VEICHI

Manual

CH310 Lifting AC Inverter
Short Version (Simplified)

Preface

First of all, thank you for using CH310 series AC drives for hoisting.

VEICHI Electric is committed to producing safe, efficient and reliable hoisting-specific products. Combined with many years of experience in the lifting industry, CH310 series products feature excellent control performance and functions since they integrate special functions such as brake control, stable lifting, constant power control (speed changes with load), zero-speed hovering, anti-shake luffing, brake torque detection, etc., which are mainly used for driving and controlling lifting, rotating and translating mechanisms in lifting equipment.

This manual describes how to correctly use CH310 series products, and provides users with relevant precautions such as install method, parameter setting, operation and fault diagnosis.

In order to use this product correctly, please read this manual carefully before using it. And if there are any doubts about the contents of this manual, please consult our technical personnel’s.

Our company is always committed to product innovation and technological breakthrough, and providing the best products and solutions to meet the application needs of hoisting. Content changes caused by continuous updates and upgrades of products are subject to no further notice.

Please get the PDF file by logging in to the official website of VEICHI (www.veichi.cn), "Service and Support-Data Download", and search it with keywords.

Catalog

Chapter 1 Precautions

1.1 Pre-use

Please refer to the following table for terms and abbreviations used in this manual:

Mark in the manual	Description
AC drive	CH310
AM-VF	Asynchronous Motor-VF Control
AM-FVC	Asynchronous Motor-Vector Control without PG
AM-SVC	Asynchronous Motor-Vector control with PG
AM-VF-SPLIT	Asynchronous Motor-Voltage Frequency Split
PM-VF	Permanent Magnet Synchronous Motor-V/F Control
PM-FVC	Permanent Magnet Synchronous Motor-Vector Control without PG
PM-SVC	Permanent Magnet Synchronous Motor-Vector control with PG
PG	Pulse Generator
Bit	Bits in Binary

1.2 Safety Instructions

Thank you for purchasing CH310 series vector AC drive designed and manufactured by Suzhou VEICHI Electric Co, Ltd .This manual describes how to use this product correctly for better outcomes. Please read this manual carefully before using the product (installation, wiring, operation, maintenance and inspection, etc.). In addition, please fully understand the safety precautions described in this manual before using this product.

Safety Precautions

Please use this product only after the safety precautions described in this manual are fully understood to protect both persons and the products.

Signs and Meanings

The following signs are used in this manual to highlight the safety key points. Failure to observe these points may result in damages to this product and the associated system, or even personal injuries.

DANGER	Incorrect operation may result in death or major safety incidents.
WARNING	Incorrect operation may result in death or major safety incidents.
CAUTION	Incorrect operation may result in minor injuries.
NOTICE	Incorrect operation may result in damage to the product and the associated system.

General Cautions

In order to introduce the details of the product, the illustrations in this manual sometimes show the product with the outer cover or safety cover removed. When using this product, please be sure to install the outer cover or safety cover as required, and operate according to the regulations in this manual.

The figures in this manual are only representative examples, and may be different from the products you ordered.

Due to product improvements or specification changes, as well as to improve the convenience of the manual itself, this manual may be changed without notice.

Please pay attention to all information in this manual regarding safety.

Please note that failure to observe the warnings may result in death or serious injuries. VEICHI will not be held liable for injuries and equipment damage caused by your company or your customers' failure to comply with the contents of this book.

To prevent electric shock

Do not perform inspection or wiring work while the power is on. Before wiring or repairing, be sure to cut off the power to the AC drive. Even if the power is cut off, there is still residual voltage in the capacitor inside the product. To prevent electric shock, wait at least the time specified by the warning label on the front panel of the product. After the indicators light is off completely, remove the front cover and terminal cover, and measure the input power voltage and the main circuit DC voltage to make sure the voltage is safe.

For mechanical safety

After the wiring work and parameter setting are completed, be sure to perform a test run to make sure that the AC drive can operate safely; otherwise it may cause personal injury or equipment damage.

Be sure to verify the set points of parameters for the virtual input/output function before the test run of AC drive.

The virtual input/output function is based on the virtual wiring of the input/output terminals inside the AC drive. Therefore, even if there is no physical wiring on the input/output terminals, the operation may be different from the factory settings. If lack of verification, unexpected actions may cause personal accidents. If lack of verification, unexpected actions may cause personal accidents.

Before turning on the power supply, please make sure that there are no people around drive, motor and machines. In addition, please make sure that the cover, coupling, shaft key and machinery of the drive have been effectively protected.

In some systems, the machines may suddenly move when the main circuit is energized, which may cause death or serious injury.

When it is external terminal control, the function of the input/output terminals of the AC drive will be different from the factory setting, so the action may be different from the description in the manual. Before the test run, please use external terminal control to confirm the input/output signals of the AC drive and the internal sequence control.

To prevent electric shock, it is strictly forbidden to modify the AC drive

- We will not take any responsibility for the modification of the product by your company or your customers.
- Non-electrical professionals are not allowed to perform wiring, installation, maintenance, inspection, component replacement or repair operations.
- Do not remove the outer cover of the product or touch the printed circuit board when the power is on.

To prevent fire

Ensure to use the correct voltage of the main circuit power supply. Before energizing, please confirm whether the rated voltage of the AC drive is consistent with the power supply voltage.

Please follow local standards to set up bypass protection circuits. Improper wiring may cause fire or personal accidents.

CAUTION

To prevent injury

Do not move the AC drive by holding the front cover or terminal cover. In addition, please make sure that the screws are properly tightened before moving.

If you move the AC drive by holding the front cover or terminal cover, it may fall due to loosen screws, which may cause injury.

NOTICE

Use a motor that meets the insulation requirements of the PWM AC drive to prevent short circuits or ground short circuits due to deterioration of the insulation.

When operating the AC drive or disassembling the printed circuit board, follow the procedures specified in the electro-static discharge (ESD). Wrong operation may damage the circuits inside the AC drive due to static electricity.

Voltage withstand tests cannot be performed on any part of the AC drive. Precision instruments used may cause damage to the product due to high voltage.

Do not operate a machine that has been damaged. Do not connect or operate the machine if it is visibly damaged or has missing parts, as this may aggravate damage to the machine and other problems may occur.

When the fuse is blown or the leakage circuit breaker trips, please do not immediately turn on the power supply or operate the machine. Please check whether the cable wiring and the selection of peripheral machines are correct and find out the cause of the problem. Please contact our company, and do not switch on the power supply or operate the machine without authorization if the causes can’t be identified.

When the packaging are wood materials need to be disinfected and disinsected, methods other than fumigation must be used, such as heat treatment (over 30 minutes with the core temperature of 56°C). In addition, please process the package materials before packaging, rather than processing the whole product after packaging.

When fumigated wood materials are used to package electrical products (stand-alone or mechanical products), the gases and vapors produced by the packaging materials may cause fatal damage to electronic products. In particular, halogen disinfectants (fluorine, chlorine, bromine, iodine, etc.) may cause internal corrosion of capacitors, and DOP gas (phthalate ester) may cause cracks in resins, etc.

1.3 Instructions for Special Purpose

If you need to use this product for special purposes such as manned, medical, aerospace, nuclear energy, electric power, submarine relay communication equipment or systems, please consult our agents or sales persons in charge.

Chapter 2 Before Use

2.1 Safety Precautions

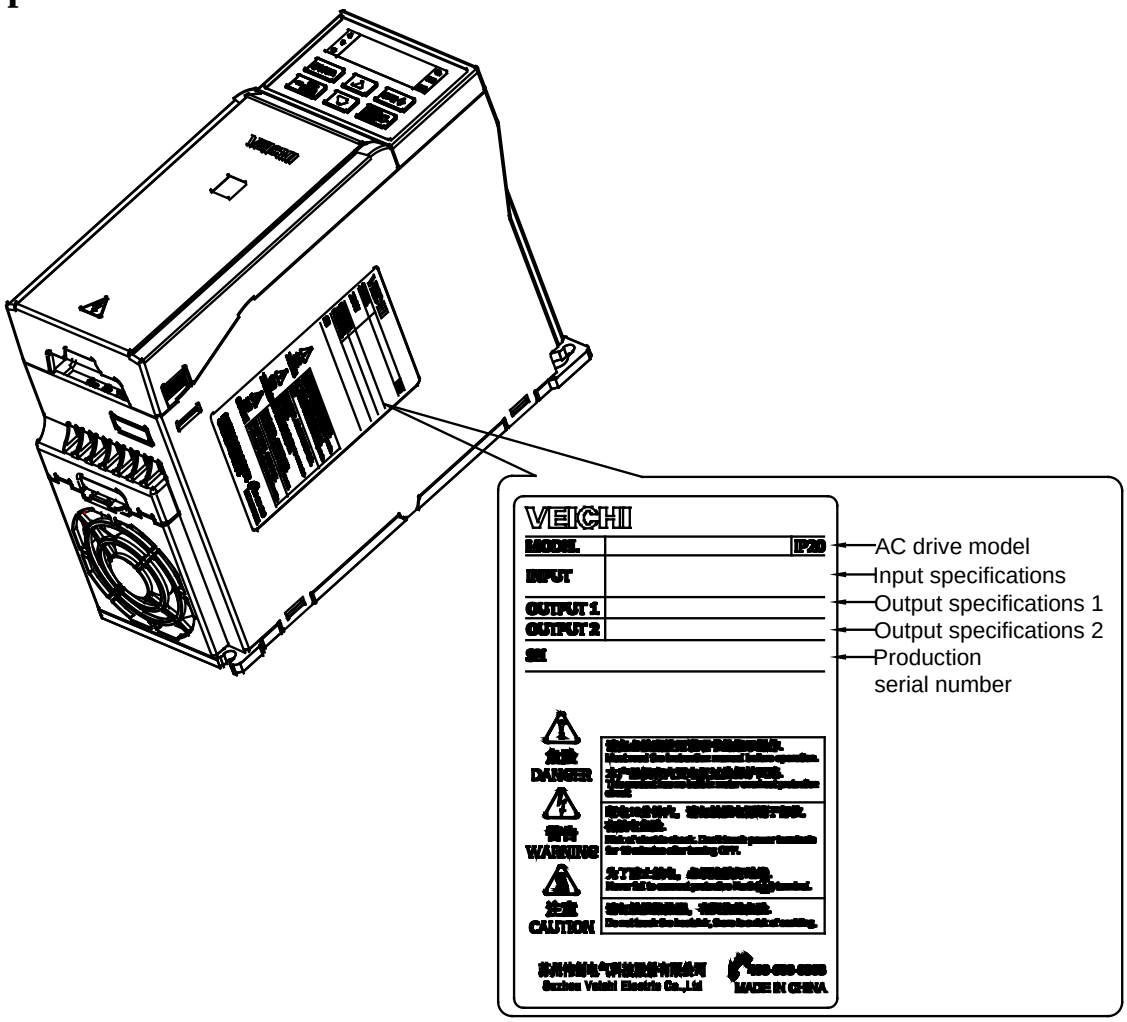
DANGER
Please pay attention to all information in this manual regarding safety. Please note that failure to observe the warnings may result in death or serious injuries. VEICHI will not be held liable for injuries and equipment damage caused by your company or your customers' failure to comply with the contents of this book.

2.2 Model and Nameplate

After receiving the product, please confirm the following:

- Please check the appearance and confirm whether there are scratches or dirt on the frequency converter. If there is any damage, please contact the transportation company immediately. Damage caused by product handling is not within the scope of our company's guarantee.
- Please confirm whether the model of the product is consistent with what you ordered. Please refer to the "MODEL" column on the nameplate on the side of the AC drive.
- If any defect is found, please immediately contact our distributor or sales persons in charge from whom you purchased the product.

Nameplate



Model reference

The method of checking the model of AC drive is shown in the figure below:

CH310 – T 3 – 011 B
1 2 3 4 5

Code	Name
1	Product series
2	Voltage T: Three-phase S: Single-phase
3	Voltage 2: 220V 3: 380V 6: 660V 11: 1140V
4	Motor power(kW) 7R5: 7.5 011: 11 132: 132
5	Accessory Type B: Brake unit; L: DC reactor; D: Cabinet

2.3 Technical Specifications

Table 2-1: Technical Specifications

Item		Specification
Power Input	Voltage and frequency	Single-phase: 220V, 50Hz/60Hz. Three-phase: 220V, 50Hz/60Hz. Three-phase: 380V~480V, 50Hz/60Hz.
	Allowable fluctuation	Voltage imbalance rate: <3%; Frequency ±5%. Distortion rate meets IEC61800-2.
	Switching inrush current	Less than rated current.
Output	Output voltage	Output under rated conditions: Three-phase, 0 V to input voltage, inaccuracy less than 5%.
	Output frequency range	0.00Hz~600.00Hz.
	Output frequency accuracy	±0.5% of the max. frequency.
	Overload capacity	150% of rated current for 89s, 180% of rated current for 10s, 200% of rated current for 3s.
Main Control Performance	Motor type	Asynchronous motor, synchronous motor, and synchronous reluctance motor.
	Motor control mode	V/F control, open-loop vector control, closed-loop vector control, voltage-frequency split control.
	Modulation mode	PWM.
	Carrier frequency	1.0kHz~16.0kHz.
	Speed control range	FVC: rated load 1:200. SVC: rated load 1:1000.
	Steady-status speed accuracy	FVC: ≤0.5% rated synchronous speed (AM), ≤0.1% rated synchronous speed (PM). SVC: ≤ 0.02% of rated synchronous speed.

	Starting torque	FVC: 150% of the motor rated torque at 0.25Hz. SVC: 200% of the motor rated torque at 0Hz.
	Torque response	FVC: <10ms; SVC: <5ms.
	Torque accuracy	FVC: ±5%; SVC: ±2.5%.
	Frequency accuracy	Digit setting: Max. frequency × ±0.01%; Analog setting: Max. frequency × ±0.2 %.
	Frequency resolution	Digit setting: 0.01Hz; Analog setting: Max. frequency × ±0.05 %.
	Torque boost	Automatic torque boost 0.0%~100.0%. Manual torque boost 0.0%~30.0%.
	V/F curve	Four modes: linear torque characteristic curve, user-defined V/F curve, reduced torque characteristic curve (to the power of 1.1 to 2.0), and square V/F curve.
	Acceleration/ deceleration curve	Two types: linear acceleration/deceleration, S-curve acceleration/deceleration. Four sets of acceleration and deceleration time; the time unit is 0.01s, the longest is 650.00s.
	Rated output voltage	With power supply voltage compensation, the motor rated voltage reaches 100%, which can be set in the range of 50% to 100% (the output cannot exceed the input voltage).
	Auto voltage regulation	The output voltage can be automatically kept constant when the grid voltage. fluctuates.
	Auto energy-saving operation	Output voltage is automatically optimized according to the load in V/F control mode to save energy.
	Auto current limit	Auto current limit during operation to prevent frequent tripping from over-current fault.
	Instantaneous power failure handling	Uninterrupted operation through bus voltage control in case of instantaneous power loss.
	Standard function	PID control, speed tracking and power-down restart, frequency jump, upper and lower frequency limit control, programmed operation, multi-step speed, RS485 communication, analog output, frequency pulse output.|
	Frequency setting channel	Setting can be done via keyboard numbers, analog voltage/current terminal AI1, analog voltage/current terminal AI2, communication and multi-channel terminal, combination of main and auxiliary channels, optional cards and such.
	Feedback input channel	Setting can be done via analog voltage/current terminal AI1, analog voltage/current terminal AI2, and communication.
	Command channel	Set via operation panel, external terminals, communication and expansion cards.
	Input command signal	Start, stop, forward and reverse, jogging, multi-step speed, free stop, reset, acceleration and deceleration time selection, frequency setting channel selection, and external fault alarm.
	External output signal	1-channel relay output, 1-channel open collector output, and 1-channel AO can be selected as 0V~10V, 0mA~20mA, 4mA~20mA, or frequency pulse

Protection		Over-voltage, under-voltage, current limit, over-current, overload, electronic thermal relay, overheat, overvoltage stall, data protection, stall protection, input/output phase loss protection.	
Display	LED display	Single-line 5-digit digital tube.	1 AC drive status.
		Dual-line 5-digit digital tube.	2 AC drive status.
	Parameter copy	The function code information of the AC drive can be uploaded and downloaded to realize fast parameter copying.	
	Status monitoring	Output frequency, given frequency, output current, I/O voltage, motor speed, PID feedback, PID setting, module temperature, and all other monitoring parameters.	
	Fault alarm	Overvoltage, undervoltage, overcurrent, short circuit, phase loss, overload, overheat, stall, damaged data, current fault status, and fault history.	
Environment	Installation site	Altitude lower than 1000 meters, derate 1% for every 100 meters rise when above 1000m. No condensation, icing, rain, snow, hail, etc., with solar radiation <700W/m^2 and air pressure 70kPa~106kPa.	
	Temperature, humidity	-10℃~+50℃, derate above 40℃, 60℃ max (no load). 5%RH~95%RH (no condensation).	
	Vibration	5.9m/s^2 (0.6G) at 9Hz~200Hz.	
	Storage temperature	-30℃~+60℃.	
	Installation method	Wall-mounted, cabinet.	
	IP	IP20.	
	Pollution class	2.	
	Cooling method	Forced air-cooled.	

2.4 Relationship between Rated Output Current, Voltage Level and Power

Input Voltage(V) / **Output Current (A)** / **Power(kW)**	**220**	**380**	**660**
0.75	4	3	-
1.5	7	4	-
2.2	10	6	-
4	16	10	-
5.5	20	13	-
7.5	30	17	10
11	42	25	15
15	55	32	18
18.5	70	38	22
22	80	45	28
30	110	60	35

37	130	75	45
45	160	90	52
55	200	110	63
75	260	150	86
90	320	180	98
110	380	210	121
132	420	250	150
160	550	310	175
185	600	340	198
200	660	380	218
220	720	415	235
250	-	470	270
280	-	510	330
315	-	600	345
355	-	670	380
400	-	750	430
450	-	800	466
500	-	860	540
560	-	990	600
630	-	1100	680
710	-	1260	750
800	-	1500	860
900	-	1620	932
1000	-	1720	1080
1120	-	1980	1200

2.5 Default Voltage Protection

The default voltage value of the AC drive includes voltage level, rated voltage, undervoltage suppression point, undervoltage point, overvoltage suppression point, overvoltage point and dynamic braking point, etc. See the table below for details.

Note: The units for the values in the table are all volts (V)

Voltage Level	Rated Voltage	Undervoltage Suppression	Undervoltage Point	Overvoltage Suppression	Overvoltage Point	Dynamic Braking
220	311.1	240	190	370	400	360
380	537.4	430	320	750	820	740
660	933.2	700	560	1100	1180	1080

2.6 Types and Characteristics of Control Modes

The AC drive can be set to AM-V/F control (initial setting), AM-open-loop vector control, AM-closed-loop vector control, PM-V/F control, PM-open-loop vector control, PM-closed-loop vector control, and VF separation control.

◆ Asynchronous Motor V/F Control

- When the frequency (F) is variable, the ratio of the control frequency to the voltage (V) remains constant.
- This control mode suits all variable speed control applications that do not require fast response and precise speed control, or scenarios where one AC drive works for multiple motors. This mode is also used when the motor parameters are not clear or auto-tuning cannot be performed.

◆ Asynchronous motor open-loop vector control

- The current of the AC drive can be calculated through vector calculation, and divided into excitation current and torque current, to carry out frequency and voltage compensation, so that the motor current matching the load torque can flow to improve the low-speed torque. At the same time, the output frequency compensation (slip compensation) is implemented to make the actual rotation speed of the motor closer to the speed instruction value.
- This control mode is used for applications requiring high speed control accuracy. With high speed response and torque response, high torque can be output even under low-speed running. It is suitable for general high-performance control occasions, one AC drive for one motor.

◆ Asynchronous motor closed-loop vector control

- This mode is used where high-precision speed control or torque control is required, and high-precision speed control is required even at zero speed.
- An encoder must be installed at the motor end, and the AC drive must be equipped with a PG card of the same type as the encoder, one AC drive for one motor.

◆ Asynchronous Motor V/F Control (PMV/ F)

- When the frequency (F) is variable, the ratio of the control frequency to the voltage (V) remains constant.
- This control mode suits all variable speed control applications that do not require fast response and precise speed control. This mode is also used when the motor parameters are not clear or auto-tuning cannot be performed.

◆ Synchronous motor open-loop vector control (PMSVC)

- By combining with a PM (permanent magnet) motor that is more efficient than an induction motor, it is possible to achieve motor control with high speed control accuracy more efficiently. With no need for a speed detector such as PG, the rotation speed of the motor is estimated through the output voltage and output current of the product. In addition, in order to maximize the efficiency of the motor and control the PM motor, the current is minimized when the load is applied.
- This control mode is used for applications that require precise speed control and torque limit functions.

◆ Synchronous motor closed-loop vector control (PMFVC)

- This mode is used where high-precision speed control or torque control is required, and high-precision speed control is required even at zero speed.
- An encoder must be installed at the motor end, and the AC drive must be equipped with a PG card of the same type as the encoder, one AC drive for one motor.

◆ Voltage frequency split control

- This control mode is used for applications where the output voltage and frequency are controlled separately.
- **Note:** The V/F separation function only supports for T3 motor (7.5kW and above) and T2 motor (5.5kW and above).

Note:

- In order to obtain the best control effect, please input the correct motor parameters and perform motor auto-tuning. Group F02.0x is the basic parameter group of the motor.
- In open-loop and closed-loop vector control, the AC drive can only drive one motor; and there shall not be too large between the level of drive capacity and that of motor capacity. The power of the AC drive can be two levels higher or one level lower than that of the motor, otherwise it may cause degraded control performance or failure of drive system.

Chapter 3 Installation and Wiring

3.1 Safety Precautions

This section explains the various precautions that must be followed to ensure safe use of this product, maximized performance, and reliable operation of the AC drive.

Cautions on use of AC drive

DANGER	● When installing the AC drive in a closed cabinet, please configure a cooling fan or cooling air conditioner for full cooling. Make sure that the air inlet temperature of the drive is below 40°C to ensure safe and reliable operation.
NOTICE	● During installation, please cover the upper part of the AC drive with cloth or paper to prevent metal chips, oil, water and other debris from falling inside during installation and drilling operations. Please remove such cover carefully after installation. ● Please follow the measures and methods specified in ESD prevention measures during operation on the AC drive, otherwise it may be damaged. ● If multiple AC drives are installed in a cabinet, sufficient space must be reserved on the upper part to facilitate the replacement of the cooling fan. ● Do not use the AC drive beyond the rated range, otherwise it may be damaged. ● When moving the AC drive, please hold on the fixed case. If only the front cover is held, the main body may fall, which may cause personal injury or damage to the product.

Cautions on use of motor

NOTICE	● The maximum allowable speed varies with motor models. Please do not exceed the maximum allowable speed of the motor. ● When the AC drive is running at low speed, the self-cooling effect of the motor will be severely reduced and long-term running of motor at a low speed will cause damage to itself due to overheating; if you need to run motor at a low speed for a long time, please use a motor special for frequency conversion. ● When a machine running at a constant speed is operated at a variable speed, resonance may occur. Please install anti-vibration rubber under the motor bracket or use the jump frequency control function to avoid it. ● The torque characteristics of the motor driven by variable frequency and the industrial frequency are different. Please confirm the torque characteristics of the mechanical equipment to be connected. ● The rated current of the submersible motor is greater than that of the standard motor. Please confirm the rated current of the motor and select an appropriate AC drive. ● When the distance between the motor and the AC drive is large, the maximum torque of the motor will be reduced due to the voltage drop. Therefore, please use a cable thick enough for connecting over a long distance.

3.2 Installation

The installation environment is very important to give full play to the performance of this product and maintain its function for a long time. Please install this product in an environment that meets the requirements shown in the table below.

Table 3-1: Environmental conditions required for reliable operation of CH310 series products

Environment	Requirement
Installation site	Indoor installation, free of direct sunlight.
Working temperature	-10℃~+50℃.
Storage temperature	-30℃~+60℃.

Ambient humidity	No condensation below 95% RH.
Surroundings	Please install the AC drives in the following places: ● Places free of oil mist, corrosive gas, flammable gas, and dust; ● Places where metal powder, oil, water and other foreign objects will not enter into the product (do not install it on flammable materials such as wood); ● Places free of radioactive materials and flammable materials; ● Places free of harmful gases and liquids; ● Places with less salt erosion; ● Places without direct sunlight.
Altitude	Below 1,000 m; it shall be derated for use above 1,000 m.
Vibration	5.9m/s^2 (0.6G) at 9Hz~200Hz.
Installation and cooling	● The AC drive must not be installed horizontally, but vertically; ● Please install braking resistors and other high-heating devices independently, rather than installing them in the same cabinet as the AC drive. It is strictly forbidden to install high-heating devices such as braking resistors at the air inlet of the AC drive.

In order to improve the reliability of this product, please use it in a place where the temperature will not change sharply; when using it in a closed space such as a control cabinet, please use a cooling fan or cooling air conditioner for cooling to prevent the internal temperature from exceeding the allowable temperature; please avoid freezing the product, since too low temperature may cause failure to some devices.

- After exceeding the allowable ambient temperature, the AC drive shall be derated as shown in the following figure.

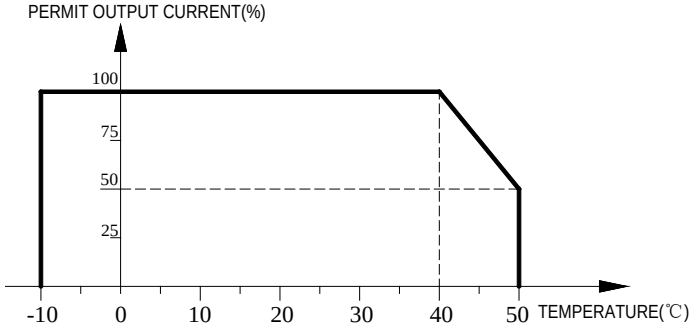


Figure 3-1: Derating Curve of CH310 Series after Exceeding Allowable Operating Temperature

- After exceeding the allowable ambient temperature, the AC drive shall be derated as shown in the following figure.

