop button (normally off)
Note: The direction is determined by the direction of the given frequency</td><td>  </td></tr>
<tr><td>4</td><td>Two-wire type 4 (single-pulse start/stop)</td><td colspan="3">B1: Forward start/stop button (normally on)
B2: Reverse start/stop button (normally on)</td><td>  </td></tr>
</table>

In terminal control mode, although single-line or two-line operation mode 1 and 2 are of level valid, it is necessary to restart by giving the stop signal before operation signal when

frequency converter stops due to the stop command generated by other sources.

For two-line 3 operation mode, the running button is invalid when the normally-off stop button is turned off.

Even if the running mode determines the operation direction, it is still limited by the direction locking.

If the terminal command has no direction information, the operation direction shall be determined by the state (positive and negative) of given frequency channels.

Danger: When the running signal exists and Fb-26 "power-on self-start permit" = 1 (default value), the frequency converter will start automatically when it is powered on.

Parameter	Name	Setting Range and Description	Factory default	Change
F4-14~ F4-18	Reserved	-	-	-
F4-19	Multi-stage speed selection	0: Code selection, 1: Direct selection 2: Overlapping mode, 3: Number selection	0	×
F4-20~ F4-67	Multi-stage frequency 1~48	0.00~650.00Hz The factory defaults of multi-stage frequency 1 ~ multi-stage frequency 48 are the multi-stage frequency numbers, for example: the multi-stage frequency 3 factory default value is 3.00 Hz	n.00Hz (n=1~48)	○
F4-68	PG pulse number per revolution	1~8192	Encoder determination	×
F4-69	PG type	0: Quadrature encoder, 1: Single channel encoder	Encoder determination	×
F4-70	PG direction selection	0: Positive 1: Negative	Encoder determination	×
F4-71	PG disconnection action	0: No action, 1: Alarm, 2: Fault and free stop	2	×
F4-72	PG disconnection detection time	0.1~10.0s	1.0s	×
F4-73	PG gear ratio denominator setting	1~1000	1	×
F4-74	PG gear ratio molecular setting	1~1000	1	×
F4-75	PG speed measurement filtering time	0.000~2.000s	0.005s	○
F4-76	DI6 digital input terminal function	Same as DI1~DI5	0	×
F4-77	DI7 digital input terminal function		0	×
F4-78	DI8 digital input terminal function		0	×
F4-79	DI9 digital input terminal function		0	×
F4-80	DI10 digital input terminal function		0	×
F4-81	Positive and negative logic 2 of input terminal	**Ten-thousands digit: DI10 Thousands digit: DI9 Hundreds digit: DI8 Tens digit: DI7 Units digit: DI6** 0: Positive logic, valid if circuit is	00000	×

		powered and invalid if circuit is not powered 1: Negative logic, invalid if circuit is powered and valid if circuit is not powered		

Note: DI6–DI10 are extended digital terminal inputs, which require configuration of an expansion board and setting of parameter F0-15

6.6 F5 digital output and relay output settings

Parameter	Name	Setting Range and Description		Factory default	Change
F5-00	Digital output terminal signal type selection	**DO2 output selection** 0: Digital output 1: Pulse frequency output (PFO)		00000	×
F5-01	DO1 digital output terminal function	0: Frequency converter ready for operation 1: Frequency converter in running 2: Frequency arrival 3: Frequency level detection signal 1 4: Frequency level detection signal 2 5: Fault output 6: Reserved 7: Motor overload 8: Motor overload 9: Motor underload 10: Undervoltage lockout 11: External fault shutdown 12: Fault self-resetting 13: Instant power failure and power-on action	14: Alarm output 15: In reverse operation 16: During stop process 17: Operation interruption status 18: In operation panel control 19: Torque limiting 20: Limited by frequency upper limit 21: Limited by frequency lower limit 22: In power generation operation 23-55: Reserved 56: A (encoder A channel) 57: B (encoder B channel) 58: PFI terminal state 59: Motor virtual loop count pulse 60~72: Reserved 73: Fan life expectancy reached 74: Hoisting closing signal 75: Translation/rotation closing brake signal	1	×
F5-02	DO2 digital output terminal function			2	
F5-03	T1 relay output function			74	
F5-04	T2 relay output function			5	

The digital output function is detailed as follows:

0: Frequency converter ready for operation. The charging contactor has been closed and free from faults.

1: Frequency converter in operation. When the frequency converter is running.

2: Frequency arrival. It is effective when the operation frequency of the frequency converter is within the positive and negative detection width of the given frequency.

3~4: Frequency level detection signal 1, 2. Refer to the explanation in F5-15~F5-18.

5: Fault output. If the frequency converter is in the fault state, there will be effective signal output.

7: Heavy motor load. The signal is valid when the frequency converter detects heavy motor load.

8: Motor overload. The signal is valid in case of motor overload.

9: Motor underload. The signal is valid in case of motor underload.

10: Undervoltage lockout. This signal is effective when the DC bus undervoltage results in stop.

11: External fault shutdown. The signal is valid in case of stop due to external fault. The signal is invalid once the external fault is reset.

12: Fault self-resetting. This signal is effective in the event of a failure and when waiting for the frequency converter to reset by itself.

13: Instant power failure and power-on action. The signal is effective when the main circuit is undervoltage and waiting for restart.

14: Alarm output. This signal is effective when the frequency converter alarms.

15: In reverse operation. This signal is effective when the frequency converter is running in reverse.

16: During stop process. This signal is valid when the frequency converter decelerates for stop.

17: Operation interruption status. The signal is valid when the frequency converter is interrupted from operation.

18: In operation panel control. This signal is valid when the running command channel is the operation panel.

19: Torque limiting. The signal is valid when the torque reaches limiting value.

20: Limited by frequency upper limit. Set frequency ≥ upper frequency, and the signal is valid when the operating frequency reaches the upper limit frequency.

21: Limited by frequency lower limit. When the set frequency is ≤ the lower frequency limit and the operating frequency reaches the lower limit frequency limit, the signal is valid.

22: In power generation operation. The frequency converter is under power generation state.

56, 57: Encoder channel A and B. Input state of encoder channel A and B can be used as high-speed input of counter and length counter.

58: PFI terminal state. It can be used as high-speed input of counter and length counter.

59: Motor virtual loop count pulse. A pulse signal with a 50% duty cycle can be connected to a counter for diameter calculation during winding control.

73: Fan life expectancy reached. Error! Bookmark not defined. See the description on life expectancy settings of fan.

74: Hoisting closing signal. Provide the closing/opening signal to the lifting mechanism, as detailed in Section 5.2.

75: Translation/rotation closing brake signal. Provide the closing/opening signal to the translation/rotation mechanism.

Parameter	Name	Setting Range and Description	Factory default	Change
F5-05	DO1 and DO2 terminal output positive and negative logic	**Tens digit: DO2 Units digit: DO1** 0: Positive logic, valid connection, invalid disconnection 1: Negative logic, valid disconnection, invalid connection	00	×
F5-06	DO1 terminal closing delay	0.00650.00s	0.00s	○
F5-07	DO1 terminal opening delay		0.00s	
F5-08	DO2 terminal closing delay		0.00s	
F5-09	DO2 terminal opening delay		0.00s	
F5-10	T1 terminal closing delay	0.00650.00s	0.00s	○
F5-11	T1 terminal opening delay		0.00s	
F5-12	T2 terminal closing delay		0.00s	
F5-13	T2 terminal opening delay		0.00s	
F5-14	Frequency arrival detection width	0.00~650.00Hz	2.50Hz	○
F5-15	Frequency level detection value 1	0.00~650.00Hz	50.00Hz	○
F5-16	Frequency level detection hysteresis value 1	0.00~650.00Hz	1.00Hz	○
F5-17	Frequency level detection value 2	0.00~650.00Hz	25.00Hz	○
F5-18	Frequency level detection hysteresis value 2	0.00~650.00Hz	1.00Hz	○
F5-19	T3 relay output function	The same as the function of T1 and T2	5	×
F5-20	T4 relay output function		5	
F5-21	T5 relay output function		5	
F5-22	T6 relay output function		5	
F5-23	T3 terminal closing delay	0.00~650.00s	0.00s	○
F5-24	T3 terminal opening delay		0.00s	
F5-25	T4 terminal closing delay		0.00s	
F5-26	T4 terminal opening delay		0.00s	
F5-27	T5 terminal closing delay		0.00s	

F5-28	T5 terminal opening delay		0.00s	
F5-29	T6 terminal closing delay		0.00s	
F5-30	T6 terminal opening delay		0.00s	

6.7 F6 Analog Quantity and Pulse Frequency Terminal Settings

Parameter	Name	Setting Range and Description	Factory default	Change
F6-00	AI1 minimum input analog quantity	-100.00%~100.00%, taking 10V or 20mA as 100%	20.00%	○
F6-01	AI1 maximum input analog quantity		100.00%	○
F6-02	Corresponding given value/feedback value of AI1 minimum input analog quantity	-100.00~100.00% Note: The highest frequency shall be used for reference for the given frequency PID reference scalar is for reference for PID feedback	0.00%	○
F6-03	Corresponding given value/feedback value of AI1 maximum input analog quantity		100.00%	○
F6-04	AI1 inflection point threshold value	AI1 minimum input analog quantity~maximum input analog quantity	20.00%	○
F6-05	AI1 inflection point return difference	0~10.00%	0.00%	○
F6-06	Corresponding given value/feedback value of AI1 inflection point	Same as F6-02, F6-03	0.00%	○
F6-07	AI1 filtering time	0.000~10.000s	0.100s	○
F6-08	AI1 offline threshold	-20.00~20.00%	0.00%	○
F6-09	AI1 offline delay	0~360.00s	1.00s	○
F6-10	AI2 minimum input analog quantity	-100.00%~100.00%, taking 10V or 20mA as 100%	0.00%	○
F6-11	AI2 maximum input analog quantity		100.00%	○
F6-12	Corresponding given value/feedback value of AI2 minimum input analog quantity	-100.00~100.00% Note: The highest frequency shall be used for reference for the given frequency PID reference scalar is for reference for PID feedback	0.00%	○
F6-13	Corresponding		100.00%	○

	given value/feedback value of AI2 maximum input analog quantity				
F6-14	AI2 inflection point threshold value	AI2 minimum input analog quantity~maximum input analog quantity		0.00%	○
F6-15	AI2 inflection point return difference	0~10.00%)		0.00%	○
F6-16	Corresponding given value/feedback value of AI2 inflection point	Same as F6-02, F6-03		0.00%	○
F6-17	AI2 filtering time	0.000~10.000s		0.100s	○
F6-18	AI2 offline threshold	-20.00~20.00%		0.00%	○
F6-19	AI2 offline delay	0~360.00s		1.00s	○
F6-20	AO1 function selection	0: Operating frequency (take max. frequency as full amplitude) 1: Given frequency (take max. frequency as full amplitude) 2: Output current (take 2-time rated current of frequency converter as full amplitude) 3: Output voltage (take 1.5-time rated voltage of frequency converter as full amplitude) 4: Output power (take 2-time rated voltage of motor as full amplitude) 5: Output torque (take 2.5-time rated torque of motor as full amplitude) 6: Given torque (take 2.5-time rated torque of motor as full amplitude) 7~9: Reserved 10: AI1 11: AI2	12: AI3 13: AI4 14~15: Reserved 16: DC bus voltage (take 1000V as full amplitude) 17: Given frequency after acceleration/deceleration ramp (with maximum frequency as full amplitude) 18: PG detection frequency (with maximum frequency as full amplitude) 19~44: Reserved 45: Measured rope length output 46: Measured radius output	0	○
F6-21	AO1 type selection	0: 0~10V or 0~20mA 1: 2~10V or 4~20mA 2: Centered on 5V or 10mA		1	○
F6-22	AO1 gain	0.0~1000.0%		100.0%	○
F6-23	AO1 offset	-100.00%~100.00%, taking 10V or 20mA as 100%		0.00%	○
F6-24	AO2 function	Same as AO1 function selection F6-20		2	○

	selection			
F6-25	AO2 type selection	Same as AO1 type selection F6-21	0	○
F6-26	AO2 gain	0.0~1000.0%	100.0%	○
F6-27	AO2 offset	-100.00%~100.00%, taking 10V or 20mA as 100%	0.00%	○
F6-28~F6-36	Reserved	-	-	-
F6-37	AI3 minimum input analog quantity	0.00~100.00%, taking 10V or 20mA as 100%	0.00%	○
F6-38	AI3 maximum input analog quantity		100.00%	○
F6-39	Corresponding given value/feedback value of AI3 minimum input analog quantity	-100.00~100.00% Note: The highest frequency shall be used for reference for the given frequency PID reference scalar is for reference for PID feedback	0.00%	○
F6-40	Corresponding given value/feedback value of AI3 maximum input analog quantity		100.00%	○
F6-41	AI3 inflection point threshold value	AI3 minimum input analog quantity~maximum input analog quantity	0.00%	○
F6-42	AI3 inflection point return difference	0~10.00%	0.00%	○
F6-43	Corresponding given value/feedback value of AI3 inflection point	Same as F6-02, F6-03	0.00%	○
F6-44	AI3 filtering time	0.000~10.000s	0.100s	○
F6-45	AI3 offline threshold	0.00~20.00%	0.00%	○
F6-46	AI3 offline delay	0~360.00s	1.00s	○
F6-47	AI4 minimum input analog quantity	0.00~100.00%, taking 10V or 20mA as 100%	0.00%	○
F6-48	AI4 maximum input analog quantity		100.00%	○
F6-49	Corresponding given value/feedback value of AI4 minimum input analog quantity	-100.00~100.00% Note: The highest frequency shall be used for reference for the given frequency PID reference scalar is for reference for PID feedback	0.00%	○
F6-50	Corresponding given value/feedback value of AI4 maximum input		100.00%	○

	analog quantity			
F6-51	AI4 inflection point threshold value	AI4 minimum input analog quantity~maximum input analog quantity	0.00%	○
F6-52	AI4 inflection point return difference	0~10.00%	0.00%	○
F6-53	Corresponding given value/feedback value of AI4 inflection point	Same as F6-02, F6-03	0.00%	○
F6-54	AI4 filtering time	0.000~10.000s	0.100s	○
F6-55	AI4 offline threshold	0.00~20.00%	0.00%	○
F6-56	AI4 offline delay	0~360.00s	1.00s	○
F6-57	AO3 function selection	Same as AO1 function selection F6-20	2	○
F6-58	AO3 type selection	Same as AO1 type selection F6-21	0	○
F6-59	AO3 gain	0.0~1000.0%	100.0%	○
F6-60	AO3 offset	-100.00%~100.00%, taking 10V or 20mA as 100%	0.00%	○

6.85 F7 Anti-Sway Control Performance Parameters

Parameter	Name	Setting Range and Description	Factory default	Change
F7-00	Anti-sway control intervention method	0=Anti-sway control not engaged 3=Modified operating frequency curve	0	×
F7-01~ F7-04	Reserved	-	-	-
F7-05	Anti-sway control coefficient 1	Range: 0.00~100.00	12.00	○
F7-06	Anti-sway control coefficient 2	Range: 0.01~100.00	0.02	○
F7-07	Anti-sway control coefficient 3	Range: 0.00~100.00	15.00	○
F7-08	Anti-sway control coefficient 4	Range: 0.00~100.00	20.00	○
F7-09	Anti-sway control coefficient 5	Range: 0.01~100.00	0.01	○
F7-10	Anti-sway control coefficient 6	Range: 0.00~100.00	22.00	○
F7-11~ F7-33	Reserved	-	-	-
F7-34	Anti-sway control speed coefficient 1	Setting range: 0~65535	1	○
F7-35	Anti-sway control speed coefficient 2	Setting range: 0~65535	10000	○
F7-36	Swing angle convergence coefficient 1	Setting range: 0~65535	50	○
F7-37	Swing angle convergence coefficient 2	Setting range: 0~65535	50	○

6.86 F8 Crane Special Function Group 1

Parameter	Name	Setting Range and Description	Factory default	Change
F8-00	Low-frequency deceleration forced shutdown frequency	Minimum unit: 0.01Hz (0: disable this function)	0	×
F8-01	Minimum time for pre-excitation maintenance during shutdown	Minimum unit: 1ms	800ms	×
F8-02	Pre-excitation maintenance mode during shutdown	0: Normal DC braking 1: Stop maintenance excitation mode 1 2: Stop maintenance excitation mode 2	0	×
F8-03	Up-down switching pulse blocking selection	0: Blocked; 1: Not blocked	0	×
F8-04	Automatic torque memory	0: Off 1: On	0	×
F8-05	Automatic torque memory lower limit	Minimum unit: 0.1%	30.0%	×
F8-06	Automatic torque memory upper limit	Minimum unit: 0.1%	100.0%	×
F8-07	Speed Reduction with Load	Load-dependent speed reduction trigger torque percentage, effective only when the torque given by FU-10 is greater than 30%. Minimum unit: 0.1% (0: disable this function)	0	×
F8-08	Motor stall protection time	Minimum unit: 1ms (0: disable this function)	0	×
F8-09	Motor stall protection frequency	Minimum unit: 0.01Hz	4.00Hz	×
F8-10	Brake failure protection angle	Minimum unit: 1° (0: disable this function)	0	×
F8-11	Brake failure protection frequency	Minimum unit: 0.01Hz	0	×
F8-12	Speed reduction with voltage drop	Rated bus voltage percentage. (0: disable this function) High two digits: Recovery voltage percentage Low two digits: Speed reduction voltage percentage Minimum unit: 1%	0	×
F8-13	Overload protection torque limit value	Minimum unit: 0.1% (0: disable this function)	0	×
F8-14	Brake torque detection torque percentage	Minimum unit: 0.1% (0: disable this function)	0	×
F8-15	Fault stop selection 1	**Units digit: Stall protection fault** **Tens digit: Overload protection fault** **Hundreds digit: Brake torque detection fault** **Thousands digit: Frequency converter overload fault** **Ten-thousands digit: Motor overload fault**	00000	×

		0: Free stop 1: Deceleration stop		
F8-16	Fault stop selection 2	**Units digit: External fault** **Tens digit: Motor overload fault** **Hundreds digit: Motor underload fault** **Thousands digit: Analog input disconnection fault** **Ten-thousands digit: Input phase loss fault** 0: Free stop 1: Deceleration stop	00000	×
F8-17	Deceleration limit trigger operating frequency threshold	Maximum operating frequency when forward deceleration limit and reverse deceleration limit are triggered. Minimum unit: 0.01Hz	5.50Hz	×
F8-18	Bus undervoltage protection threshold	Setting range: 350-450V (0: disable this function)	0V	×
F8-19	Reserved	-	-	-
F8-20	Crane overspeed protection	**Units: Overspeed protection enabled (with PG)** **Hundreds: Overspeed protection enabled (post-ramp reference protection)** 0: Off 1: On	000	×
F8-21	Overspeed protection error value 1	When F8-20 hundreds digit is 1, it is effective. Post-ramp reference protection frequency error protection value 1 Minimum unit: 0.01Hz	3.00Hz	×
F8-22	Overspeed protection error value 2	When F8-20 hundreds digit is 1, it is effective. Post-ramp reference protection frequency error protection value 2 Minimum unit: 0.01Hz	15.00Hz	×
F8-23	Load-dependent speed reduction trigger time	Minimum unit: 1ms	2000ms	×
F8-24~ F8-68	Reserved	-	-	-
F8-69	Motor 2 rated power	0.40~500.00 kW	Model determination	×
F8-70	Motor 2 pole number	2~48	4	×
F8-71	Motor 2 rated current	0.5~1200.0A	Model determination	×
F8-72	Motor 2 rated frequency	1.00~650.00 Hz	50.00Hz	×
F8-73	Motor 2 rated speed	125~40000rpm	Model determination	×
F8-74	Motor 2 rated voltage	150~500V	380V	×
F8-75	Motor 2 no-load current	0.1A~FA-03 "motor rated current"	Model determination	×
F8-76	Motor 2 stator resistance	0.00~50.00%	Model determination	○
F8-77	Motor 2 leakage reactance	0.00~50.00%	Model determination	○
F8-78	Motor 2 rotor resistance	0.00~50.00%	Model	○

			determination	
F8-79	Motor 2 mutual reactance	0.0~2000.0%	Model determination	○
F8-80	Motor 2 core saturation coefficient 1	1.000-1.500	1.300	×
F8-81	Motor 2 core saturation coefficient 2	1.000~FA-12 "motor core saturation coefficient 1"	1.100	×
F8-82	Motor 2 core saturation coefficient 3	FA-15 "motor core saturation coefficient 4"~1.000	0.900	×
F8-83	Motor 2 core saturation coefficient 4	0.300-1.000	0.700	×
F8-84	Motor 3 rated power	0.40~500.00 kW	Model determination	×
F8-85	Motor 3 pole number	2~48	4	×
F8-86	Motor 3 rated current	0.5~1200.0A	Model determination	×
F8-87	Motor 3 rated frequency	1.00~650.00 Hz	50.00Hz	×
F8-88	Motor 3 rated speed	125~40000rpm	Model determination	×
F8-89	Motor 3 rated voltage	150~500V	380V	×
F8-90	Motor 3 no-load current	0.1A~FA-03 "motor rated current"	Model determination	×
F8-91	Motor 3 stator resistance	0.00~50.00%	Model determination	○
F8-92	Motor 3 leakage reactance	0.00~50.00%	Model determination	○
F8-93	Motor 3 rotor resistance	0.00~50.00%	Model determination	○
F8-94	Motor 3 mutual reactance	0.0~2000.0%	Model determination	○
F8-95	Motor 3 core saturation coefficient 1	1.000-1.500	1.300	×
F8-96	Motor 3 core saturation coefficient 2	1.000~FA-12 "motor core saturation coefficient 1"	1.100	×
F8-97	Motor 3 core saturation coefficient 3	FA-15 "motor core saturation coefficient 4"~1.000	0.900	×
F8-98	Motor 3 core saturation coefficient 4	0.300-1.000	0.700	×