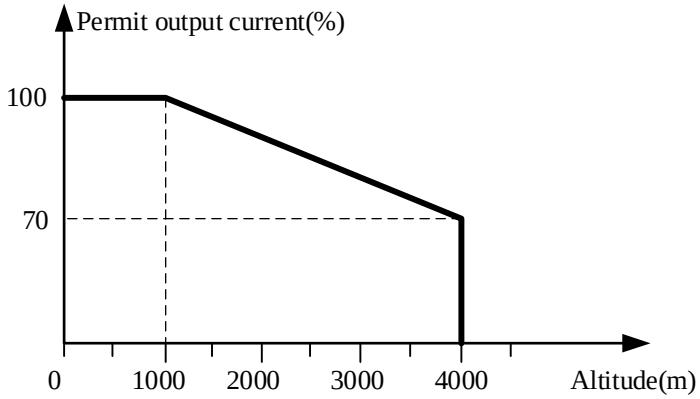


Figure 3-2: Derating Curve of CH310 Series after Exceeding Allowable Altitude

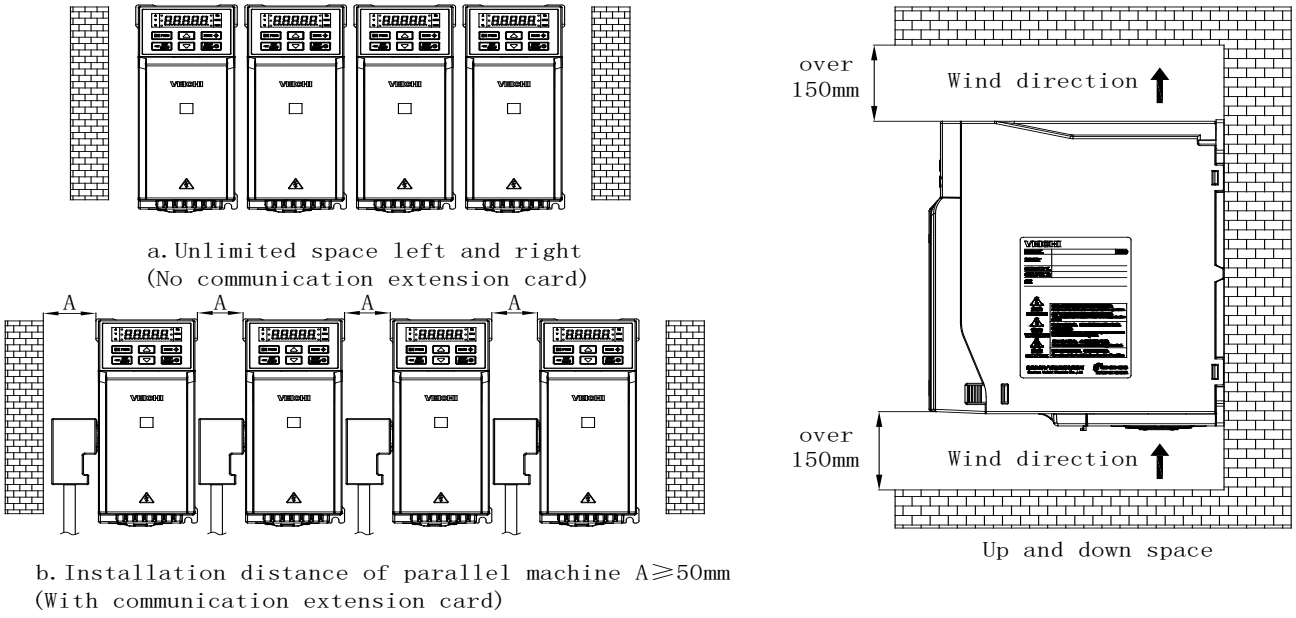
3.3 Installation Direction and Space

- Direction

Be sure to install the AC drive vertically to avoid reducing the cooling effect.

- Space

Stand-alone installation: to ensure the ventilation space and wiring space required for cooling, please be sure to comply with the installation conditions shown in the figure below and install the AC drive with its back closely attached to the wall to make the cooling air around the cooling fan flow smoothly.



a. Unlimited space left and right
(No communication extension card)

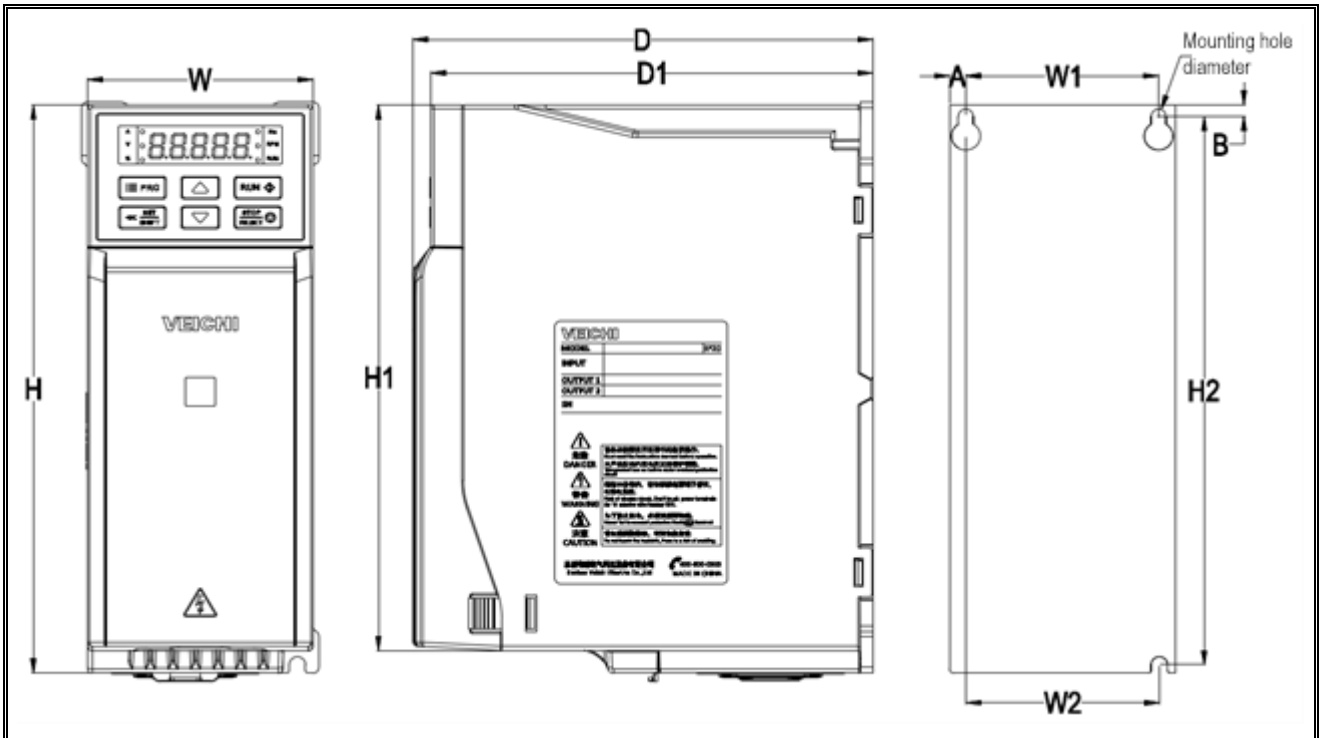
b. Installation distance of parallel machine A≥50mm
(With communication extension card)

Up and down space

Figure 3-3 Installation Space Requirements

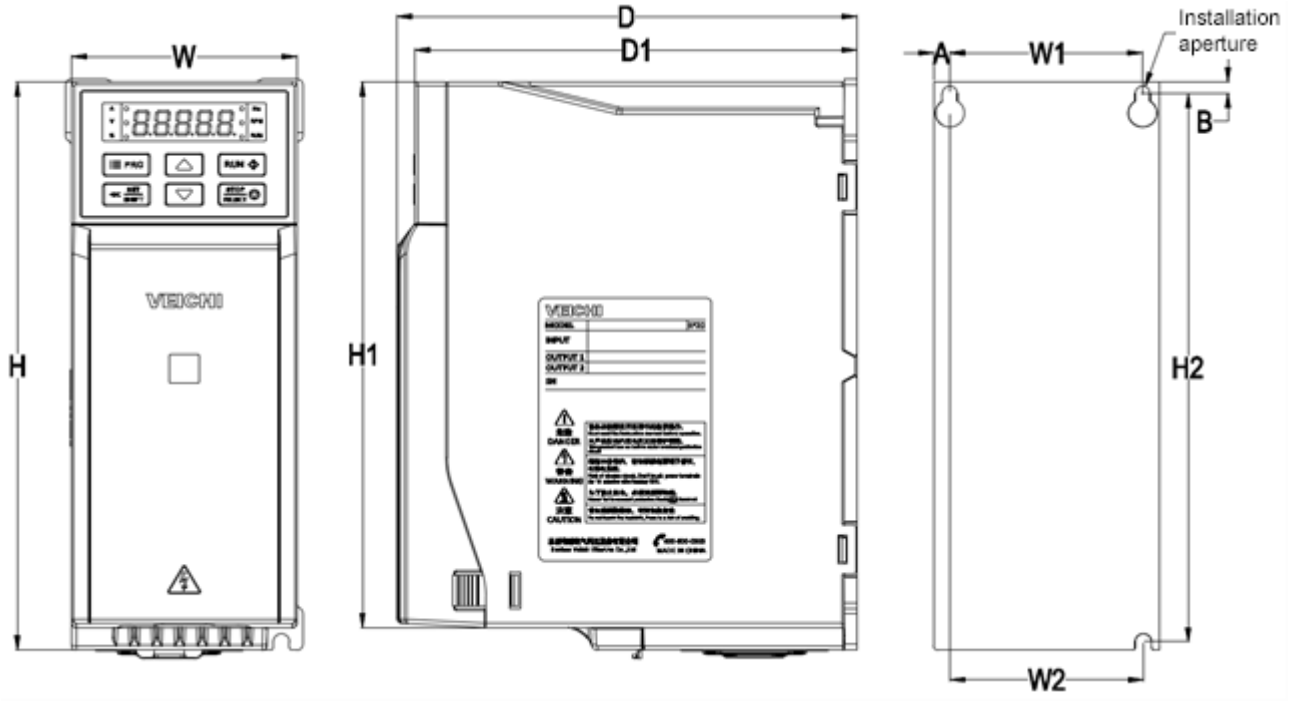
3.4 Dimensions

3.4.1 T2 Dimensions (Plastic)



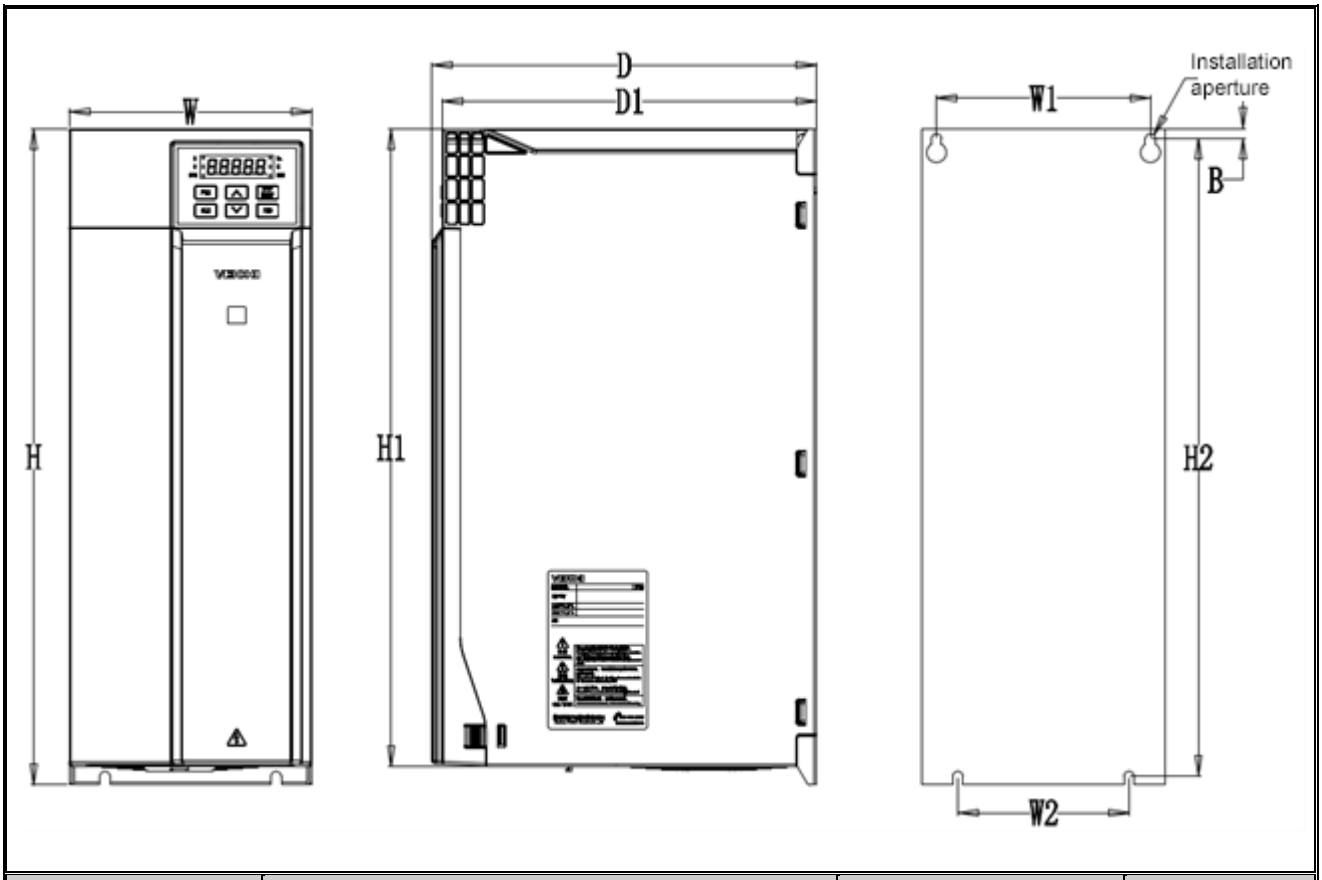
Drive model	Outer dimension (mm)					Installation dimension (mm)					Installation aperture
	W	H	H1	D	D1	W1	W2	H2	A	B	
CH310-T2-R75B	76	200	192	155	149	65	65	193	5.5	4	3-M4
CH310-T2-1R5B											

CH310-T2-2R2B	100	242	231	155	149	84	86.5	231.5	8	5.5	3-M4
CH310-T2-004B											
CH310-T2-5R5B	116	320	307.5	175	169	98	100	307.5	9	6	3-M5



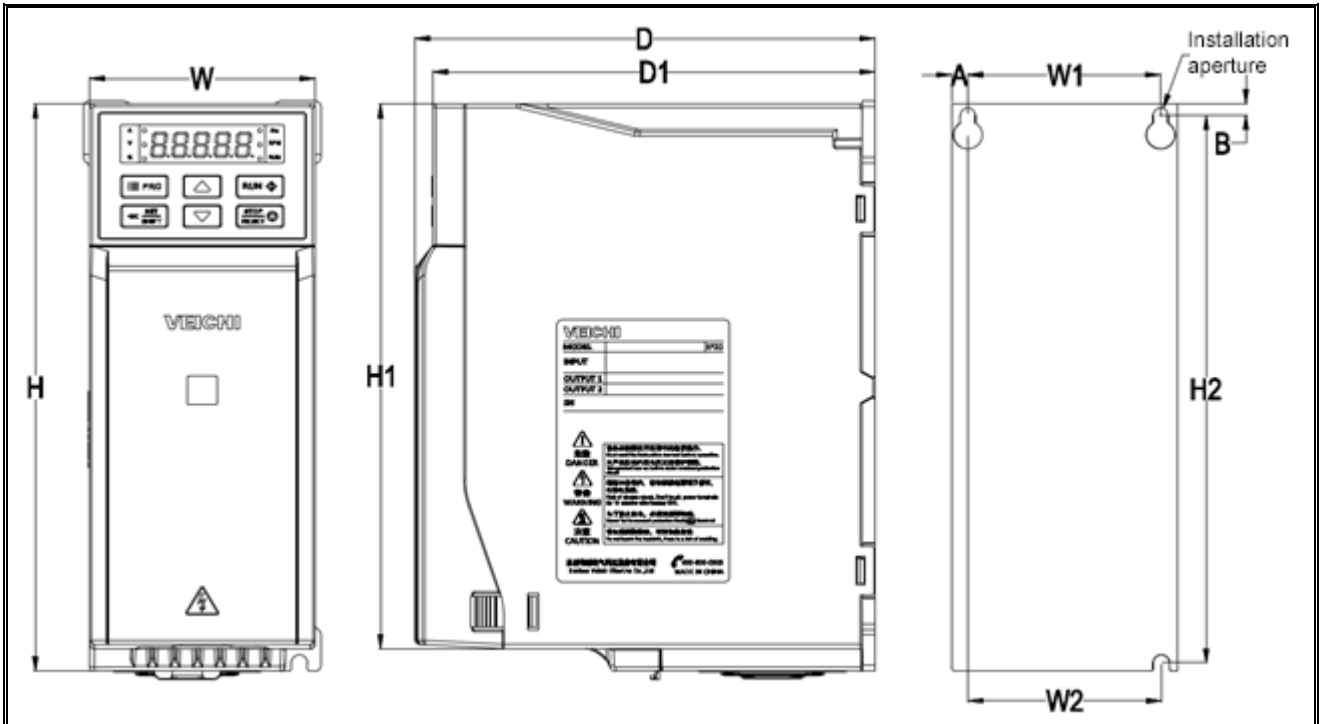
Drive model	Outer dimension (mm)					Installation dimension (mm)				Installation aperture
	W	H	H1	D	D1	W1	W2	H2	B	
CH310-T2-7R5B	142	383	372	225	219	125	100	372	6	4-M5
CH310-T2-011B										
CH310-T2-015B	172	430	/	225	219	150	150	416.5	7.5	4-M5
CH310-T2-018B										
CH310-T2-022B										

3.4.2 T2 Dimensions (Steel)

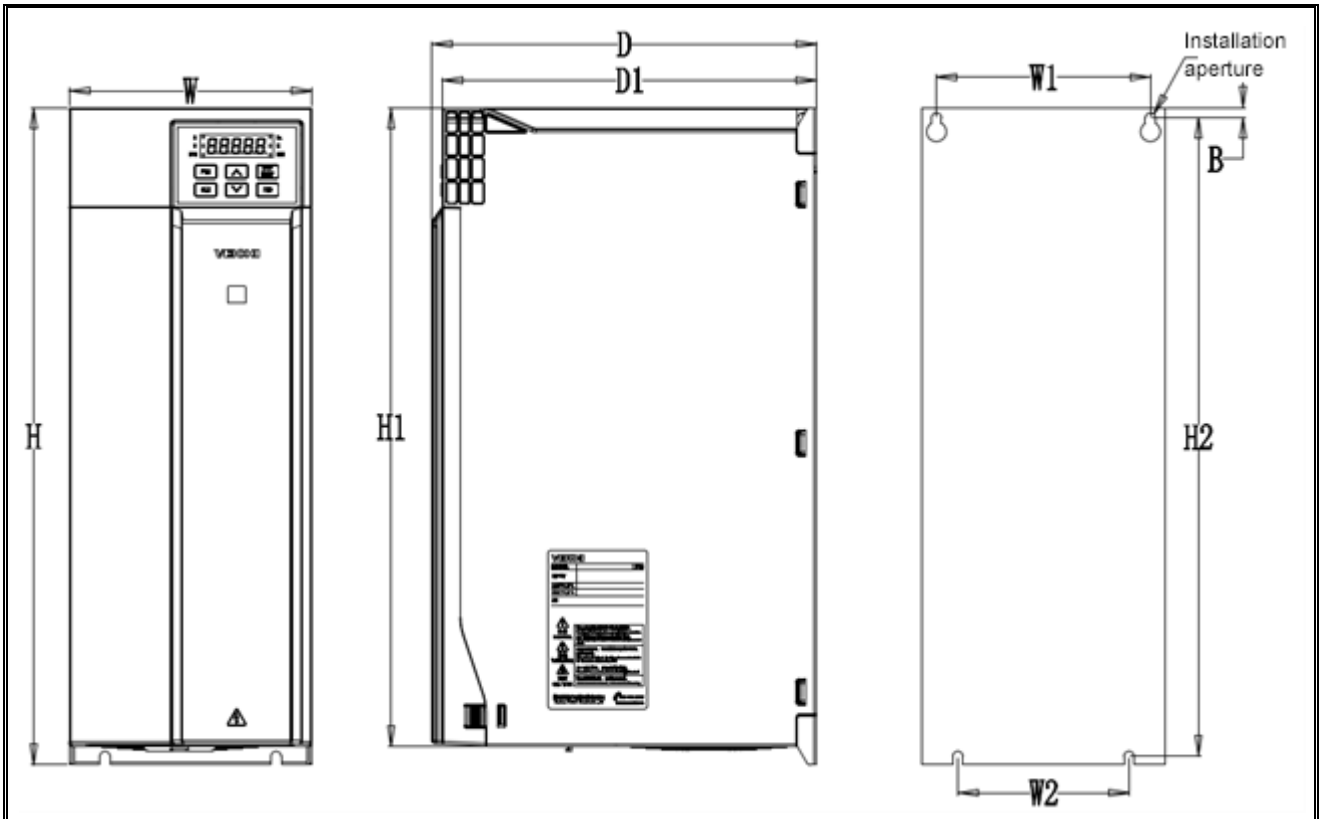


Drive model	Outer dimension (mm)				Hole position (mm)		Installation aperture
	W	H	H1	D	W1	H2	
CH310-T2-030B	240	560	520	310	176	544	4-M6
CH310-T2-037B							
CH310-T2-045B							
CH310-T2-055B	270	638	580	350	195	615	4-M8

3.4.3 T3 Dimensions (Plastic)

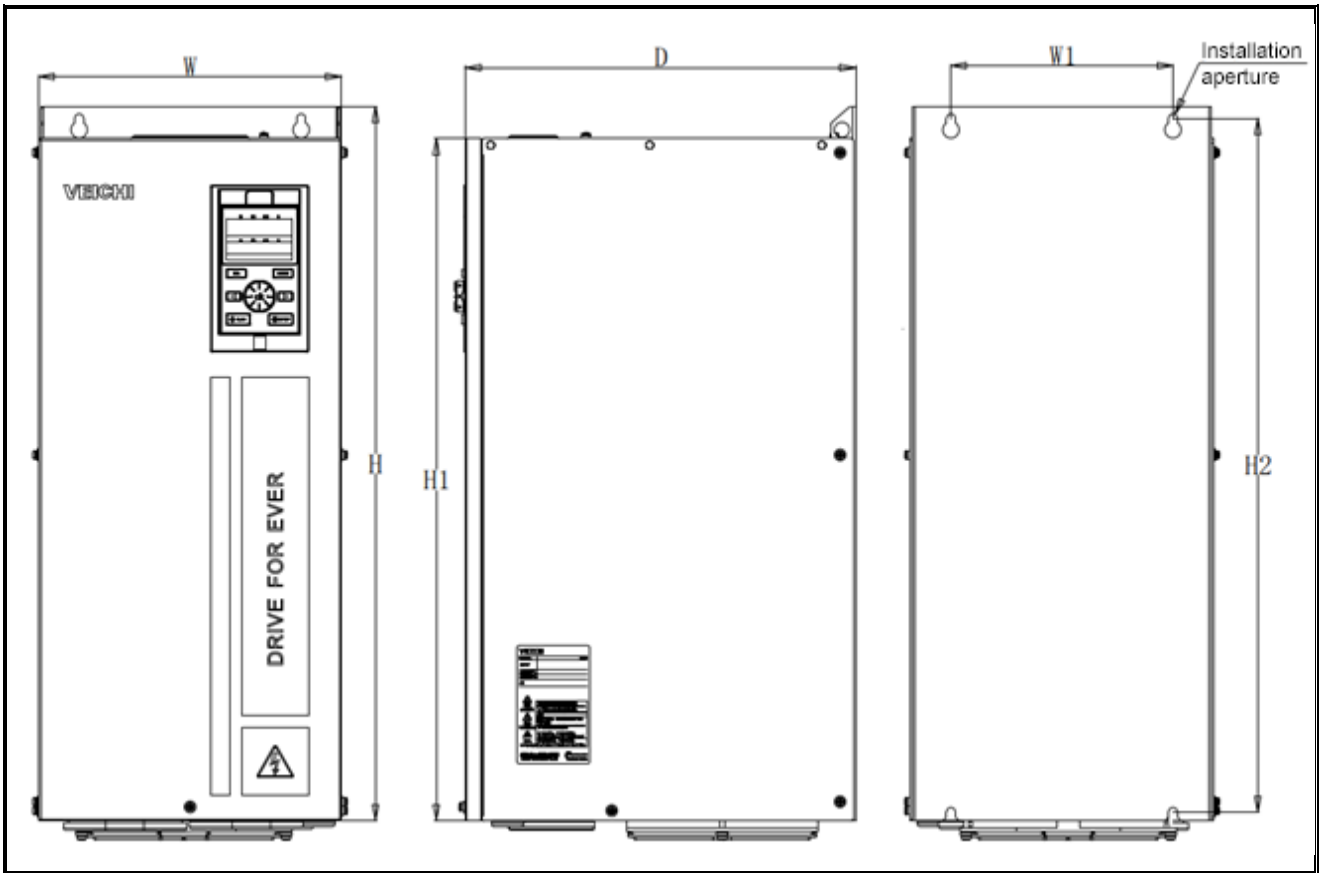


Drive model	Outer dimension (mm)					Installation dimension (mm)					Installation aperture
	W	H	H1	D	D1	W1	W2	H2	A	B	
CH310-T3-R75B	76	200	192	155	149	65	65	193	5.5	4	3-M4
CH310-T3-1R5B											
CH310-T3-2R2B											
CH310-T3-004B	100	242	231	155	149	84	86.5	231.5	8	5.5	3-M4
CH310-T3-5R5B											
CH310-T3-7R5B	116	320	307.5	175	169	98	100	307.5	9	6	3-M5
CH310-T3-011B											



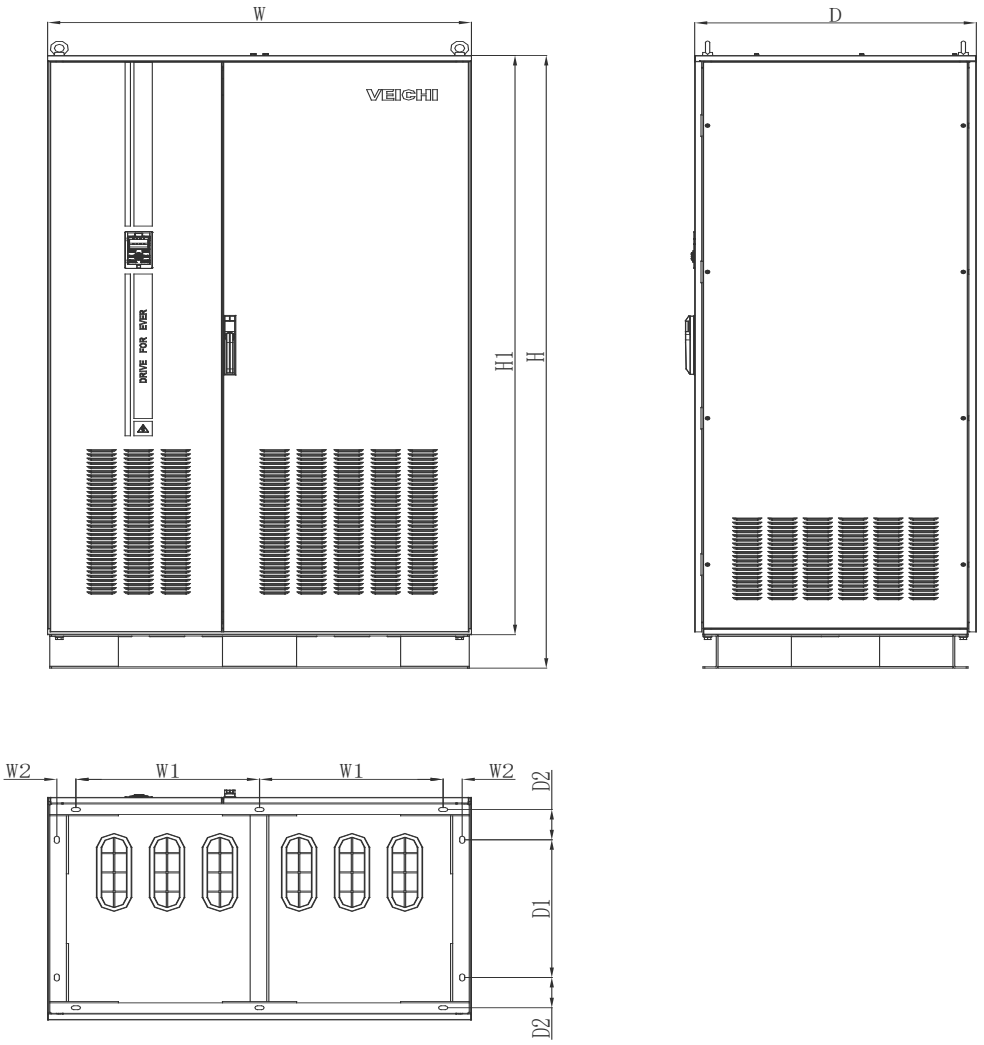
Drive model	Outer dimension (mm)					Installation dimension (mm)				Installation aperture
	W	H	H1	D	D1	W1	W2	H2	B	
CH310-T3-015B	142	383	372	225	219	125	100	372	6	4-M5
CH310-T3-018B										
CH310-T3-022B										
CH310-T3-030B	172	430	/	225	219	150	150	416.5	7.5	4-M5
CH310-T3-037B										

3.4.4 T3 Dimensions (Steel)



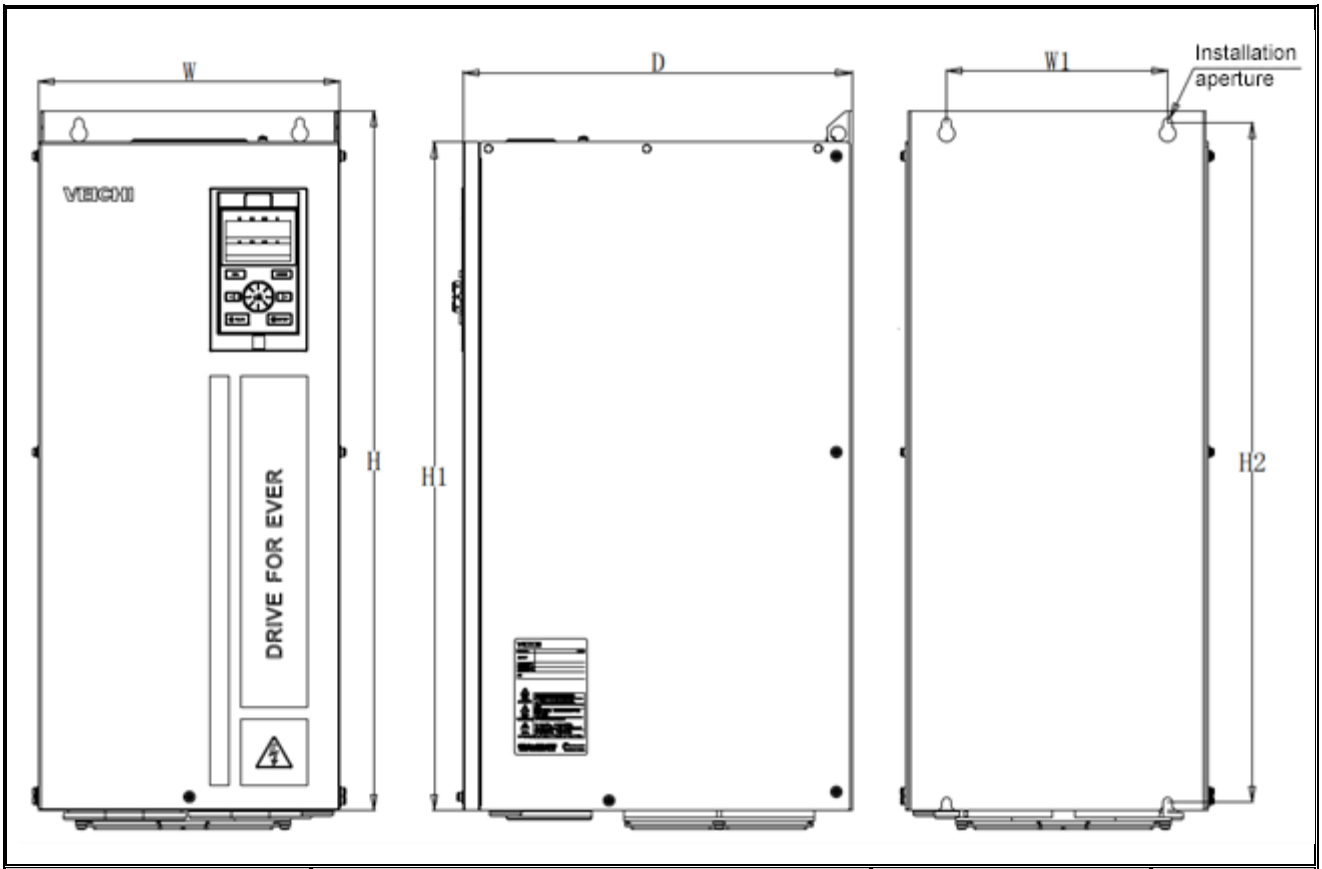
Drive model	Outer dimension (mm)				Hole position (mm)		Installation aperture
	W	H	H1	D	W1	H2	
CH310-T3-045B	240	560	520	310	176	544	4-M6
CH310-T3-055B							
CH310-T3-075B							
CH310-T3-090B	270	638	580	350	195	615	4-M8
CH310-T3-110B							
CH310-T3-132	350	738	680	405	220	715	4-M8
CH310-T3-160							
CH310-T3-185	360	940	850	480	200	910	4-M16
CH310-T3-200							
CH310-T3-220							
CH310-T3-250	370	1140	1050	545	200	1110	4-M16
CH310-T3-280							
CH310-T3-315	400	1250	1140	545	240	1213	4-M16
CH310-T3-355							
CH310-T3-400							
CH310-T3-450	460	1400	1293	545	300	1363	4-M16
CH310-T3-500							
CH310-T3-560							

3.4.5 T3 Dimensions (Cabinet)



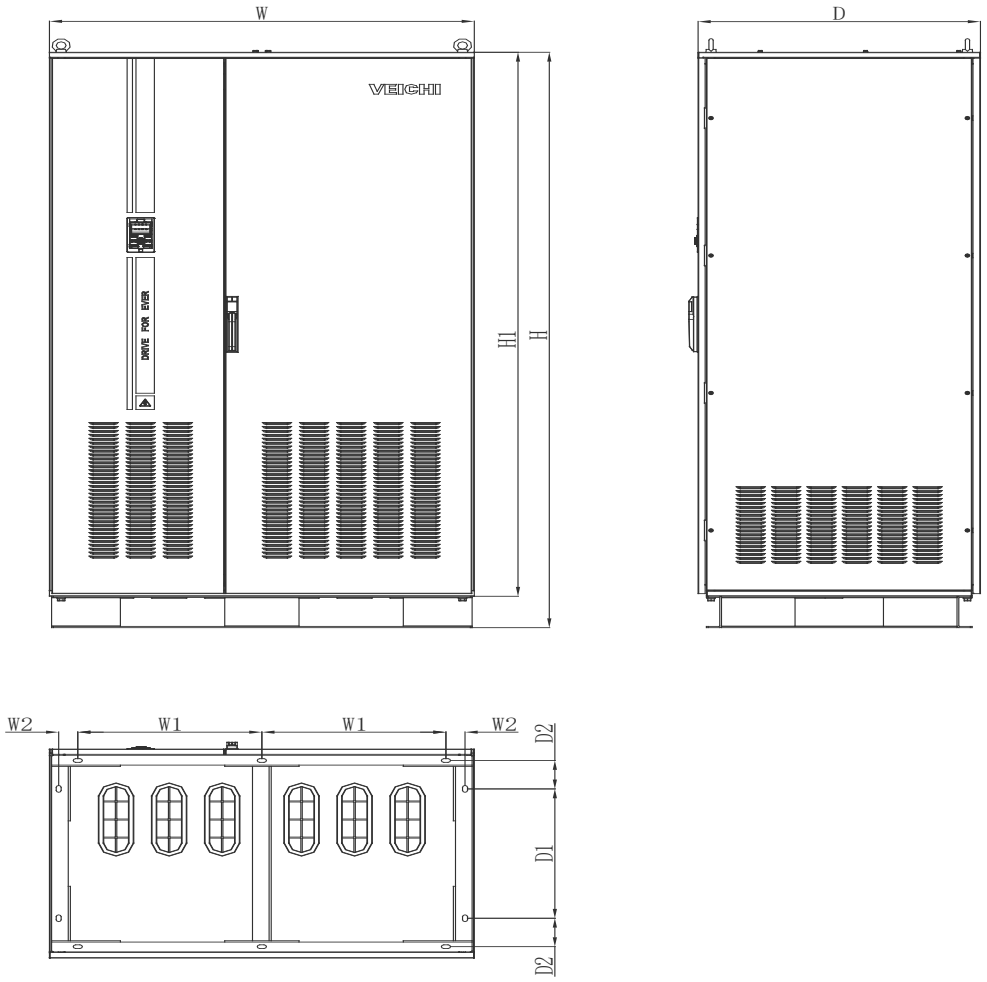
Drive model	Outer dimension (mm)				Hole position (mm)				Installation aperture
	W	H	H1	D	W1	W2	D1	D2	
CH310-T3-630-LD	1200	2200	2080	800	520	54	494	108.5	Ø14
CH310-T3-710-LD									
CH310-T3-800-LD									
CH310-T3-900-LD									
CH310-T3-1000-LD									
CH310-T3-1120-LD									

3.4.6 T6 Dimensions (Steel)



Drive model	Outer dimension (mm)				Hole position (mm)		Installation aperture
	W	H	H1	D	W1	H2	
CH310-T6-022B	240	560	520	310	176	544	4-M6
CH310-T6-030B							
CH310-T6-037B							
CH310-T6-045B							
CH310-T6-055B							
CH310-T6-075B							
CH310-T6-090B	270	638	580	350	195	615	4-M8
CH310-T6-110B							
CH310-T6-132	350	738	680	405	220	715	4-M8
CH310-T6-160							
CH310-T6-185	360	940	850	480	200	910	4-M16
CH310-T6-200							
CH310-T6-220							
CH310-T6-250	370	1140	1050	545	200	1110	4-M16
CH310-T6-280							
CH310-T6-315	400	1250	1140	545	240	1213	4-M16
CH310-T6-355							
CH310-T6-400							
CH310-T6-450	460	1400	1293	545	300	1363	4-M16
CH310-T6-500							
CH310-T6-560							

3.4.7 T6 Dimensions (Cabinet)



Drive model	Outer dimension (mm)				Hole position (mm)				Installation aperture
	W	H	H1	D	W1	W2	D1	D2	
CH310-T6-630-LD	1200	2200	2080	800	520	54	494	108.5	Ø14
CH310-T6-710-LD									
CH310-T6-800-LD									
CH310-T6-900-LD									
CH310-T6-1000-LD									
CH310-T6-1120-LD									

3.4.8 Keyboard Dimensions

- **Boundary dimension and bore dimension of external dual-line keypad (unit: Mm)**
  Model: KBD300-25
  Note: The boundary dimensions and bore dimensions of the LCD and LED keypads are fully compatible.

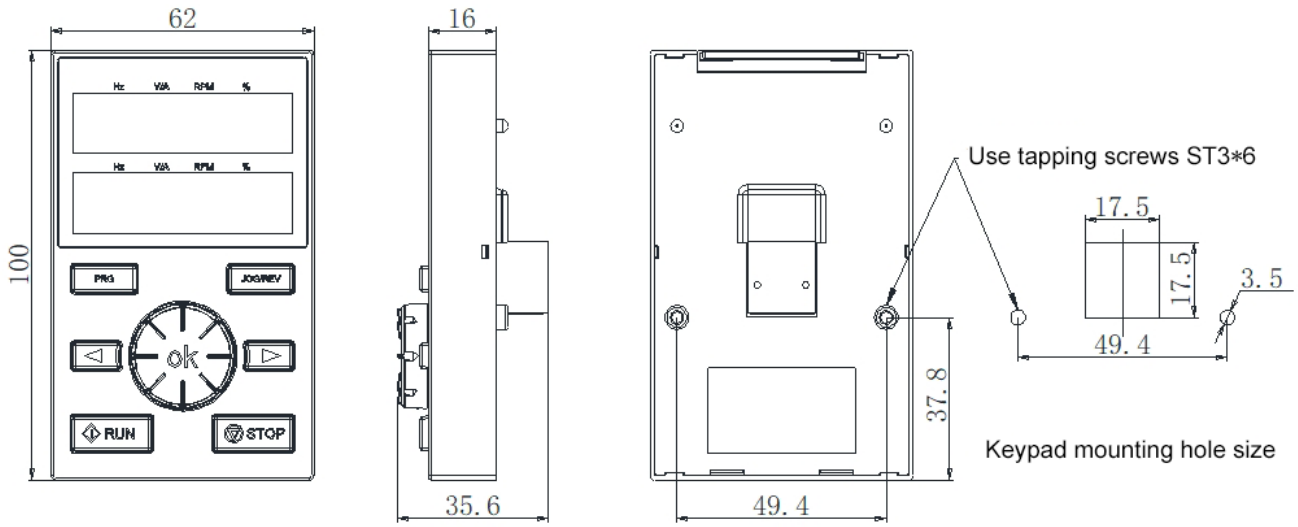


Figure 3-4 Boundary Dimensions and Bore Dimensions of External Dual-line Keyboard

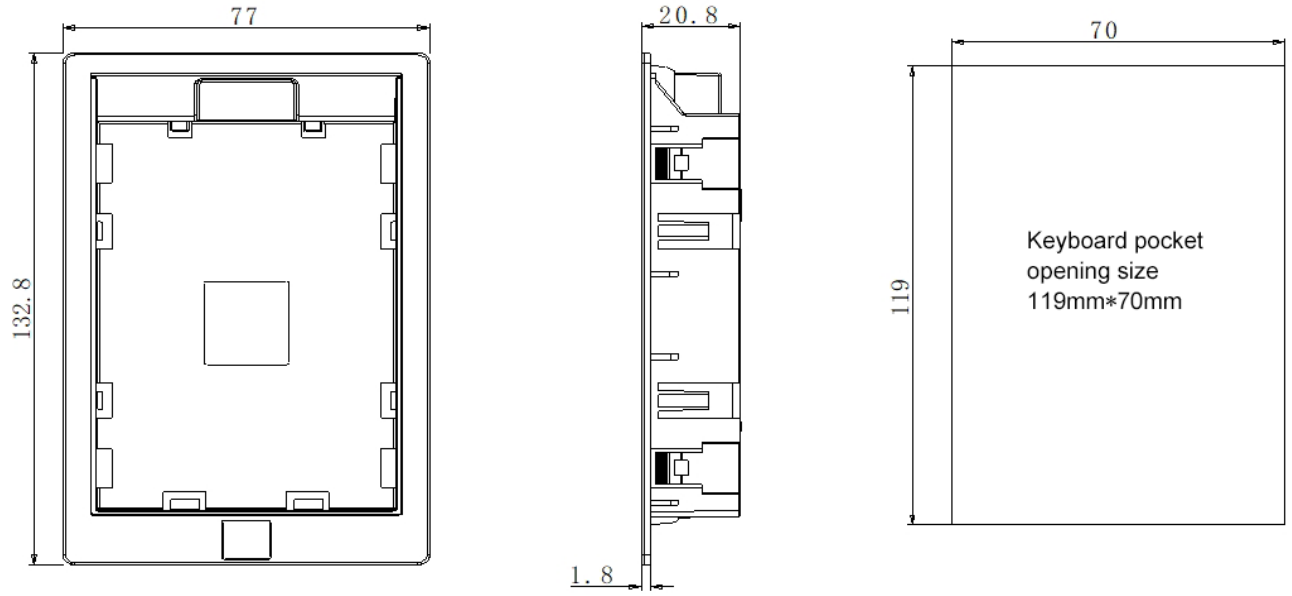


Figure 3-5 Boundary Dimensions and Bore Dimensions of External Dual-line Keyboard Pocket

3.5 Standard Wiring

This section explains the various precautions that must be followed to ensure safe use of this product, maximized performance, and reliable operation of the AC drive.

Safety Precautions

WARNING	● The AC drive must be grounded reliably when it is put into operation, otherwise it may cause personal injury or death and failure of the device. ● In order to ensure the safe operation, the installation and wiring of the AC drive must be carried out by trained professionals. ● Do not carry out work with the power supply on, as there is a risk of electric shock and death. ● Do not perform wiring work while the power is on, as there is a risk of death by electric shock. Before performing wiring, inspection, maintenance, etc., disconnect the power supply to all associated equipment and make sure that the DC voltage in the main circuit has dropped to a safe level for 5 minutes.
CAUTION	● The wiring of the control cable and the power cable of the AC drive, and the cable to the motor must be isolated from each other rather than be arranged in the same cable trough or on the same cable rack. ● This device can only be used for the purpose specified by the manufacturer. If you need to use it in other special occasions, please consult our sales department.
NOTICE	● It is forbidden to use high-voltage insulation testing device to test the AC drive and the insulation of the cables connected to it. ● When the AC drive and external devices (filters, reactors, etc.) need insulation test, their insulation resistance to ground shall be first measured with a 500V megameter, and the insulation resistance shall not be less than 4MΩ.

3.5.1 Standard Connection Diagram

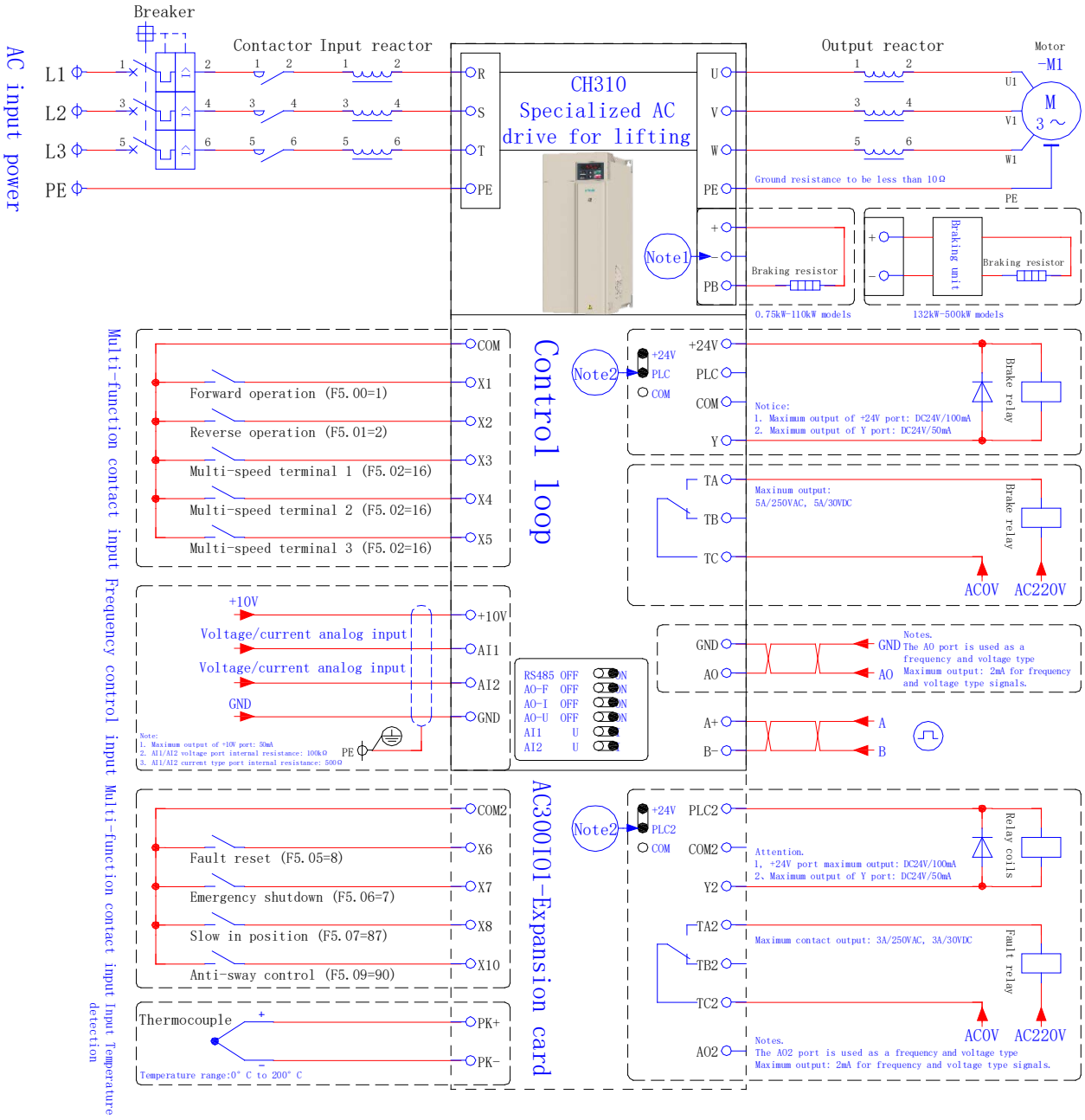


Figure 3-6 Standard Wiring

Note:

1. For T3 models with power of 22kW and below, and models with built-in braking unit, braking resistors can be connected as required; for models without built-in braking unit, external braking units can be installed as needed.

2. Terminals (X1~X5, X6~X10)) can support NPN or PNP transistor input signals, and the bias voltage can be selected from the internal power supply of AC drive (+24V terminal) or external power supply (PLC terminal).

3.5.2 Auxiliary Terminal Output Capacity

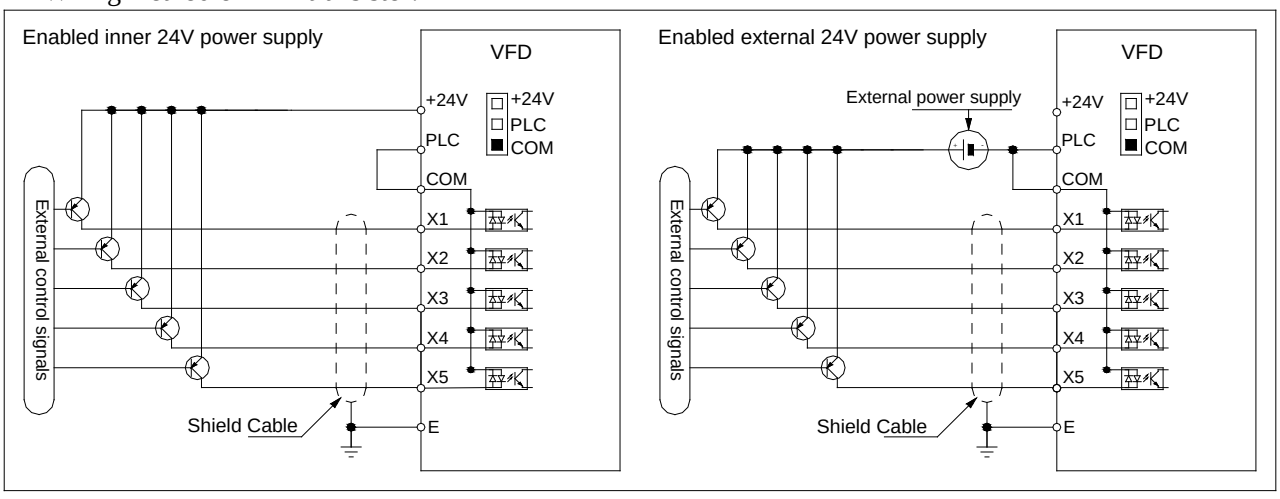
Terminal	Definition	Max. output
+10V	10V auxiliary power output, forming a circuit with GND.	50mA
AO, AO2	Analog monitoring output, forming a circuit with GND.	The maximum output is 2mA for the signal of frequency and voltage type.
+24V	24V auxiliary power output, forming a circuit with COM.	100mA
Y, Y2	Open collector output, action object can be set in the software.	DC24V/50mA
TA/TB/TC	Passive contact output, action object can be set in the software.	Normally open: 5A/250VAC, 5A/30VDC Normally closed: 3A/250VAC, 3A/30VDC
TA2/TB2/TC2	Passive contact output, action object can be set in the software.	Normally open: 3A/250VAC, 3A/30VDC Normally closed: 2A/250VAC, 3A/30VDC

3.5.3 Illustration and Description of DIP Switch Functions

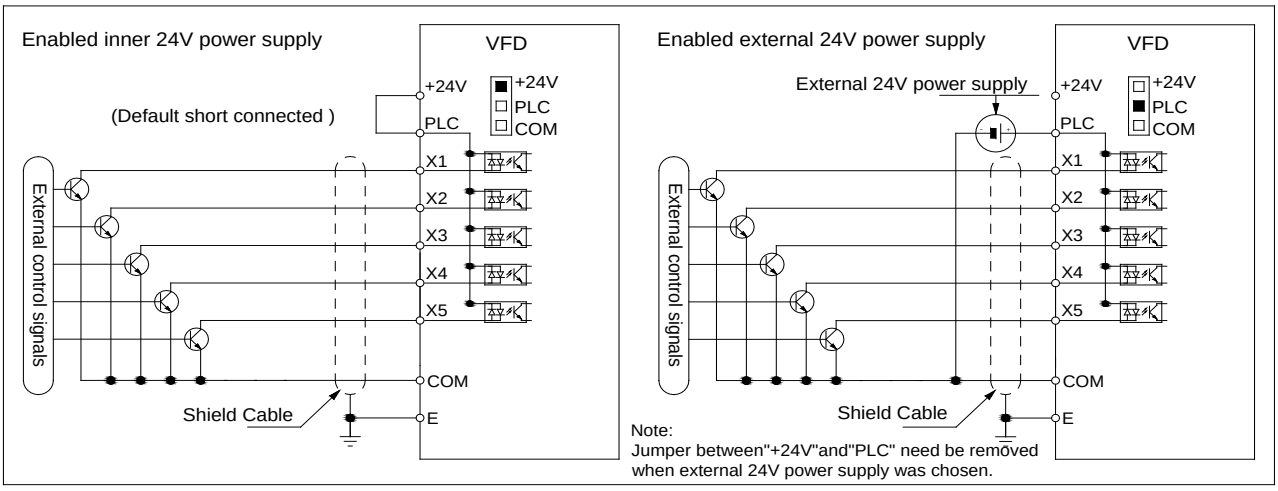
Pin	Position	Description
	RS485 terminal resistance	RS48 connected to 120Ω terminal resistance.
	AO-frequency	0.0kHz~100.0kHz frequency output. Switch to ON of AO-F; external pull-up is required (Generally pull up to 10 V when connecting to 5.1 kΩ).
	AO-current	0mA~20mA or 4mA~20mA current output.
	AO-voltage	0V~10V voltage output.
	AI1-current/voltage	0mA-20mA or 0V-10V input.
	AI2-current/voltage	0mA-20mA or 0V-10V input.