6.10 F9 Crane Special Function Group 88

Parameter	Name	Setting Range and Description	Factory default	Change
F9-00~ 35	Reserved	-	-	-

6.11 FA Motor Parameters

Parameter	Name	Setting Range and Description	Factory default	Change
FA-00	Motor parameters self-tuning	11: Stationary partial self-tuning 22: No-load rotation complete self-tuning 33: Stationary complete self-tuning	00	×
FA-01	Rated power of motor	0.40~500.00 kW	Model determination	×
FA-02	Motor pole number	2~48	4	×
FA-03	Rated current of motor	0.5~1200.0A	Model determination	×

FA-04	Rated frequency of motor	1.00~650.00 Hz	50.00Hz	×
FA-05	Rated speed of motor	125~40000rpm	Model determination	×
FA-06	Rated voltage of motor	150~500V	380V	×
FA-07	Motor no-load current	0.1A~FA-03 "motor rated current"	Model determination	×
FA-08	Motor stator resistance	0.00~50.00%	Model determination	○
FA-09	Motor leakage inductive reactance	0.00~50.00%	Model determination	○
FA-10	Motor rotor resistance	0.00~50.00%	Model determination	○
FA-11	Motor mutual inductive reactance	0.0~2000.0%	Model determination	○
FA-12	Motor core saturation coefficient 1	1.000-1.500	1.300	×
FA-13	Motor core saturation coefficient 2	1.000~FA-12 "motor core saturation coefficient 1"	1.100	×
FA-14	Motor core saturation coefficient 3	FA-15 "motor core saturation coefficient 4"~1.000	0.900	×
FA-15	Motor core saturation coefficient 4	0.300-1.000	0.700	×
FA-16	Motor selection	1: Motor 1 2: Motor 2 3: Motor 3	1	×
FA-17	Motor control mode selection	**Units: Motor 2 control mode** **Tens: Motor 3 control mode** 0: Without PGV/F control 1: With PGV/F control 2: No PG vector control 3: With PG vector control 4: V/F separation control 5: With PG vector control 2	00	×

6.12 Fb Protection Function and Frequency Converter Advanced Settings

Parameter	Name	Setting Range and Description	Factory default	Change
Fb-00	Motor cooling condition	0: Ordinary motor 1: Variable frequency motor or motor with independent fan	0	○
Fb-01	Motor overload protection value	50.0~150.0%, rated current of the motor as 100%	100.0%	○
Fb-02	Motor overload protection action selection	0: No action 1: Alarm 2: Fault and free stop	2	×
Fb-03	Motor overloaded protection selection	**Units: Overload detection selection** 0: Keep detecting 1: Only detect at constant speed **Tens: Overload action selection** 0: No action 1: Alarm 2: Fault and free stop	00	×

Fb-04	Motor overload detection level	20.0~200.0%, rated current of the motor as 100%	130.0%	×
Fb-05	Motor overload detection time	0.0-30.0s	5.0s	×
Fb-06	Motor underload protection	0: No action 1: Alarm 2: Fault and free stop	0	×
Fb-07	Motor underload protection level	0.0-100.0%, with motor rated current as 100%	30.0%	×
Fb-08	Underload protection detection frequency	0.00~50.00Hz	0.00Hz	○
Fb-09	Underload protection detection time	0.0-100.0s	1.0s	×
Fb-10	Analog input offline action	0: No action 1: Alarm, run at the average operation frequency of 10s before connection loss 2: Alarm, run at an analog input drop forced frequency 3: Fault and free stop	0	×
Fb-11	Analog input drop forced frequency	0.00Hz～F0-06 "maximum frequency"	0.00Hz	○
Fb-12	Selection of other protection actions	**Units: Frequency converter input phase loss protection** 0: No action 1: Alarm 2: Fault and free stop **Tens: Frequency converter output phase loss protection** 0: No action 1: Alarm 2: Fault and free stop **Hundreds: Grounding test** 0: No test 1: Test only when powered up 2: Test before operation 3: Test during operation **Thousands: Parameter storage failure action selection** 0: Alarm 1: Fault and free stop **Ten thousands: AC input power failure treatment** 0: No action 1: Alarm	10122	×
Fb-13	Overcurrent & stall prevention selection	Units: Acceleration overcurrent & stall prevention Tens: Constant speed overcurrent & stall prevention 0: Invalid 1: Valid, limited time 1min 2: Valid, unlimited time Hundreds: Stall mode selection 0: Mode 1 1: Mode 2 2: Mode 3	011	×
Fb-14	Acceleration overcurrent & stall point	50.0-200.0%, with frequency converter rated current as 100%	150.0%	×
Fb-15	Constant speed overcurrent & stall point	50.0-200.0%, with frequency converter rated current as 100%	150.0%	×
Fb-16	Overvoltage & stall prevention selection	0: Invalid, 1: Valid	1	×

Fb-17	Overvoltage & stall point	650-750V	700V	×
Fb-18	DC bus undervoltage action	0: Free stop, report undervoltage fault (Er.dcL) 1: Free stop, recover power and restart in limited time 2: Free stop, recover power supply and restart during CPU operation 3: Deceleration and maintain bus voltage	0	×
Fb-19	DC bus undervoltage point	280-480V	400V	×
Fb-20	Instantaneous power failure allowable time	0.0-30.0s	0.1s	×
Fb-21	Instantaneous stop deceleration time	0.0~200.0s. If it is set to 0.0, the current deceleration time will be used	5.0s	×
Fb-22	Automatic reset times for faults	0~10. Module protection and external fault without automatic reset function	0	×
Fb-23	Interval time for automatic reset	1.0-30.0s	5.0s	×
Fb-24	Fault output during automatic reset period	0: No output 1: Output	0	×
Fb-25	Instantaneous stop, automatic reset, and restart mode after operation interruption	0: Start by start mode 1: Tracking start	1	×
Fb-26	Power-on self-start allowed	0: Prohibited 1: Allowed	1	○
Fb-27	Braking unit operating point	620-720V	680V	○
Fb-28	Modulation mode	0: Auto 1: Continuous modulation	0	○
Fb-29	Carrier frequency	15kW and below: 1.1k-12.0kHz, factory default 4.0kHz 18.5-30kW: 1.1k-10.0kHz, factory default 3.0kHz 37-160kW: 1.1k-8.0kHz, factory default 2.5kHz 200kW and above: 1.1k-5.0kHz, factory default 2.0kHz	Model determination	○
Fb-30	Random PWM settings	0-30%	0%	○
Fb-31	Automatic adjustment selection of carrier frequency	0: Prohibited 1: Allowed	1	○
Fb-32	Dead zone compensation allowed	0: Prohibited 1: Allowed	1	×
Fb-33	Space vector angle stop memory	0: No memory 1: With memory	0	×
Fb-34	Overmodulation enabled	0: Prohibited 1: Allowed	1	×
Fb-35	Cooling fan control	0: Power off after 3min of standby 1: Keep running 2: Always running	0	○

Fb-42	Fan life expectancy settings	1-65000h	40000h	○

92.13 FC Keyboard Operation and Display Settings

Parameter	Name	Setting Range and Description	Factory default	Change
FC-00	Display parameter selection	0: All 1: User parameters 2: Different from factory default	0	○
FC-01	Key function and automatic lock	**Units: Automatic key lock function** 0: Not locked 1: Fully locked 2: Fully locked except ○ 3: Fully locked except ◁ and ▷ 4: Fully locked except ○, ◁ and ▷ 5: Fully locked except □ and 0 **Tens: ○ function selection** 0: Valid only when in the operation panel running command channel 1: Valid when in the operation panel, terminal, and communication running command channels, and shut down according to stop mode 2: Shut down according to stop mode in the operation panel running command channel. Shut down freely in the non-operation panel running command channel and report Er.Abb **Hundreds: □ function selection (only for panel command channel)** 0: Select running function 1: Select jogging function **Thousands: Arrow key combination function selection** 0: Press and hold combination key ◁ and △, or combination key ▷ and ▽ simultaneously to switch the main given frequency channel and run command channel function is invalid 1: Press and hold combination key ◁ and △, or combination key ▷ and ▽ simultaneously to switch the main given frequency channel and run command channel function is valid	0000	×
FC-02	Monitoring parameter selection 1	-1 to 56 It aims to select the monitoring parameters displayed in both running and standby monitoring states Note: -1 indicates null, and 0-56 represents FU-00 to FU-56FC-02. The minimum value is 0.	1	○
FC-03	Monitoring parameter selection 2		-1	○
FC-04	Monitoring parameter selection 3		-1	○
FC-05	Monitoring parameter		-1	○

	selection 4			
FC-06	Monitoring parameter selection 5		-1	○
FC-07	Monitoring parameter selection 6		-1	○
FC-08	Monitoring parameter selection 7		-1	○
FC-09	Operation monitoring parameter 1	-1 to 56 It aims to select monitoring parameters that are displayed only in the running monitoring state Note: -1 indicates null, and 0-56 indicates FU-00 to FU-56	0	○
FC-10	Operation monitoring parameter 2		2	○
FC-11	Operation monitoring parameter 3		4	○
FC-12	Operation monitoring parameter 4		-1	○
FC-13	Speed display coefficient	0.001-10.000	1.000	○
FC-14	Linear velocity display coefficient	0.01-100.00	0.01	○
FC-15~ FC-44	User parameter 1, user parameter 30	-00.01 to FU.56, excluding manufacturer parameters Fn -00.01 is null, and the others are the parameter numbers. For example, F0.01 means F0-01	-00.01	○
FC-45	User parameter 31	Fixed to FC-00 "Display parameter selection"	FC.00	△
FC-46	User parameter 32	Fixed to F0-10 "Parameter writing protection"	F0.10	△
FC-47	Administrator parameters	Fixed to F0-17 "Administrator password"	F0.17	△

6.14 Fd Crane Special Function Group 3

Parameter	Name	Setting Range and Description	Factory default	Change
Fd-01	Tapered motor control selection	Units: Tapered motor control enabled; 0: Off 1: On Tens: Selection of the voltage curve for the deceleration section of the tapered motor; same as F2-00; Hundreds: Selection of torque boost for the deceleration section of the tapered motor; same as F2-01;	010	×
Fd-02	Maximum voltage change rate	Setting range: 0-65535	50	×
Fd-03	Maximum voltage during the stop phase of the tapered motor	Setting range: 0-500V	340V	×
Fd-04	Maximum voltage during the starting phase of the tapered motor	Setting range: 0-500V	420V	×
Fd-05	Torque boost during the stop phase of the tapered motor	Same as F2-02;	0	×
Fd-18	Online mutual inductance	Setting range: 0-1	1	×

	identification mode selection			
Fd-32	Stator and rotor resistance identification mode selection	Units: Stator resistance mode selection 0-1 Tens: Rotor resistance mode selection 0-2	00	×
Fd-50	Anti-sway enable and mode selection	**Units digit: Anti-sway function enable** 0: Off 1: On **Tens digit: Anti-sway mode selection** 1: Mode I 2: Mode II 3: Mode III 4: Mode IV 5: Mode V **Hundreds digit: Select translation or rotation anti-sway** 0: Translation anti-sway 1: Rotation anti-sway	010	×
Fd-51	Gravitational acceleration	Minimum unit: 0.001m/s^2	9.800m/s^2	×
Fd-52	Set vertical rope length	Minimum unit: 0.001m	7.000m	×
Fd-53	Set rotation radius	Minimum unit: 0.001m	5.000m	×
Fd-54	Translation linear velocity	Translation linear velocity at rated frequency	1.000m/s	×
Fd-55	Rotation angular velocity	Rotation angular velocity at rated frequency 0.001rad/s	0.500rad/s	×
Fd-56	Fixed rope length	Minimum unit: 0.001m	1.000m	×
Fd-57	Fixed radius	Minimum unit: 0.001m	1.000m	×
Fd-58	Damping coefficient	Minimum unit: 1	13	×
Fd-59	Acceleration factor	-	800	×
Fd-60	The high 16 bits of the encoder pulse count recorded during power loss	Display range: -32767~32767	00000	×
Fd-61	The low 16 bits of the encoder pulse count recorded during power loss	Display range: -32767~32767	00000	×
Fd-62	The high 16 bits of the encoder pulse count recorded during rope length self-learning	Display range: -32767~32767	00000	×
Fd-63	The low 16 bits of the encoder pulse count recorded during rope length self-learning	Display range: -32767~32767	00000	×
Fd-64	Maximum rope length or radius	The user sets the maximum vertical rope length and rotation radius with a minimum unit of 0.001m	10.000m	×
Fd-65	Rope length/radius self-learning enable	**Rope length/radius self-learning enable** Units digit: 0: No action 1: Enable rope length self-learning 2: Forced stop of rope length self-learning process or forced clearing of self-learning results **Tens: Source of rope length** 0: Use Fd-52 1: Use automatic rope length 2: Use AI1 to receive rope length 3: Use AI2 to receive rope length **Hundreds: Source of radius** 0: Use Fd-53 1: Use automatic rope length 2: Use AI1 to receive rope length 3: Use AI2 to receive rope length **Thousands:** Manual upper limit signal of rope length manual self-learning or correction	00000	×

		Ten-thousandths: Manual lower limit signal of rope length manual self-learning or correction		
Fd-66	Forward opening frequency	Indicates the output frequency setting range before the ascending brake opens: 0-20.00Hz. Minimum unit: 0.01Hz	2.00Hz	×
Fd-67	Forward closing frequency	Indicates the output frequency setting range before the ascending brake closes: 0-20.00Hz. Minimum unit: 0.01Hz	2.00Hz	×
Fd-68	Reversal opening frequency	Indicates the output frequency setting range before the descending brake opens: 0-20.00Hz. Minimum unit: 0.01Hz	2.00Hz	×
Fd-69	Reversal closing frequency	Indicates the output frequency setting range before the descending brake closes: 0-20.00Hz. Minimum unit: 0.01Hz	2.00Hz	×
Fd-70	Forward opening current threshold	This parameter represents the percentage of the motor's rated current, and the brake open command can only be output when the frequency converter's output current reaches this value Setting range: 0.0-200.0% of the rated current of frequency converter Unit: 0.1%	10.0%	×
Fd-71	Reversal opening current threshold		3.0%	×
Fd-72	Opening maintenance frequency	After the brake is released, accelerate to this frequency to ensure the motor can output full torque Setting range: max (Fd-66, Fd-68) ~ F0-00 Minimum unit: 0.01Hz	3.00Hz	×
Fd-73	Opening maintenance time	Indicates the time from when the brake starts to open until it is fully open, during which the frequency output is maintained to keep the brake released Minimum unit: 1s	0.25s	×
Fd-74	Anti-slip frequency	After the brake is closed, decelerate to this frequency to ensure the motor can continuously output torque Setting range: 0~min(Fd-67, Fd-69) Minimum unit: 0.01Hz	2.00Hz	×
Fd-75	Anti-slip action time	Indicates that the frequency of preventing slippage is maintained for a certain period Minimum unit: 1s	0.30s	×
Fd-76	Forward opening torque threshold	This parameter represents the percentage of the motor's rated torque. When the frequency converter's output torque reaches this value, the brake release command is immediately issued Setting range: 0.0-200.0% of rated motor torque Unit: 0.1%	6.0%	×
Fd-77	Reversal opening torque threshold		0.0%	×
Fd-78	Closing state switching time	Indicates the interval time between the release signal and closing signal Minimum unit: 0.01s	0.50s	×
Fd-79	Anti-slip end delay stop time	Minimum unit: 0.01s	10.00s	×
Fd-80	Closing feedback signal switch contact status	**Units: Closing feedback signal switch contact status** Normally open: 0 Normally closed: 1	15002	×

		No feedback: 2 **Tens: Action mode** 0: Send the closing signal and force a stop 1: Trigger the brake failure protection **Ten thousands, thousands & hundreds: Detection time** Minimum unit: 0.001s		
Fd-81	Zero-crossing closing enable switch	0: Off 1: On	0	×
Fd-82	Closing enabling switch	0: Off 1: On	0	×
Fd-83	Zero-crossing closing frequency threshold	Minimum unit: 0.01Hz	2.00Hz	×
Fd-84	Downward frequency upward torque enable	**Units: Descending frequency upward torque enabled** 0: Off 1: On **Tens: Action mode** 0: Mode 1 1: Mode 2	00	×
Fd-85	Upward frequency value	Minimum unit: 0.01Hz	4.00Hz	×
Fd-86	Downward frequency upward torque limit value	Setting range: 0-100%. Minimum unit: 0.1%	50.0%	×
Fd-87	Stall saturation time	Unit: 1ms	350ms	×
Fd-88	Stall saturation enable	0: Off 1: On	0	×
Fd-89	Frequency lower limit associated closing frequency enable	0: Off 1: On	0	×
Fd-90	Crane application macro	0: Not enabled 1: Hoisting mechanism + asynchronous motor 2: Lifting mechanism + tapered motor 3: Translation mechanism + asynchronous motor 4: Translation mechanism + tapered motor 5: Rotation mechanism + asynchronous motor 6: Rotation mechanism + tapered motor	0	×
Fd-91	Crane special machine software version number	-	-	△

6.15 FF Communication Parameters

Parameter	Name	Setting Range and Description	Factory default	Change
FF-00	COMM2 communication protocol selection	0: Modbus 1: USS command 2: CAN Note: COMM1 only supports Modbus communication	0	×
FF-01	Communication data format	**Units: COMM1 data format** **Tens: COMM2 data format** 0:8, N, 1 1:8, E, 1 2:8, O, 1 3:8, N, 2 4:8, E, 2 5:8, O, 2	00	×
FF-02	Baud rate selection	**Units: COMM1 Baud rate** **Tens: COMM2 Baud rate** 0: 1200 bps 1: 2400 bps 2: 4800 bps 3: 9600 bps 4: 19200 bps 5: 38400 bps 6: 57600 bps 7: 115200 bps 8: 250000 bps 9: 500000 bps	34	×
FF-03	COMM1 address of the machine	0-247	1	×