3.5.4 Multi-function Input Connection

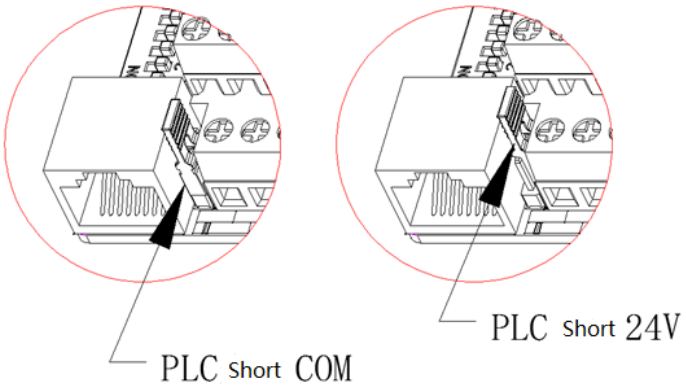
Wiring method of PNP transistor:



Wiring method of NPN transistor:



3.5.5 Connection Jumper Caps "+24V", "PLC", and "COM"



3.6 Wiring of Main Circuit

3.6.1 Arrangement and Definition of Terminals

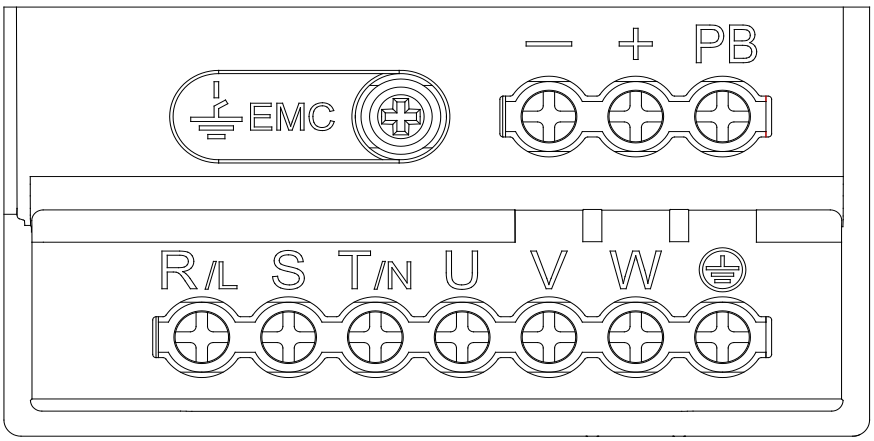


Table 3-2: Arrangement and Definition of Terminals of CH310 Series Main Circuit

Mark	Name	Description
(-)	DC power terminal	Output DC power; (-) is the cathode of the DC bus, and (+) is the anode of the DC bus; for connecting an external braking unit.
(+)		
(+)	Brake resistor terminal	For connecting external braking resistor to realize quick stop.
PB		

R	Drive input terminal	For connecting three-phase AC supply.
S		
T		
U	Drive output terminal	For connecting motor.
V		
W		
⏚	Grounding	Grounding terminal, with the grounding resistance < 10Ω.
E		

3.6.2 Main Circuit Wiring of Three-Phase 380V~480V AC Drive

Table 3-3: Recommended Wire Diameter and Fixed Torque of Main Circuit of Three-phase 380V~480V AC Drive

Model	Screw (mm)	Torque (N·m)	Copper Core Cable mm^2(AWG)
CH310-T3-R75B	M3	0.8~1.0	1.5mm^2(14)
CH310-T3-1R5B	M3	0.8~1.0	2.5mm^2(12)
CH310-T3-2R2B	M3	0.8~1.0	2.5mm^2(12)
CH310-T3-004B	M3.5	1.2~1.5	4mm^2(10)
CH310-T3-5R5B	M3.5	1.2~1.5	6mm^2(9)
CH310-T3-7R5B	M4	1.2~1.5	6mm^2(9)
CH310-T3-011B	M4	1.2~1.5	10mm^2(7)
CH310-T3-015B	M6	4~6	10mm^2(7)
CH310-T3-018B	M6	4~6	16mm^2(5)
CH310-T3-022B	M6	4~6	16mm^2(5)
CH310-T3-030B	M6	4~6	25mm^2(3)
CH310-T3-037B	M6	4~6	25mm^2(3)
CH310-T3-045B	M8	8~10	35mm^2(2)
CH310-T3-055B	M8	8~10	35mm^2(2)
CH310-T3-075B	M8	8~10	50mm^2(1)
CH310-T3-090B	M8	8~10	50mm^2(1/ 0)
CH310-T3-110B	M8	8~10	70mm^2(2/ 0)
CH310-T3-132	M12	14~16	95mm^2(3/ 0)
CH310-T3-160	M12	14~16	95mm^2(4/ 0)
CH310-T3-185	M12	14~16	120mm^2(14)
CH310-T3-200	M12	14~16	150mm^2(14)
CH310-T3-220	M12	14~16	150mm^2(14)
CH310-T3-250	M12	14~16	185mm^2(14)
CH310-T3-280	M12	14~16	185mm^2(14)
CH310-T3-315	M16	20~23	240mm^2(14)

CH310-T3-355	M16	20~23	240mm^2(14)
CH310-T3-400	M16	20~23	300mm^2(14)
CH310-T3-450	M16	20~23	400mm^2(14)
CH310-T3-500	M16	20~23	400mm^2(14)
CH310-T3-560	M16	20~23	500mm^2(14)
CH310-T3-630	M16	20~23	500mm^2(14)
CH310-T3-710	M16	20~23	500mm^2(14)
For AC drives above 185kW, it is recommended to use copper bars as electrical connections for the main circuit. For the cross-sectional area of the copper bars, please refer to the "Specifications of recommended copper core cable (mm2)" in the above table.			

3.6.3 Main Circuit Wiring of Single/Three-Phase 220V~240V AC Drive

Table 3-4: Recommended Wire Diameter and Fixed Torque of Main Circuit of Single/Three-phase 220V AC Drive

Model	Screw (mm)	Torque(N·m)	Copper Core Cable mm^2(AWG)
CH310-T/ S2-R40B	M3	0.8~1.0	1.5mm^2(14)
CH310-T/ S2-R75B	M3	0.8~1.0	2.5mm^2(12)
CH310-T/ S2-1R5B	M3	0.8~1.0	2.5mm^2(12)
CH310-T/ S2-2R2B	M3.5	1.2~1.5	4mm^2(10)
CH310-T/ S2-004B	M3.5	1.2~1.5	4mm^2(10)
CH310-T/ S2-5R5B	M4	1.2~1.5	10mm^2(7)
CH310-T/ S2-7R5B	M6	4~6	16mm^2(5)
CH310-T/ S2-011B	M6	4~6	16mm^2(5)
CH310-T/ S2-015B	M6	4~6	25mm^2(3)
CH310-T2-018B	M6	4~6	25mm^2(3)
CH310-T2-022B	M6	4~6	25mm^2(3)
CH310-T2-030B	M8	8~10	35mm^2(2)
CH310-T2-037B	M8	8~10	50mm^2(1)
CH310-T2-045B	M8	8~10	50mm^2(1)
CH310-T2-055B	M8	8~10	70mm^2(2/ 0)

3.6.4 Recommended Main Circuit Components Specification

Table 3-5: Recommended Components Specification of Main Circuit of Three-phase 380V AC Drive

Model	Contactor(A)	Breaker(A)	DC Reactor	Input Filter	Output Filter
CH310-T3-R75B	10A	10A	-	NFI-005	NFO-010
CH310-T3-1R5B	10A	10A	-	NFI-005	NFO-010
CH310-T3-2R2B	16A	15A	-	NFI-010	NFO-010
CH310-T3-004B	16A	20A	-	NFI-010	NFO-010
CH310-T3-5R5B	25A	20A	-	NFI-020	NFO-020
CH310-T3-7R5B	25A	30A	-	NFI-020	NFO-020

CH310-T3-011B	32A	40A	-	NFI-036	NFO-036
CH310-T3-015B	40A	50A	-	NFI-036	NFO-036
CH310-T3-018B	50A	60A	-	NFI-050	NFO-050
CH310-T3-022B	50A	75A	-	NFI-050	NFO-050
CH310-T3-030B	63A	100A	DCL-80	NFI-080	NFO-080
CH310-T3-037B	80A	125A	DCL-100	NFI-100	NFO-100
CH310-T3-045B	100A	150A	DCL-110	NFI-100	NFO-100
CH310-T3-055B	125A	175A	DCL-125	NFI-150	NFO-150
CH310-T3-075B	160A	200A	DCL-150	NFI-150	NFO-150
CH310-T3-090B	220A	250A	DCL-200	NFI-200	NFO-300
CH310-T3-110B	220A	300A	DCL-200	NFI-200	NFO-300
CH310-T3-132	250A	400A	DCL-300	NFI-300	NFO-300
CH310-T3-160	300A	500A	DCL-300	NFI-300	NFO-300
CH310-T3-185	400A	600A	DCL-400	NFI-400	NFO-400
CH310-T3-200	400A	700A	DCL-400	NFI-400	NFO-400
CH310-T3-220	630A	800A	DCL-500	NFI-600	NFO-600
CH310-T3-250	630A	1000A	DCL-600	NFI-600	NFO-600
CH310-T3-280	630A	1200A	DCL-600	NFI-600	NFO-600
CH310-T3-315	630A	1200A	DCL-800	-	-
CH310-T3-355	800A	1400A	DCL-800	-	-
CH310-T3-400	1000A	1600A	DCL-1000	-	-
CH310-T3-450	1000A	2000A	DCL-1000	-	-
CH310-T3-500	1000A	2000A	DCL-1200	-	-
CH310-T3-560	1200A	2000A	DCL-1200	-	-
CH310-T3-630	1200A	2000A	DCL-1200	-	-
CH310-T3-710	1400A	2000A	DCL-1200	-	-

Note: For detailed specifications and circuit connection forms of DC reactors, input filters, output filters, etc., please refer to the "External Units and Optional Parts" section.

3.7 Wiring of Control Circuit

3.7.1 Arrangement of Control Circuit Terminals

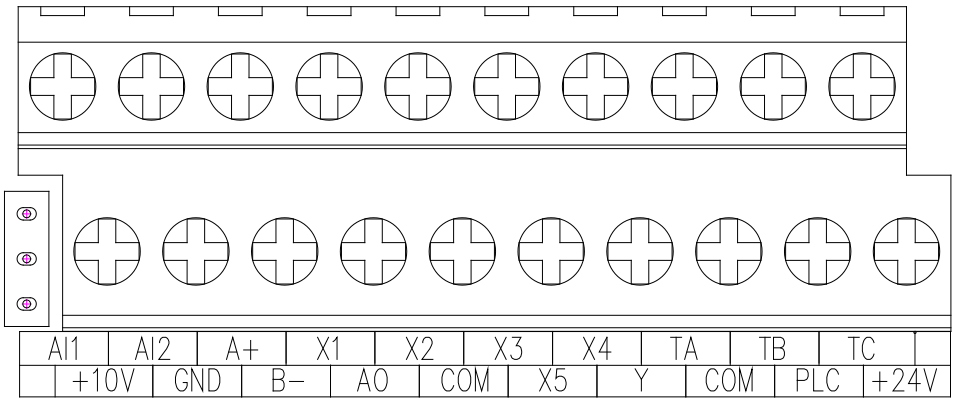


Table 3-6: Arrangement and Definition of Terminals of CH310 series Control Circuit

Item	Mark	Name	Description
Power Supply	+10V-GND	External +10V power supply	Provide +10V power supply, with maximum output current of 50mA; generally used as the power supply for external potentiometer with the resistance range of 1kΩ-5kΩ.
	+24V-COM	External +24V power supply	Provide +24V power supply, generally used as the power supply for DI and DO terminals and external sensors. Maximum output current: 100mA.
	PLC	External common terminal	Connect to +24V by factory default. When X1-X5/PUL is driven with external signals, PLC needs to be connected to external power supply and disconnected from the +24V power supply (see "+24V", "PLC", "COM" connection diagram for details).
AI	AI1-GND	Voltage/Current analog input	1. Current: DC 0V~10V/0mA~20mA. 2. Voltage impedance: 100kΩ. 3. Current input impedance: 500Ω.
	AI2-GND	Voltage/Current analog input	1. Input range: DC 0V~10V/0mA~20mA. 2. Voltage impedance: 100kΩ. 3. Current input impedance: 500Ω.
DI	X1-PLC	Multi-function contact input 1	Optocoupler isolated, compatible with bipolar input. 1. Input impedance: 4.4kΩ. 2. Voltage range at high-level input: 10V~30V. 3. Voltage range at low-level input: 0V~5V.
	X2-PLC	Multi-function contact input 2	
	X3-PLC	Multi-function contact input 3	
	X4-PLC	Multi-function contact input 4	
	X5-PLC	Multi-function contact input 5	
AO Output	AO-GND	Analog output	1. Voltage range: DC 0V~10V. 2. Current range: DC 0mA~20mA. 3. Pulse range: 0kHz~50kHz.
DO Output	Y-COM	DO1	Optocoupler isolated, open collector output. 1. Voltage range: DC 0V~30V. 2. Current range: DC 0mA~50mA.
Relay Output	TA-TC	Normally open	Contact drive capacity: Normally ON: 5A/250VAC, 5A/30VDC Normally closed: 3A/250VAC, 3A/30VDC
	TB-TC	Normally closed	

Communication Terminal	A+	Communication terminal A+	RS485 communication port. According to the illustration and description of DIP switch function, the position of the RS485 DIP switch determines whether the RS485 communication is connected to 120 Ω terminal resistor.
	B-	Communication terminal B-	

3.7.2 AC300IO1 Wiring

CH310 is built in with AC300IO1 expansion card with DI, DO and AO functions

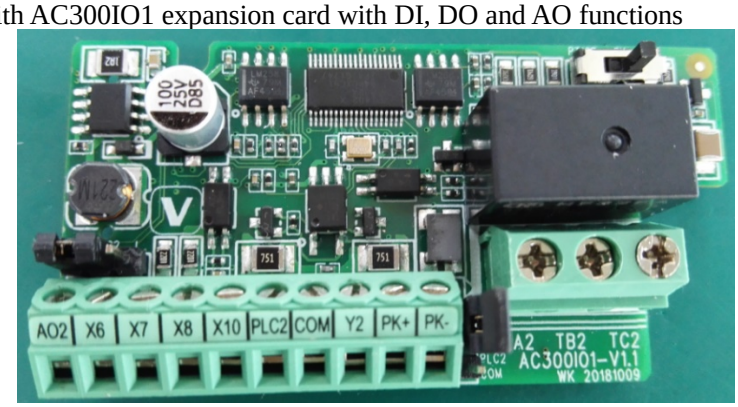


Table 3-7: Arrangement and Definition of Terminals of CH310 Series Expansion

Item	DI signal characteristics			
	Name	Response Frequency Range	Input Impedance	Effective Level
Input signal	X6, X7, X8	0kHz~5kHz	4.4kΩ	High-level: 10V~30V Low-level: 0V~5V
	X10	0kHz~50kHz	1.5kΩ	High-level: 10V~30V Low-level: 0V~5V
Select PLC2 to be connected to 24V or COM via jumper switch S7, supporting the input of NPN and PNP transistor signals.				
Item	**DO signal characteristics**			
	Name	**Output Mode**		**Max. Output**
Output Signal	Y2	NPN transistor, open-circuit collector output		DC24V/50mA
	TA2, TB2, TC2	Relay normally open and normally closed output.		Normally open: 3A/250VAC 3A/30VDC Normally closed: 2A/250VAC 2A/30VDC
Item	**AO2 signal characteristics (selected by J2 jumper switch)**			
	Name	**Output Capacity**		**Comment**
AO2	AO2-V (voltage output)	DC 0V~10V		2mA
	AO2-I (current output)	DC 0mA~20mA or 4mA~20mA		20mA
PK+/PK-temperature sensor signal				
Name	**Thermocouple**	**Selection Mode**	**Differential Input Method**	**Temperature Range**
PK+/PK-	PT100	By DIP switch S1	Differential two-wire input.	0℃~220℃
	KTY84	By DIP switch S1 with F10.26 setting		
	PT1000			

3.7.3 Control Circuit Wiring Specification

3-8 Control Circuit Wiring Specification

Name	Screw (mm)	Torque (N·m)	Cable (mm^2)	Cable Type
A+, B-	M2.5	0.4~0.6	0.75	Shielded twisted pair
+10V, GND, AO, AI1, AI2	M2.5	0.4~0.6	0.75	Shielded twisted pair
+24V, COM, Y, TA, TB, TC, PLC, X1, X2, X3, X4, X5	M2.5	0.4~0.6	0.75	Shielded cable

3.8. Braking Resistor Settings

- Connection of brake resistor for machines below 110kW (inclusive)

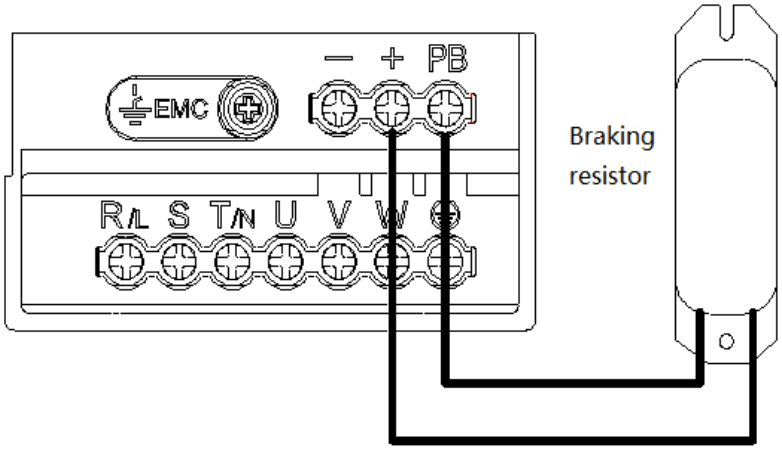


Table 3-7: Connection of Brake Resistor for Machines below 110kW (inclusive)

- Connection of brake units for 132kW and above. **Note:** Optional brake units are available for 132kW-500kW

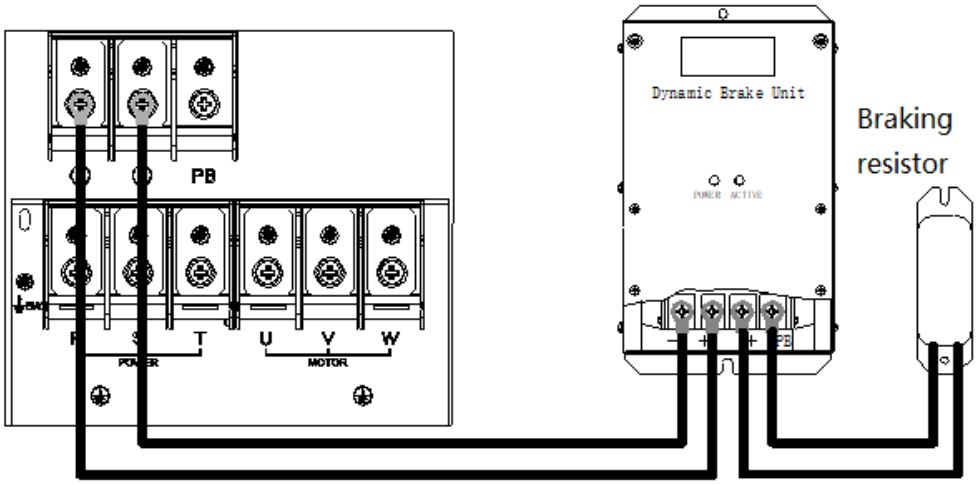


Table 3-8: Connection of Brake Resistor for Machines above132kW (inclusive)

3.8.1 Braking Resistor Selection

The selection of braking resistor needs to be determined according to the actual power generated by the motor, which is related to the inertia, deceleration time, and Potential energy load, etc. The larger the inertia of the system, the shorter the deceleration time required, and the more frequent the braking, the larger the power and smaller the resistance value of the braking resistor needs to be selected.

Table 3-9 CH310 Hoisting Mechanism Brake Component

AC drive		Brake Unit	Brake Resistor		
Specification	Rated Current		Braking Power	Recommend	Set
CH310-T3-R75B	3A	Built-in	≥300W	≥300Ω	1
CH310-T3-1R5B	4A	Built-in	≥750W	≥250Ω	1
CH310-T3-2R2B	6A	Built-in	≥1.1kW	≥200Ω	1
CH310-T3-004B	10A	Built-in	≥2kW	≥120Ω	1
CH310-T3-5R5B	13A	Built-in	≥3kW	≥80Ω	1
CH310-T3-7R5B	17A	Built-in	≥4kW	≥65Ω	1
CH310-T3-011B	25A	Built-in	≥5.5kW	≥43Ω	1
CH310-T3-015B	32A	Built-in	≥7.5kW	≥32Ω	1
CH310-T3-018B	38A	Built-in	≥10kW	≥20Ω	1
CH310-T3-022B	45A	Built-in	≥11kW	≥18Ω	1
CH310-T3-030B	60A	Built-in	≥15kW	≥15Ω	1
CH310-T3-037B	75A	Built-in	≥19kW	≥12Ω	1
CH310-T3-045B	90A	Built-in	≥23kW	≥10Ω	1
CH310-T3-055B	110A	Built-in	≥28kW	≥8Ω	1
CH310-T3-075B	150A	Built-in	≥38kW	≥7Ω	1
CH310-T3-090B	180A	Built-in	≥45kW	≥6Ω	1
CH310-T3-110B	210A	Built-in	≥56kW	≥5Ω	1
CH310-T3-132	250A	BU30-3-300	≥67kW	≥3Ω	1
CH310-T3-160	310A	BU30-3-300	≥80kW	≥3Ω	1
CH310-T3-185	340A	BU30-3-300	≥93kW	≥3Ω	1
CH310-T3-200	380A	BU30-3-300* 2	≥50kW	≥3Ω	2
CH310-T3-220	415A	BU30-3-300* 2	≥55kW	≥3Ω	2
CH310-T3-250	470A	BU30-3-300* 2	≥63kW	≥3Ω	2
CH310-T3-280	510A	BU30-3-300* 2	≥70kW	≥3Ω	2
CH310-T3-315	600A	BU30-3-300* 2	≥78kW	≥3Ω	2
CH310-T3-355	670A	BU30-3-300* 2	≥88kW	≥3Ω	2
CH310-T3-400	750A	BU30-3-300* 3	≥67kW	≥3Ω	3
CH310-T3-450	800A	BU30-3-300* 3	≥75kW	≥3Ω	3
CH310-T3-500	860A	BU30-3-300* 3	≥80kW	≥3Ω	3
CH310-T3-560	990A	BU30-3-300* 4	≥90kW	≥3Ω	3
CH310-T3-630	1100A	BU30-3-300* 4	≥105kW	≥3Ω	3
CH310-T3-710	1260A	BU30-3-300* 4	≥88kW	≥3Ω	4
Hoisting AC drive: Braking resistor power PR ≥ motor power * 0.5					

Table 3-10 CH310 Translation Mechanism Brake Component

AC drive		Brake Unit	Brake Resistor		
Specification	Rated Current		Braking Power	Recommend	Set
CH310-T3-R75B	3A	Built-in	≥150W	≥300Ω	1
CH310-T3-1R5B	4A	Built-in	≥300W	≥250Ω	1
CH310-T3-2R2B	6A	Built-in	≥550W	≥200Ω	1
CH310-T3-004B	10A	Built-in	≥750W	≥120Ω	1
CH310-T3-5R5B	13A	Built-in	≥1.1kW	≥80Ω	1
CH310-T3-7R5B	17A	Built-in	≥1.5kW	≥65Ω	1
CH310-T3-011B	25A	Built-in	≥2.2kW	≥43Ω	1
CH310-T3-015B	32A	Built-in	≥3kW	≥32Ω	1
CH310-T3-018B	38A	Built-in	≥3.6kW	≥20Ω	1
CH310-T3-022B	45A	Built-in	≥4.4kW	≥18Ω	1
CH310-T3-030B	60A	Built-in	≥6kW	≥15Ω	1
CH310-T3-037B	75A	Built-in	≥7.4kW	≥12Ω	1
CH310-T3-045B	90A	Built-in	≥9kW	≥10Ω	1
CH310-T3-055B	110A	Built-in	≥11kW	≥8Ω	1
CH310-T3-075B	150A	Built-in	≥15kW	≥7Ω	1
CH310-T3-090B	180A	Built-in	≥18kW	≥6Ω	1

CH310-T3-110B	210A	Built-in	≥23kW	≥5Ω	1
CH310-T3-132	250A	BU30-3-100	≥26kW	≥9Ω	1
CH310-T3-160	310A	BU30-3-150	≥32kW	≥6Ω	1
CH310-T3-185	340A	BU30-3-150	≥36kW	≥6Ω	1
CH310-T3-200	380A	BU30-3-150	≥40kW	≥6Ω	1
CH310-T3-220	415A	BU30-3-300	≥44kW	≥3Ω	1
CH310-T3-250	470A	BU30-3-300	≥50kW	≥3Ω	1
CH310-T3-280	510A	BU30-3-300	≥56kW	≥3Ω	1
CH310-T3-315	600A	BU30-3-300	≥63kW	≥3Ω	1
CH310-T3-355	670A	BU30-3-300	≥70kW	≥3Ω	1
CH310-T3-400	750A	BU30-3-300	≥80kW	≥3Ω	1
CH310-T3-450	800A	BU30-3-300	≥90kW	≥3Ω	1
CH310-T3-500	860A	BU30-3-300* 2	≥50kW*2	≥3Ω	2
CH310-T3-560	990A	BU30-3-300* 2	≥56kW*2	≥3Ω	2
CH310-T3-630	1100A	BU30-3-300* 2	≥63kW*2	≥3Ω	2
CH310-T3-710	1260A	BU30-3-300* 2	≥71kW*2	≥3Ω	2
Translation AC drive: Braking resistor power PR ≥ motor power * 0.2					

Note:

1. *2 and *3 indicate that two and three braking units are used in parallel with their respective braking resistors.
2. The table is for your information. Please select different resistor and power according to the actual conditions, but the resistance value must not be smaller than the braking resistor in the table while the power can be larger.
3. Please refer to "BU30 Brake Unit Manual" for ***BU30 Brake Unit's shape and installation dimensions***.

3.8.2 Brake Unit Appearance and Installation Dimension

Please refer to ***BU30 Brake Unit Manual*** for BU30 Brake Unit's shape and installation dimensions.

3.9 Backup Control System

AC drives are composed of semiconductor devices, passive electronic devices, and motion devices. These devices have a service life. Even under normal working conditions, some characteristics changes or failures may occur to these devices, leading to product failures. In order to prevent product failures from causing loss of production stop, it is recommended to set up a backup control system while using the product.

The following figure shows the backup control system that Manually switches to the grid power to directly drive the motor after the AC drive fails. In actual use, please select, according to actual needs and use environment, the grid power Y/Δ step-down start mode, the grid power auto-coupling step-down start mode and grid power soft start mode to drive the motor, and other control systems such as frequency conversion system in standby.

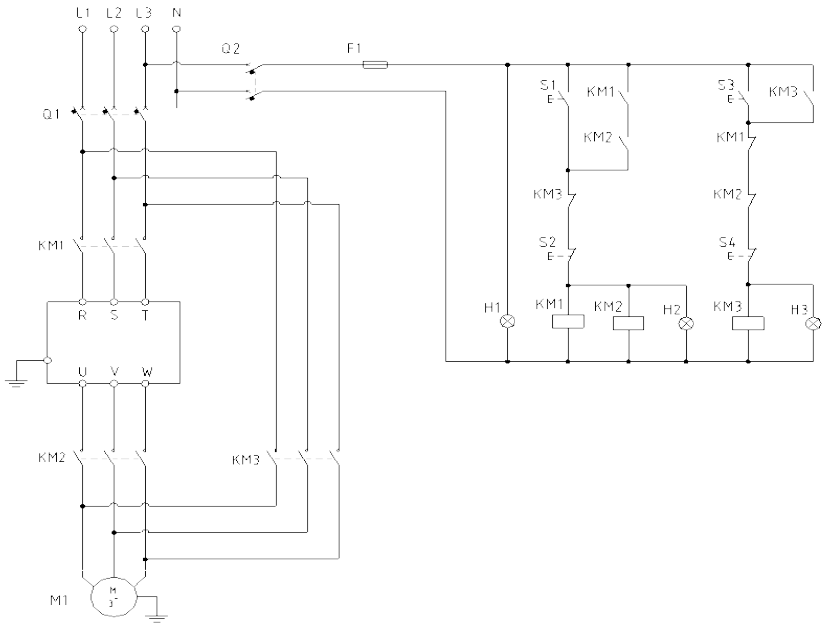


Figure. 3-9 Backup Control System with Power Grid Directly Driving the Motor

Chapter 4 Trial Operation

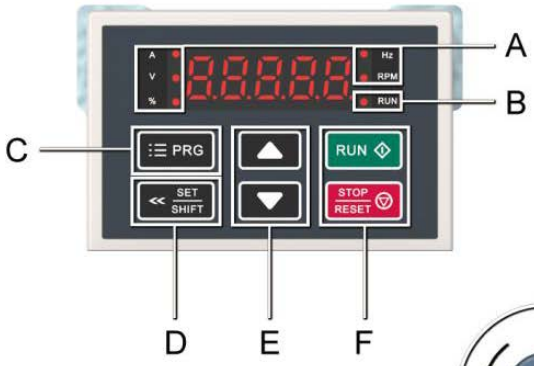
4.1 Safety Precautions

DANGER
Please pay attention to all information in this manual regarding safety. Please note that failure to observe the warnings may result in death or serious injuries. VEICHI will not be held liable for injuries and equipment damage caused by your company or your customers' failure to comply with the contents of this book.

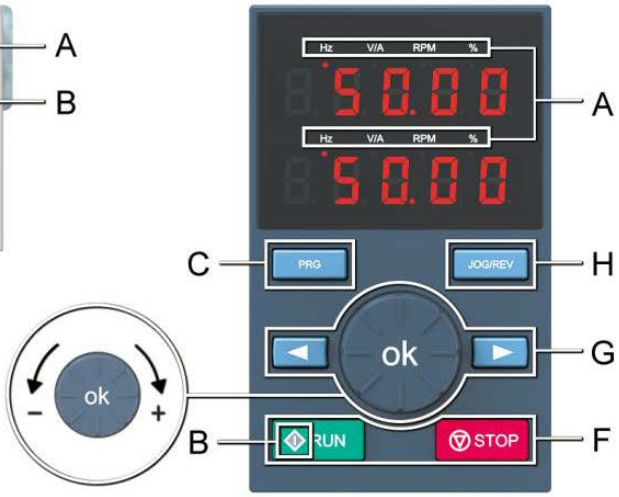
4.2 Name and Function of Keyboard

- **Keyboard name**

Single-line keyboard (37kW and below)



Dual-line keyboard (37kW and above)



- **Keyboard functions**

Mark	Single-line keyboard	Dual-line keyboard	Function
A	Unit indicator		Hz: Frequency; A: Current; V: Voltage; A/V: Current or Voltage Revolutions per minute; %: Percentage.
B	Status indicator		On: Forward running status; Flashing: Reverse running status OFF: Stop status.
C	Program PRG	Program PRG	Enter the function menu interface when standby or running; press the key to exit the modification when in the parameter modification status; long press the key (1 second) when standby or running to enter the status interface directly.
D	Set/Shift SET SHIFT		Confirm function: Press the key to confirm the modified value after modification. Shift function: Long press the key (1 second) to move the operation position, long press without releasing will carry out cyclic shifting.
E	UP/DOWN		The UP key increases the value, the DOWN key decreases the value.

F	RUN 	RUN 	When run/stop is controlled by the keyboard, press the key to turn the drive forward. When run/stop is controlled by the keyboard, press the key to turn the drive forward. The status indicator light is always on when running in forward direction, and flashes when running in reverse direction.
	Stop/Reset 	Stop/Reset 	When the given command channel is controlled by keypad, press this button to stop the AC drive; you can define whether other command channels are valid through the parameter [F11.03]; press this button in the fault state to reset the AC drive.
G			Digital potentiometer: clockwise rotation is used as the UP key to increase the operation value; counterclockwise rotation is used as the DOWN key to decrease the operation value.
			OK button: Press this button after modifying the value to confirm the modification.
		Left/Right 	Move the operation position left and right.
H		Jog/Reverse 	The functions of the key are selected via parameter [F11.02].

- **Cross Reference Table**

Table 4-1 Cross Reference Table

Letter	LED Display	Letter	LED Display	Letter	LED Display
0		C		O	
1		D		P	
2		E		Q	
3		F		R	
4		G		S	
5		H		T	
6		I		U	
7		J		V	
8		K		W	
9		L		X	No display
A		M		Y	
B		N		Z	No display

4.3 LED Status Indicator

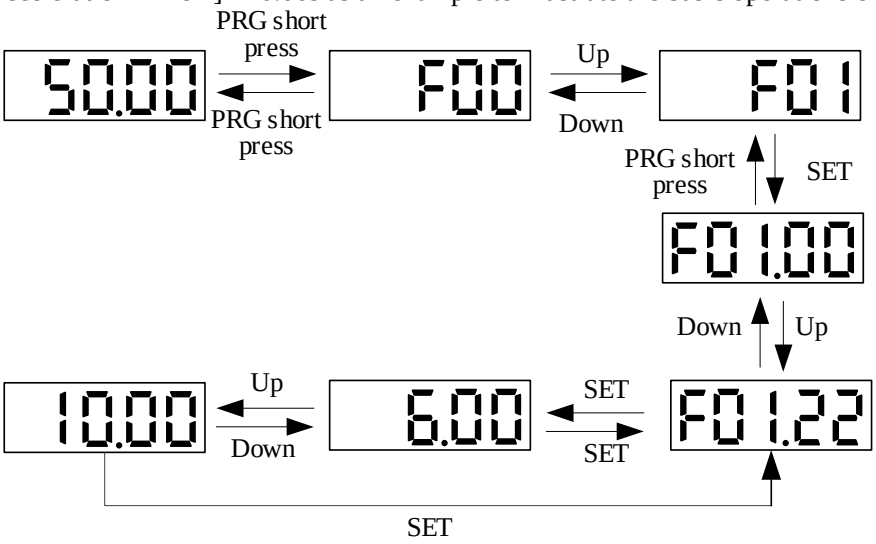
In the table below, ○ indicates that the light is on, ● indicates that the light is off, and ◎ indicates that the light is flashing.

Operation indicator	RUN ●	OFF: Stop status.
	RUN ○	ON: Forward running.
	RUN ◎	Flashing: Reverse running.
Unit indicator (Hz: Frequency; A: Current; V: Voltage; rpm: Revolutions per minute; %: Percentage)	○	ON: Unit of the value under monitor.
	●	OFF: Unit of the value not under monitor.

4.4 Keyboard Operation

● Basic parameters setting

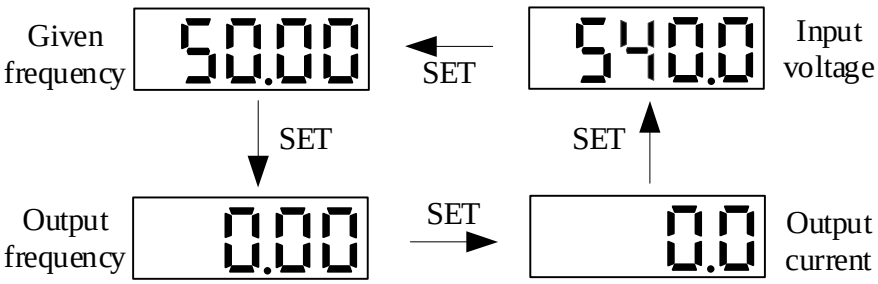
Take F01.22 [Acceleration Time 1]= 10.00s as an example to illustrate the basic operations of the LED keyboard.



Note: To modify the tens-, hundreds-and thousands-bit of a parameter, the keyboard shift key function can be used to quickly select it.

● Monitoring status of the operation check

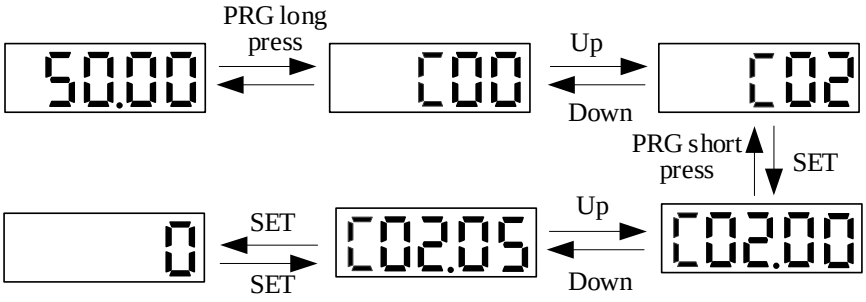
Take the default monitoring state parameter check as an example to illustrate the variable switching in the monitoring state.



Note: Use the left shift key to cycle through the first row of monitoring parameters and the right shift key to cycle through the second row of monitoring parameters when using an external keyboard.

● Monitoring parameter check

The following is an example of checking C02.05 [PLC Operation Stage] to illustrate basic LED keyboard operation.



4.5 Items to Be Confirmed at Initial Start

Checks before power on:

Before connecting the power supply, be sure to confirm the following items to ensure the safety of personnel and the product.

Item	Content
Input power voltage	Confirm whether the specification of input power voltage is correct. Single-phase: 220V, 50Hz/60Hz Three-phase: 220V, 50Hz/60Hz Three-phase: 380V~480V, 50Hz/60Hz Three-phase: 660V, 50Hz/60Hz Three-phase: 380V~1140V, 50Hz/60Hz
	Confirm that the power supply will not fluctuate greatly.
	Confirm that the AC drive and the motor are properly grounded.
Connection of AC drive output terminals and motor terminals	Confirm that the wiring of the AC drive ouput terminals (U, V, W) and motor terminals is reasonable and correct.
Wiring of control circuit	Confirm that the control circuit terminals of the AC drives are connected properly and correctly.
Control power status	Confirm that the signals input from the switches connected to the control circuit terminals of the AC drive are all disconnected.
Connection status of motor and machinery	Confirm that the motor and machinery are connected correctly and properly.

Checks after power on:

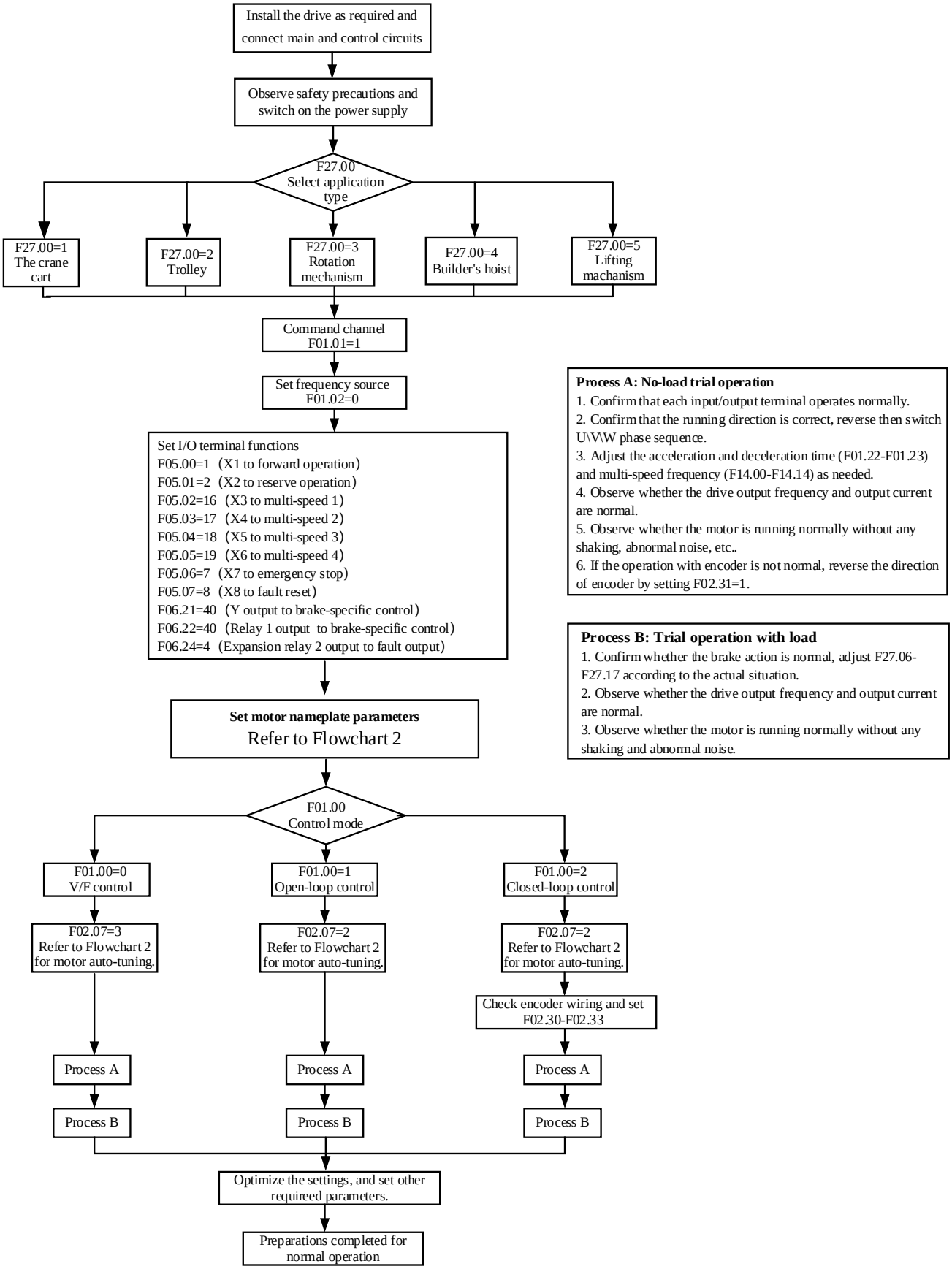
After connecting the power supply, check whether the AC drive shows a fault. If it is normally powered on, go on the rest steps, if a fault occurs, conduct troubleshooting according to the fault code, and perform related operations after troubleshooting.

4.6 Trial Operation

The basic initial startup steps of our AC drives are explained as below. For the initial use, please refer to the corresponding flowchart according to the actual situation; only the most basic settings are introduced here, and the user can operate according to the steps: Flowchart 1: Basic operation; Flowchart 2: Motor auto-tuning operation; Flowchart 3: Vector operation optimization.

Flowchart 1

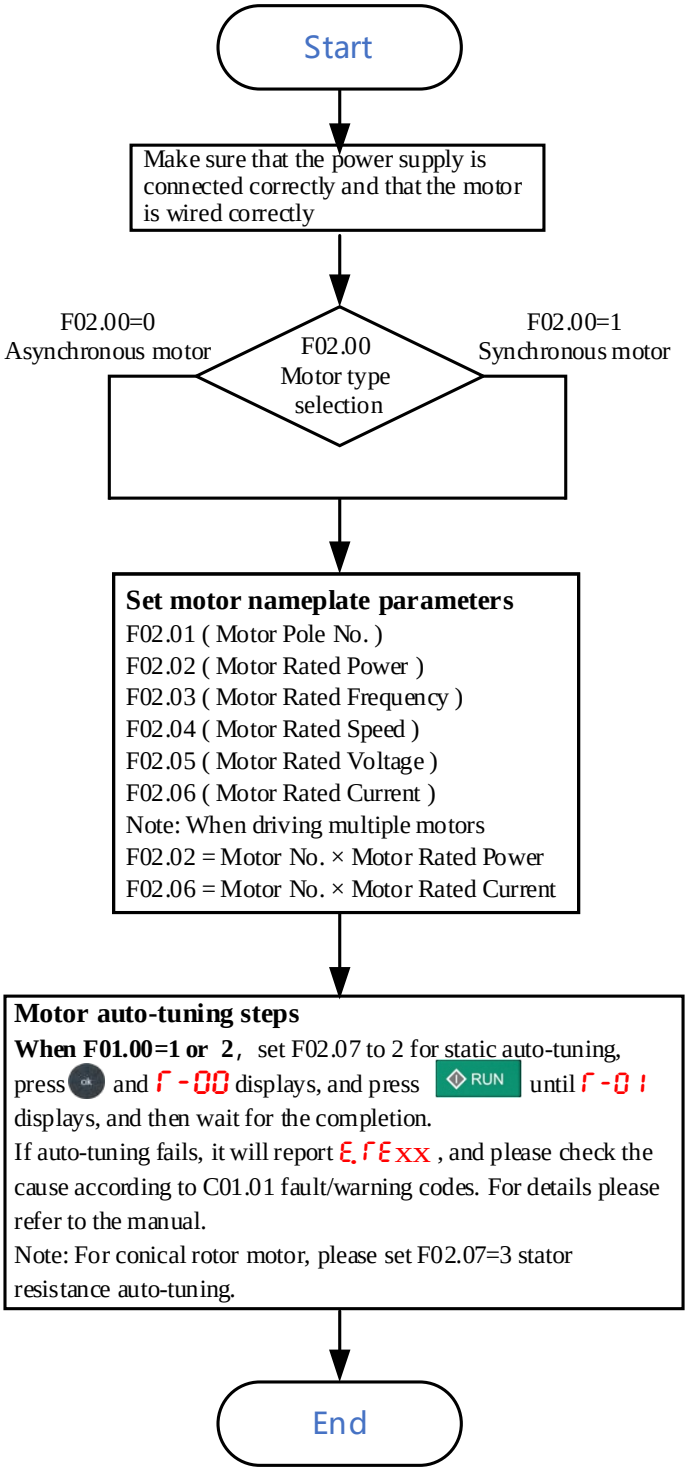
Flowchart 1 is a guide for commissioning and trial operation. When the AC drive is commissioned for the first time, please operate according to the following process.



Note:1. When disconnecting the motor for operation and debugging, F00.09 [Operation Mode] should be set to 1 "Debugging Mode". This mode forcibly shields functions like output phase loss and brake release current protection, so it is convenient for users to debug newly installed equipment offline.

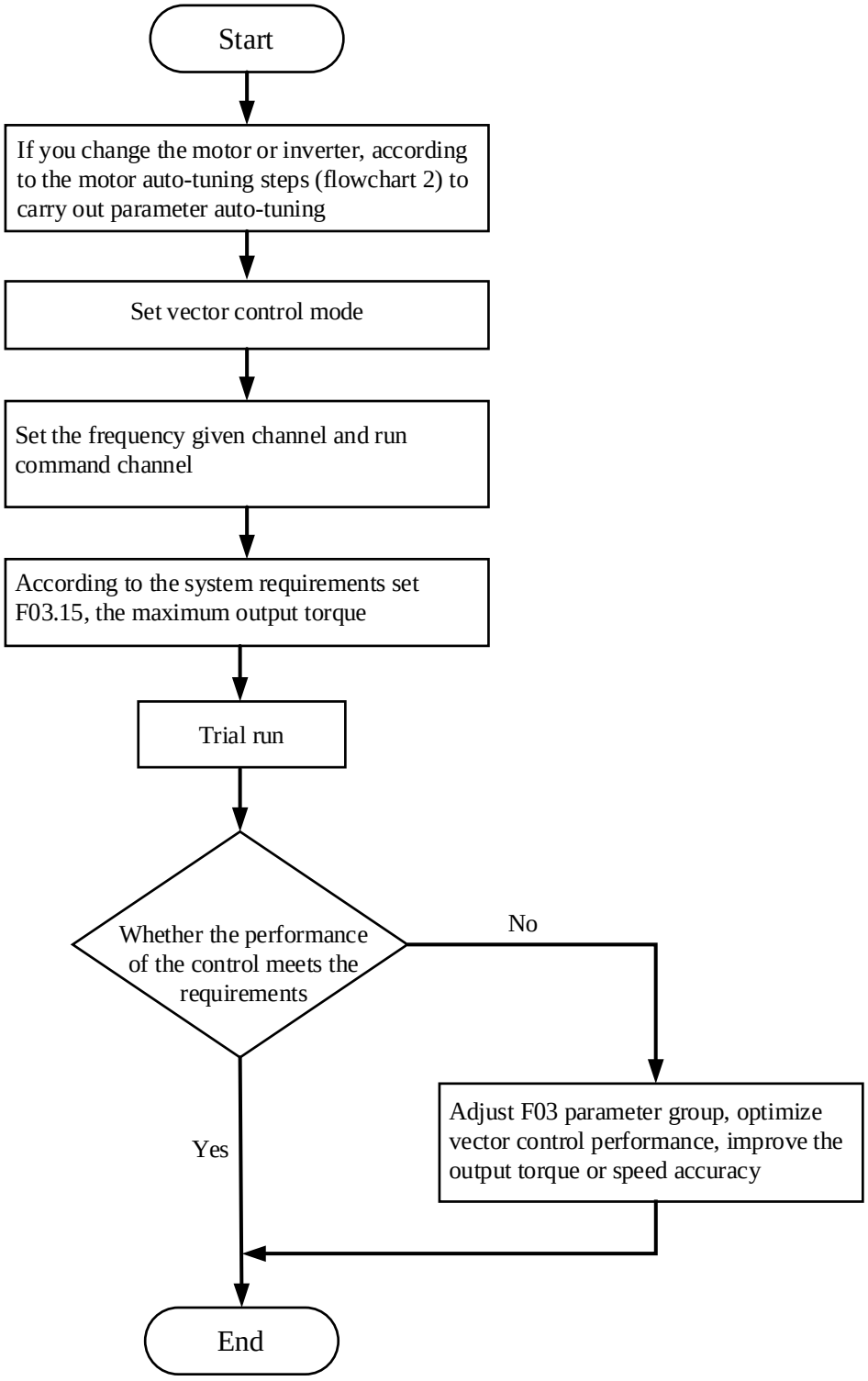
Flowchart 2

Flowchart 2 is the process of motor parameter auto-tuning. To better control the motor, motor parameter auto-tuning is required (**Note:** the rated motor parameters must be set before auto-tuning).



Flowchart 3

Flowchart 3 is the vector control process for debugging the vector mode, so as to achieve better frequency control performance.



4.7 Auto-Tuning

Auto-Tuning is to automatically determine the motor characteristic values required for vector control and automatically set values to the function codes of the AC drive. The methods for the AC drive to obtain the internal electrical parameters of the controlled motor include: dynamic auto-tuning, static auto-tuning, stator resistance auto-tuning, manual input of motor parameters, etc. Please select the most suitable auto-tuning mode according to the type of motor used, the control mode of the AC drive, and the installation environment of the motor, and input the necessary parameters according to the selected auto-tuning mode and the control mode set by F01.00.

WARNING
For mechanical safety: During dynamic auto-tuning, the motor will rotate at a speed above 50% of the rated frequency. Please confirm safety around. Otherwise, it may cause personal accidents or mechanical damage.

◆ Asynchronous motor auto-tuning

The following describes the motor parameter auto-tuning method for asynchronous motors. The following parameters need to be set firstly:

- Motor parameters: F02.01~F02.06.
- Speed feedback parameters: F2.30~F2.38 (set for vector control with PG).

Note: Static auto-tuning is an alternative function when dynamic auto-tuning is unavailable. Sometimes the measurement results of static auto-tuning may have a large error with the motor characteristic parameters. Please confirm the measured motor characteristic values through the parameters after the auto-tuning is completed.

Table 4-2 Asynchronous Motor Auto-Tuning Method

Parameter Setting	Condition and Advantage	Control Mode (F01.00)		
		V/F (0)	SVC1	FVC2
Dynamic auto-tuning (F02.07=1)	When the motor can rotate during auto-tuning. When running a motor with constant output. To obtain the highest-precision motor control, please choose dynamic auto-tuning if possible. When the motor cannot be separated from the mechanical load, and the load of the motor is lower than 30%.	Valid	Valid	Valid
Static auto-tuning (F02.07=2)	When the motor cannot be separated from the mechanical load, and the load of the motor exceeding 30%. If the test report of the motor or the data indicated on the motor nameplate is not available, the static auto-tuning learns the motor and measures the necessary motor data while the motor is stopped. **Note:** When the motor load is lower than 20%, the motor may rotate at a small angle during tuning. The greater the power level, the longer the learning time (in minutes).	Valid	Valid	Valid
Stator resistance auto-tuning (F02.07=3)	Auto-tuning has been performed, but after installing the motor, the wiring distance between the AC drive and motor is farther than 50m. When the wiring distance under V/F control is more than 50 meters. When the motor output is different from the AC drive capacity.	Valid	Valid	Valid

◆ Input data of asynchronous motor auto-tuning

Before auto-tuning, please confirm the test report of the motor or the data marked on the motor nameplate, and enter the items marked with ○ in the following table.

Table 4-3 Input Data of Asynchronous Motor Auto-Tuning

Name	Code	Unit	Dynamic Auto-Tuning (F02.07=1)	Static Auto-Tuning (F02.07=2)	Stator Resistance Auto-Tuning (F02.07= 3)
Motor Pole No.	F02.01	-	○	○	-
Motor Rated Power	F02.02	kW	○	○	○
Motor Rated Frequency	F02.03	Hz	○	○	-
Motor Rated Speed	F02.04	rpm	○	○	-
Motor Rated Voltage	F02.05	V	○	○	○
Motor Rated Current	F02.06	A	○	○	○
Speed Feedback Encoder Type	F02.30	-	Input when F01.00 = 2 [Asynchronous Motor Closed-Loop Vector Control].		
ABZ Encoder Line No.	F02.33	-			
Rotary Transformer Pole No.	F02.34	-			

◆ Synchronous motor auto-tuning

The following describes the motor parameter auto-tuning method for synchronous motors. The following parameters need to be set firstly:

- Motor parameters: F02.01~F02.06.
- Speed feedback parameters: F2.30~F2.38 (set for vector control with PG).