FF-04	COMM2 address of the machine	0-247	1	×
FF-05	Communication timeout detection time	0.1-600.0s	10.0s	○
FF-06	COMM1 response delay of the machine	0-1000ms	5ms	○
FF-07	COMM2 response delay of the machine	0-1000ms	5ms	○
FF-08	Communication timeout action	**Units: COMM1 communication timeout action** **Tens: COMM2 communication timeout action** 0: No action 1: Alarm 2: Fault and free stop 3: Alarm according to F0-00 4: Alarm according to F0-07 5: Alarm according to F0-08	00	×
FF-09	COMM2USS message PZD word count	0-4	2	×
FF-10	COMM1 communication setting frequency ratio	0.001-30.000	1.000	○
FF-11	COMM2 communication setting frequency ratio	0.001-30.000	1.000	○

6.16 FP Fault Record

Parameter	Name	Content and Description	
FP-00	Last fault type	0: No fault 1.ocb: Instantaneous overcurrent at starting 2.ocA: Overcurrent during acceleration 3.ocd: Overcurrent during deceleration 4.ocn: Overcurrent during constant speed operation 5.ouA: Overvoltage at acceleration 6.oud: Overvoltage at deceleration 7.oun: Overvoltage at constant speed operation 8.ouE: Overvoltage during standby 9.dcL: Undervoltage during operation 10.PLI: Input phase loss 11.PLo: Output phase loss 12.FoP: Power device protection 13.oHI: Frequency	21.Co3: Output protection signal of comparator 3 22.Co4: Output protection signal of comparator 4 23.EEP: Parameter storage failure 24.C1E: COMM1 communication abnormality 25.C2E: C0MM2 communication abnormality 26.ccF: Current detection fault 27.ArF: Poor self-tuning 28. Aco: Analog input offline 29.PGo: PG disconnection 30.rHo: Thermistor open circuit March 31: Abnormal stop fault 32.cno: Charging contactor abnormality 33. GFF: Grounding fault output 37.dcE: DC bus voltage abnormality 38.SP0: Motor stalling 39.SP1: Overload fault

		converter overheating 14.oLI: Frequency converter overload 15.oLL: Motor overload 16.EEF: External fault 17.oLP: Motor overload 18.ULd: Motor underload 19.Co1: Output protection signal of comparator 1 20.Co2: Output protection signal of comparator 2	40.SP2: Brake torque detection fault 41.SP3: Stop due to low grid voltage 42.SP4: Brake feedback signal abnormality
FP-01	Accumulated running time in the most recent fault	Minimum unit: 1h	
FP-02	Operation frequency in the most recent failure	Minimum unit: 0.01Hz	
FP-03	Given frequency in the most recent fault	Minimum unit: 0.01Hz	
FP-04	Output current in the most recent fault	Minimum unit: 0.1A	
FP-05	Output voltage in the most recent fault	Minimum unit: 0.1V	
FP-06	Output power in the most recent fault	Minimum unit: 0.1kW	
FP-07	Bus voltage in the most recent fault	Minimum unit: 0.1V	
FP-08	Inverter bridge temperature in the most recent fault	Minimum unit: 0.1°C	
FP-09	Terminal input state 1 in the most recent fault	Ten thousands: DI5 Thousands: DI4 Hundreds: DI3 Tens: DI2 Units: DI1	
FP-10	Terminal input state 2 in the most recent fault	Ten thousands: DI10 Thousands: DI9 Hundreds: DI8 Tens: DI7 Units: DI6	
FP-11	Second last fault type	Content & meaning same as FP-00	
FP-12	Accumulated running time in second last fault	Minimum unit: 1h	
FP-13	Third last fault type	Content & meaning same as FP-00	
FP-14	Accumulated running time in third last fault	Minimum unit: 1h	
FP-15	Fourth last fault type	Content & meaning same as FP-00	
FP-16	Accumulated running time in fourth last fault	Minimum unit: 1h	
FP-17	Fifth last fault type	Content & meaning same as FP-00	
FP-18	Accumulated running time in fifth last fault	Minimum unit: 1h	
FP-19	Single operation time in case of fault	Minimum unit: 0.1h	
FP-20	Fault record clearing	11: Clear this menu parameter, it will automatically change to 00 after the operation is completed	

6.17 FU Data Monitoring

Parameter	Name	Content and Description
FU-00	Operating frequency	Reflects the frequency of the motor speed. Minimum unit:

		0.01Hz
FU-01	Given frequency	Unit indicator flickers. Minimum unit: 0.01Hz
FU-02	Output current	Minimum unit: 0.1A
FU-03	Load current percentage	Rated current of frequency converter as 100%. Minimum unit: 0.1%
FU-04	Output voltage	Minimum unit: 0.1V
FU-05	Operating speed	Minimum unit: 1r/min
FU-06	Given speed	Unit indicator flickers. Minimum unit: 1r/min
FU-07	DC bus voltage	Minimum unit: 0.1V
FU-08	Output power	Minimum unit: 0.1kW
FU-09	Output torque	Rated torque as 100%. Minimum unit: 0.1%
FU-10	Given torque	Rated torque as 100%, the unit indicator flickers, minimum unit: 0.1%
FU-11	Running linear speed	Minimum unit: 1m/s
FU-12	Given linear speed	Unit indicator flickers. Min. unit: 1m/s
FU-16	Rope length	The current rope length applied to anti-sway control, minimum unit: 0.001m
FU-17	Radius	The current radius applied for anti-sway control, minimum unit: 0.001m
FU-18	AI1	Minimum unit: 0.1%
FU-19	AI2	Minimum unit: 0.1%
FU-20	AI3	Minimum unit: 0.1%
FU-21	AI4	Minimum unit: 0.1%
FU-36	Radiator temperature	Minimum unit: 0.1°C
FU-38	PG detection frequency	Minimum unit: 0.1Hz
FU-39	Output power factor	Minimum unit: 0.01
FU-42	Digital input terminal status	Ten thousands: DI5 Thousands: DI4 Hundreds: DI3 Tens: DI2 Units: DI1 0: Invalid, 1: Valid
FU-43	Extended digital input terminal status	Ten thousands: DI10 Thousands: DI9 Hundreds: DI8 Tens: DI7 Units: DI6 0: Invalid, 1: Valid
FU-44	Digital output terminal status	Thousands: T2 Hundreds: T1 Tens: DO2 Units: DO1 0: Invalid, 1: Valid
FU-45	Extended digital output terminal status	Thousands: T6 Hundreds: T5 Tens: T4 Units: T3 0: Invalid, 1: Valid
FU-46	Comparator output state	Thousands: Comparator 4 Hundreds: Comparator 3 Tens: Comparator 2 Units: Comparator 1 0: Output 0 1: Output 1
FU-47	Number of COMM1 communication errors	0-65000
FU-48	Number of COMM2 communication errors	0-65000
FU-49	COMM1 communication polling time	Minimum unit: 0.001s
FU-50	COMM2 communication polling time	Minimum unit: 0.001s
FU-51	Given frequency after acceleration and deceleration ramp	Minimum unit: 0.01Hz
FU-52	PG high position byte	Encoder feedback position indicated by binary system is high 16 bits
FU-53	PG low position byte	Encoder feedback position indicated by binary system is low 16 bits

FU-54	Crane logic control version number	-
FU-55	Closing feedback signal	-
FU-56	Accumulated running time of fan	Minimum unit: 1h
FU-57	Production date	Minimum unit: 00.00
FU-58	Frequency converter No.	Minimum unit: 0001

7 Troubleshooting and Exception Handling

7.1 Common Crane Faults and Handling Measures

Troubleshooting for Hook Slipping

■ Solution to Hook Slipping during the Start of Ascending Release

1) Appropriately increase the current threshold for ascending brake release (Fd-70) and the torque threshold for brake release (Fd-76);

2) Ascending release slippage can also be appropriately extended by increasing the release maintenance time (Fd-73) and the release maintenance frequency (Fd-72), allowing the frequency converter to maintain torque output during the brake release process;

3) Enable torque memory (F8-04=1) and refer to Section 5.5 of Chapter 5 for setup. Before enabling, determine the direction of the torque to be issued and observe the positive or negative value of FU-10 during ascending release under load. If FU-10 is greater than 0, set F3-64 to 0, otherwise set ljF3-64 to 1.

Note: The above three methods shall be used according to specific circumstances, and it is necessary to consider the starting effects and impacts (such as starting current) under both light and heavy loads after setting.

■ Solution to Hook Slipping during the Start of Descending Release

1) Appropriately increase the descending brake release current threshold (Fd-71) and the brake release torque threshold (Fd-77);

2) If there is a hook slipping during descending release, set FD-84 to 1 to enable the upward torque function at the descending start frequency. Also, set FD-85 (ascending frequency) and Fd-86 (ascending torque limit);

3) Enable torque memory (F8-04=1) and refer to Section 5.5 of Chapter 5 for setup. Before enabling, determine the direction of the torque to be issued and observe the positive or negative value of FU-10 during ascending release under load. If FU-10 is greater than 0, set F3-64 to 0. Otherwise, set F3-64 to 1;

4) Appropriately increase the release maintenance time (Fd-73) and release maintenance frequency (Fd-72) to ensure the frequency converter maintains torque output during the brake release process.

Note: The above three methods shall be used according to specific circumstances, and it is necessary to consider the starting effects and impacts (such as starting current) under both light and heavy loads after setting.

■ Solution to Hook Slipping when the Frequency Converter is Not Started

1) It may be caused by insufficient braking torque of the brake. Replacing the brake can prevent hook slipping;

■ Solution to Hook Slipping during Ascending and Descending during Stop and Closing

1) When the frequency equals Fd-74 (anti-slip frequency), the frequency converter maintains output while waiting for closing. The maintenance time is set via Fd-75

(anti-slip action time, unit of 10ms, 100ms when set as 10). If slipping occurs, increase the Fd-75 setting value. If there is dragging (friction noise), decrease this value.

2) You may appropriately extend the low-frequency deceleration time by setting the low-frequency switching point via F1-17, and then setting the deceleration time below low frequency via F1-15.

Note: The set anti-slip frequency shall be less than or equal to the closing frequency (minimum of forward and reverse closing), and the set F1-26 (stop frequency) shall be less than the anti-slip frequency.

■ **Frequency Converter Undervoltage Fault Handling Method**

1) Observe whether the input voltage is normal. If not, check the input lines.

2) Enable speed reduction with voltage drop and low voltage quick stop, refer to Section 5.7, Chapter 5 for settings.

3) If undervoltage fault still occurs after enabling speed reduction with voltage drop, increase F8-12 (speed reduction threshold with voltage drop) and F8-18 (bus voltage too low protection threshold) to improve system stability.

7.2 Abnormal Operation of the Frequency Converter and Solutions

Table for abnormal operation and solutions:

Phenomenon	Occurrence Conditions	Possible Cause	Countermeasure
The keys on the operation panel have no response	Some keys or all keys have no response	Operation panel keys are automatically locked	Press and hold ENTER + MENU for 3s to unlock
		The connection wire of the operation panel is in poor contact	Check the connecting line and seek for service from our company in case of exceptions
		The keys on the operation panel are damaged	Replace the operation panel
		The chip is damaged	Seek service from our company
Parameters cannot be modified	Some parameters cannot be modified	F0-10 is set to 1 or 2	Set F0-10 into 0
		Attributes of parameters are changed to read only	Users cannot modify read-only parameters
	Non-modifiable under operating state	Attributes of parameters are changed to non-modifiable under operating state	Modify under standby state
Frequency converter stops accidentally in operation	The frequency converter stops automatically with no stop command, and the running indicator light is off	Fault exists	Find out fault causes and reset the faulty part
		PLC cycle completed	Check PLC parameter setting
		Run command channel 1/2 switch	Check operation and status of running command channel
		Fb-18=3 "Deceleration during instantaneous power failure", and the power failure time is too long	Check DC bus undervoltage action settings and input voltage
	The motor automatically stops with no stop command,	Automatic fault reset period	Check the setting of fault automatic reset and fault causes
		In PLC suspended state	Check PLC function setting
		Operation interruption	Check running interruption setting

	and the frequency converter running indicator light is on	Given frequency is 0, under zero frequency operation	Check the given frequency
		PID direct action. Feedback > given PID reaction. Feedback < given	Check the feedback and given PID
The frequency converter cannot start	The frequency converter does not start after giving starting command, and the running indicator light is not on	"Free stop" is valid with the digit 18 inputted	Check the free stop terminal
		"Frequency converter operation prohibited" is valid with the digit 17 inputted	Check the operation prohibition terminal of frequency converter
		Stop button is not closed under the control mode of three-wire 1 and 2 or two-wire 3	Check the stop button and wiring
		Running command channel error	Modify the running command channel
		Frequency converter is in fault	Troubleshooting
		The logic of input terminal is set improperly	Check F4-05 and F4-81 settings
		The bus voltage of parallel models is inconsistent	Check the power input loop, voltage detection loop, etc.

7.3 Frequency Converter Faults and Handling

Table for faults and solutions:

Fault Display (Fault Code)	Fault Type	Possible Fault Causes	Troubleshooting Method
Er.ocb Er.ocb (1)	Instantaneous overcurrent at starting	There is phase-to-phase or to-ground short circuit inside the motor or wiring	Check the motor and wiring
		The inverter module is damaged	Seek service
		The starting voltage is too high	Check torque boost settings (reduce F2-02 parameter)
Er.ocA Er.ocA (2)	Overcurrent during acceleration	Acceleration time is too short	Extend acceleration time (increase F1-00 acceleration time)
		V/F curve is not suitable	Adjust V/F curve or torque boost settings (modify F2-00 or F2-01)
		Restart the rotating motor	Set to speed tracking start (modify F1-19=2) Or restart the motor after it is completely stopped
		The power grid voltage is low	Check input power or enable speed reduction with voltage drop function, refer to Section 5.7 for settings
		The power of frequency converter is too small	Use the frequency converter with large power class
		Vector control does not perform parameter self-tuning	Perform parameter self-tuning (modify FA-00=33)
		Sudden load increase during acceleration	Cancel sudden load increase

Er.ocd Er.ocd (3)	Overcurrent during deceleration	Deceleration time is too short	Extend deceleration time (modify F1-01 deceleration time)
		There is potential energy load or the inertia torque is too large	Add appropriate energy consumption braking assembly (braking resistor)
		The power of frequency converter is too small	Use the frequency converter with large power class
		Vector control does not perform parameter self-tuning	Perform parameter self-tuning (modify FA-00=33)
		Low voltage	Adjust voltage to normal range
		Braking circuit short circuit	Troubleshoot braking resistor
Er.ocn Er.ocn (4)	Overcurrent of constant speed operation	The load changes suddenly	Reduce the sudden change of load
		Abnormal load	Inspect the load
		The power grid voltage is low	Check the input power
		The power of frequency converter is too small	Use the frequency converter with large power class
		Vector control does not perform parameter self-tuning	Perform parameter self-tuning (modify FA-00=33)
		Braking circuit short circuit	Troubleshoot braking resistor
Er.ouA Er.ouA (5)	Overvoltage during acceleration	Input voltage abnormality	Check the input power
		Restart the rotating motor	Set to speed tracking start (modify F1-19=2) Or restart the motor after it is completely stopped
		Acceleration time is too short	Appropriately extend acceleration and deceleration time (modify F1-00, 01 acceleration and deceleration time)
		No braking unit or braking resistor is installed	Install braking unit and resistor
Er.oud Er.oud (6)	Overvoltage during deceleration	Deceleration time is too short	Extend deceleration time (modify F1-01 deceleration time)
		There is potential energy load or the load inertia is too large	Select proper dynamic braking assembly outside
		Input voltage abnormality	Check the input power
		Inappropriate ASR parameters	Adjust ASR parameters to reduce overshooting
		No braking unit or braking resistor is installed	Install braking unit and resistor
Er.oun Er.oun (7)	Overvoltage at constant speed operation	Input voltage abnormality	Check the input power
		The set time of acceleration and deceleration is too short	Appropriately extend acceleration and deceleration time (modify F1-00, 01 acceleration and deceleration time)
		Input voltage has abnormal changes	Install the input reactor
		Load inertia is large	Adopt the dynamic braking assembly
Er.ouE Er.ouE (8)	Overvoltage in standby mode	Input voltage is too high	Check the input power
		DC bus voltage detection circuit fault	Seek service

Er.dcL Er.dcL (9)	Undervoltage during running	Input voltage is abnormal or power fails during operation	Inspect the input power supply and wiring Enable speed reduction with voltage drop function. Refer to Section 5.7
		There is heavy load impact	Check load
		Charging contactor is damaged	Check and replace
		Input phase loss	Inspect the input power supply and wiring
Er.PLI Er.PLI (10)	Input phase loss	Inputs R, S, and T have phase loss	Check installation wiring
		Three input phases are unbalanced	Check input voltage
Er.PLo Er.PLo (11)	Output phase loss	Outputs U, V and W have phase loss	Check output wiring, motor, and cable
Er.FoP Er.FoP (12)	Protection for power devices	Output with phase-to-phase or grounding short circuit	Rewire
		Connection wires or plug-ins of the control board are loose	Check and reconnect wiring
		The connecting wire between the motor and the frequency converter is too long	Add an output reactor or filter
		Overcurrent of braking unit models of 15kW and below	Check the resistance value and wiring of the external braking resistor
		There is serious interference or the frequency converter is damaged	Seek service
Er.oHI Er.oHI (13)	Frequency converter overtemperature	Ambient overtemperature	Decrease the ambient temperature
		Air ducts are blocked or fans are damaged	Clear the air ducts or replace the fans
		Overload	Check the load or select large-power frequency converter
Er.oLI Er.oLI (14)	Frequency converter overload	Overload	Check the load or select large-power frequency converter
		Temperature of frequency converter is too high	Check fans, air ducts, and ambient temperature
		Acceleration time is too short	Extend acceleration time (modify F1-00 acceleration time)
		Carrier frequency is set too high	Reduce the carrier frequency or select the frequency converter with larger capacity
		V/F curve is not suitable	Adjust V/F curve and torque boost amount (modify F2-00 or F2-01)
		Restart the rotating motor	Set to speed tracking start (modify F1-19=2) Or restart the motor after it is completely stopped
		Input voltage is too low	Check input voltage
Er.oLL Er.oLL (15)	Motor overload	V/F curve is not suitable	Correctly set V/F curve and torque boost amount (modify F2-00 or F2-01)
		Input voltage is too low	Check input voltage

		The ordinary motor runs with heavy load at low speed for a long time	Add an independent cooling fan or select the variable frequency motor ...
		Motor nameplate or overload protection is not properly set	Correctly set FA-03, Fb-00 Increase overload protection value Fb-01 Or turn off this function Fb-02=1
		Motor is locked or too large sudden load change	Check load
Er.EEF Er.EEF (16)	External fault	External fault terminal is closed	Solve the external fault
Er.oLP Er.oLP (17)	Motor overload	Motor current exceeds the overload detection level and is beyond the detection time	Check load Check overload protection settings (Fb-03 to 05) Increase overload protection value Fb-04 Delay overload protection time Fb-05
Er.ULd Er.ULd (18)	Motor underload	Output current of frequency converter is less than the underload protection level and beyond the detection time	Check load Check underload protection settings (Fb-06~09)
Er.Co1 Er.Co1 (19)	Output protection signal of comparator 1	Generated by comparator 1	Check comparator 1 output definition
Er.Co2 Er.Co2 (20)	Output protection signal of comparator 2	Generated by comparator 2	Check comparator 2 output definition
Er.Co3 Er.Co3 (21)	Comparator 3 output protection signal	Generated by comparator 3	Check comparator 3 output definition
Er.Co4 Er.Co4 (22)	Comparator 4 output protection signal	Generated by comparator 4	Check comparator 4 output definition
Er.EEP Er.EEP (23)	Parameter storage failure	Parameter writing error	After reset, try again. If the problem still exists, please seek service
Er.CIE Er.ClE (24)	COMM1 Communication error	Communication parameters are not properly set	Check the FF menu setting
		Severe communication interference	Check the wiring and grounding of communication loop
Er.C2E Er.C2E (25)	COMM2 Communication error	Upper computer is not working	Check the upper computer and wiring
Er.ccF Er.ccF (26)	Current detection fault	The internal cable or plug-in of the frequency converter is loose	Check and reconnect wiring
		Current sensor is damaged or the circuit is abnormal	Seek service
Er.ArF Er.ArF (27)	Poor self-tuning	Motor nameplate parameter setting error	Set the parameters correctly according to the motor nameplate

		Missing motor or motor phase loss	Check motor wiring
		During complete self-tuning, the motor is not at no load	Take the motor off the mechanical load
		Self-tuning oscillation	Adjust F2-09 "Anti-vibration damping"
Er.Aco Er.Aco (28)	Analog input connection loss	The wiring is disconnected or the external equipment is damaged	Check the external wiring and external equipment
		The threshold of connection loss is not properly set	Check the settings of F6-06, F6-13 Check the settings of Fb-10 and Fb-11
Er.PGo Er.PGo (29)	PG disconnection	The wiring with encoder interface board fails	Check wiring
		Jumper of encoder interface board is not set properly	Refer to Section 9.6 to check the jumper
		F4-72 "PG disconnection detection time" is too short	Increase the set value properly
		Encoder fault	Check and replace the damaged encoder
Er.rHo Er.rHo (30)	Thermistor open-circuit	Thermistor is disconnected	Check the thermistor connection or seek service, or the ambient temperature is too low
Er.Abb Er.Abb (31)	Abnormal stop fault	The stall state lasts for 1 minute	Set the operating parameters correctly
		Use to stop at non-operation panel	-
		PG is connected reversely which causes overspeed	Check PG wiring
		The given speed does not match the actual running speed (slipping occurs)	Check if there is any slipping. If so, adjust as per Section 7.1
Er.cno Er.cno (32)	Charging contactor is abnormal (only valid for hardware detection)	The power grid voltage is too low	Check the grid voltage
		Contactor damage	Replace contactor and seek service
		The power-on buffer resistor is damaged	Replace the buffer resistor and seek service
		Control loop is damaged	Seek service
Er.GFF Er.GFF (33)	Output grounding fault	Outputs U, V, W have grounding current	Check the output wiring and check if the motor and cable are grounded
Er.dcE Er.dcE (37)	Abnormal DC bus voltage	Detect loop abnormality	Seek service
Er.SPO Er.SPO (38)	Motor stalling	The brake is not released, and the motor is stalled	Check if the brake is released Check if the brake contactor is damaged Check if F5-03~04 are set according to the actual wiring
Er.SPl Er.SPl (39)	Overload fault	The load is too heavy and has exceeded the protection value	Reduce the load weight Set F8-13=0 to disable this function
Er.SP2 Er.SP2 (40)	Brake torque detection fault	Insufficient brake torque	Replace the brake
Er.SP3 Er.SP3 (41)	Stop due to low grid voltage	The grid voltage is too low	Check if the power capacity is sufficient Set F8-18=0 to disable this

			function
Er.SP4 (42)	Abnormal brake feedback signal	The brake contactor feedback signal does not correspond to the release/closing signal	After the release/closing signal is sent, check if the brake contactor operates and if there is a feedback signal

7.4 Frequency Converter Alarm and Handling

Table for alarms and solutions:

Alarm Display	Alarm Name	Content and Description	Countermeasure	Corresponding Bits of Alarm Characters
AL.oLL AL.oLL	Motor overload	Temperature rise of motor is detected by the thermal model is too high	Refer to solutions to corresponding faults	Word 1 Bit 0
AL.oLP AL.oLP	Motor overload prediction	Motor current exceeds the overload detection level and is beyond the detection time	Refer to solutions to corresponding faults	Word 1 Bit 1
AL.ULd AL.ULd	Motor underload	Output current of frequency converter is less than the underload protection level and beyond the detection time	Refer to solutions to corresponding faults	Word 1 Bit 2
AL.Aco AL.Aco	Analog input connection loss	Analog input signal is lower than the connection loss threshold	Refer to solutions to corresponding faults	Word 1 Bit 4
AL.PLI AL.PLI	Input phase loss	Input phase is lost or three phases are imbalanced	Refer to solutions to corresponding faults	Word 1 Bit 5
AL.PLo AL.PLo	Output phase loss	Output phase loss	Refer to solutions to corresponding faults	Word 1 Bit 6
AL.C1E AL.C1E	Abnormal COMM1 communication	Communication timeout	Refer to solutions to corresponding faults	Word 1 Bit 7
AL.C2E AL.C2E	Abnormal COMM2 communication			Word 1 Bit 8
AL.EEP AL.EEP	Abnormal EEP storage	Parameter writing failure	Refer to solutions to corresponding faults Press ENTER to clear	Word 1 Bit 9
AL.dcL AL.dcL	DC bus undervoltage	The DC bus voltage is below the undervoltage point	The information is normal as per switching off display	Word 1 Bit 11
AL.Co1 AL.Col	Comparator 1 alarm	Generated by comparator 1	Check comparator 1 output definition	Word 1 Bit 12
AL.Co2 AL.Co2	Comparator 2 alarm	Generated by comparator 2	Check comparator 2 output definition	Word 1 Bit 13
AL.Co3 AL.Co3	Comparator 3 alarm	Generated by comparator 3	Check comparator 3 output definition	Word 1 Bit 14
AL.Co4 AL.Co4	Comparator 4 alarm	Generated by comparator 4	Check comparator 4 output definition	Word 1 Bit 15
AL.PGo AL.PGo	Encoder offline	Encoder no signal	Refer to solutions to corresponding faults	Word 2 Bit 0

AL.cno AL.cno	Contactor abnormality	The power grid voltage is too low	Check power grid	Word 2 Bit 1
		Contactor damage	Replace contactor and seek service	
		The power-on buffer resistor is damaged	Replace the buffer resistor and seek service	
		Control loop is damaged	Seek service	
AL.PLL AL.PLL	AC input power failure alarm	Three-phase power outage	Check the three-phase input line of the power grid	Word 2 Bit 2
AL.PcE AL.PcE	Parameter abnormality	Improper parameter setting	Correct parameter settings or restore factory defaults. Press ENTER to clear	Word 2 Bit 3
AL.oHI AL.oHI	Frequency converter overtemperature	Ambient overtemperature	Decrease the ambient temperature	Word 2 Bit 4
		Air ducts are blocked or fans are damaged	Clear the air ducts or replace the fans	
		Overload	Check the load or select large-power frequency converter	
AL.SA0 AL.SA0	Brake failure	The brake is damaged or the brake torque is insufficient	Replace the brake	Word 2 Bit 10
AL.SA1	Low voltage warning	Block the output when the bus voltage is too low, and resume normal operation when the voltage is restored	Check the grid voltage	Word 2 Bit 11

8 Maintenance and After-sales Services

Danger
1. Only professionally trained personnel can disassemble components, perform maintenance, and replace parts; **2. Before inspection and maintenance, make sure the frequency converter is powered off, the high voltage indicator is off, and the voltage between DC+ and DC- is less than 36V, otherwise there is a risk of electric shock;** **3. Do not leave screw, washer and other metal parts in the machine, otherwise equipment may be damaged and there will be fire risks;** **4. After replacing the control board, relevant parameters must be set before operation, otherwise equipment may be damaged.**

8.1 Daily Maintenance

It is necessary to periodically check the frequency converter and its operating environment because faults may be caused by dust, humidity, vibration and other factors in the environment, as well as aging and failure of devices. Maintaining a good operating environment, recording daily operation data, and finding out abnormal phenomena early are good ways to prolong the service life of the frequency converter. Following aspects shall be inspected in the daily maintenance of frequency converter:

1. Whether the operating environment of the frequency converter meets the requirements;

2. Whether the operating parameters of the frequency converter are within the specified range;

3. Whether there is abnormal vibration or noise;

4. Whether there is an abnormal odor;

5. Whether the fan is functioning normally;

6. Whether the input voltage is within the specified range, and whether the voltage of each phase is in balance.

8.2 Regular Maintenance

Users can inspect the frequency converter regularly once every three/six months as per the using environment. General inspection contents are as follows:

1. Whether the control terminal screws are loose;

2. Whether terminals of main loop are in poor contact, and whether the copper bar joints are overheated;

3. Whether power cables and control cables are damaged, especially whether the surface contacting with metal surface has scratches;

4. Whether the insulation cable tie of cold-pressed terminal of power cable has fallen off;

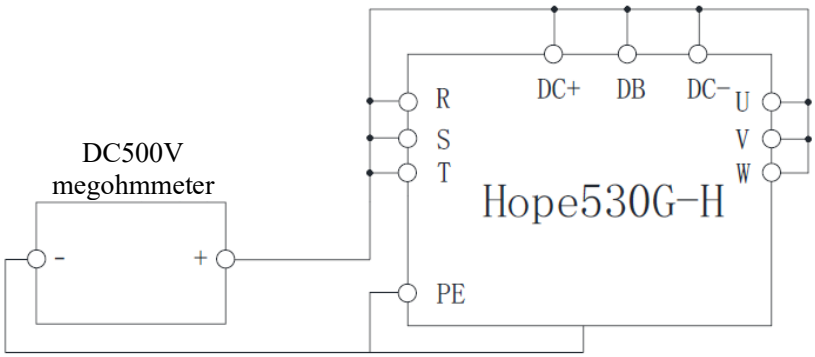
5. The dust in circuit board and air duct shall be cleaned thoroughly, and the dust collector shall be used for the best;

6. Frequency converters stored for a long time must go through one power-on test within two years, which shall last for nearly five hours. A voltage regulator shall be used to increase the voltage to rated value slowly without load.

Danger: If the insulation test of the motor is carried out, the wiring between the motor and the frequency converter must be disconnected, otherwise the frequency converter will be damaged.

Danger: The control loop shall not go through the withstand voltage test and insulation test, or circuit components will be damaged.

If you need to perform insulation test on the frequency converter, please connect as shown in the figure below, and you need to loosen the two Phillips screws corresponding to VAR and EMC (see Section 3.3 of Chapter 3 for details). The high-voltage (>500V) test has been completed before the product leaves the factory, it is strictly forbidden to perform the test again. The measurement result is required to be greater than 1MΩ.



8.3 Replacement of Frequency Converter Consumable Parts

Vulnerable parts of the frequency converter mainly include filtering electrolytic capacitors and cooling fans, with service life closely related to the operating environment and maintenance status. Users can determine whether the vulnerable parts need to be replaced according to the operating time.

♦ Cooling fan

Possible causes of damage: bearing wear, blade aging (fan lifespan is generally 30,000 to 40,000 hours).

Determination criteria: Whether there are cracks on fan blades and abnormal vibration sound when starting the machine.

Precautions for replacement:

1. Replace the fan with the model specified by the manufacturer (rated voltage, current, speed, and air volume must be the same);

2. The direction marked on the fan must be consistent with the supply air direction of the fan;

3. Do not forget to install the fan guard.

♦ Filter electrolytic capacitor

Possible cause of damage: High ambient temperature, frequent load jump, resulting in increased pulsating current, electrolyte aging.

Determination criteria: Whether there is liquid leakage, and whether the safety valve has bulged. Determination results of electrostatic capacitance and insulation resistance.

It is recommended to replace the electrolytic capacitor every four to five years.

8.4 Storage of Frequency Converter

After the user purchases the frequency converter, the following aspects must be paid attention to for temporary storage and long-term storage:

♦ Avoid storage in places with high temperature, high humidity, high dust content, or metal dust;

♦ Long-time storage will lead to deterioration of electrolytic capacitor, it must be guaranteed to be powered at least once for 5h every time within two years, the input voltage must be increased slowly to the rated value with the voltage regulator.

8.5 After-sales Service

The warranty period of the product is 12 months from the date of purchase, but repair is paid even within the warranty period in the following cases.

1. Damage caused by failure to operate and use according to user's manual;
2. Man-made damage caused by modification without permission;
3. Damage caused by use beyond the requirements of standard specifications;
4. Damage caused by falling down after purchase or caused in transport;
5. Damage caused by fire, flood, abnormal voltage, strong lightning strike, etc.

In case of abnormal working conditions of the frequency converter, check and adjust according to the Manual. In case of fault, please contact the supplier or the local electric company of SLANVERT or the company headquarters in time. Within the warranty period, the Company will provide free repair service for any fault due to the product manufacturing and design defects, and any defect beyond the warranty period will be repaired by the Company after being paid according to customer requirements.

9 Optional accessories

The optional accessories listed below, if necessary, please order from our company.

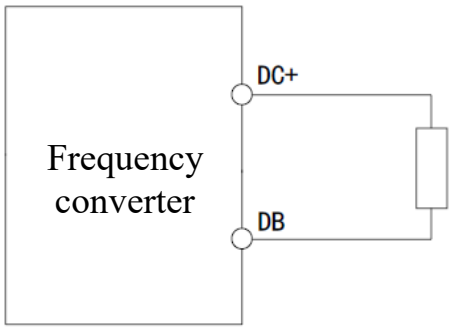
9.1 Braking Assemblies

For the frequency converter with built-in braking unit, you can choose a suitable braking resistor. The recommended selection of braking resistor and insulated cable is as follows:

Frequency Converter Specifications and Models	Braking unit	Minimum Power of Lifting Resistor (kW)	Minimum Power of Translational Resistor (kW)	Increased Minimum Resistance Value (Ω)	Recommended Resistor Selection (Ω)
Hope530G0.75T4B*-H	Built-in	0.35	0.15	165	650
Hope530G1.5T4B*-H	Built-in	0.75	0.3	111	300
Hope530G2.2T4B*-H	Built-in	1.1	0.44	75	200
Hope530G4T4B*-H	Built-in	2	0.8	43	100
Hope530G5.5T4B*-H	Built-in	2.7	1.1	32	90
Hope530G7.5T4B*-H	Built-in	3.7	1.5	23	60
Hope530G11T4B*-H	Built-in	5.5	2.2	17	40
Hope530G15T4B*-H	Built-in	7.5	3	14	30
Hope530G18.5T4B*-H	Built-in	9	3.7	11	25
Hope530G22T4B*-H	Built-in	11	4.4	9	25
Hope530G30T4B*-H	Built-in	15	6	7	20
Hope530G37T4B*-H	Built-in	18	7.5	6	15
Hope530G45T4B*-H	Built-in	22	9	5	13
Hope530G55T4B*-H	Built-in	27	11	4	10
Hope530G75T4B*-H	Built-in	37	15	3	7
Hope530G90T4BL-H	Built-in	43	18	3	6
Hope530G110T4BL-H	Built-in	55	22	3	5
Hope530G132T4BL-H	Built-in	62	26.4	3	4
Hope530G160T4BL-H	Built-in	88	32	3	4
Hope530G200T4L-H	SZ20G-380	50*2	20*2	≥3*2	3.4*2
Hope530G220T4L-H	SZ20G-380	55*2	22*2	≥3*2	3.4*2
Hope530G250T4L-H	SZ20G-380	63*2	25*2	≥3*2	3.4*2
Hope530G280T4L-H	Customized by manufacturer	70*2	28*2	≥3*2	3.4*2
Hope530G315T4L-H	Customized by manufacturer	80*2	31*2	≥3*2	3.4*2
Hope530G375T4L-H	Customized by manufacturer	60*3	24*3	≥3*3	3.4*3

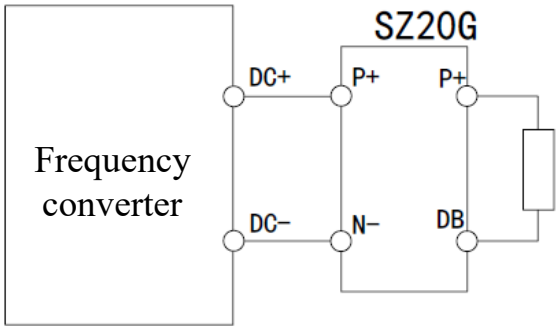
Note: When the resistance value exceeds the recommended data in the table, the braking ability will be weakened. Generally, it shall not be greater than 1.5 to 2.0 times the recommended resistance value.

The wiring diagram of the built-in braking unit is as follows:



For frequency converters without built-in braking unit, SZ20G series braking unit and braking resistor are required. The resistance value of the braking resistor shall not be less than the recommended value, otherwise the frequency converter may be damaged. The power of the braking resistor must be determined according to the power generation conditions of the actual load (the size of the power generation, the frequency of power generation, etc.).

The SZ20G series braking unit cooperates with the braking resistor to absorb the regenerative electric energy during motor braking and prevent overvoltage of the frequency converter. In addition to being used in SLANVERT frequency converters, it can also be used in frequency converters of other brands. At the same time, four braking voltages of 660V, 680V, 700V, and 720V are available, and multiple units can be used in parallel to obtain greater braking power. The wiring diagram of SLANVERT SZ series braking unit is as follows:



The wiring between the braking unit and the frequency converter and between the braking unit and the braking resistor shall be within 5m, and the surrounding loop area shall be minimized.

SLANVERT SZ series braking unit specifications are as follows:

Braking Unit Model	Resistance Value (Ω)	Adaptive Variable Frequency (kW)	Braking Voltage (V)
SZ20G-30	≥22	18.5/22	680
SZ20G-60	≥11	30/37	680
SZ20G-85	≥8	45/55	680
SZ20G-130	≥5	75/90	680
SZ20G-170	≥4	110	680
SZ20G-260	≥2.6	132/160	680
SZ20G-380	≥1.8	200/250	680

Note: When the resistance value exceeds the recommended data in the table, the braking ability will be weakened. Generally, it shall not be greater than 1.5 to 2.0 times the recommended resistance value.

⚠ **Note:** The braking resistor is a heating device, so be sure to install the cabinet independently when using it, otherwise there is a risk of fire.

9.2 Communication Assemblies

Control panel extension cable: The length of the control panel extension cable can be customized.

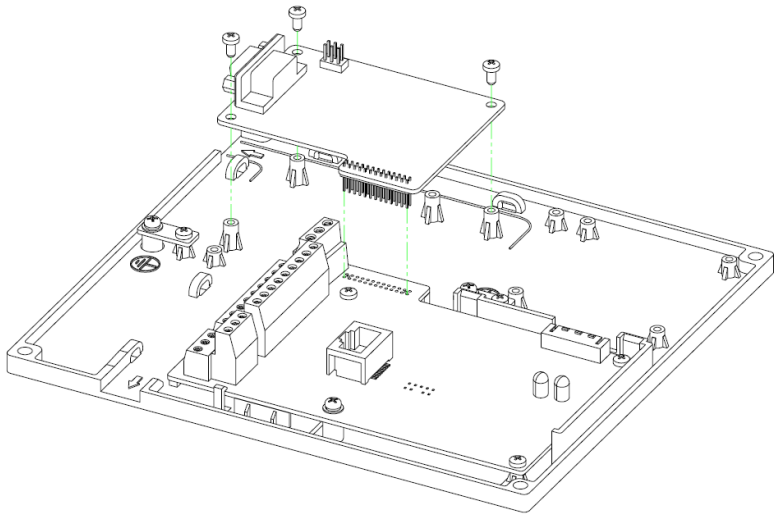
Other communication assemblies are listed in the table below:

Communication Assembly Name	Models Compatible with Units of 11kW and Above	Models Compatible with Units of 7.5kW and Below
Profibus-DP module	SL510-DP	-
PROFINET module	SL510-PN	SL530-PN
Isolated RS485 communication module	SL510-COMM1	SL530-COMM1
Isolated RS485 communication module (supports TCP)	SL510-COMM2	SL530-COMM2

Note: For models with 7.5kW and below, if DP communication is required, please specify in advance when placing the order.