Table 4-4 Synchronous Motor Auto-Tuning Method

Parameter Setting	Condition and Advantage	Control Mode (F01.00)		
		V/F (10)	SVC (11)	FVC (12)
Dynamic auto-tuning F02.07=1	When the motor can rotate during auto-tuning. When running a motor with constant output. To obtain the highest-precision motor control, please choose dynamic auto-tuning if possible. When the motor cannot be separated from the mechanical load, and the load of the motor is lower than 30%.	Valid	Valid	Valid
Static auto-tuning F02.07=2	When the motor cannot be separated from the mechanical load, and the load of the motor exceeding 30%. If the test report of the motor or the data indicated on the motor nameplate is not available, the static auto-tuning learns the motor and measures the necessary motor data while the motor is stopped. **Note:** When the motor load is lower than 20%, the motor may rotate at a small angle during tuning. The greater the power level, the longer the learning time (in minutes).	Valid	Valid	Valid
Stator resistance auto-tuning F02.07=3	Auto-tuning has been performed, but after installing the motor, the wiring distance between the AC drive and motor is farther than 50m. When the wiring distance under V/F control is more than 50 meters. When the motor output is different from the AC drive capacity.	Valid	Valid	Valid

◆ Input data of synchronous motor auto-tuning

Table 4-5 Synchronous Motor Auto-Tuning Method

Name	Code	Unit	Dynamic Auto-Tuning (F02.07=1)	Static Auto-Tuning (F02.07=2)	Stator Resistance Auto-Tuning (F02.07= 3)
Motor Pole No.	F02.01	-	○	○	-
Motor Rated Power	F02.02	kW	○	○	○
Motor Rated Frequency	F02.03	Hz	○	○	-
Motor Rated Speed	F02.04	rpm	○	○	-
Motor Rated Voltage	F02.05	V	○	○	○
Motor Rated Current	F02.06	A	○	○	○
Speed Feedback Encoder Type	F02.30	-	Input when F01.00 = 12 [Synchronous Motor Closed-Loop Vector Control].		
ABZ Encoder Line No.	F02.33	-			
Rotary Transformer Pole No.	F02.34	-			

4.8 Trial Operation

Set the basic parameters and start test-run after the motor auto-tuning is completed.

WARNING

For mechanical safety: During dynamic auto-tuning, the motor will rotate at a speed above 50% of the rated frequency. Please confirm safety around. Otherwise, it may cause personal accidents or mechanical damage.

4.8.1 No-load Trial Operation

The steps for the no-load test run are described below:

1. Power on the AC drive, and the keyboard will display normally.

2. Press the PRG on the keyboard to set frequency parameter F01.09 via keypad numbers, and set frequency to 5.00Hz.

3. Press RUN, the running indicator is on, and the motor will rotate forward at 5.00Hz.

4. Confirm that the motor rotates in the correct direction and the product has no fault; if it shows a fault, conduct troubleshooting.

5. Increase the set frequency of the AC drive, press the Up/Down to change the value of F01.09, and at the same time confirm the responsiveness of the motor, while adjusting F01.09 in an amplitude of 10Hz.

6. Every time the set value is increased, the output current of the AC drive must be confirmed through C00.02 (output current). It is normal if the output current of the AC drive does not exceed the rated current of the motor.

Example: 5.00Hz→10.00Hz→20.00Hz→30.00Hz→40.00Hz→50.00Hz

7. After confirming that the motor can rotate normally, press the STOP, and the running indicator will light off after the motor has completely stopped.

After confirming that there is no problem when running under no-load condition, connect the motor to the mechanical system for test run.

◆ Precautions before operation

- Please confirm the safety around the motor and machinery.
- Please confirm that the motor has stopped completely.

- Please connect the motor and machinery. Please confirm whether the mounting screws are loose, and securely fix the motor shaft and the mechanical system.
- In order to prevent abnormal actions, please be prepared to press the STOP button of the manipulator at any time.

◆ **Items to be confirmed during operation**

- Please confirm whether the machine runs in correct direction (whether the motor rotates in correct direction).
- Please confirm whether the motor accelerates and decelerates smoothly.

4.8.2 Trial Operation with Load

After connecting the machinery to the motor, perform the test-run according to the same operation steps as the no-load trial operation.

Please confirm whether C00.02 (Output Current) is too large.

1. Power on the AC drive, and the keyboard will display normally.

2. Press the PRG on the keyboard to set frequency parameter F01.09 via keypad numbers, and set frequency to 5.00Hz.

3. Press RUN, the running indicator is on, and the motor will rotate forward at 5.00Hz.

4. Confirm that the motor rotates in the correct direction and the product has no fault; if it shows a fault, conduct troubleshooting.

5. Increase the set frequency of the AC drive, press the Up/Down to change the value of F01.09, and at the same time confirm the responsiveness of the motor, while adjusting F01.09 in an amplitude of 10Hz.

6. Every time the set value is increased, the output current of the AC drive must be confirmed through C00.02 (Output Current). It is normal if the output current of the AC drive does not exceed the rated current of the motor.

Example: 5.00Hz→10.00Hz→20.00Hz→30.00Hz→40.00Hz→50.00Hz

7. After confirming that the motor can rotate normally, press the STOP, and the running indicator will light off after the motor has completely stopped.

Change the frequency command and rotation direction to confirm whether there are abnormal sounds and vibrations.

If there is a control failure such as imbalance or vibration, please adjust.

4.9 Precise Adjustment during Trial Operation (Optimization of Control Performance)

The following describes how to adjust control failures such as imbalance or vibration that occurs during trial operation. Please adjust the corresponding parameters in the table according to the control mode used and the state of the AC drive.

Note: This section only lists the parameters that are frequently adjusted. If you need to make more precise adjustments, please contact us.

◆ V/F control

Parameters Used for AC drive Fine-tuning (V/F Control Mode)

Fault	Parameter No.	Measure	Default	Recommend
1: Large electromagnetic noise of the motor 2: Imbalance or vibration at low speed (below10Hz) and medium speed (10Hz~40Hz)	F01.40[Carrier Frequency]	● Increase the carrier frequency when the electromagnetic noise of the motor is large. ● Decrease the carrier frequency when imbalance or vibration occurs at low and medium speeds.	3.0kHz	1.0~Upper limit
1. Insufficient torque at low speed (below 10Hz) 2. Imbalance or vibration	F04.01[Torque Boost]	● Increase the set value when the torque is insufficient at low speed. ● Decrease the set value when imbalance or vibration occurs with light load.	Up to model	0.0~Upper limit
Poor speed accuracy	F04.03[Slip Compensation Gain]	● After setting F02.06 [Rated Motor Current], F02.04 [Rated Motor Speed], and F02.10 [Motor No-load Current], please adjust F04.03 appropriately.	0.0%	50.0%~150.0%

◆ Vector Control without PG

Parameters Used for AC Drive Fine-tuning (Vector Control without PG Mode)

Fault	Parameter No.	Measure	Default	Recommend
1. Slow torque and speed response 2. Imbalance or vibration at medium speed(10Hz~40Hz)	F03.02 [ASR Proportional Gain 1] F03.06 [ASR Proportional Gain 2]	● Gradually reduce the setting value by 0.05 to improve torque and speed responsiveness. ● Increase the set value by 0.05 when imbalance or vibration occurs.	10.00	0.01~100.00
	F03.03 [ASR Integral Time 1] F03.07 [ASR Integral Time 2]	● Gradually reduce the setting value by 0.01 to improve torque and speed responsiveness. ● Increase the set value by 0.05 while checking responsiveness when imbalance, vibration or large load moment of inertia occurs.	0.100s	0.000s~6.000s
Over-voltage fault at the end of acceleration, at the beginning of	F03.04 [ASR Filter Time 1] F03.08 [ASR Filter Time 2]	● Increase the set value by 4ms while checking responsiveness when overvoltage occurs. ● Gradually reduce the	0.0ms	0.0ms~100.0ms

deceleration, and during great load changes.		setting value by 2ms while checking responsiveness when it's slow.		
Poor speed accuracy	F03.23[Slip compensation]	● Gradually increase the set value by 10% when it's fast. ● Gradually reduce the setting value by 10% when it's slow.	100%	0%~250%
1. Large electromagnetic noise of the motor 2. Imbalance or vibration at low speed (below 10)	F01.40[Carrier Frequency]	● Increase the carrier frequency when the electromagnetic noise of the motor is large. ● Decrease the carrier frequency when imbalance or vibration occurs at low and medium speeds.	3.0kHz	1.0kHz~Upper limit

◆ Vector Control with PG

Parameters Used for AC Drive Fine-tuning (Vector Control with PG)

Fault	Parameter No.	Measure	Default	Recommend
1. Slow torque and speed response 2. Imbalance or vibration	● High-speed side F03.02 [ASR Proportional Gain 2] ● Low-speed side F03.06 [ASR Proportional Gain 1]	● Gradually increase the set value by 5.00 when torque/speed response is slow. ● Decrease the set value when imbalance or vibration occurs.	10.00	0.01~100.00
	● High-speed side F03.03 [ASR Integral Time 2] ● Low-speed side F03.07 [ASR Integral Time 1]	● Gradually decrease the set value when torque/speed response is slow. ● Increase the set value when imbalance or vibration occurs.	0.100s	0.000s~6.000s
ASR proportional gain and integral time not ensured on the low-speed or high-speed side	● F03.05 [ASR Switching Frequency 1 of Speed Control] ● F03.09 [ASR Switching Frequency 2 of Speed Control]	● Change the ASR proportional gain and integral time based on the output frequency.	0.0Hz	0.0Hz~Max. output frequency
Imbalance or vibration	● F03.04 [ASR Filter Time 1] ● F03.08 [ASR Filter Time 2]	● Gradually decrease the set value by 0.010 when torque/speed response is slow. ● Gradually increase the setting value when mechanical rigidity is low.	0.0ms	0.0ms~100.0ms
1. Large electromagnetic noise of the motor	● F01.40[Carrier Frequency]	● Increase the carrier frequency when the electromagnetic noise of	3.0kHz	2.0kHz~Upper limit

2. Imbalance or vibration at low speed(below 3Hz)		the motor is large. ● Decrease the carrier frequency when imbalance or vibration occurs at low and medium speeds.		

◆ PM Vector Control without PG

Parameters Used for AC Drive Fine-tuning (PM Vector Control without PG)

Fault	Parameter No.	Measure	Default	Recommend
Motor action failure as command	● F02 motor parameters, F02.20-F02.29 parameters	● Confirm F02.03 [Motor Rated Frequency]. ● Check the PM parameters and confirm all the parameters related to the motor are set up correctly.	-	-
Slow torque and speed response	● F03.04 [ASR Filter Time 1] ● F03.08 [ASR Filter Time 2]	● Decrease the set value.	0.0ms	Change it by 0.1.
1. Vibration when motor starts 2. Motor stall	● F03.20 [Low frequency pull-in current]	● Increase set value.	20%	Gradually increase by 5.0%.
	● F07.23 [DC Braking Current] ● F07.21 [Startup DC braking time]	● Perform DC braking during motor starting.	F07.23:60.0 % F07.21:0.0s	F07.23: Adjust as necessary F07.21:0.0s
High frequency generates excessive current	● F03.20 [High-speed Pull-in Current]	● Decrease the set value.	10.0%	Gradually reduce the setting value by 2.0%.
Stall or vibration of the motor occurs with load during a certain period of operation	● F03.20 [Low-frequency Pull-in Current] ● F03.20 [High-frequency Pull-in Current]	● Increase set value.	F03.20:20.0 % F03.20:10.0 %	Gradually increase by 5.0%.
Imbalance or vibration	● F03.04 [ASR Filter Time 1] ● F03.08 [ASR Filter Time 2]	● Increase set value.	0.0	Gradually increase by 0.5.

◆ PM Vector Control with PG

Parameters Used for AC Drive Fine-tuning (PM Vector Control with PG)

Fault	Parameter No.	Measure	Default	Recommend
1. Slow torque and speed response 2. Imbalance or vibration	● High-speed side F03.02 [ASR Proportional Gain 1] ● Low-speed side F03.06 [ASR Proportional Gain 2]	● Gradually increase the set value by 5.00 when torque/speed response is slow. ● Decrease the set value when imbalance or vibration occurs.	10.00	0.01~100.00
	● High-speed side F03.03 [ASR	● Gradually decrease the set value when torque/speed	0.100s	0.000s~6.000s

	Integral Time 1] ● Low-speed side F03.07 [ASR Integral Time 2]	response is slow. ● Increase the set value when imbalance or vibration occurs.		
Speed response not ensured on the low-speed or high-speed side	● F03.05 [ASR Switching Frequency 1 of Speed Control] ● F03.09 [ASR Switching Frequency 2 of Speed Control]	● Change the ASR proportional gain and integral time based on the output frequency.	0.0Hz	0.0Hz~Max. output frequency
Imbalance or vibration	● F03.04 [ASR Filter Time 1] ● F03.08 [ASR Filter Time 2]	● Gradually decrease the set value by 0.010 when torque/speed response is slow. ● Gradually increase the setting value when mechanical rigidity is low.	0.0ms	0.0ms~100.0ms
Imbalance or vibration	● F02 motor parameters, PM parameters	● Confirm the test report or nameplate of the motor and set the parameters correctly.	-	-

4.10 Trial Operation Checklist

➢ Please check the following items before performing a test run.

No.	Content	Check
1	Read this manual carefully before performing a trial operation.	-
2	Check the main circuit wiring.	-
3	Check power to the AC drive.	-
4	Check that the input supply voltage matches the AC drive model.	-

Please check the necessary items based on the control mode.

WARNING

Safety measures when restarting the machine: Correctly wire the start/stop and safety circuits, and make sure that the AC drive operates properly after power up. Failure to obey can cause personal injury from a sudden start of the machine.

➢ **V/F control [F01.00= 0]**

No.	Content	Check
5	Check to select the best V/F curve based on the application and motor specifications.	-

➢ **Vector control without PG [F01.00 = 1]**

No.	Content	Check
6	Check if dynamic auto-tuning is performed.	-
7	When implementing dynamic auto-tuning, confirm the motor shaft is separated from the connecting part of the machinery.	-
8	Set the following items correctly based on the information listed on the nameplate before performing auto-tuning: ● Pole No. Rated Output Power (kW) ● Rated Voltage (V) Rated Current (A) ● Rated Frequency (Hz) Rated Speed (rpm)	-

➢ **Vector control with PG [F01.00 = 2]**

No.	Content	Check
9	Check if dynamic auto-tuning is performed.	-
10	When performing dynamic auto-tuning, check if the motor shaft is separated from the mechanical connection part. Set the following items correctly based on the information listed on the nameplate before performing auto-tuning: ● Pole No. Rated Output Power (kW) ● Rated Voltage (V) Rated Current (A) ● Rated Frequency (Hz) Rated Speed (rpm) Check setting of F02.30 [Encoder Type], F02.33 [PG Pulse No.] or F02.34 [RT Pole No.].	-

➢ **PM V/F control [F01.00= 10]**

No.	Content	Check
11	Check the motor specifications against purposes.	-

➢ **PM vector control without PG [F01.00 = 11]**

No.	Content	Check
12	Check if dynamic auto-tuning is performed.	-
13	When performing dynamic auto-tuning, check if the motor shaft is separated from the mechanical connection part. Set the following items correctly based on the information listed on the nameplate before performing auto-tuning: ● Pole No. Rated Output Power (kW) ● Rated Voltage (V) Rated Current (A) ● Rated Frequency (Hz) Rated Speed (rpm)	-

➢ **PM vector control with PG [F01.00 = 12]**

No.	Content	Check
14	Check if dynamic auto-tuning is performed.	-
15	When performing dynamic auto-tuning, check if the motor shaft is separated from the mechanical connection part. Set the following items correctly based on the information listed on the nameplate before performing auto-tuning: ● Pole No. Rated Output Power (kW) ● Rated Voltage (V) Rated Current (A) ● Rated Frequency (Hz) Rated Speed (rpm) Check setting of F02.30 [Encoder Type], F02.33 [PG Pulse No.] or F02.34 [RT Pole No.]	-

➢ **After checking No.5 to 15, please check the following items:**

No.	Content	Check
16	Confirm that the keypad displays properly when starting operation.	-
17	Confirm that F01.01=0 and F01.02=0 when entering the operation command and frequency command from the keyboard.	-
18	Exchange any two of the AC drive output terminals U, V, and W when the motor rotates in the wrong direction during the test run.	-

19	Set F10.55 (Motor Overload Model) and F10.56 (Motor Insulation Class) correctly to ensure the proper operation of motor overload protection.	-
20	Confirm that F01.01=1 and F01.02=2 (VS1) when entering the operation command and frequency command from the control circuit terminal.	-
21	When entering the frequency command from the analog input terminal AI1: ● Voltage input Confirm that the drive DIP switch AI1 is set to U. Confirm that F01.02 = 2 [Frequency Source A = Terminal AI1]. ● Current input Confirm that the drive DIP switch AI1 is set to I. Confirm that F01.02 = 2 [Frequency Source A = Terminal AI1].	-
22	When entering the frequency command from the analog input terminal AI2: ● Voltage input Confirm that the drive DIP switch AI2 is set to terminal U. Confirm that F01.02 = 3 [Frequency Source A = Terminal AI1]. ● Current input Confirm that the drive DIP switch AI2 is set to I. Confirm that F01.02 = 3 [Frequency Source A = Terminal AI1].	-
23	Confirm that the frequency command has reached the desired minimum/maximum value. If the desired value is not reached, please check the following items: Gain adjustment: Set the maximum voltage/current value and adjust the analog input gain until the frequency command reaches the desired value. (Frequency Source A Gain: F01.03; Frequency Source B Gain: F01.05.) Bias adjustment: Set the maximum voltage/current value and adjust the analog input bias until the frequency command reaches the desired minimum value. (When entering from terminal AI1: F05.50-F05.53; when entering from terminal AI2: F05.55-F05.58.)	-

Chapter 5 Network Communication

5.1 Safety Precautions

Please pay attention to all information in this manual regarding safety.

Please note that failure to observe the warnings may result in death or serious injuries. VEICHI will not be held liable for injuries and equipment damage caused by your company or your customers' failure to comply with the Alarm contents of this book.

5.2 Modbus Communication

The CH310 series drive is equipped with RS485 communication ports as standard, and its communication adopts international standard Modbus protocol. Via PC/PLC or master AC drive, centralized control (which allows for AC drive commands setting, operational frequency setting, function parameters adjustment, and AC drive status and faults monitoring) can be realized to satisfy unique application requirements.

5.2.1 Master/Slave Composition

Communication between a master and a slave (serial communication) means the master sends a message and the slave responds to it. The master presets addresses for each slave and assigns signals through the addresses. A slave that receives a command from the master performs the function specified by the master and responds to the master.

5.2.2 Communication Rules

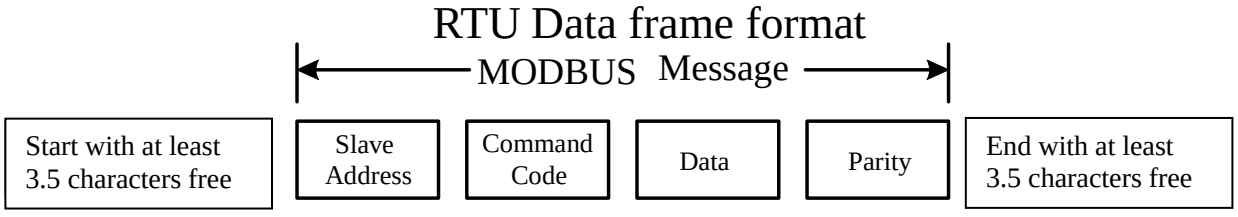
The format of MODBUS communication is shown in the table below.

Item	Description
Interface	RS-485 (RS232 port requires additional RS232/RS485 adaptor)
Synchronous mode	Unsynchronized
Communication frame	Baud rate: 1200, 2400, 4800, 9600, 19200, 38400 or 57600bps
	Data length: 8 bits (fixed)
	Parity: odd, even, none.
	Stop bit: 1 bit (fixed)
Communication protocol	Modbus protocol (RTU mode only)

Note: The CH310 series only supports RTU mode.

5.2.3 Information Components

In RTU mode, a new frame requires to start with a transmission pause interval of at least 3.5 character. Then it is followed by the data transmission field, which consists of a sequence that includes the slave address, operation command code, data and parity words. After the final byte of these words has been transmitted, there is a minimum of a 3.5-byte transmission pause interval to indicate the end of this frame. The format of RTU data frame is shown in the table below.



Slave address

Please set a value in the range of 0~247 (decimal). When the slave address is set to 0, the master is for broadcasting and all slaves receive commands.

For broadcast mode, the slave does not send response messages to the master.

Command code

Command code	Function
03H	Read slave parameters
06H	Write slave parameters
08H	Circuit self-detection

Data

Data is formed from AC drive parameter code and its associated data which includes data for reading and writing codes or specific addresses.

Parity

Standard Modbus communication uses two kinds of error checking methods. Parity check is for each characteristic and the Cyclical redundancy check (CRC) is for a frame.

1. Parity

Users can configure controllers for odd, even parity or no parity. This will determine how the parity bit is set in each character.

If either even or odd parity is specified, the quantity of "1" bits will be counted in the data portion of each character (7 data bits for ASCII mode, or 8 for RTU). For example, the RTU character frame contains the following 8 data bits: 1 1 0 0 0 1 0 1, and the total quantity of "1" bits is 4.

If even parity is used, the frame's parity bit will be a 0, making the total quantity of "1" bits remains 4. If odd parity check is used, the frame's parity bit will be a 1, making the total quantity of "1" bits is 5.

If no parity bit is specified, no parity bit is transmitted and no parity can be made. An additional stop bit is transmitted to fill out the character frame.

2. CRC-16 (Cyclical Redundancy Check)

RTU frame format is used here. The frame includes CRC-based error detection field for all of the contents of the entire frame. The CRC field is a two-byte binary value containing 16 bits. It is calculated by the transmission device and added to the frame. The receiving device recalculates the CRC of the received frame and compares it with the value in the received CRC field. If the two CRC values are not equal, an error is indicated in the transmission.

The CRC is stored to 0xFFFF firstly and then applies a process to handle the successive 6–bit bytes of the frame to the current contents of the register. Only the 8Bit data in each character is valid for CRC. Start/stop and the even/odd parity bits are invalid.

During the generation of the CRC, each 8–bit character is XOR with the register contents respectively. Then the result is shifted to the least significant bit, with a zero filled into the most significant bit (MSB) position. The LSB is extracted and examined. If the LSB is 1, the register is XOR with pre-settings respectively. If the LSB is 0, no XOR will be done. Repeat this process for 8 times and after completing the last bit(8th bit), the next 8-bit byte will be processed XOR with the current register values again. The final contents of the register, after all the bytes of the message have been applied, is the CRC value.

This calculation of CRC adopts the international standard CRC checksum rule. When editing the CRC algorithm, please refer to the relevant standard CRC algorithm.

5.2.4 Communication Command Example

For reading slave **parameters command code: 03H**, read N words, up to 20 words consecutively.

For example, if an AC drive with a slave address of 01H and a memory starting address of 2100H ([C00.00]) that reads three consecutive words, the framing is described as follows:

RTU master command:

START	Transmission time for 3.5 bytes.
Slave address	01H
Command code	03H
Starting address high byte	21H

Starting address low byte	00H
No. of data high byte	00H
No. of data low byte	03H
CRC CHK low byte	0FH
CRC CHK high byte	F7H
END	Transmission time for 3.5 bytes.

RTU slave response (normal):

START	Transmission time for 3.5 bytes.
Slave address	01H
Command code	03H
Byte count low position	06H
Data address 2100H high position	13H
Data address 2100H low position	88H
Data address 2101H high position	00H
Data address 2101H low position	00H
Data address 2102H high position	00H
Data address 2102H low position	00H
CRC CHK low byte	C3H
CRC CHK high byte	C9H
END	Transmission time for 3.5 bytes.

RTU slave response (abnormal):

START	Transmission time for 3.5 bytes.
Slave address	01H
Command code	83H
Fault code	04H
CRC CHK low byte	40H
CRC CHK high byte	F3H
END	Transmission time for 3.5 bytes.

For writing slave parameters command code: 06H, it allows for writing a word into the designated address, which can be used to modify the AC drive parameters.

For example: write 5000 (1388H) to the address 3000H of the AC drive at slave address 1. The description for the fame format is as below:

RTU master command:

START	Transmission time for 3.5 bytes.
Slave address	01H
Command code	06H
Write data address high position	30H
Write data address low position	00H
Data content high byte	13H
Data content low byte	88H
CRC CHK low byte	8BH
CRC CHK high byte	9CH
END	Transmission time for 3.5 bytes.

RTU slave response (normal):

START	Transmission time for 3.5 bytes.
Slave address	01H
Command code	06H
Write data address high position	30H
Write data address low position	00H
Data content high byte	13H
Data content low byte	88H
CRC CHK low byte	8BH
CRC CHK high byte	9CH
END	Transmission time for 3.5 bytes.

RTU slave response (abnormal):

START	Transmission time for 3.5 bytes.
Slave address	01H

Command code	86H
Fault code	01H
CRC CHK low byte	83H
CRC CHK high byte	A0H
END	Transmission time for 3.5 bytes.

For circuit self-examination command code: 06H, it sends back the same slave response information as the command information of the master, which is applied to check if the signal transmission between the master and the slave is normal or not. The check code and data can be set arbitrarily, and the check code has nothing to do with the parameter address of the AC drive.

For example: write 5000 (1388H) to the check address 0000H of the AC drive at slave address 1. The description for the fame format is as below:

RTU master command:

START	Transmission time for 3.5 bytes.
Slave address	01H
Command code	08H
Check code high byte	00H
Check code low byte	00H
Data high byte	13H
Data low byte	88H
CRC CHK low byte	EDH
CRC CHK high byte	5DH
END	Transmission time for 3.5 bytes.

RTU slave response (normal):

START	Transmission time for 3.5 bytes.
Slave address	01H
Command code	08H
Check code high byte	00H
Check code low byte	00H
Data high byte	13H
Data low byte	88H
CRC CHK low byte	EDH
CRC CHK high byte	5DH
END	Transmission time for 3.5 bytes.

RTU slave response (abnormal):

START	Transmission time for 3.5 bytes.
Slave address	01H
Command code	88H
Fault code	03H
CRC CHK low byte	06H
CRC CHK high byte	01H
END	Transmission time for 3.5 bytes.

5.2.5 Communication Data List

Rules for CH310 series function parameter address

The AC drive function parameter serial number is used as the register address, which is divided into two parts: the high byte and the low byte. The high byte indicates the serial number of the function parameter group, and the low byte indicates the serial number of the function parameter in the group, which needs to be converted to hexadecimal.