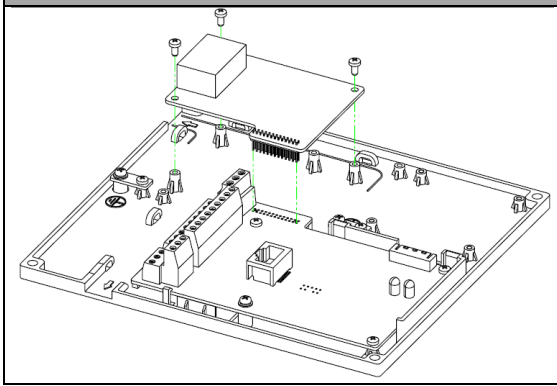
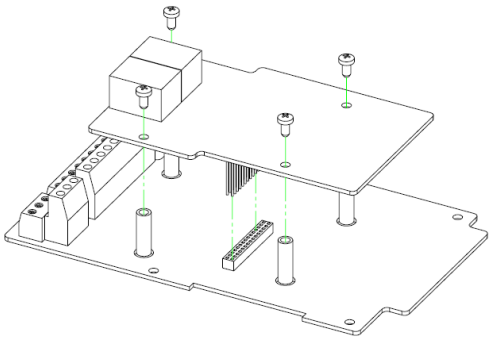
(I) Profibus-DP Module

The installation and wiring diagrams for the Profibus-DP module on the control board of models with 11kW and above are as follows:



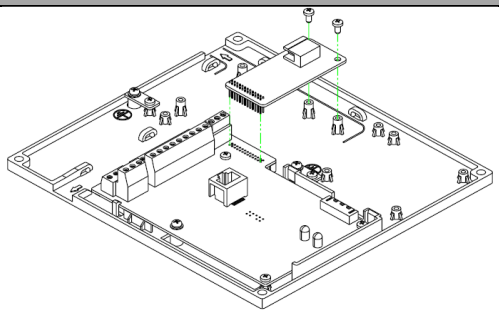
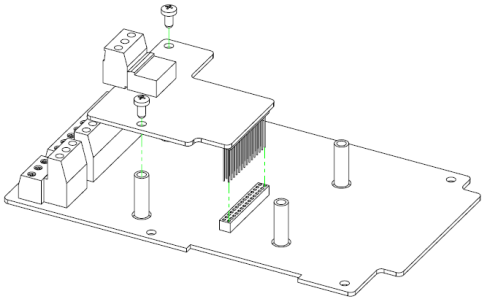
(II) PROFINET Module

The schematic diagram of the installation and wiring of the PROFINET module on the control board is as follows:

Wiring Diagram for Installation of Models of 11kW and Above	Wiring Diagram for Installation of Models of 7.5kW and Below
	

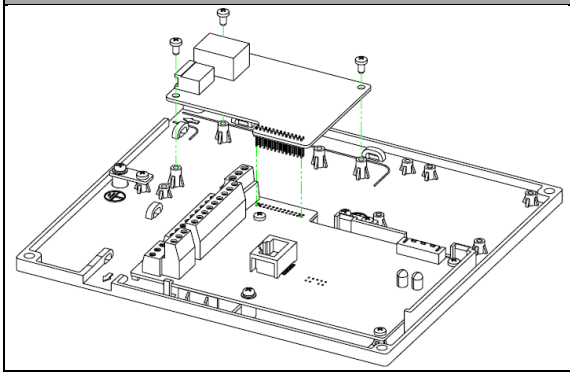
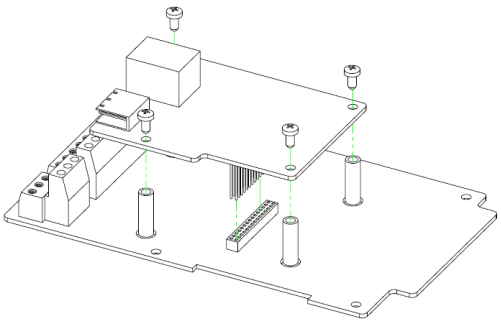
(III) Isolated RS485 Communication Module

The installation and wiring diagram of the isolated RS485 communication module on the control board is as follows:

Wiring Diagram for Installation of Models of 11kW and Above	Wiring Diagram for Installation of Models of 7.5kW and Below
	

(IV) Isolated RS485 Communication Module (Supports TCP)

The wiring diagram for installing the isolated RS485 communication module (supports TCP) on the control board is as follows:

Wiring Diagram for Installation of Models of 11kW and Above	Wiring Diagram for Installation of Models of 7.5kW and Below
	

9.3 AC Reactor

The AC reactor on the input side can suppress the higher harmonics of the input current of the frequency converter and improve the power factor on the input side. Recommended for use in the following situations: When the power grid capacity is

significantly larger than the frequency converter capacity and the frequency converter power is greater than 30kW;

■ A thyristor load or a power factor compensation device with switch control is connected to the same power supply;

■ The voltage unbalance of the three-phase power supply is greater than 3%;

■ The power factor on the input side needs to be improved.

The AC reactor on the output side has the following functions:

■ Reduce output harmonics of frequency converter;

■ Prevent motor insulation damage;

■ Reduce the common mode interference on the output side and reduce the motor shaft current.

9.4 EMI Filter and Ferrite Common Mode Filter

The EMI filter is used to suppress the radiation interference generated by the frequency converter, as well as external radio interference and the interference of the instantaneous impact and surge to the frequency converter. The ferrite common mode filter (magnetic ring) is used to suppress the radiated interference generated by the frequency converter.

Filters shall be used in situations where there is a high requirement to prevent radio interference and compliance with CE, UL, and CSA standards, or when there are equipment with insufficient anti-interference ability around the frequency converter. When installing, keep the wiring as short as possible, and the filter shall be as close to the frequency converter as possible.

9.5 Digital I/O Expansion Board

Digital I/O expansion board is used to expand the number of digital input terminals and relay output terminals.

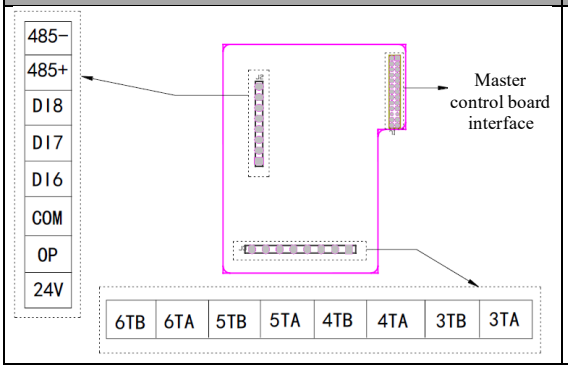
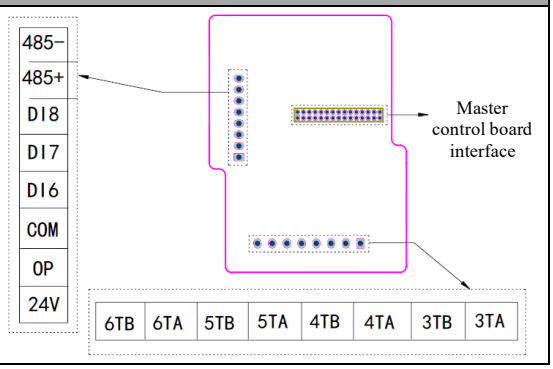
For the basic wiring of the digital input part, see the connection diagram of the multi-function input terminals and external devices on page 37.

The digital I/O expansion board provides multiple digital inputs and relay outputs, which can be selected by the user. The models of digital I/O expansion boards applicable to the Hope530-H series are shown in the table below:

Expansion board model		Expansion function	Remarks
Compatible with models of 11kW and above	Compatible with models of 7.5kW and above		
SL510-DIO1	SL530-DIO1	3DI+4T+RS485	3 digital inputs, 4 relay outputs, RS485 communication, with SL510-DIO2 and SL530-DIO2 additionally supporting RTC function
SL510-DIO2	SL530-DIO2	3DI+4T+RS485+RTC	
SL510-DIO3	-	5DI+2T	5 digital inputs, 2 relay outputs

Taking SL510-DIO1 and SL530-DIO1 as examples, the functional specifications are as follows:

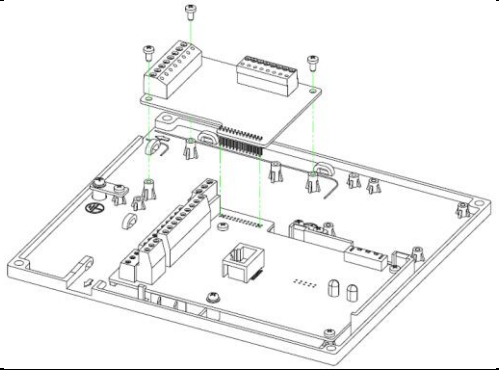
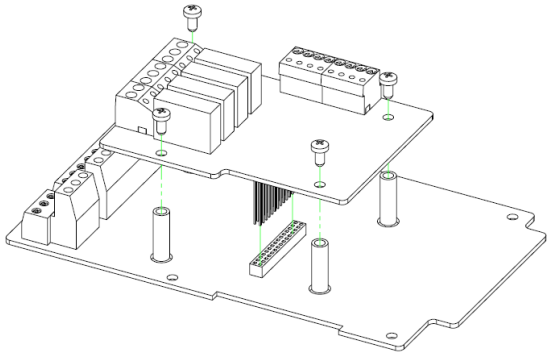
The terminal distribution of some expansion boards is as follows:

SL510-DIO1 Expansion Board Wiring Terminal Distribution	SL530-DIO1 Expansion Board Terminal Distribution
	

The terminal function descriptions of the SL510-DIO1 and SL530-DIO1 expansion boards are as follows:

Terminal symbol	Terminal name	Terminal Function & Description	Technical Specifications
24V	24V power terminal	24V power supply provided to the user	24V maximum output current 80mA
COM		24V power ground	
OP	Digital input common terminal	Common terminal of DI6-DI8 terminals	The interior is isolated from COM and 24V. For the use of the OP terminal, see the basic operation wiring connection diagram
DI6	DI6 digital input terminal	See F4 menus for function selection and settings. Monitoring parameters: FU-43	Optocoupler-isolated Support bi-directional input Input impedance: >3k Ω Input voltage range: <30V Sampling period: 1ms High level: voltage difference with OP >10V Low level: Voltage difference with OP <3V
DI7	DI7 digital input terminal		
DI8	DI8 digital input terminal		
485+	Positive terminal of 485 differential signal	RS485 communication interface	Can connect 1-32 RS485 sites Input impedance: >10kΩ
485-	Negative terminal of 485 differential signal		
3TA	Output terminal of relay 3	See F5 menu for function selection and settings Monitoring parameters: FU-45	TA-TB: normally open Contact specification: 250VAC/3A 24VDC/5A
3TB			
4TA	Output terminal of relay 4		
4TB			
5TA	Output terminal of relay 5		
5TB			
6TA	Output terminal of relay 6		
6TB			

Installation method: Ensure the frequency converter is powered off, then install the SL510-DIO1 and SL530-DIO1 expansion boards onto the control board as shown in the diagram below.

Installation Diagram of SL510-DIO1 on Models with 11kW and Above	Installation Diagram of SL530-DIO1 on Models with 7.5kW and Below
	

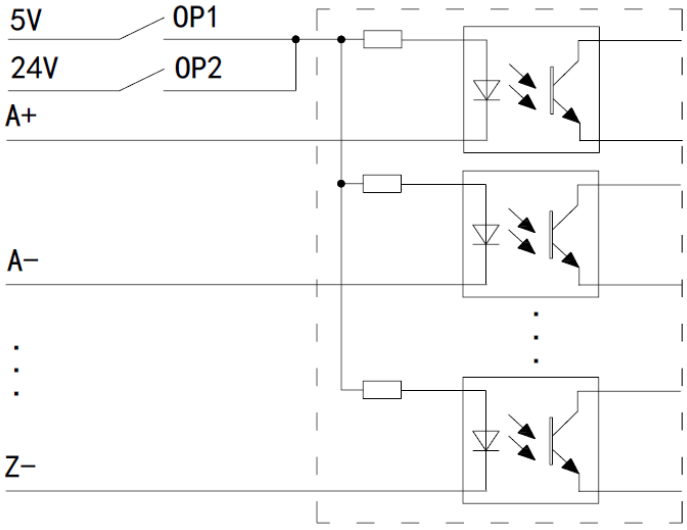
9.6 Encoder Interface Board

The encoder interface board is used to receive the encoder signal, so that the frequency converter can carry out PGV/F control or PG vector control. It can also be used for high-speed counting or meter counting by a counter or length counter. Additionally, it can be connected to the frequency given and other purposes through analog output 18 "PG detection frequency".

Encoder Interface Board Name	Models Compatible with Units of 11kW and Above	Models Compatible with Units of 7.5kW and Below
Pulse generator signal adapter board	SL510-PG0	SL530-PG0
Resolver encoder signal adapter board	SL530-PG1	-

The pulse generator signal adapter board provides isolated power supplies of 24V and 5V.

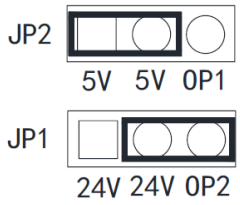
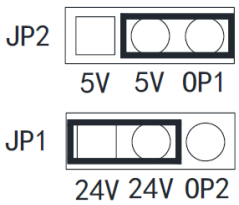
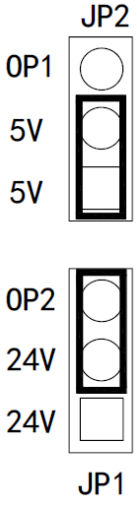
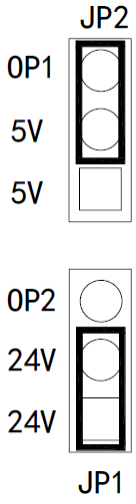
Note: SL510-PG0 and SL530-PG0 must correctly select the encoder interface type and power supply through jumpers. The factory jumper is 24V. The basic wiring for SL510-PG0 and SL530-PG0 is as follows:



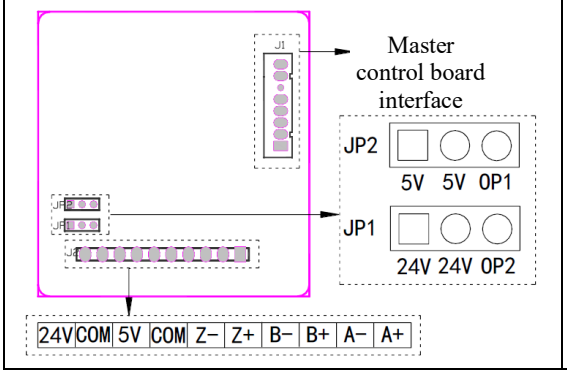
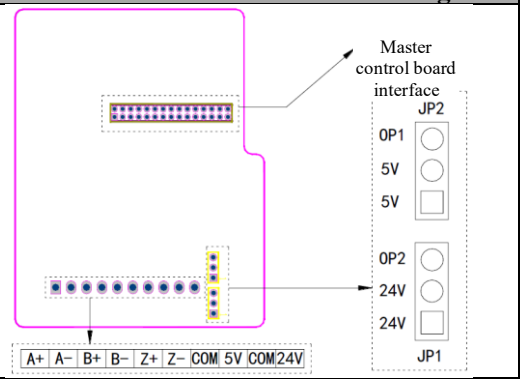
The terminal functions and specifications of the SL510-PG0 and SL530-PG0 encoder interface board are shown in the table below:

Terminal symbol	Terminal name	Terminal Function & Description	Technical Specifications
A+	Encoder A+ input terminal	Encoder A same-phase signal input	Maximum input frequency: 300kHz; The single-channel encoder is only connected to the A channel; Non-differential input type must be connected from A+, B+, or Z+. In this case, A-, B-, and Z- must all be shorted to the COM of the encoder interface board
A-	Encoder A- input terminal	Encoder A reverse-phase signal input	
B+	Encoder B+ input terminal	Encoder B same-phase signal input	
B-	Encoder B- input terminal	Encoder B reverse-phase signal input	
Z+	Encoder Z+ input terminal	Encoder Z same-phase signal input	
Z-	Encoder Z- input terminal	Encoder Z reverse-phase signal input	
COM	Power ground	The 24V and 5V power supplies and input signal grounds are isolated from the main control board GND	-
24V	24V power terminal	24V power supply for users	Maximum output current: 80mA
5V	5V power terminal	5V power supply for users	Maximum output current: 200mA

The instructions for using the power jumper of the encoder interface board are as follows:

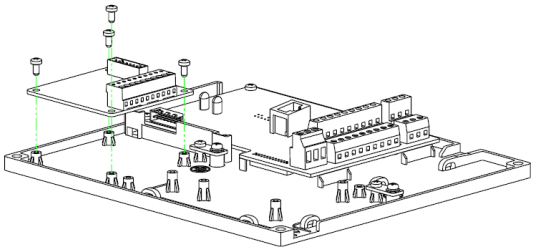
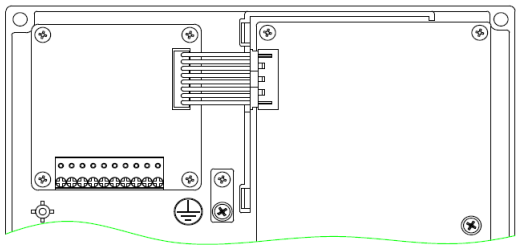
SL510-PG0		SL530-PG0	
Jumper Position for 24V Power Supply	**Jumper Position for 5V Power Supply**	**Jumper Position for 24V Power Supply**	**Jumper Position for 5V Power Supply**
			

The wiring terminals of the encoder expansion board are distributed as follows:

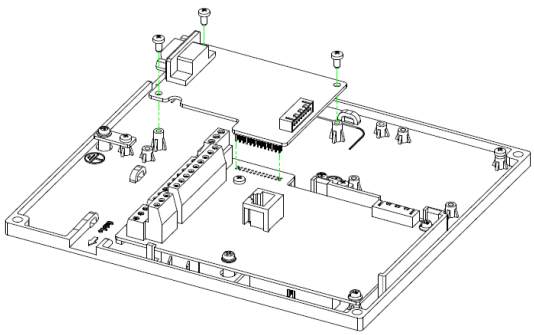
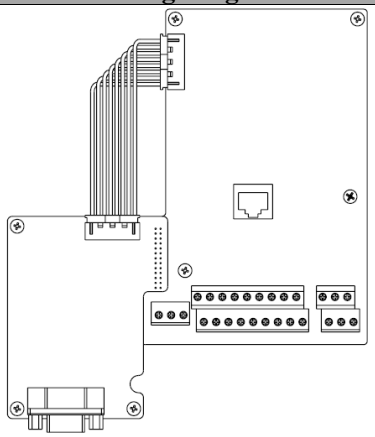
SL510-PG0 Terminal Distribution Diagram	SL530-PG0 Terminal Distribution Diagram
	

Installation method: (1) Confirm that the frequency converter is powered off; (2) Install the encoder signal adapter board according to the encoder installation diagram; (3) Connect the encoder expansion board to the control board according to the method shown in the encoder wiring diagram.

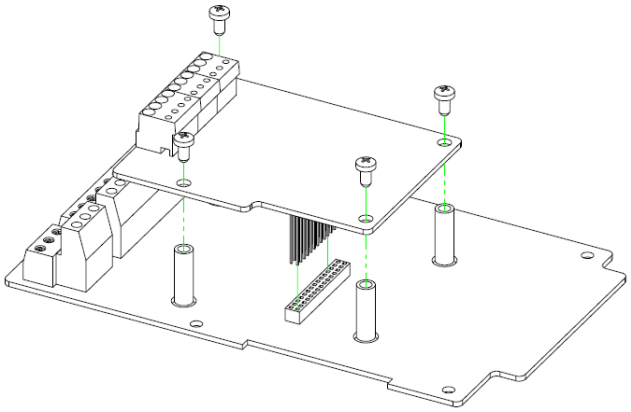
The wiring and installation diagrams of SL510-PG0 on models with 11kW and above are as follows:

Installation Diagram	Wiring Diagram
	

The wiring and installation diagrams for SL530-PG1 on models with 11kW and above are as follows:

Installation Diagram	Wiring Diagram
	

The wiring and installation diagrams for the SL530-PG0 in models of 7.5kW and below are as follows (the SL530-PG0 does not require additional wiring to the control board):



⚠Note	**1. Check whether the coaxiality of the connection between the mechanical shaft and the encoder meets the requirements. If not, torque fluctuation and mechanical vibration will occur.** **2. It is recommended to use a shielded twisted pair to connect the encoder and the encoder interface board. The shielding layer of the shielded line close to the frequency converter end must be connected to the COM of the encoder interface board.** **3. The encoder signal line and power line must be separated, otherwise electric magnetic interference will affect the output signal of the encoder.** **4. Grounding the encoder housing can reduce interference.**

9.7 Operation Panel Option

The operation panel options can be installed away from the frequency converter. The options are as follows:

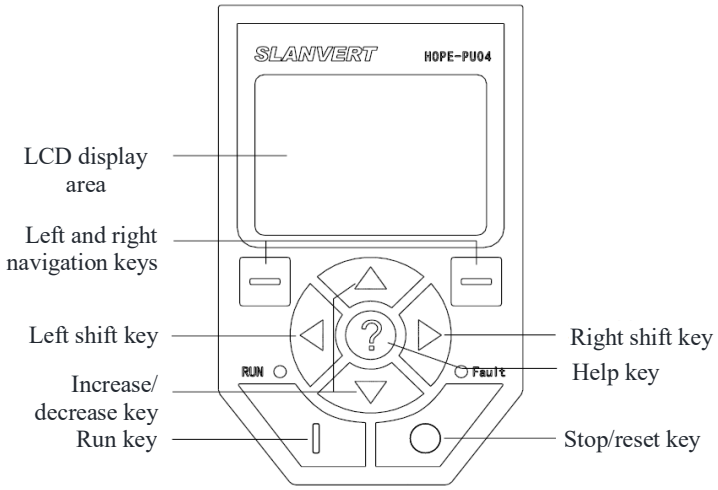
List of Operation Panel Options

Order No.	Product Details
H510-E-1-0m	HOPE-PU04 + installation box
H510-E-1-2m	HOPE-PU04 + installation box + 2m extension cable
H510-E-1-3m	HOPE-PU04 + installation box + 3m extension cable
H510-E-1-5m	HOPE-PU04 + installation box + 5m extension cable
H510-E-2-0m	HOPE-PU07 + installation box
H510-E-2-2m	HOPE-PU07 + installation box + 2m extension cable
H510-E-2-3m	HOPE-PU07 + installation box + 3m extension cable
H510-E-2-5m	HOPE-PU07 + installation box + 5m extension cable

9.7.1 Functions of Operation Panel

The HOPE-PU07 is the standard LED operation panel, but it can also be configured with the HOPE-PU04 (LCD operation panel) or HOPE-PU10 (LED operation panel with potentiometer) based on customer requirements. External extension operation panels can use HOPE-PU04, HOPE-PU07, or HOPE-PU10. For functions and display information, please refer to the relevant content in Chapter 4.

HOPE-PU04 liquid crystal display (LCD) operation panel can set and view parameters, run control, display faults, alarm information, help information, parameter copying and other functions. The operation panel is as follows:



Note 1: The communication data format of the LCD operation panel is fixed to range 0 (i.e., 8, N, 1).

Note 2: The LCD display panel occupies the COMM1 communication interface. COMM1 is no longer available externally. For communication, a communication expansion card needs to be configured.

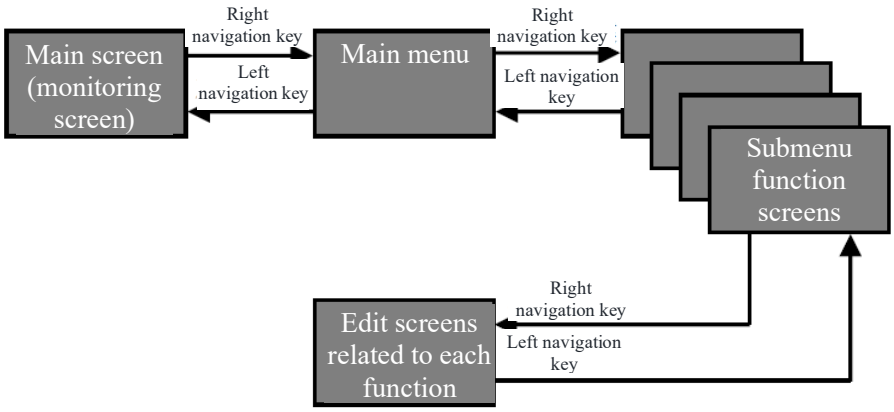
The meanings of the two status indicators RUN and Fault on the operation panel are shown in the following table:

Indicator light	Display status	Indicated current status of the frequency converter
RUN indicator	Off	Standby status
	On	Stable operating status
	Flashing	Accelerating or decelerating
Fault indicator	Off	Fault-free status
	On	Fault status

Functions of keys on HOPE-PU04 operation panel are shown below:

Key label	Key name	Function
	Left/right navigation keys	The corresponding function is completed according to the display of its corresponding position.
△	Increase key	The number increases progressively, and increases faster when long pressing it down
▽	Decrease key	The number decreases progressively, and decreases faster when long pressing it down
◁	Left shift key	Select the bit to be modified; in monitoring mode, the monitored parameters can be displayed cyclically
▷	Right shift key	
	Run key	Run command
○	Stop/reset key	Shutdown, fault reset
	Help key	When there are alarms and faults displayed, press this key to display help information

The basic hierarchical structure of the LCD operation panel is as follows:



Menu structure function table:

Main Menu	Submenu	Function
All parameters	Each functional group number	Set frequency converter parameters
PID regulator	-	Set PID-related parameters
I/O port settings	Digital input	Enter related parameters
	Digital output	
	Analog input	
	Analog output	
I/O port status	DI terminal status	Show related status
	DO terminal status	
	Relay terminal	
	Analog input terminal	
Parameter backup	Upload to panel	Perform related operations
	Download to the frequency converter	
	Parameters different from the panel	
	Clear backup data	
Modified parameters	-	Display parameters different from factory values
User parameters	User parameter list	Modify related functions
	Change user parameters	Define user parameter function number
LCD settings	LCD contrast adjustment	Modify display contrast
	Time setting	Set time
	Monitor menu font	Modify the main screen display mode
	Monitoring item switching time	Modify the main screen monitoring item switching time
	∧ ∨ key given selection	Define the role of the ∧ ∨ keys in the main screen
	LCD software version Vx.xx	Current software version
	LCD monitoring content selection	Modify the monitoring content of six monitoring items on the main screen
	Language selection	Select language (Chinese/English)

Description of key combinations:

■ Lock the keyboard: (the function of FC-01 needs to be modified) Hold down the left key and then press the ▷ key, and it will return to the monitoring screen display after success.

■ Keyboard unlock: Simultaneously press and hold the left key and right key (for more than 3s).

■ Password lock: Press the right key and key at the same time.

■ Free stop: (The panel is not locked, and the running command channel is non-communication control) First hold down the left key, and then double-click the key.

■ In the parameter setting interface, press the key and the key at the same time to enter the previous parameter setting interface.

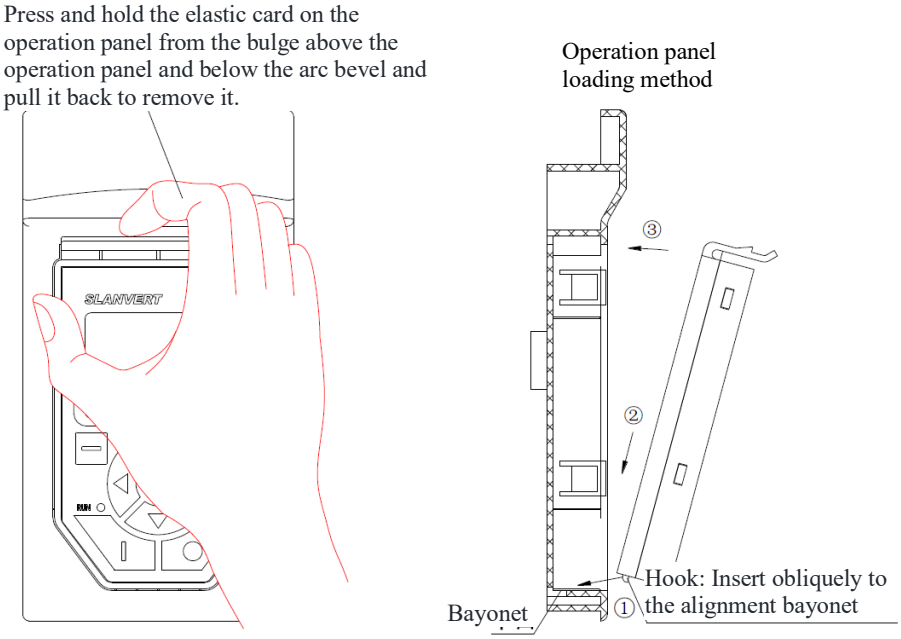
■ In the parameter setting interface, press the key and the key at the same time to enter the next parameter setting interface.

■ Administrator password input: Press the right key and key at the same time.

9.7.2 Removal and Installation of the Operation Panel

Removal: Put your fingers on the protrusions above the operation panel and below the arc-shaped slope, press firmly on the shrapnel on the upper end of the operation panel and pull it out, as shown in the figure below.

Installation: Connect the bottom fixing bayonet of the operation panel to the bayonet hook under the installation slot of the operation panel, press and hold the upper part of the operation panel and push it inward with your finger, and then release it, as shown in the following figure:



9.7.3 The operation panel is installed on the cabinet panel

The operation panels HOPE-PU04 or HOPE-PU07 of Hope530-H frequency converter can be also installed on the panel of cabinet and can be connected with frequency converter body via extension cables. Users can install it via the operation panel

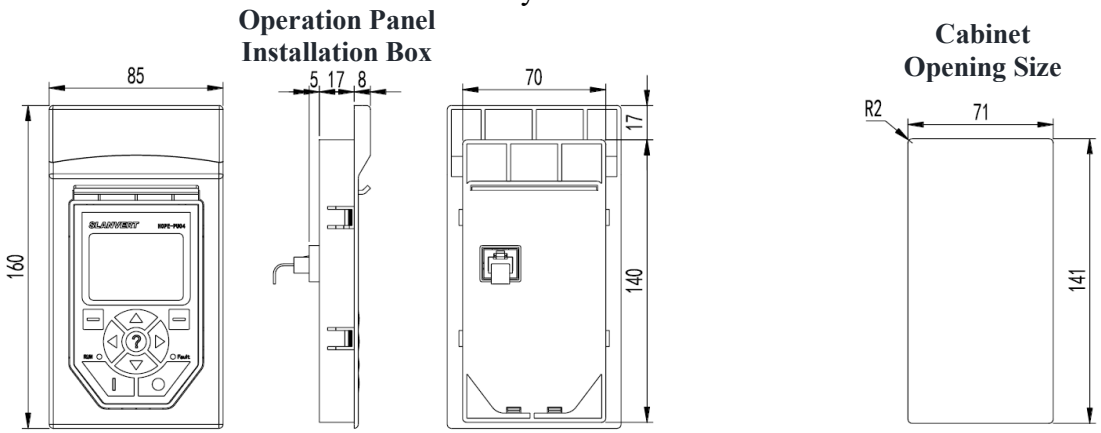
installation box according to the steps below:

① Opening holes on the cabinet panel as shown in the following figure;

② Install the operation panel installation box (optional) on the cabinet panel;

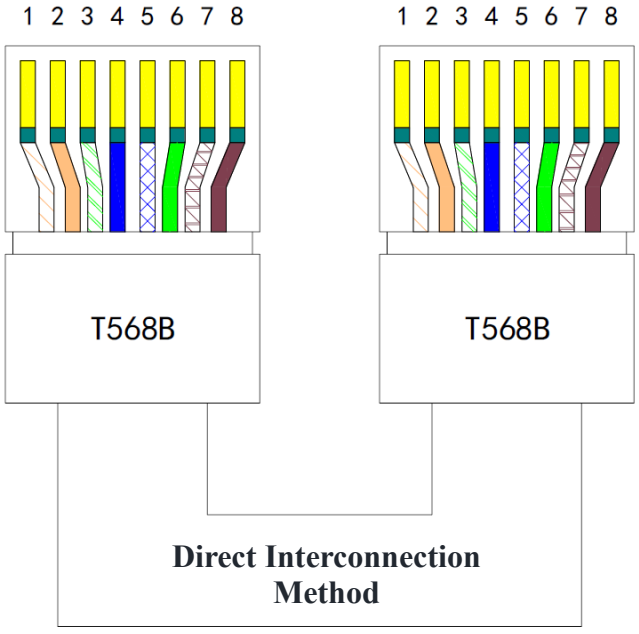
③ Install the operation panel into the installation box;

④ Insert the socket at the end of the extension cable into the operation panel. Insert the other end into the corresponding socket on the circuit board of frequency converter and lock it. Put the chassis cover carefully.



Note: Requirements for extension cables of operation panel are as follows:

Connection of extension cables of operation panel for HOPE-PU04 and HOPE-PU07 shall be subject to standard T568B (direct interconnection method) with RJ-45 joint (crystal head) adopted in crimping mode of corresponding relationship, i.e., 1-1, 2-2, 3-3, ..., 8-8 (colors of cables crimped in slot positions 1-8 of crystal head are respectively white-orange, orange, white-green, blue, white-blue, green, white-brown, brown according to T568B). See the figure below:



9.8 Analog I/O Expansion Board

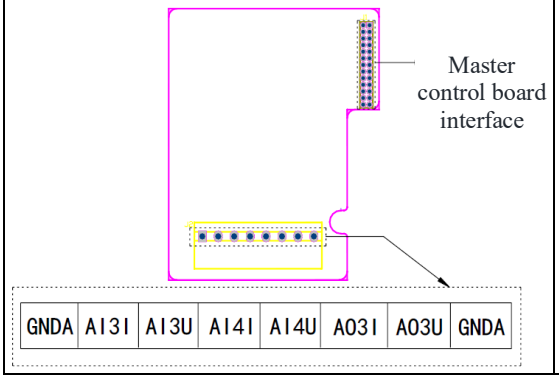
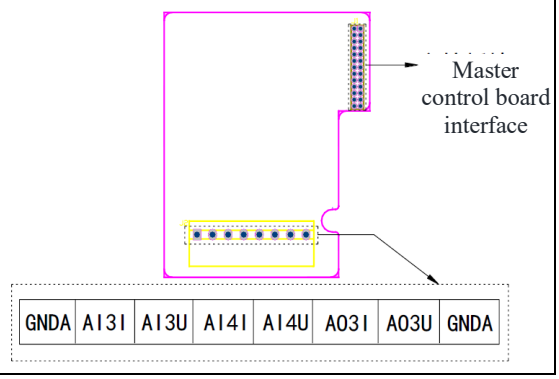
The analog I/O expansion board is used to expand the number of analog input and

analog output terminals.

The analog I/O expansion board provides multiple analog inputs and outputs, and supports analog voltage input and analog current input. The models of analog I/O expansion boards applicable to each model of the Hope530-H series are shown in the table below:

Expansion board model		Expansion function	Remarks
Compatible with models of 11kW and above	Compatible with models of 7.5kW and above		
SL510-AIO1	SL530-AIO1	2AI+1AO	2-channel analog input (both voltage and current) 1-channel analog output (both voltage and current)

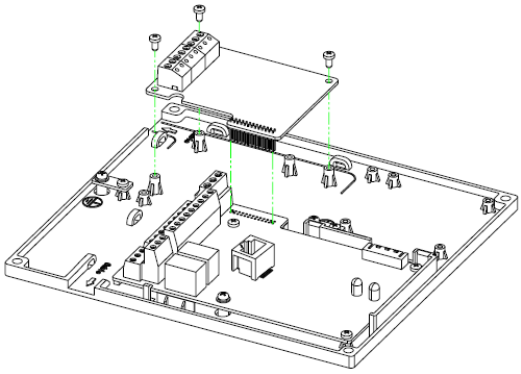
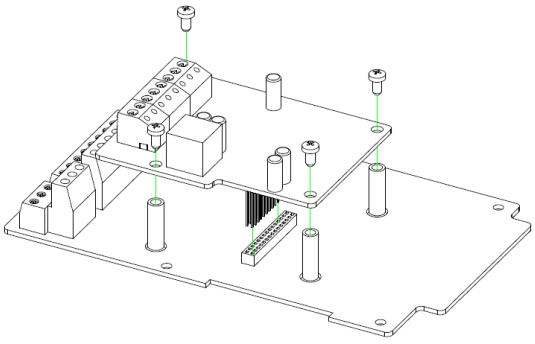
The terminal distribution is as follows:

SL510-AIO1 Expansion Board Terminal Distribution	SL530-AIO1 Expansion Board Terminal Distribution
	

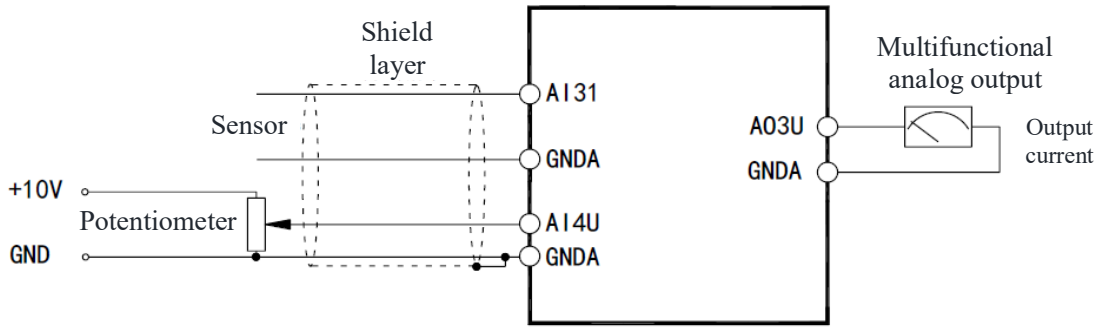
The terminal functions of the SL510-AIO1 and SL530-AIO1 expansion boards are described as follows:

Terminal symbol	Terminal name	Terminal Function & Description	Technical Specifications
GNDA	Ground	Grounding terminal for analog input/output	GNDA is internally isolated from COM, OP, and CME
AI31	Analog input 3I (current input)	Function selection: Refer to the description of parameters F6-37 to F6-56.	Input voltage range: 0-10V Input current range: 0-20mA Input impedance: voltage input: 110kΩ Current input: 250Ω
AI3U	Analog input 3U (voltage input)		
AI4I	Analog input 4I (current input)		
AI4U	Analog input 4U (voltage input)		
AO3I	Multi-function analog output 3I (current output)	Function selection: Refer to the description of parameters F6-57 to F6-60.	Current type: 0-20mA, load ≤500Ω Voltage type: 0~10V, output ≤10mA
AO3U	Multi-function analog output 3U (voltage output)		

Installation method: Confirm that the frequency converter is powered off, and then install the expansion board on the control board as shown in the figure below.