Address field high byte:

Parameter group	Corresponding parameter address
F00 Environmental Application Group	0x00xx (not stored in EEPROM) 0x10xx (stored in EEPROM)

F01 Basic Parameter Group	0x01xx (not stored in EEPROM) 0x11xx (stored in EEPROM)
F02 Motor 1 Parameter Group	0x02xx (not stored in EEPROM) 0x12xx (stored in EEPROM)
F03 Vector Control Parameter Group	0x03xx (not stored in EEPROM) 0x13xx (stored in EEPROM)
F04 V/F Control Parameter Group	0x04xx (not stored in EEPROM) 0x14xx (stored in EEPROM)
F05 Analog Terminal Parameter Group	0x05xx (not stored in EEPROM) 0x15xx (stored in EEPROM)
F06: V Output Terminal Control Parameter Group	0x06xx (not stored in EEPROM) 0x16xx (stored in EEPROM)
F07 Operation Control Parameter Group	0x07xx (not stored in EEPROM) 0x17xx (stored in EEPROM)
F08: Auxiliary Control 1 Parameter Group	0x08xx (not stored in EEPROM) 0x18xx (stored in EEPROM)
F08: Auxiliary Control 2 Parameter Group	0x09xx (not stored in EEPROM) 0x19xx (stored in EEPROM)
F10 Protection Parameter Group	0x0Axx (not stored in EEPROM) 0x1Axx (stored in EEPROM)
F11 Keyboard Parameter Group	0x0Bxx (not stored in EEPROM) 0x1Bxx (stored in EEPROM)
F12: Communication Parameter Group	0x0Cxx (not stored in EEPROM) 0x1Cxx (stored in EEPROM)
F13: Reserved	x0Dxx (not stored in EEPROM) 0x1Dxx (stored in EEPROM)
F14 Torque Control Parameter Group	0x0Exx (not stored in EEPROM) 0x1Exx (stored in EEPROM)
F15: Reserved	0x0Fxx (not stored in EEPROM) 0x1Fxx (stored in EEPROM)
F16: Reserved	0x50xx (not stored in EEPROM) 0xD0xx (stored in EEPROM)
F17 Motor 2 Parameter Group	0x51xx (not stored in EEPROM) 0xD1xx (stored in EEPROM)
F18 Motor 2 Parameter Group	0x52xx (not stored in EEPROM) 0xD2xx (stored in EEPROM)
F27 Lifting-specific Parameter Group	0x5Bxx (not stored in EEPROM) 0xDBxx (stored in EEPROM)
C00 Basic Parameter Group	0x2100
C01 Fault Monitoring Parameter Group	0x2200
C02 APP Monitoring Parameter Group	0x2300
C03 Maintenance Monitoring Parameter Group	0x2400
C04 Industrial Application Monitoring Parameter Group	0x2500
C05 Control Monitoring Parameter Group	0x2600

C06 Option Card Monitoring Parameter Group A	0x2700
C07 Option Card Monitoring Parameter Group B	0x2800
Modbus Communication Control Parameter Group	0X30xx or 0x20xx
Option Card Communication Control Parameter Group	0x31xx
I/O Port Communication Parameter Group	0x34xx
Cache Register Communication Parameter Group	0x35xx
Expansion Fault and Power-Down Save Parameter Group	0x36xx

Note: There is a possibility of frequent rewriting of parameter values for communication. And the service life of EEPROM can be reduced due to excessive write operations. Users do not need to save specific function codes in communication mode; adjusting the values in the on-chip RAM is adequate for their requirements. The CH310 protocol dictates that for the write command (06H), if the highest bit in the function code's address field is 0, it is only written in AC drive's RAM, namely, data will not be stored in power loss, if the high nibble is 1, it is written to EEPROM, namely, data will be stored in power loss.

Take rewriting the function parameter [F00.14] as an example, if it is not stored in the EEPROM, the address is 000EH, and if it is stored in the EEPROM, the address is 100EH.

Modbus communication control parameter group:

Address	Name	R/W	Scale (Range)	Content
0x2000/ 0x3000	Frequency giving	R/W	0.01Hz (0.00Hz~320.00 Hz)	Frequency given via communication.
0x2001/ 0x3001	Command giving	R/W	0x0000 (0x0~0x0103)	0x0000: Invalid 0x0001: Forward; 0x0002: Reverse 0x0003: Forward jogging 0x0004: Reverse jogging 0x0005: Deceleration stop 0x0006: Free stop 0x0007: Reset 0x0008: operation disable command, when writing address 3001 to 8 through communication, AC drive freely stops. It needs writing 9 to address 3001 or re-power on to run. 0x0009: Operation enable 0X0101: Equivalent to F02.07 = 1 [Dynamic Auto-Tuning], plus operation command. 0X0102: Equivalent to F02.07 = 2 [Static Auto-Tuning], plus operation command. 0X0103: Equivalent to F02.07 = 3 [Stator Resistance Auto-Tuning], plus operation command.

0x2002/ 0x3002	AC drive status	R	Binary	Bit0: 0-Stop;1-Operation Bit1: 0-Non-acceleration; 1-Acceleration Bit2: 0-Non-deceleration; 1-Deceleration Bit3: 0: Forward;1: Reverse Bit4: 0-Normal AC drive; 1-Faulty Bit5: 0-Unlocked; 1-Locked Bit6: 0-No warning;1-Warning Bit7: 0-Operation enable; 1-Operation disable
0x2003/ 0x3003	Drive fault code	R	0 (0~127)	Read the corresponding value of the fault code via communication.
0x2004 /0x3004	Upper limit frequency	R/W	0.01Hz (0.00Hz~320.00 Hz)	Upper limit frequency given via communication.
0x2005 /0x3005	Torque	R/W	0.0% (0.0%~100.0%)	Torque setting via communication.
0x2006/ 0x3006	Torque-controlled FWD speed limit	R/W	0.0% (0.0%~100.0%)	Torque-controlled FWD speed limit given via communication.
0x2007 /0x3007	Torque-controlled of REV speed limit	R/W	0.0% (0.0%~100.0%)	Torque-controlled REV speed limit given via communication.
0x200A /0x300A	Voltage-frequency split voltage	R/W	0.0% (0.0%~100.0%)	Frequency conversion-specific power supply application parameters.
0x200E/ 0x300E	Acceleration Time 1	R/W	0.00s (0.00s~600.00s)	Read and write F01.22.
0x200F/ 0x300F	Deceleration Time 1	R/W	0.00s (0.00s~600.00s)	Read and write F01.23.
0x2010/ 0x3010	Error/Alarm code	R	0 (0~65535)	1~127: Error code, 128~159: Alarm code, and 0 means no error.
0x2012/ 0x3012	Torque filter time	R/W	0.000s (0.000s~6.000s)	Read and write F03.47.
0x2014 /0x3014	Torque limit during motoring given via communication	R/W	0~4000 (corresponds to 400%)	-
0x2015 /0x3015	Torque limit in power generation mode given via communication	R/W	0~4000 (corresponds to 400%)	-
0x2016/ 0x3016	Reserved	R/W	-	Use with optional cards.
0x2017 /0x3017	Reserved	R/W	-	Use with optional cards.

0x2018/ 0x3018	Terminal output	W	Binary	F06.01=18 [AO Function = communication output]. Bit0: Y terminal Bit1: Relay Bit2: Expansion Y2 Bit3: Expansion relay
0x2019/ 0x3019	AO	W	0.01 (0.00~100.00)	F06.01=18 [AO Function= communication output].
0x201A /0x301A	Expansion AO	W	0.01 (0.00~100.00)	F06.11=18 [Expansion AO Function= communication output].

5.2.6 Error Code

The error codes of MODBUS communication is shown in the table below. Upon malfunction, please eliminate the cause before new communication.

Fault code	Description
1	Command code error
2	Reserved
3	CRC parity error
4	Illegal address
5	Illegal data
6	Parameters cannot be changed during operation.
7	Reserved
8	Drive is busy (EEPROM storage now)
9	Parameter over range
10	Reserved parameters are not for modification.
11	Error in reading parameter bytes.

Chapter 6 Troubleshooting

6.1 Safety Precautions

WARNING	● This product is equipped with hazardous voltage to control potentially dangerous motion mechanisms. Non-compliance with regulations or failure to operate in accordance with this manual may lead to damage to the product and associated systems or even personal injury and death. ● This product is exclusively for use by trained professionals who must thoroughly understand all safety precautions and operational procedures outlined in the manual prior to use. Proper operation and maintenance are essential for safe operation and stable performance of the product. ● Do not work on wiring while power is on, as it poses a risk of fatal electric shock. Prior to any wiring, inspection, or maintenance work, ensure that the power supply to all associated equipment is disconnected, and confirm that the DC voltage in the main circuit has dropped to a safe level. Wait for 5 minutes before commencing the work.
CAUTION	● Prevent children and the public from contacting or approaching this product. ● This product is intended for use in accordance with the manufacturer's specified purpose. Unauthorized use for special fields such as emergency, rescue, marine, medical, aviation, nuclear facility-related settings is prohibited. ● Unauthorized modifications or using of spare parts not sold or recommended by the manufacturer of this product may cause malfunctions.
NOTICE	● Ensure this manual is provided directly to the actual user, who must read it thoroughly prior to use. ● Ensure that you have thoroughly read and comprehended the associated safety guidelines and warning notices before installing and adjusting the AC drive.

6.2 Fault, Warning, and Prompt Codes

If the AC drive or motor operates abnormally, first check that the displayed code and prompts on the keyboard.

If the issue still exists despite consulting the manual, please double-check the following items prior to contacting our agent or calling VEICHI’s customer service (refer to the back cover for details).

1. Model of the AC drive
2. Software version
3. Purchase date
4. Inquiry content (malfunction status)

Refer to the following table for the description of the faults, warnings, and prompts that occur during operation of the AC drive.

Table 6-6 Fault, Warning, and Prompt Codes

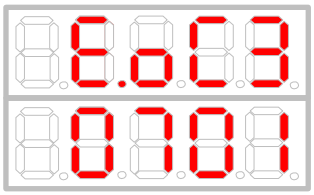
Type	AC Drive Response during Malfunction
Fault	The following conditions will occur upon a fault is detected. The AC drive fails to operate until it is restored to a normal status by fault reset. ● An error warning appears on the keyboard. ● The AC drive cuts off output and the motor stops freely. ● When a fault is detected, set the terminal for F06.21~F06.22 = 4 [Output Terminal Function = Fault Output] to ON. Terminal will not output a signal even if a fault is detected without setting.

Alarm	The following conditions occur when an alarm is detected, and no reset is required. ● Alarm code appears on the keyboard. ● The AC drive continues to operate. ● When an alarm is detected, set the terminal to ON by F06.21~F06.22 = 29 [Output Terminal Function = Alarm Output] . Terminal will not output a signal even if a warning is detected without setting.
Note	When the power is turned on, "Pon" is displayed to indicate that the control board is power. "SAvE" is displayed when it is reset to factory settings. "T-00" is displayed to indicate the auto-tuning is on after setting. "Copy" is displayed during parameters uploading, and "LoAd" is displayed during parameters downloading.

6.3 Table of Fault, Warning, and Prompt Codes

Single-line keypad fault display: Refer to C01.01 for the fault subcodes.

Dual-line keypad fault display:



The first three digits of the dual-line keypad display are the fault code, and the last two digits are the fault sub-code.

The fault, warning and prompt codes are shown in Table 6.2. When the keypad displays the codes in the table, the detailed causes and countermeasures of the fault or warning can be found on the corresponding page of the reference source.

Note: The numbers in brackets in the code column are error codes or alarm codes (Dec indicates decimal).

Table 6-2: Fault, Warning, and Prompt Codes

Display (Dec.)	Name	Fault Type	Display (Dec.)	Name	Fault Type
E.SC1 (1)	System failure during	Error	E.PSr3 (76)	PM step loss fault 3	Error
E.SC2 (2)	System failure during	Error	E.dEF (77)	Excessive speed deviation	Error
E.SC3 (3)	System failure during	Error	E.SPd (78)	Stall fault	Error
E.SC4 (4)	System failure during stop	Error	E.Ld1 (79)	Load protection 1	Error
E.oC1 (5)	Overcurrent during	Error	E.Ld2 (80)	Load protection 2	Error
E.oC2 (6)	Overcurrent during	Error	E.CPu (81)	CPU timeout	Error
E.oC3 (7)	Overcurrent during	Error	E.LoC (85)	Chip locked	Error
E.ou1 (9)	Overvoltage during	Error	E.EEP (86)	Parameter storage failure	Error
E.ou2 (10)	Overvoltage during	Error	E.PG (87)	PLL error	Error
E.ou3 (11)	Overvoltage in constant	Error	E.buS1 (91)	Expansion card A	Error
E.LoC (13)	Undervoltage during	Error	E.buS2 (92)	Expansion card B	Error
E.oL1 (14)	Motor overload	Error	E.buS3 (93)	CAN expansion card error	Error
E.oL2 (15)	AC drive overload 1	Error	E.buS4 (94)	Others expansion card	Error

E.oL3 (16)	AC drive overload 2, CBC	Error	E.buS5 (95)	Others expansion card	Error
E.oL4 (17)	AC drive overload 3	Error	E.buS6 (96)	Others expansion card	Error
E.iLF (18)	Input Phase Loss	Error	E.CP1 (97)	Monitor comparator output	Error
E.oLF (19)	Three-phase output phase	Error	E.CP2 (98)	Monitor comparator output	Error
E.oLF1(20)	U-phase output phase loss	Error	E.dAT (99)	Parameter setting fault	Error
E.oLF2 (21)	V-phase output phase loss	Error	E. 103 (103)	Brake resistor error	Error
E.oLF3 (22)	W-phase output phase loss	Error	E. 104 (104)	Insufficient brake torque	Error
E.oH1 (30)	Rectifier module overheat	Error	E. 105 (105)	Brake release error	Error
E.oH2 (31)	IGBT module overheat	Error	E.106 (106)	Anti-snag error	Error
E.oH3 (32)	Motor overheat	Error	E.107 (107)	Current not reaching	Error
E.EF (33)	External fault	Error	**The following are the alarm codes**		
E.CE (34)	Modbus communication	Error			
E.HAL1 (35)	Large U-phase zero drift	Error	A.Lu1 (128)	Undervoltage during stop	Alarm
E.HAL2 (36)	Large V-phase zero drift	Error	A.ou (129)	Overvoltage during stop	Alarm
E.HAL (37)	Non-0 current sum of three	Error	A.IIF (130)	Input phase loss	Alarm
E.HAL3 (38)	Large W-phase zero drift	Error	A.Pid (131)	PID feedback	Alarm
E.SCxy (40)	Short circuit to ground	Error	A.EEP (132)	Parameter storage alarm	Alarm
E.FSC (41)	Fan short circuit	Error	A.dEF (133)	Excessive speed deviation	Alarm
E.Pid (42)	PID feedback	Error	A.SPd (134)	Stall alarm	Alarm
E.CoP(43)	Parameter copy failure	Error	A.GPS1 (135)	GPS lock	Alarm
E.PG1 (44)	PG parameter setting fault	Error	A.GPS2 (136)	GPS disconnection	Alarm
E.PG2 (44)	Encoder Z-pulse failure	Error	A.CE (137)	Modbus communication	Alarm
E.PG3 (44)	RT check error	Error	A.Ld1 (138)	Load protection 1	Alarm
E.PG4 (44)	RT disconnection	Error	A.Ld2 (139)	Load protection 2	Alarm
E.PG5 (44)	ABZ encoder	Error	A.buS (140)	Expansion card	Alarm
E.PG6 (44)	Spindle encoder	Error	A.oH1 (141)	Module overtemperature	Alarm
E.PG7 (44)	Spindle encoder Z-pulse tolerance failure	Error	A.oH3 (142)	Motor overheat	Alarm
E.PG8 (44)	Encoder Z-pulse logic	Error	A.run1 (143)	Operation command	Alarm
E.PG9 (44)	Spindle encoder Z-pulse logic failure	Error	A.run2 (158)	Jogging terminal starting protection	Alarm
E.PG10 (44)	Encoder Z-pulse	Error	A.run3 (159)	Terminal starting	Alarm
E.PG11 (44)	E. PG9 (44)	Error	A.PA2 (144)	External keyboard	Alarm
E.PG12 (44)	Encoder feedback error	Error	A.CoP (145)	Parameter copy alarm	Alarm
E.PG13 (44)	Encoder hardware	Error	A.CP1 (146)	Monitor comparator output	Alarm
E.bru (50)	Reserved	Error	A.CP2 (147)	Monitor comparator output	Alarm

E.rExx (52)	Motor parameter auto-tuning failure	Error	A.161 (161)	Cooling fan lifetime warning	Alarm
E.E62 (62)	Low current before brake	Error	A.163 (163)	Main relay lifespan alarm	Alarm
E.E63 (63)	Output current error	Error	A.168 (168)	Given frequency lower	Alarm
E.AE1 (71)	Motor angle tuning fault 1	Error	A.169 (169)	Given frequency lower	Alarm
E.AE2 (72)	Motor angle tuning fault 2	Error	A.SPd (170)	Free stop command valid	Alarm
E.AE3 (73)	Motor angle tuning fault 3	Error	A.SPd (171)	Emergency stop command	Alarm
E.PSr1 (74)	PM step loss fault 1	Error	A.178 (178)	Brake failure	Alarm
E.PSr2 (75)	PM step loss fault 2	Error	A.179 (179)	Anti-snag error	Alarm

6.4 Fault Information and Details

Don’t run the AC drive in the event of a malfunction. Please refer to the table below for potential causes and solutions.

Note: All faults have to be removed by fault reset operation.

Code	Name	Cause	Solution
E.SC1 (01)	System failure during acceleration	Short circuit on the output side of the drive or short circuit to ground.	Check the main circuit to solve the short circuits.
		AC drive output cable length beyond limit.	Shorten the distance between AC drive and motor or add output reactor.
		Malfunction caused by interference.	Check the wiring of the main and control circuit and grounding to remove the interference sources.
		Motor damage.	Measure resistance between motor wires and replace motor immediately if conductive.
		High torque boost.	Decrease F04.01[Torque Boost].
		Overload.	Reduce the load or replace with a large-capacity AC drive. Reduce the load change frequency of the impact load or replace the drive with a larger capacity.
		Short acceleration time.	Increase F01.22 [Acceleration Time 1]. Replace with a large-capacity AC drive.
Note: This fault is detected when the drive output is short-circuited, short-circuited to ground, or when the IGBT module is faulty.			
Code	**Name**	**Cause**	**Solution**
E.SC2 (02)	System failure during deceleration	Short circuit on the output side of the drive or short circuit to ground.	Check the main circuit to solve the short circuits.
		AC drive output cable length beyond limit.	Shorten the distance between AC drive and motor or add output reactor.
		Malfunction caused by interference.	Check the wiring of the main and control circuit and grounding to remove the interference sources.

		Motor damage.	Measure resistance between motor wires and replace motor immediately if conductive.
		High torque boost.	Decrease F04.01[Torque Boost].
		Overload.	Reduce the load or replace with a large-capacity AC drive. Reduce the load change frequency of the impact load or replace the drive with a larger capacity.
		Short deceleration time.	Increase F01.23 [Deceleration Time 1]. Replace with a large-capacity AC drive.
Note: This fault is detected when the drive output is short-circuited, short-circuited to ground, or when the IGBT module is faulty.			
Code	**Name**	**Cause**	**Solution**
E.SC3 (03)	System failure during constant running	Short circuit on the output side of the drive or short circuit to ground.	Check the main circuit to solve the short circuits.
		AC drive output cable length beyond limit.	Shorten the distance between AC drive and motor or add output reactor.
		Malfunction caused by interference.	Check the wiring of the main and control circuit and grounding to remove the interference sources.
		Motor damage.	Measure resistance between motor wires and replace motor immediately if conductive.
		High torque boost.	Decrease F04.01[Torque Boost].
		Overload.	Reduce the load or replace with a large-capacity AC drive. Reduce the load change frequency of the impact load or replace the drive with a larger capacity.
Note: This fault is detected when the drive output is short-circuited, short-circuited to ground, or when the IGBT module is faulty.			
Code	**Name**	**Cause**	**Solution**
E.SC4 (04)	System failure during stop	Short circuit on the output side of the drive or short circuit to ground.	Check the main circuit to solve the short circuits, and repower-up.
		Malfunction caused by interference.	Check the wiring of the main and control circuit and grounding to remove the interference sources.
		Disturbances or damage to the control board.	Seek for technical support if it is not eliminated after power cut and restart.
Note: This fault is detected when the drive short-circuited to ground or when the IGBT module is faulty.			
Code	**Name**	**Cause**	**Solution**
E.oC1 (05)	Overcurrent during acceleration	Overload.	Reduce the load or replace with a large-capacity AC drive. Reduce the load change frequency of the impact load or replace the drive with a larger capacity.

		Short circuit on the output side of the drive or short circuit to ground.	Check the main circuit to solve the short circuits.
		Motor damage.	Measure resistance between motor wires and replace motor immediately if conductive.
		Short acceleration time.	Increase F01.22 [Acceleration Time 1]. Replace with a large-capacity AC drive.
		Acceleration overcurrent faults may be generated during overvoltage suppression step-up.	Reduce F10.13 [Overvoltage Suppression Gain].
		AC drive output cable length beyond limit.	Shorten the distance between AC drive and motor or add output reactor.
		Malfunction caused by interference.	Check the wiring of the main and control circuit and grounding to remove the interference sources.
Note: This fault is detected when the drive output current exceeds the overcurrent point.			
Code	**Name**	**Cause**	**Solution**
E.oC2 (06)	Overcurrent during deceleration	Overload.	Reduce the load or replace with a large-capacity AC drive. Reduce the load change frequency of the impact load or replace the drive with a larger capacity.
		Short circuit on the output side of the drive or short circuit to ground.	Check the main circuit to solve the short circuits.
		Motor damage.	Measure resistance between motor wires and replace motor immediately if conductive.
		Short deceleration time.	Increase F01.23 [Deceleration Time 1]. Replace with a large-capacity AC drive.
		Deceleration overcurrent faults may be generated during overvoltage suppression step-down.	Increase F10.02 [Overcurrent Suppression Gain] and reduce the load.
		AC drive output cable length beyond limit.	Shorten the distance between AC drive and motor or add output reactor.
		Malfunction caused by interference.	Check the wiring of the main and control circuit and grounding to remove the interference sources.
Note: This fault is detected when the drive output current exceeds the overcurrent point.			
Code	**Name**	**Cause**	**Solution**
E.oC3 (07)	Overcurrent during constant operation	Overload.	Reduce the load or replace with a large-capacity AC drive. Reduce the load change frequency of the impact load or replace the drive with a larger capacity.
		Short circuit on the output side of the drive or short circuit to ground.	Check the main circuit to solve the short circuits.

		Motor damage.	Measure resistance between motor wires and replace motor immediately if conductive.
		AC drive output cable length beyond limit.	Shorten the distance between AC drive and motor or add output reactor.
		Malfunction caused by interference.	Check the wiring of the main and control circuit and grounding to remove the interference sources.
Note: This fault is detected when the drive output current exceeds the overcurrent point.			
Code	**Name**	**Cause**	**Solution**
EoU1 (09)	Overvoltage during acceleration	High power supply voltage.	Set the power supply voltage within the specified range.
		Drive output short circuit or short circuit to ground.	Check the main circuit to solve the short circuits.
		Short acceleration time.	Check if the malfunction is detected when stopping under rapid acceleration. Increase F01.22 [Acceleration Time 1].
		Acceleration overvoltage faults may be generated during overvoltage suppression step-up.	Reduce F10.13 [Overvoltage Suppression Gain].
		Large braking loads.	Use a braking resistor.
		Surge voltage mixed in the input voltage.	Add a reactor on the input side.
		Improper setting of speed tracking parameters.	Modify the speed tracking parameters (F07.25 to F07.28).
Note: This fault is detected when the bus voltage exceeds the overvoltage point. The overvoltage point is 820V for three-phase input and 400V for single-phase input.			
Code	**Name**	**Cause**	**Solution**
EoU2 (10)	Overvoltage during deceleration	High power supply voltage.	Set the power supply voltage within the specified range.
		Drive output short circuit or short circuit to ground.	Check the main circuit to solve the short circuits.
		Short deceleration time.	Increase F01.23 [Deceleration Time 1]. Use a braking resistor.
		Deceleration overvoltage faults may be generated during overcurrent suppression step-down.	Increase F10.02 [Overcurrent Suppression Gain] and reduce the load.
		Large braking loads.	Use a braking resistor.
		Surge voltage mixed in the input voltage.	Add a reactor on the input side.
		Improper setting of speed tracking parameters.	Modify the speed tracking parameters (F07.25 to F07.28).
Note: This fault is detected when the bus voltage exceeds the overvoltage point. The overvoltage point is 820V for T3 models and 400V for S2/T2 models.			

Code	Name	Cause	Solution
E.oU3 (11)	Overvoltage during constant operation	High power supply voltage.	Set the power supply voltage within the specified range.
		Drive output short circuit or short circuit to ground.	Check the main circuit to solve the short circuits.
		Large braking loads.	Use a braking resistor.
		Surge voltage mixed in the input voltage.	Add a reactor on the input side.
		Improper setting of speed tracking parameters.	Modify the speed tracking parameters (F07.25 to F07.28).
Note: This fault is detected when the bus voltage exceeds the overvoltage point. The overvoltage point is 820V for three-phase input and 400V for single-phase input.			

Code	Name	Cause	Solution
E.oU4	Overvoltage during stop	High power supply voltage.	Set the power supply voltage within the specified range.
		Drive output short circuit or short circuit to ground.	Check the main circuit to solve the short circuits.
		Surge voltage mixed in the input voltage.	Add a reactor on the input side.
Note: This fault is detected when the bus voltage exceeds the overvoltage point. The overvoltage point is 820V for three-phase input and 400V for single-phase input.			

Code	Name	Cause	Solution
E.LU (13)	Undervoltage during operation	Power cut or instantaneous power failure.	Check power supply, reset and restart.
		Input power supply phase loss.	Check the main circuit wiring.
		Large fluctuation of input voltage.	Improve the power supply to meet the rated voltage of the drive. If the main circuit power supply is OK, check whether there is any problem with the electromagnetic contactor on the main circuit side.
Note: This fault is detected when the bus voltage falls below the undervoltage protection point (F10.19) during drive operation.			

Code	Name	Cause	Solution
E.oL 1(14)	Motor overload	Overload.	Reduce the load. Increase the motor overload protection curve factor appropriately.
		Short acceleration/deceleration time.	Increase F01.22 and F01.23 [Acceleration/Deceleration Time].
		High torque boost.	Reduce F04.01[Torque Boost].
		Incorrect V/F curve setting.	Confirm the relationship between voltage and frequency for the V/F curve setting, and modify F04.00 [V/F Curve]. If a customized V/F curve is used, modify the parameters related to the customized V/F curve (F04.10~F04.19).

		Inconsistent characteristics of the electronic thermal relay with motor load.	Use an external thermal relay.
		Abnormal output current due to input phase loss.	Check the main circuit to solve input phase loss.
Code	**Name**	**Cause**	**Solution**
E.oL2(15)	AC drive overload 1	Overload.	Reduce the load. Increase the motor overload protection curve factor appropriately.
		Short acceleration/deceleration time.	Increase F01.22 and F01.23 [Acceleration/Deceleration Time].
		High torque boost.	Reduce F04.01[Torque Boost].
		Incorrect V/F curve setting.	Confirm the relationship between voltage and frequency for the V/F curve setting, and modify F04.00 [V/F Curve]. If a customized V/F curve is used, modify the parameters related to the customized V/F curve (F04.10~F04.19).
		Abnormal output current due to input phase loss.	Check the main circuit to solve input phase loss.
Code	**Name**	**Cause**	**Solution**
E.oL3(16)	AC drive overload 2, (CBC continuously occurs)	Overload.	Reduce the load. Increase the motor overload protection curve factor appropriately.
		Short acceleration/deceleration time.	Increase F01.22 and F01.23 [Acceleration/Deceleration Time].
		High torque boost.	Reduce F04.01[Torque Boost].
		Incorrect V/F curve setting.	Confirm the relationship between voltage and frequency for the V/F curve setting, and modify F04.00 [V/F Curve]. If a user-defined V/F curve is used, F04.10 to F04.19 parameters are related to this user-defined V/F curve.
		Abnormal output current due to input phase loss.	Check the main circuit to solve input phase loss.
Code	**Name**	**Cause**	**Solution**
E.iLF(18)	Input phase loss	Loose main circuit terminals of drive.	Repower and restart after tightening the screws.
		Large fluctuation of input voltage.	Improve the power supply to meet the rated voltage of the drive. If the main circuit power supply is OK, check whether there is any problem with the electromagnetic contactor on the main circuit side.
		Imbalanced of three-phase voltage.	Confirm whether there is any problem with the input voltage to solve the power supply imbalance.