Installation Diagram of SL510-AIO1 Models on 11kW and Above	Installation Diagram of SL530-AIO1 on Models 7.5kW and Below
	

Wiring method: The AI and AO terminals of the SL510-AIO1 and SL530-AIO1 expansion boards have two types, i.e., voltage type and current type. Only one can be used for the same channel. Taking AI3 as a current type input, AI4 as a voltage type input, and AO3 as a voltage type output as examples, the actual wiring method during installation is as shown in the figure below:



Wiring Diagram for SL510-AIO1 and SL530-AIO1

9.9 Embedded Installation Hanging Bar

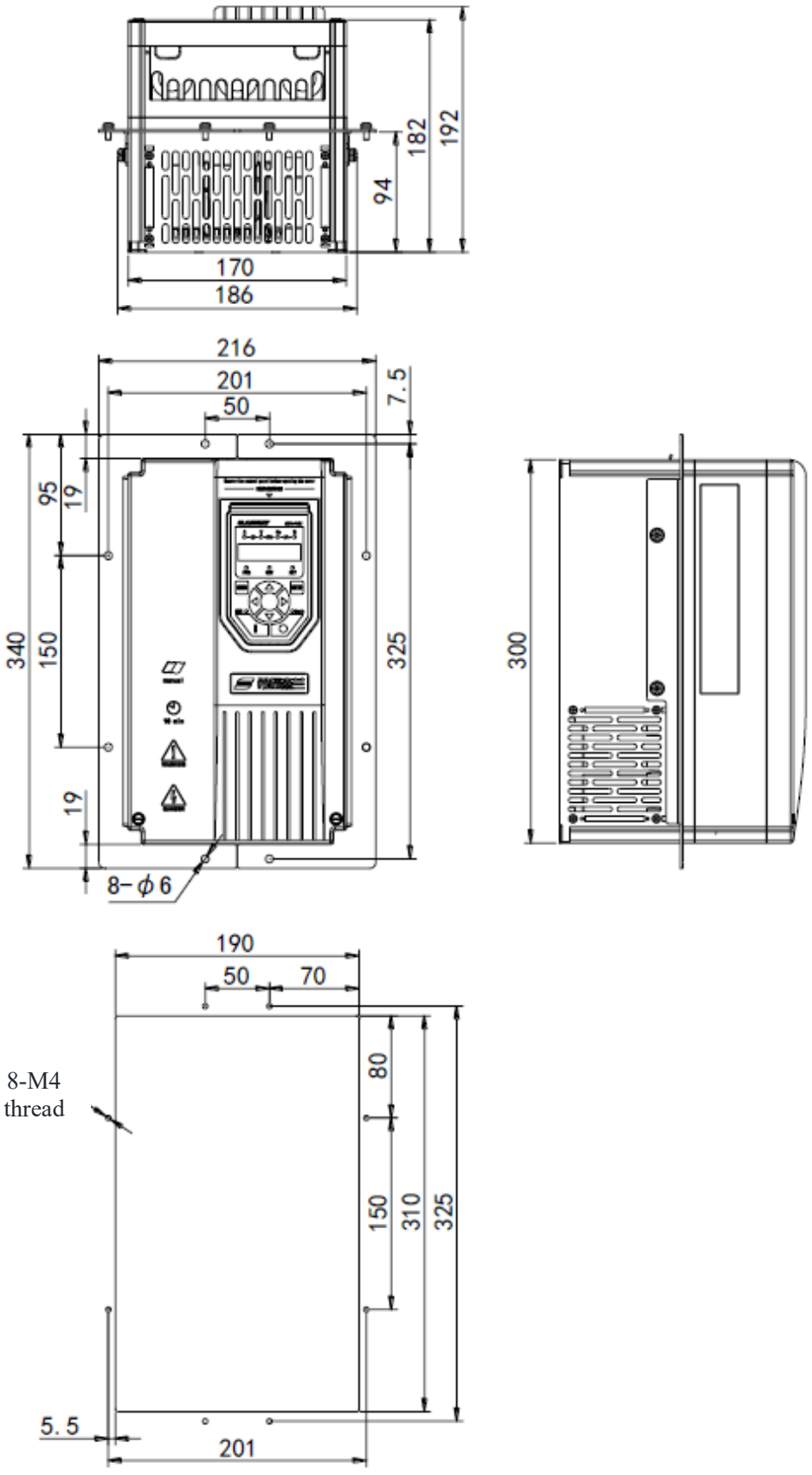
The embedded installation hanging bar is used to connect the frequency converter with the installation cabinet. The corresponding models of the hanging bar suitable for each model are as follows:

List of Embedded Installation Hanging Bar Models

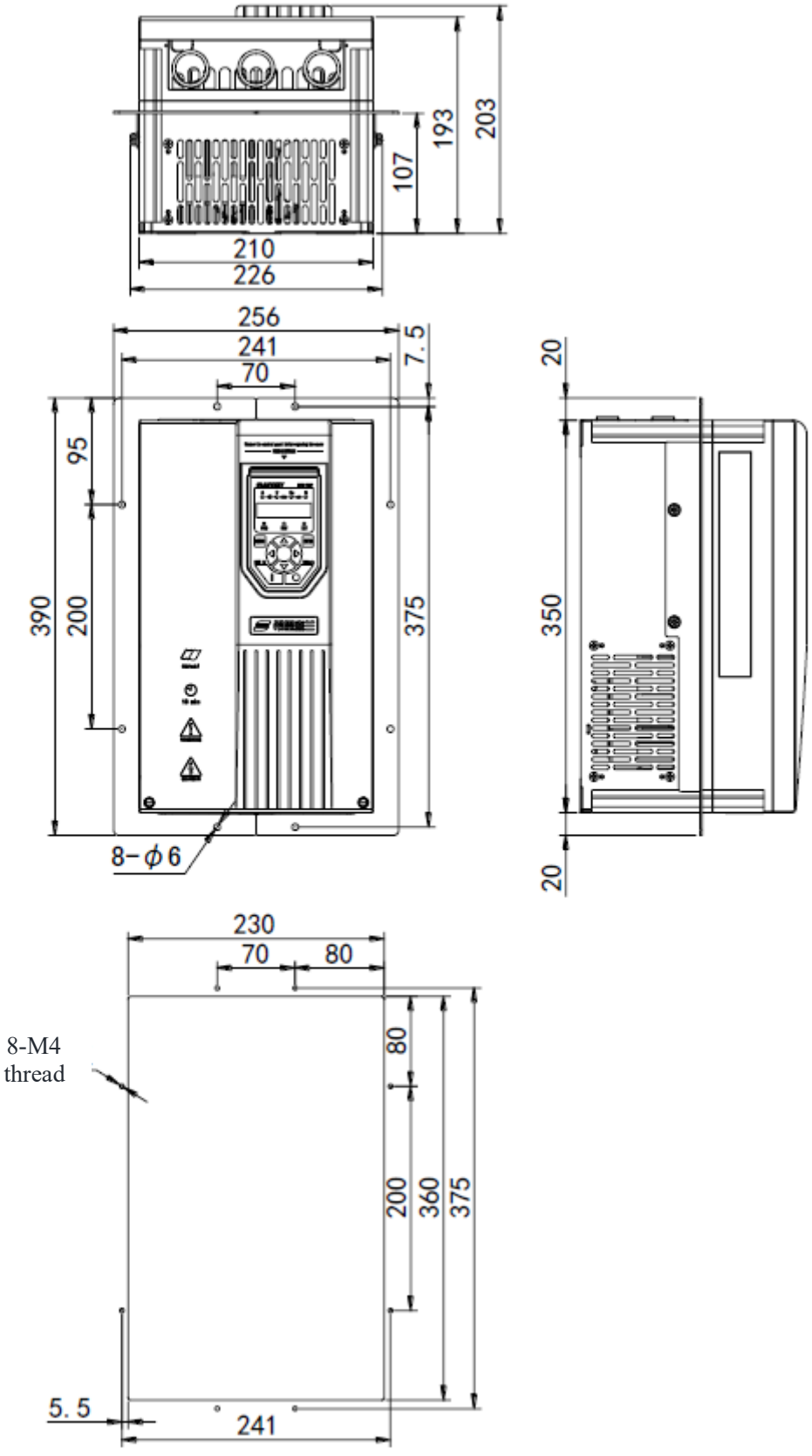
Frequency converter model	Corresponding Embedded Installation Hanging Bar Order Number	Dimensions
Hope530G11T4B*-H	H510-A-1	Please refer to the following illustrations for the embedded installation hanging bars and opening size.
Hope530G15T4B*-H		
Hope530G18.5T4B*-H	H510-A-2	
Hope530G22T4B*-H		
Hope530G30T4B*-H	H510-A-3	
Hope530G37T4B*-H		
Hope530G45T4B*-H	H510-A-4	
Hope530G55T4B*-H		
Hope530G75T4B*-H	H510-A-5	
Hope530G90T4BL-H		
Hope530G110T4BL-H		
Hope530G132T4BL-H	H530-A-6	

Hope530G160T4BL-H		

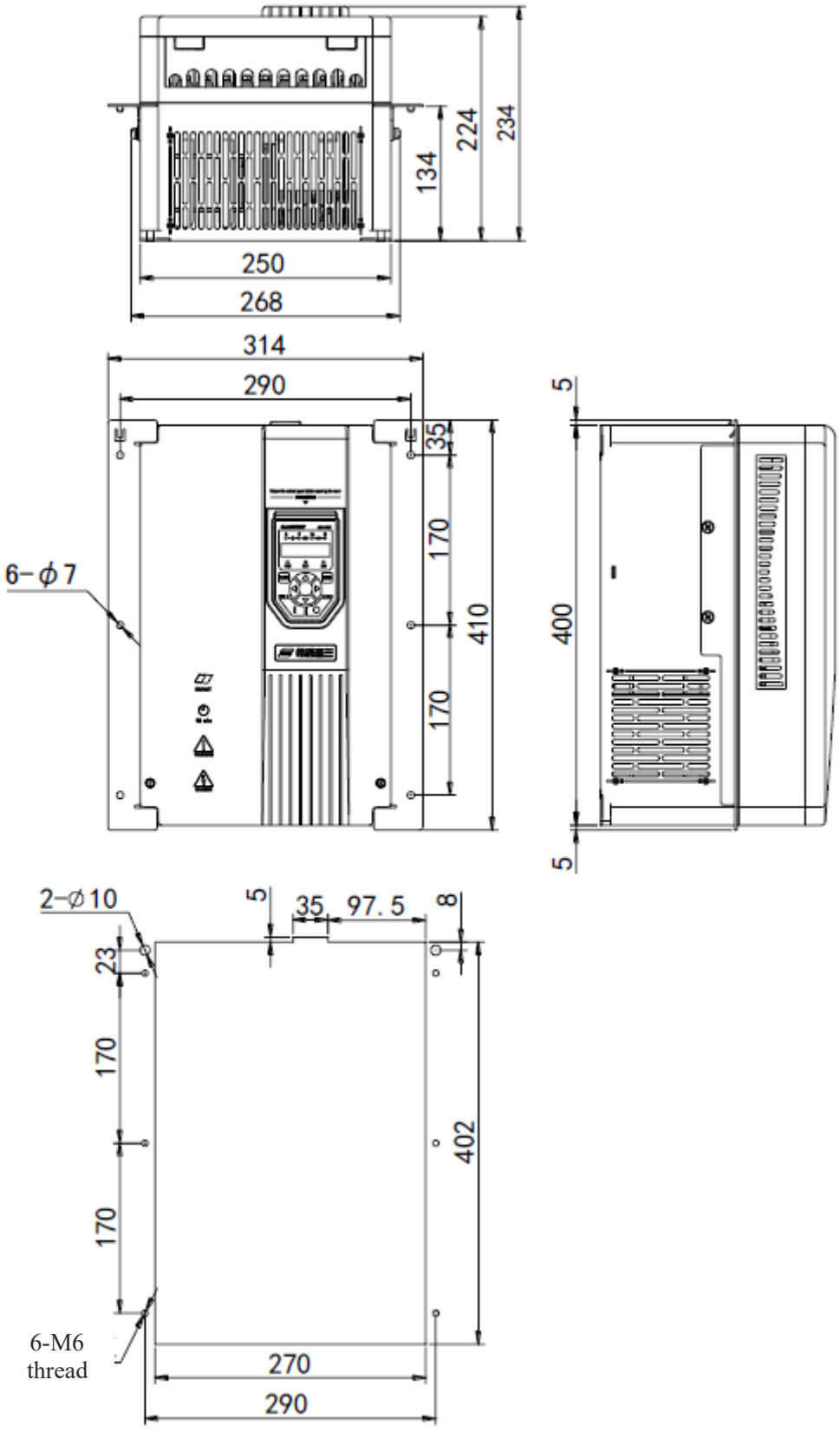
The installation of 200kW and above power that requires embedded installation. Please contact the manufacturer.



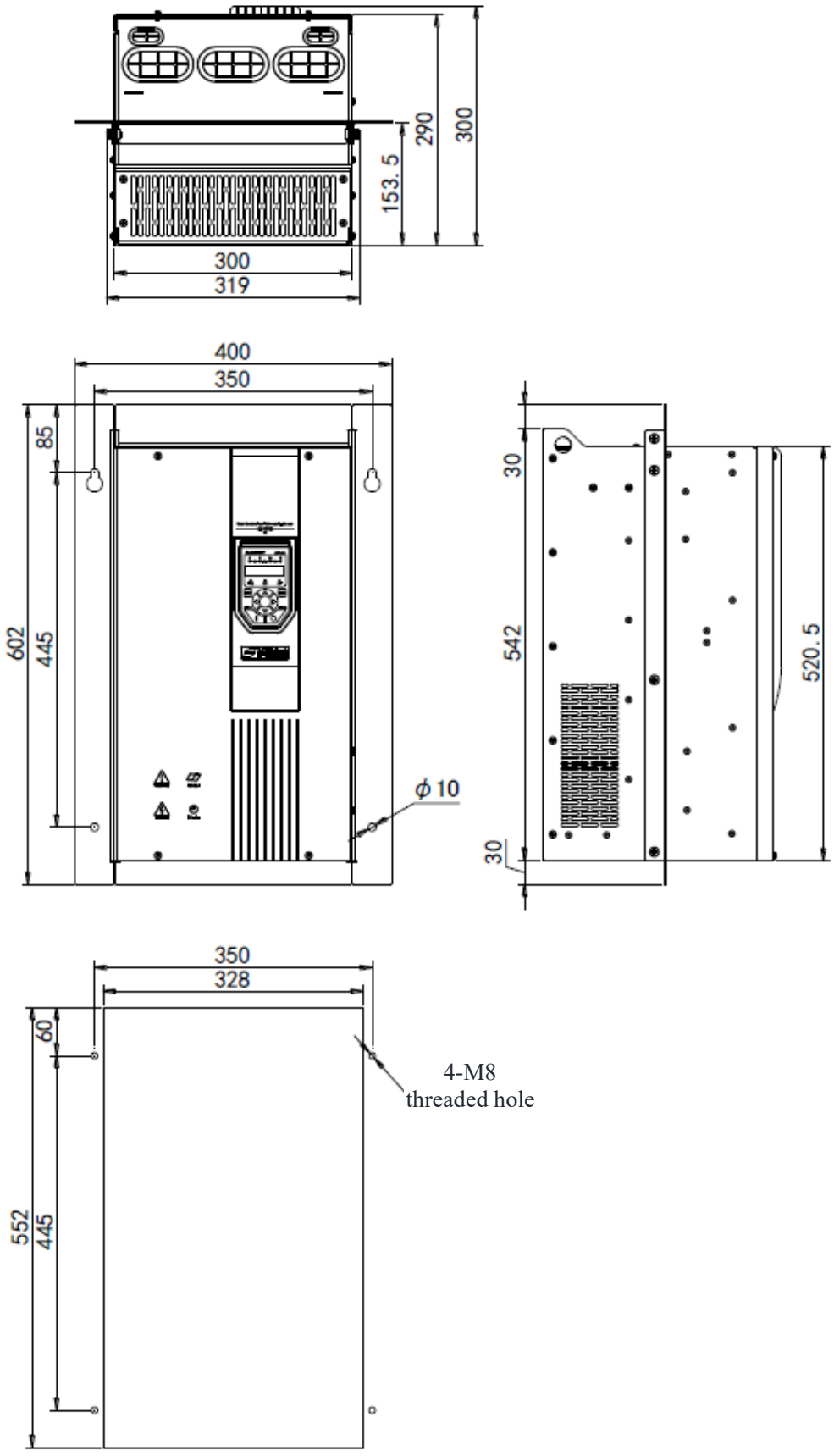
H510-A-130 installation hanging bar and opening size diagram



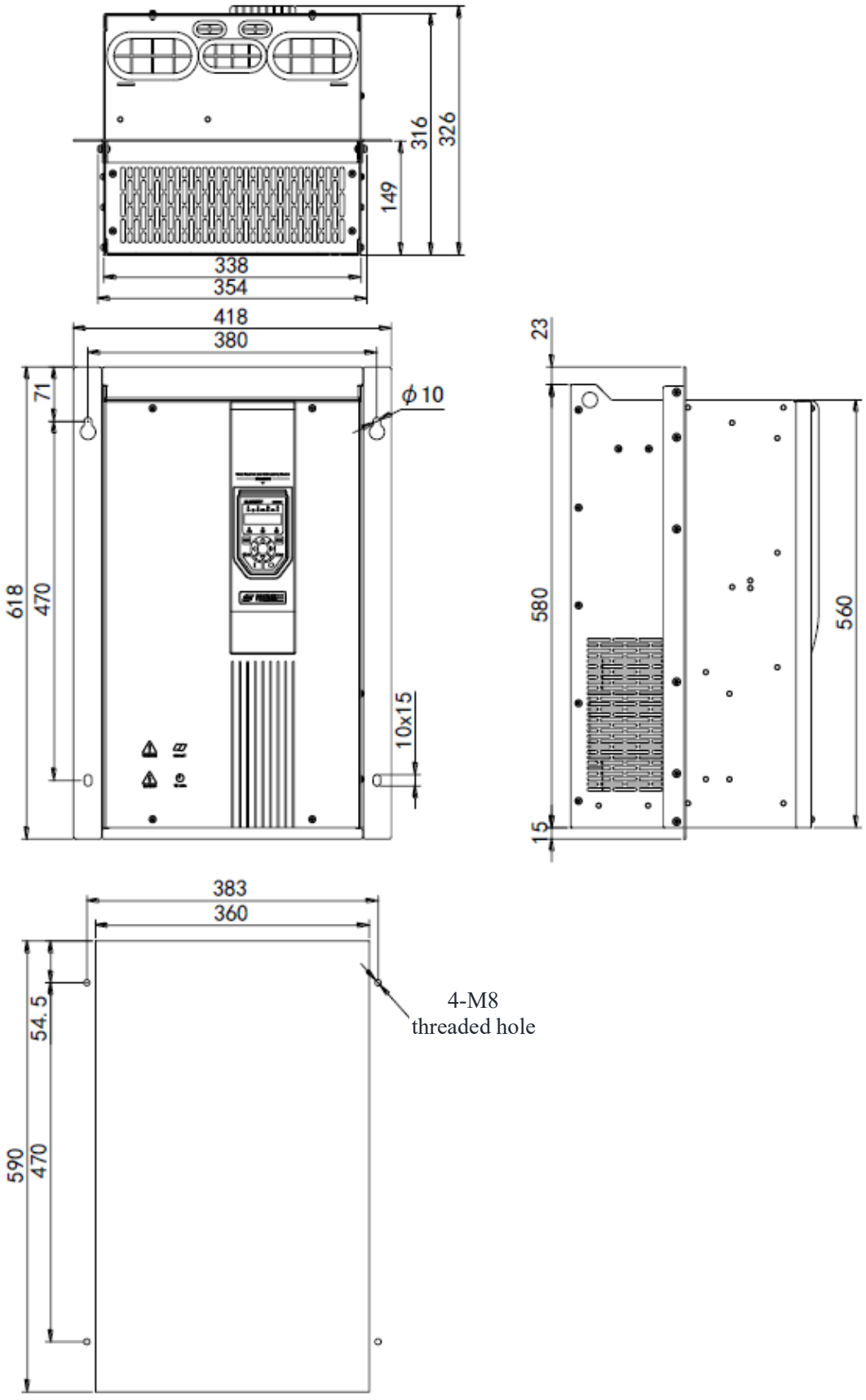
H510-A-131 installation hanging bar and opening size diagram



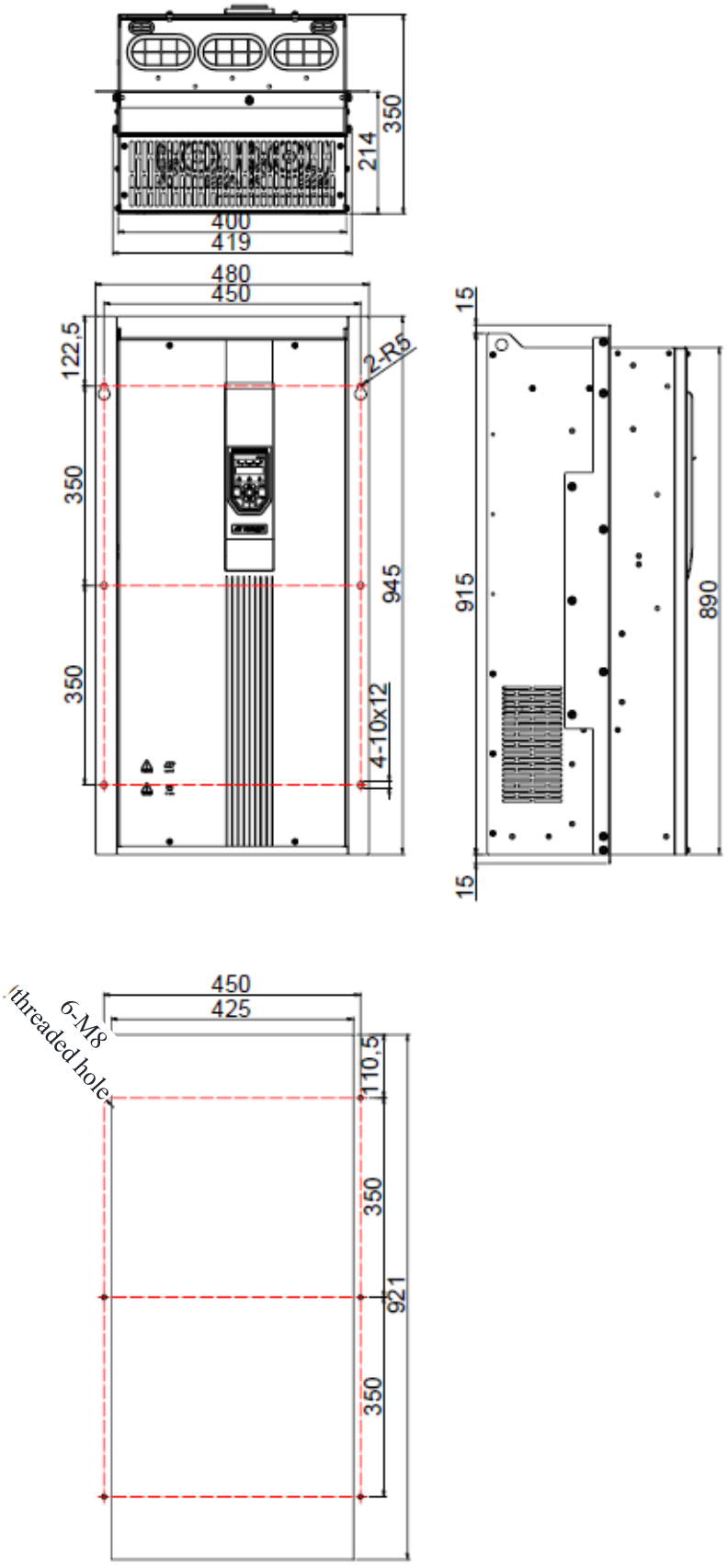
H510-A-3 installation hanging bar and opening size diagram



H510-A-133 installation hanging bar and opening size diagram



H510-A-134 installation hanging bar and opening size diagram



H530-A-6 installation hanging bar and opening size diagram

9.10 Wiring Auxiliary Kit

When wiring the main loop of the frequency converter, the auxiliary kit can be used to make the cable installation more secure. There are two main types of wiring auxiliary kits, namely cable bracket and wiring board.

9.10.1 Cable bracket

The cable brackets can be used on the Hope530G45T4-H to Hope530G375T4-H models. Refer to the cable bracket selection guide for each frequency converter model

Hope530-H Series Cable Support Selection Table See the illustration on page 28 for the appearance of the cable bracket, and the illustration on page 32 for the wiring effect with the cable bracket installed.

Hope530-H Series Cable Support Selection Table

Frequency converter model	Corresponding Cable Bracket Order Number
Hope530G45T4B*-H	H510-B-1
Hope530G55T4B*-H	
Hope530G75T4B*-H	H510-B-2
Hope530G90T4BL-H	
Hope530G110T4BL-H	
Hope530G132T4BL-H	H530-B-3
Hope530G160T4BL-H	
Hope530G200T4L-H	H510-B-4
Hope530G220T4L-H	
Hope530G250T4L-H	H510-B-5
Hope530G280T4L-H	
Hope530G315T4L-H	H510-B-6
Hope530G375T4L-H	

9.10.2 Wiring Board

The wiring board can be used on models from Hope530G11T4-H to Hope530G37T4-H. It is recommended to use this auxiliary kit when the power cable is thick or the power cable is multi-stranded. Please refer to the selection table of the Hope530-H series wiring board for the selection of the wiring board of each type of frequency converter. See the illustration on page 28 for the outline of the wiring board and the illustration on page 32 for the wiring effect of the main loop with the wiring board installed.

Hope530-H Series Wiring Board Selection Table

Frequency converter model	Corresponding Wiring Board Order Number
Hope530G11T4B*-H	H510-C-1
Hope530G15T4B*-H	
Hope530G18.5T4B*-H	H510-C-2
Hope530G22T4B*-H	
Hope530G30T4B*-H	H510-C-3
Hope530G37T4B*-H	

9.11 Protective Cover

The protective cover can enhance the dustproofing capability of the frequency converter. The protective cover is optional for models Hope530G1lT4-H to Hope530G37T4-H. The overall appearance of the machine equipped with a protective cover is shown in the illustration on page 9.

Hope530-H Series Protective Cover Selection Table

Frequency converter model	Corresponding Protective Cover Order Number
Hope530G11T4B*-H	H510-D-1
Hope530G15T4B*-H	
Hope530G18.5T4B*-H	H510-D-2
Hope530G22T4B*-H	
Hope530G30T4B*-H	H510-D-3
Hope530G37T4B*-H	

Note: The protective cover needs to be cleaned regularly. It is recommended to use a brush to clean it or rinse it with clean water. Do not use a steel brush, otherwise the protective cover may be damaged.

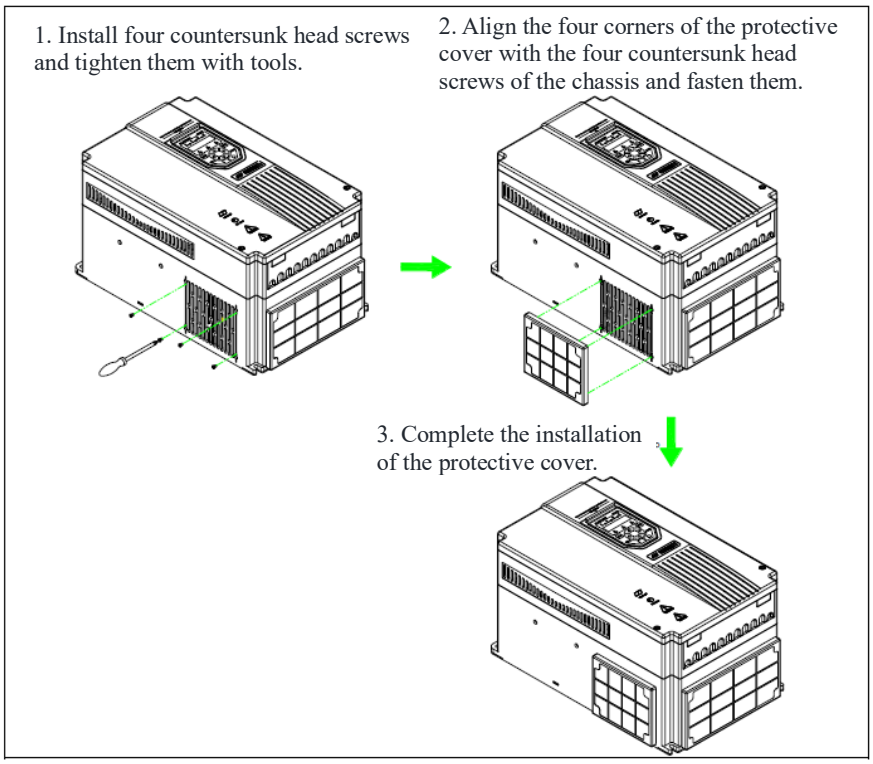
The installation steps of the chassis protective cover are as follows:

① Install four countersunk head screws and tighten them with tools.

② Align the four corners of the protective cover with the four countersunk head screws of the chassis and fasten them.

③ Complete protective cover installation.

The following figure shows the installation steps of the protective cover on the left side of the chassis, and the installation method of the protective cover on the other two sides is the same as above.



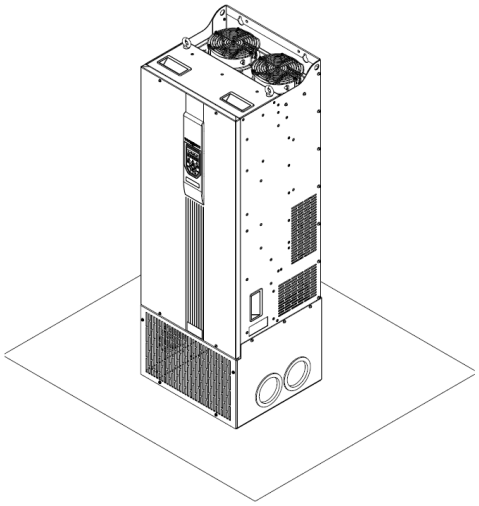
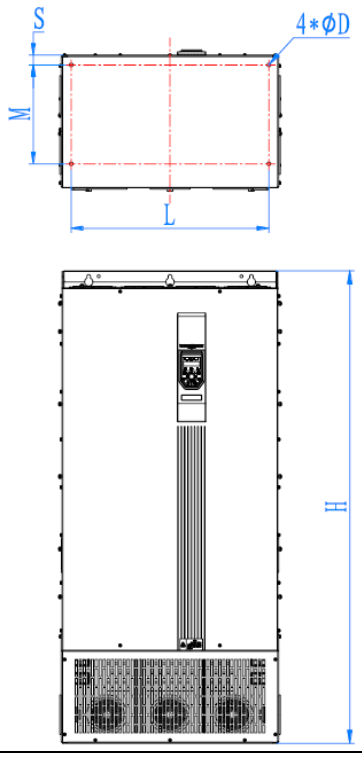
137.12 Base Assemblies

The Hope530G45T4-H to Hope530G375T4-H models are available with optional base assemblies. With the base assemblies, the frequency converter can be installed on the floor, offering more flexible installation locations.

Hope530-H Series Base Assembly Selection Table

Frequency converter model	Corresponding Base Assembly Order Number	H (mm)	L (mm)	M (mm)	S (mm)	D (mm)
Hope530G45T4B*-H	H510-F-6	725	240	180	35	9
Hope530G55T4B*-H						
Hope530G75T4B*-H	H510-F-1	870	276	205	45	9
Hope530G90T4BL-H						
Hope530G110T4BL-H						
Hope530G132T4BL-H	H510-F-2	1162	352	265	32	9
Hope530G160T4BL-H						
Hope530G200T4L-H	H510-F-3	1282	380	280	44	11
Hope530G220T4L-H						
Hope530G250T4L-H	H510-F-4	1412	425	290	35	11
Hope530G280T4L-H						
Hope530G315T4L-H	H510-F-5	1435	595	300	30	11
Hope530G375T4L-H						

The schematic diagram and dimensions for floor-mounted installation are as follows:

Floor-mounted Installation Diagram	Floor-mounted Installation Dimension Drawing
	

Appendix

A. Mailing Address

■ The COMM1 communication port is the built-in RS485 interface of the local control board, and COMM2 is an optional communication port. Refer to Chapter 9, Section on Communication Assemblies.

■ The Hope530-H frequency converter RS485Modbus protocol consists of three layers, i.e., the physical layer, the data link layer, and the application layer. The physical layer and data link layer adopt Modbus protocol based on RS485, and the application layer controls frequency converter operation, stop, parameter reading and writing and other operations.

■ The Modbus protocol is a master-slave protocol. The communication between the host and the slave has two types, i.e., the host requests and the slave responds, or the host broadcasts and the slave does not respond. Only one device can transmit on the bus at any time, and the host polls the slave. The slave cannot send messages without receiving the command from the host. The host can send the command repeatedly if the communication is not correct. If no response is received within a given period of time, the polled slave is considered lost. If the slave cannot execute a certain message, it sends an exception message to the host.

■ Communication writes to the frequency converter parameters only by modifying the values in RAM. If it is required to write RAM parameters to EEPROM, it is necessary to rewrite the communication variable "EEP write command" (Modbus address 3209H) to 1.

■ Frequency converter parameter addressing method: The high 8 bits of 16-bit Modbus parameter address are the group number of parameters, and the lower 8 bits are the number in the group of the parameter, all of them are addressed in hexadecimal way. For example, the address of parameter F4-17 is 0411H. For communication variables (control words, status words, etc.), the parameter group number is 50 (32H). Note: Communication variables include frequency converter parameters that can be accessed by communication, special instruction variables for communication and special status variables for communication. Corresponding communication parameter group number of menu code is shown in the table below:

Menu Code	Parameter Group No.	Menu Code	Parameter Group No.	Menu Code	Parameter Group No.	Menu Code	Parameter Group No.
F0	0 (00H)	F5	5 (05H)	FA	10 (0AH)	FF	15 (0FH)
F1	1 (01H)	F6	6 (06H)	Fb	11 (0BH)	Fn	16 (10H)
F2	2 (02H)	F7	7 (07H)	FC	12 (0CH)	FP	17 (11H)
F3	3 (03H)	F8	8 (08H)	Fd	13 (0DH)	FU	18 (12H)
F4	4 (04H)	F9	9 (09H)	FE	14 (0EH)	Communication variable	50 (32H)

■ Data type in communication: The data transmitted in communication is a 16-bit integer. The smallest unit can be seen from the decimal point position of the parameter in the parameter list. For example, for F0-00 "Digital given frequency", the minimum unit of is 0.01Hz, so for Modbus protocol, communication transmission 5000 represents 50.00Hz.

■ Communication command variable:

Name	Modbus Address	Change	Description
Master control word	3200H	○	Bit 0: ON/OFF1 (operation on rising edge; stop when it is 0) Bit 1: OFF2 (free stop if it is 0) Bit 2: OFF3 (emergency stop if it is 0) Bit 3: Drive lockout (drive lockout if it is 0) Bit 4: Ramp enabling (stop acceleration and deceleration if it is 0) Bit 5: Not used Bit 6: Not used Bit 7: Fault reset (fault reset on rising edge) Bit 8: Forward jogging Bit 9: Reverse jogging Bit 10: Not used Bit 11: Set value is reversed (given frequency is reversed if it is 1, and given frequency is not reversed if it is 0) Bit 12: Upper computer digital quantity 1 (for programmable unit) Bit 13: UP Bit 14: DOWN Bit 15: Upper computer digital quantity 2 (for programmable unit)
Communication given frequency	3201H	○	A non-negative number with a unit of 0.01Hz, multiplied by the communication given frequency ratio and used as frequency reference
Upper computer analog quantity 1	3202H	○	Range: -32768 to 32767 Except for position control, please set the value within the range of -10000 to 10000
Upper computer analog quantity 2	3203H	○	
Extended control word 1	3204H	○	Bit 0 to Bit 15 correspond to digital inputs 1 to 16
Extended control word 2	3205H	○	Bit 0 to Bit 15 correspond to digital inputs 17 to 32
Extended control word 3	3206H	○	Bit 0 to Bit 15 correspond to digital inputs 33 to 48
Extended control word 4	3207H	○	Bits 0 to 13 correspond to digital inputs 49 to 62, and the remaining bits are reserved
Extended control word 5	3208H	○	Reserved
EEPROM write	3209H	○	When writing 1 in the address, the parameters in RAM of the frequency converter will write in EEPROM

Note: Digital input 37 "3-wire stop command", 38 "Internal virtual FWD1 terminal", 39 "Internal virtual REV1 terminal", 40 "Internal virtual FWD2 terminal", 41 "Internal virtual REV2 terminal" are only used for terminal control, communication modification is invalid.

■ Communication status variables:

Name	Modbus Address	Change	Description	
Master status	3210H	△	Bit 0: Ready	Bit 8: Reserved

word			Bit 1: Operational readiness Bit 2: Operating Bit 3: Fault Bit 4: OFF2 is valid (valid when it is 0) Bit 5: OFF3 is in stop (valid when it is 0) Bit 6: Charging contactor is disconnected Bit 7: Alarm	Bit 9: Reserved Bit 10: Frequency level detection signal 1 Bit 11: Reserved Bit 12: Reserved Bit 13: Reserved Bit 14: Forward operating Bit 15: Reserved
Operating frequency	3211H	△	Non-negative number of unit 0.01Hz	
Arithmetic unit 1 output	3212H	△	Unit: 0.01%, When used as encoder position high and low word, the unit is the number of pulses	
Arithmetic unit 2 output	3213H	△		
Given frequency	3214H	△	Non-negative number of unit 0.01Hz	
Output current	3215H	△	Unit: 0.1A	
Output torque	3216H	△	Unit: 0.1%. Rated torque	
Output voltage	3217H	△	Unit: 0.1V	
Bus voltage	3218H	△	Unit: 0.1V	
Fault code	3219H	△	See page 104 for faults and solutions	
Alarm word 1	321AH	△	See page 108 for faults and solutions	
Alarm word 2	321BH	△	See page 108 for faults and solutions	
Extended status word 1	321CH	△	Bit 0 to Bit 15 correspond to digital outputs 0 to 15	
Extended status word 2	321DH	△	Bit 0 to Bit 15 correspond to digital outputs 16 to 31	
Extended status word 3	321EH	△	Bit 0 to Bit 15 correspond to digital outputs 32 to 47	
Extended status word 4	321FH	△	Bit 0 to Bit 15 correspond to digital outputs 48 to 63	
Extended status word 5	3220H	△	Bit 0 to Bit 9 corresponds to digital outputs 64 to 73	

Hope530-H frequency converter supports Modbus protocol in RTU (remote terminal unit) mode. The supported functions are: function 3 (read multiple parameters, the maximum number of words is 50), function 6 (write a single parameter), function 8 (loop test), function 16 (write multiple parameters, the maximum number of words is 10), function 22 (mask write). Among them, functions 6, 16 and 22 support broadcasting (the address of the broadcast message is 0). The start and end of an RTU frame are marked by at least 3.5 character intervals (Baud rate of 19200bit/s and 38400bit/s: 2ms). Format of RTU frames is as follows:

Slave address (1 byte)	Modbus function number (1 byte)	1 data (multiple bytes)	CRC16 (2 bytes)

■ USS directive compatibility

Hope530-H also has a compatible USS command mode, which is designed to be compatible with the upper computer instructions that support the USS protocol. It can control the operation of the Hope530-H series frequency converter through the upper computer software (including PC, PLC and other upper computer software) supporting the USS protocol. Set the given frequency of the frequency converter, read the running state parameters of the frequency converter, the running frequency of the frequency

converter, the output current, output voltage, and DC bus voltage of the frequency converter. If the user has this demand, please consult the manufacturer.

User Parameter Record Form

Parameter Code	Parameter Value	Remarks

Parameter Code	Parameter Value	Remarks

SLANVERT Frequency Converter Service Warranty Card NO

To be filled by the Seller	**User Company**		**Tel**		**Fax**	
	Company Address		**Contact Person**			
	Sales Company		**Tel**		**Fax**	
	Company Address		**Service Personnel**			
	Product Model		**Product No.**		**Receipt Date**	**Date**
	Unpacking inspection and power-on test: □ Normal □ Abnormal					
Filled by the User	**After the installation and commissioning is completed, the user confirms whether the product runs normally: □ Normal □ Abnormal**					
	User comments:					

Filling instructions:

1. This form is to be filled out in detail by both the service personnel and the user

2. In order to protect the legitimate rights and interests of users, please keep this card properly, and enjoy one-year warranty (from the date of receipt of the product) and lifetime maintenance services with this document.

3. If there are service problems, please call the service number: 400-619-6968.

HOPE SENLAN SCIENCE AND TECHNOLOGY HOLDING CORP., LTD.

SLANVERT Special Machine Series
Dedicated for the crane industry
Frequency converter
HOPE530-H Crane-specific Frequency Converter Manual

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