Note: Select whether or not to turn on the input phase loss fault detection function through the F10.20 [Input and Output Phase Loss Protection] by the tens digit.			
Code	**Name**	**Cause**	**Solution**
E.oLF(19)	All output phase loss	Two or more phases on the output side of the drive are disconnected.	Check whether the three-phase connection of the motor is normal. Check whether the drive output terminal screws are loose.
		Motor damage.	Measure resistance between motor wires and replace motor immediately if conductive.
		Low rated power.	Reset the drive or motor power.
Note: Select whether or not to turn on the output phase loss detection function via the F10.20 [Input and Output Phase Loss Protection] by the ones digit.			
Code	**Name**	**Cause**	**Solution**
E.oLF 1(20)	U-phase output phase loss	Two or more phases on the output side of the drive are disconnected.	Check whether the three-phase connection of the motor is normal. Check whether the drive output terminal screws are loose.
		Motor damage.	Measure resistance between motor wires and replace motor immediately if conductive.
		Low rated power.	Reset the drive or motor power.
Code	**Name**	**Cause**	**Solution**
E.oLF2(21)	V-phase output phase loss	V-phase disconnection on the output side.	Check whether the V-phase connection of the motor is normal. Check whether the drive output terminal screws are loose.
		Motor damage.	Measure resistance between motor wires and replace motor immediately if conductive.
		Low rated power.	Reset the drive or motor power.
Code	**Name**	**Cause**	**Solution**
E.oLF3(22)	W-phase output phase loss	W-phase disconnection on the output side.	Check whether the W-phase connection of the motor is normal. Check whether the drive output terminal screws are loose.
		Motor damage.	Measure resistance between motor wires and replace motor immediately if conductive.
		Low rated power.	Reset the drive or motor power.
Code	**Name**	**Cause**	**Solution**
E.oLF4(23)	Current imbalance	Phase loss on the output side.	Check whether the drive output wiring is disconnected or loose.
		Output circuit malfunction.	Replace the circuit board or AC drive.
		Three-phase imbalance in motor impedance.	Measure the resistance between the wires of the motor to confirm that the three phases are not deviated or disconnected.
		Low current imbalance threshold.	Increase F10.05[Current Imbalance Threshold].

Note: In the case of one drive for several motors, lack of one or two phases of a motor can be effectively protected against faults.			
Code	**Name**	**Cause**	**Solution**
E.oH1 (30)	Rectifier module overheat	Working environment overheat.	Lower the ambient temperature.
		Overload.	Reduce the load.
		Fan error.	Confirm that the fan is operating normally, if the fan is abnormal, replace the fan and restart.
Code	**Name**	**Cause**	**Solution**
E.oH2 (31)	IGBT module overheat	Working environment overheat.	Lower the ambient temperature.
		Overload.	Reduce the load. Reduce F01.40[Carrier Frequency].
		Fan error.	Confirm that the fan is operating normally, if the fan is abnormal, replace the fan and restart.
Code	**Name**	**Cause**	**Solution**
E.oH3 (32)	Motor overheat	Abnormal motor heat dissipation.	Improve motor heat dissipation.
		Overload.	Reduce the load.
Note: This function requires optional IO expansion card. This fault is reported when the motor temperature exceeds the F10.27 [Motor Overheat Warning Level]. Choose temperature sensor type (PT1000/KTY84) by F10.26 [Motor Overheat Protection] on the ones digit and motor action by F10.26 [Motor Overheat Protection] on the tens digit.			
Code	**Name**	**Cause**	**Solution**
E.EF (33)	External fault	External fault signal input to the multi-function input terminal.	Remove the external fault. Disable the external fault via multi-function input terminal.
Note: This external fault detection can be realized by configuring any X terminal from F05.00 to F05.09.			
Code	**Name**	**Cause**	**Solution**
E.CE (34)	Modbus communication error	Communication line malfunction, such as short circuit, disconnection, etc.	Check the communication wiring.
		Abnormal communication data due to interference.	Check the cabinet grounding wiring. Change to shielded communication cables.
Note: Report this error if the communication data is incorrect and the time exceeds FD.06 [Modbus Timeout]. Set F12.07 [Communication Disconnection Handling] when this fault is detected.			
Code	**Name**	**Cause**	**Solution**
E.HAL1 (35)	Large U-phase zero drift	Abnormal U-phase current signal due to interference.	Check grounding and remove interference sources.
		Abnormal AC drive hardware.	Seek support from the manufacturer.
Code	**Name**	**Cause**	**Solution**
E.HAL2 (36)	Large V-phase zero drift	Abnormal V-phase current signal due to interference.	Check grounding and remove V-phase Hall interference sources.
		Abnormal AC drive hardware.	Seek support from the manufacturer.

Code	Name	Cause	Solution
E.HAL (37)	Three-phase current fault	Abnormal phase current detection signal due to interference.	Check grounding and remove interference sources.
		Short circuit between motor phases.	Check motor wiring and repower.
		Check whether the drive output terminal screws are loose.	Repower and restart after tightening the screws.
		Abnormal AC drive hardware.	Seek support from the manufacturer.
Code	**Name**	**Cause**	**Solution**
E.HAL3 (38)	Large W-phase zero drift	Abnormal W-phase current detection signal due to interference.	Check grounding and remove W-phase Hall interference sources.
		Abnormal AC drive hardware.	Seek support from the manufacturer.
Code	**Name**	**Cause**	**Solution**
E.POS (39)	Internal power supply short circuit	Short circuit in the power supply board due to dust.	Remove dust inside the machine.
		Aging of power board components.	Replace the power board.
Note: This fault is valid for T3 models of 45kW-110kW.			
Code	**Name**	**Cause**	**Solution**
E.SCxy (40)	Output shorted to ground	Burnt motor or insulation deterioration.	Measure the wire-to-wire resistance of the motor and replace the motor if it is conducting or if insulation deterioration has occurred.
		Large distributed capacitance between the output cable and the ground terminal, and large leakage current.	Reduce the carrier frequency when the cable length exceeds 100m.
		Hardware failure on the drive.	Seek support from the manufacturer.
Note: Use fault sub-code "xy" to locate the specific phase with short-circuit to ground, the fault sub-code smaller than 16 means U phase, smaller than 32 means V phase, otherwise, it is W phase. Manual reset after the occurrence of the fault is invalid, repower up after troubleshooting and the drive will be reset. Fault sub-code "xy" minus 16, until the tens digit is 0, the cause of the failure can be told via the ones digit. When the processed y is 1, take this fault as a system fault; If it is 2, it means overcurrent; When it is 4, it indicates drive overload 2. And if it is 8, it indicates overvoltage.			
Code	**Name**	**Cause**	**Solution**
E.FSC (41)	Fan shorted to ground	The cooling fan of the drive is damaged.	Seek for technical support if it is not eliminated after power cut and restart.
Note: Manual reset after the occurrence of the fault is invalid, repower up after troubleshooting and the drive will be reset.			
Code	**Name**	**Cause**	**Solution**
E.COP (43)	Parameter copy failure	Communication failure.	Confirm whether the keyboard and drive wiring is normal, plug and re-copy.
		The drive model or software version does not match the parameters stored in the keyboard.	Re-copy the parameters and then download them to the drive.

		Hardware failure of keyboard parameter copying.	Seek technical support from the manufacturer if copy fails after replacement of the keyboard.
Code	**Name**	**Cause**	**Solution**
E.PG01 (44)	PG parameter setting fault	Incorrect setting of the encoder drive ratio.	Reset F02.35 [Drive Ratio Numerator] and F02.36 [Drive Ratio Denominator] so that the ratio is in the range of 0.01 to 100.
Code	**Name**	**Cause**	**Solution**
E.PG02 (44)	Z-pulse error	Incorrect wiring of the ABZ encoder or disconnection.	Check the encoder wiring.
Code	**Name**	**Cause**	**Solution**
E.PG03 (44)	ABZ encoder disconnection	Incorrect wiring of the ABZ encoder or disconnection.	Check the encoder wiring.
		Motor electromagnetic brake in applying position.	Release the brake.
Note: This fault is reported after no signal of the ABZ encoder is detected and lasts for F02.38 [Encoder Disconnection Detection Time].			
Code	**Name**	**Cause**	**Solution**
E.PG04 (44)	RT check error	Data transmission failure due to strong interference sources.	Check grounding and remove interference sources.
		Check the grounding of the whole machine and remove the source of interference.	Check the RT wiring.
Code	**Name**	**Cause**	**Solution**
E.PG05 (44)	RT disconnection	Check the grounding of the whole machine and remove the source of interference.	Check the RT wiring.
Note: This fault is reported after no signal of the ABZ encoder is detected and lasts for F02.38 [Encoder Disconnection Detection Time].			
Code	**Name**	**Cause**	**Solution**
E.PG08 (44)	Encoder Z-pulse logic fault	Incorrect setting of the number of ABZ encoder lines.	Set the line number of the ABZ encoder.
		Incorrect Z-pulse detection setting.	Set F02.32[ABZ Encoder Z-Pulse Detection].
Code	**Name**	**Cause**	**Solution**
E.PG10 (44)	Encoder Z-pulse disconnection	Incorrect wiring of the ABZ encoder or disconnection.	Check the encoder wiring.
Code	**Name**	**Cause**	**Solution**
E.brU (50)	Reserved		
Code	**Name**	**Cause**	**Solution**
E.rExx (52)	Auto-tuning failure	Auto-tuning AC drive output current beyond limit.	Check motor connections, reset and re auto-tuning, and seek factory support if still reporting faults.
Note: Detailed troubleshooting information for parameter tuning faults is available in the Fault Countermeasures Remarks table. “xx” means auto-tuning fault subcode.			

Code	Name	Cause	Solution
E.1AE	PM initial position angle tuning failure	PM initial position angle tuning failure.	Check motor parameters; Retuning when the motor is still.
Code	**Name**	**Cause**	**Solution**
EE62 (62)	Release current or torque error	The release current or release torque does not meet the conditions.	Check whether motor parameters on the drive match the actual motor parameters; Check whether the drive output terminal and the motor are connected.
EE63 (63)	Current detection fault during operation	Detected output current during operation is lower than FF.26.	Check whether motor parameters on the drive match the actual motor parameters; Check whether the drive output terminal and the motor are connected.
Code	**Name**	**Cause**	**Solution**
E.PSr2 (75)	Step loss fault	Poor motor angle control.	Check if the motor parameters and encoder parameters are correct, if there is an error, please correct it.
			Make sure to retry auto-tuning after changing motor or encoder parameters.
			Increase F3.83[Motor Step Loss Detection Time].
Code	**Name**	**Cause**	**Solution**
E.dEF (77)	Excessive speed deviation	Overload.	Reduce the load.
		Short accel./decel. time.	Increase F01.22 and F01.23 [Acceleration/Deceleration Time].
		Improper setting of speed detection-related parameters.	Adjust F10.41 [Excessive Speed Deviation Detection Threshold] and F10.42 [Excessive Speed Deviation Detection Time].
		Motor electromagnetic brake in applying position.	Release the brake.
Note: This fault is reported after the percentage of output motor speed relative to F01.10 [Maximum Frequency] is greater than F10.41 [Speed Deviation Detection Threshold] for a duration of F10.42 [Speed Deviation Detection Time]. F10.40 [Excessive speed deviation protection] can be used to enable fault detection and set the motor operation mode when the fault is detected.			
Code	**Name**	**Cause**	**Solution**
E.SPd (78)	Stall fault	Improper setting of the number of encoder lines or poles.	Adjust F02.33 [ABZ Encoder Line Number] or F02.34 [Rotary Transformer Pole Number].
		Improper setting of stall detection-related parameters.	Adjust F10.44 [Stall Detection Threshold] and F10.45 [Stall Detection Time].
Note: The percentage of the output motor speed relative to F01.10 [Max. frequency] is greater than F10.44 [Stall Detection Threshold], alarm for a period of F10.45 [Stall Detection Time]. F10.43 [Stall Protection] can be used to enable fault detection and set the motor operation mode when the fault is detected.			

Code	Name	Cause	Solution
E.Ld1 (79)	Load warning 1	Failure on the mechanical side, such as a broken pulley belt.	Check the machine for troubleshooting.
		Improper parameter settings of load warning 1.	Adjust F10.33 [Load Detection Warning1] and F10.34 [Load Detection Warning Time1].
Note: This fault is reported when the drive output current exceeds F10.33 [Load Warning Detection Level 1], the duration exceeds F10.34 [Load Warning Detection Time 1], and F10.32 [Load Detection Warning Setting] ones and tens are set to enable this fault detection and to report the fault and free stop when this fault is detected.			
Code	**Name**	**Cause**	**Solution**
E.Ld2 (80)	Load warning 2	Failure on the mechanical side, such as a broken pulley belt.	Check the machine for troubleshooting.
		Improper parameter settings of load warning 2.	Adjust F10.35 [Load Detection Warning 2] and F10.36 [Load Detection Warning Time 2].
Note: This fault is reported when the drive output current exceeds F10.35 [Load Warning Detection Level 2], the duration exceeds F10.36 [Load Warning Detection Time 2], and F10.32 [Load Detection Warning Setting] ones and tens are set to enable this fault detection and to report the fault and free stop when this fault is detected.			
Code	**Name**	**Cause**	**Solution**
E.CPU (81)	CPU timeout	Software calculation timeout due to strong interference to the main chip.	Remove the source of strong interference, power off and restart.
		Hardware problem of the main chip.	Seek support from the manufacturer.
Note: Manual reset after the occurrence of the fault is invalid, repower up after troubleshooting and the drive will be reset.			
Code	**Name**	**Cause**	**Solution**
E.LoC (85)	Chip locked	The software version does not match the control board.	Seek support from the manufacturer.
Note: Manual reset after the occurrence of the fault is invalid, repower up after troubleshooting and the drive will be reset.			
Code	**Name**	**Cause**	**Solution**
E.EEP (86)	EEPROM error	Interference during read and write parameter operation to EEPROM.	Re-read and write parameters after checking and removing interference sources.
		EEPROM hardware error.	Power off and restart to confirm if the fault will occur again. Seek technical support from the manufacturer if it still exists.
Note: Manual reset after the occurrence of the fault is invalid, repower up after troubleshooting and the drive will be reset.			
Code	**Name**	**Cause**	**Solution**
E.PLL (87)	PLL error	CPU chip under strong interference.	Restart the drive to confirm whether the fault persists, and seek technical support from the manufacturer if the fault persists and cannot be reset.
Note: Manual reset after the occurrence of the fault is invalid, repower up after troubleshooting and the drive will be reset.			

Code	Name	Cause	Solution
E.bUS 1 (91)	Expansion card A disconnection	Data transmission failure due to strong interference sources.	Check grounding and remove interference sources.
		Improper wiring or disconnection on expansion card A.	Check the expansion card A wiring.
Note: F12.50 [Expansion Card Communication Disconnection Handling] ones-bit can be used to set the action to be taken when the expansion card inserted into the EX-A port is detected as disconnection with the drive. "Expansion card A" refers to the expansion card inserted into the EX-A port, and "Expansion card B" refers to the expansion card inserted into the EX-B port.			
Code	**Name**	**Cause**	**Solution**
E.bUS2 (92)	Expansion card B disconnection	Data transmission failure due to strong interference sources.	Check grounding and remove interference sources.
		Improper wiring or disconnection on expansion card B.	Check the expansion card B wiring.
Note: F12.50 [Expansion Card Communication Disconnection Handling] ones-bit can be used to set the action to be taken when the expansion card inserted into the EX-B port is detected as disconnection with the drive.			
Code	**Name**	**Cause**	**Solution**
E.bUS3 (93)	CAN expansion card error	Data transmission failure due to strong interference sources.	Check grounding and remove interference sources.
		Incorrect wiring of the CAN encoder or disconnection.	Check the CAN expansion card wiring.
Note: Available via F12.32 [CAN Master-Slave Disconnection Action = 1: Alarm and free stop].			
Code	**Name**	**Cause**	**Solution**
E.bUS4 (94)	DP expansion card error	Data transmission failure due to strong interference sources.	Check grounding and remove interference sources.
		Incorrect wiring of the DP encoder or disconnection.	Check the DP expansion card wiring.
Note: Available via F12.32 [DP Master-Slave Disconnection Action = 1: Alarm and free stop].			
Code	**Name**	**Cause**	**Solution**
E.dAT (99)	Parameter setting fault	Wrong parameter setting.	Set as per the given parameter range.
Code	**Name**	**Cause**	**Solution**
E.FAx (11x)	Reserved external expansion error	Reserved warnings, the industry-specific machines correspond to different meanings.	Check the user manual of the corresponding industry to confirm the specific fault.
E. 103 (103)	Brake resistor error	Large or small braking resistor resistance value.	1. Choose the appropriate braking resistor. 2. Check whether the wiring from drive to braking resistor is correct.
E. 104 (104)	Insufficient brake torque	If the current is low during brake torque detection, it means that the brake is released and the braking torque is insufficient.	Check whether the brake is released, adjust the braking torque if it is or contact the manufacturer.
E. 105 (105)	Brake release feedback error	Brake release feedback signal input error.	1. Check brake feedback circuit. 2. Check control board brake release feedback signal input selection(Input function 91).

E.106 (106)	Braking feedback error	Braking feedback signal input error.	1. Check brake feedback circuit. 2. Check control board braking feedback signal input selection(Input function 91).
E.107 (107)	Anti-snag error	A sudden change in load detected during lifting acceleration.	Check the cause of the sudden load change and remove the cause before continuing operation.

Auto-tuning fault subcode

Note: Detailed diagnostic information of auto-tuning fault E. TExx is shown in the table below, and "xx" is the sub-code of auto-tuning fault.

Subcode	Cause	Solution
1	Current saturation, Hall detection error or large output current.	1. Check whether there is a short circuit between phases in the motor wires, please connect the motor wires correctly if there is any error. 2. The synchronous motor may rotate at a certain angle during the DC tuning period, resulting in excessive current. Retry auto-tuning. 3. The internal wiring of the drive is abnormal or damaged, please contact the manufacturer.
2	Excessive zero-bias of the current.	1. Check if the Hall sensor fails. 2. If the fault is not removed after several auto-tuning attempts, please contact the manufacturer.
3	Current imbalance.	1. Check whether there is phase loss during motor wiring, please correct it if there is any error. 2. Measure the resistance value between the motor wires, if there is a deviation, please replace the cable wires.
4	Current oscillation.	1. Check whether there is a short circuit between phases in the motor wires, please connect the motor wires correctly if there is any error. 2. Check if the input motor nameplate parameters are correct. 3. Large acceleration and deceleration time setting will cause current oscillation, so reduce F01.22 [Acceleration Time 1] and F01.23 [Deceleration Time 1] appropriately. 4. Adjust F04.06 [Oscillation Suppression Gain] according to the parameter description.
5	Static auto-tuning current over range.	1. Check whether there is a short circuit between phases in the motor wires, please connect the motor wires correctly if there is any error. 2. Check if the input motor nameplate parameters are correct. 3. Make sure the motor rated current is lower than the drive output current limit point.
6	U-phase current above limit during static auto-tuning.	Check the U-phase motor wiring for short circuits between phases or to ground.
7	V-phase current above limit during static auto-tuning.	Check the V-phase motor wiring for short circuits between phases or to ground.
8	W-phase current above limit during static auto-tuning.	Check the W-phase motor wiring for short circuits between phases or to ground.

9	Current always above limit during dynamic auto-tuning.	1. Check whether there is a short circuit between phases in the motor wires, please connect the motor wires correctly if there is any error. 2. Check if the input motor nameplate parameters are correct. 3. Ensure that the load carried by the motor does not exceed 50% of the rated load. 4. Increase F01.22 [Acceleration Time 1] and F01.23 [Deceleration Time 1] appropriately.
10	Voltage saturation.	1. Check whether there is an open circuit in the motor wiring, please correct if there is. 2. Check if the input motor nameplate parameters are correct. 3. Shorten the motor power line length (<1000m) or increase the motor power line diameter.
15	Excessive rotor resistance.	1. Check if the input motor nameplate parameters are correct. 2. Shorten the motor power line length (<1000m) or increase the motor power line diameter.
16	Excessive inductance.	1. Check if the input motor nameplate parameters are correct. 2. If the fault is not removed after several auto-tuning attempts, please contact the manufacturer.
40	Auto-tuning timeout.	1. Check if the input motor nameplate parameters are correct. 2. Check if there's a large difference between the power levels of the AC drive and the motor. (> 3 level). 3. If the fault is not removed after several auto-tuning attempts, please contact the manufacturer.
41	Parameter setting fault.	Re-enter the motor nameplate parameters correctly to ensure that the motor's rated frequency is within the range of 10Hz~500Hz.
44	Negative rotor resistance.	1. Check if the input motor nameplate parameters are correct. 2. If the fault is not removed after several auto-tuning attempts, please contact the manufacturer.
45	PM output voltage over range.	Check whether the entered motor nameplate parameters are correct (especially whether the keyboard input rated frequency is greater than the motor nameplate rated value).
46	High back emf. voltage during tuning.	Check whether the entered motor nameplate parameters are correct (especially whether the keyboard input rated frequency is greater than the motor nameplate rated value).
47	Low back emf. voltage during tuning.	1. Check whether the entered motor nameplate parameters are correct (especially whether the keyboard input rated frequency is lower than the motor nameplate rated value). 2. Motor demagnetized.
50	Wrong motor operation direction.	1. Check whether the number of encoder lines is set correctly. 2. Check if the motor load is too high (>30%). 3. Separate the motor from the machine and try auto-tuning again.
52	PM Z-pulse not detected.	1. Check whether the encoder Z pulse wiring is normal. 2. Check if the encoder wiring is poor to cause too much interference. 3. Make sure the encoder outputs Z-pulse normally.
53	Excessive deviation of Z-pulse on PM.	1. Check whether the number of encoder lines is set correctly. 2. Check if the encoder wiring is poor and causes too much interference.
61	Max. frequency under limit.	The set max. frequency of AC drive is lower than the rated frequency of the motor, please reset the max. frequency of AC drive and the upper limit frequency and then perform tuning again.

62	Excessive deviation between the AC drive and motor currents.	Check if there's a large difference between the power levels of the AC drive and the motor. Keep it within 2 levels.
90	Shutdown command given during auto-tuning.	Failure to complete the parameter tuning, need to retry.
Other subcodes	Multiple faults at the same time while tuning.	1. Check if the motor wiring is correct. 2. If the subcode fault is still reported in tuning after rewiring, please seek technical support from the manufacturer.

6.5 Warning

When a warning occurs, the drive can continue to operate. The following table explains the causes of the warning and the corresponding measures.

Note: All warnings can be cleared automatically once they do not meet the detection conditions.

Code	Name	Cause	Solution
A.LU1	Shutdown undervoltage	Low input power supply voltage.	Increase the input supply voltage.
		Input power supply phase loss.	Check if the main circuit wiring is normal.
		Loose input power supply terminals.	Tighten the screws in the main circuit terminals.
		Aged AC drive main circuit capacitor.	Seek technical support.
Note: A.LU1 during power down is a normal response since the capacitor is over discharged.			
Code	**Name**	**Cause**	**Solution**
A.oU	Overvoltage during shutdown	High power supply voltage.	Set the power supply voltage within the specified range.
		Drive output short circuit or short circuit to ground.	Check the main circuit to solve the short circuits.
		Surge voltage mixed in the input voltage.	Add a reactor on the input side.
Note: This fault is detected when the bus voltage exceeds the overvoltage point. The overvoltage point is 820V for T3 models and 400V for S2/T2 models.			
Code	**Name**	**Cause**	**Solution**
A.LF	Input phase loss alert	Loose main circuit terminals of drive.	Repower and restart after tightening the screws.
		Large fluctuation of input voltage.	Improve the power supply to meet the rated voltage of the drive. If the main circuit power supply is OK, check whether there is any problem with the electromagnetic contactor on the main circuit side.
		Imbalanced of three-phase voltage.	Confirm whether there is any problem with the input voltage to solve the power supply imbalance.
Note: Set tens-bit F10.20 [I/O Phase Loss Protection] to select whether or not to enable the input phase loss warning detection function.			
Code	**Name**	**Cause**	**Solution**
A.EEP	EEPROM read/write warning	Interference during read and write parameter operation to EEPROM.	Re-read and write parameters after checking and removing interference sources.

Code	Name	Cause	Solution
A dEF	Excessive speed deviation warning	Overload.	Reduce the load.
		Short accel./decel. time.	Increase F01.22 and F01.23 [Acceleration/Deceleration Time].
		Improper setting of speed detection-related parameters.	Adjust F10.41 [Excessive Speed Deviation Detection Threshold] and F10.42 [Excessive Speed Deviation Detection Time].
		Motor electromagnetic brake in applying position.	Release the brake.
Note: This alarm is reported after the percentage of output motor speed relative to F01.10 [Maximum Frequency] is greater than F10.41 [Speed Deviation Detection Threshold] for a duration of F10.42 [Speed Deviation Detection Time]. F10.40 [Excessive Speed Deviation Protection] can be used to enable fault detection and set the motor operation mode when the fault is detected.			
Code	**Name**	**Cause**	**Solution**
A SPd	Stall alarm	Improper setting of the number of encoder lines or poles.	Adjust F02.33 [ABZ Encoder Line Number] or F02.34 [Rotary Transformer Pole Number].
		Improper setting of stall detection-related parameters.	Adjust F10.44 [Stall Detection Threshold] and F10.45 [Stall Detection Time].
Note: this alarm is report when the percentage of the output motor speed relative to F01.10 [Max. Frequency] is greater than F10.44 [Stall Detection Threshold] and lasts for a period of F10.45 [Stall Detection Time]. F10.43 [Stall Protection] can be used to enable fault detection and set the motor operation mode when the fault is detected.			
Code	**Name**	**Cause**	**Solution**
A GPS 1	GPS lock	AC drive operation time reaches the set time.	Seek support from the manufacturer.
Note: GPS function requires optional GPRS expansion card.			
Code	**Name**	**Cause**	**Solution**
A GPS2	GPS disconnection	Communication line malfunction, such as short circuit, disconnection, etc.	Check the communication wiring.
		Abnormal communication data due to interference.	Check the cabinet grounding wiring. Change to shielded communication lines.
Note: GPS function requires optional GPRS expansion card.			
Code	**Name**	**Cause**	**Solution**
A CE	Modbus communication warning	Communication line malfunction, such as short circuit, disconnection, etc.	Check the communication wiring.
		Abnormal communication data due to interference.	Check the cabinet grounding wiring. Change to shielded communication cables.
Note: Report this alarm if the communication data error lasts for FD.06 [Modbus Timeout]. Set F12.07 [Communication Disconnection Handling] when this fault is detected.			

Code	Name	Cause	Solution
ALd1	Load warning1	Failure on the mechanical side, such as a broken pulley belt.	Check the machine for troubleshooting.
		Improper parameter settings of load warning 1.	Adjust F10.33 [Load Detection Warning 1] and F10.34 [Load Detection Warning Time 1].
Note: The warning is reported if the output current of AC drive exceeds F10.33 [Load Detection Warning1], the duration exceeds F10.34 [Load Detection Warning Time1], and the warning detection is enabled by the ones and tens-bit of F10.32 [Load Detection Setting] and the motor operation mode is set to “alarm and continue operation”.			
Code	**Name**	**Cause**	**Solution**
ALd2	Load warning2	Failure on the mechanical side, such as a broken pulley belt.	Check the machine for troubleshooting.
		Improper parameter settings of load warning 2.	Adjust F10.35 [Load Detection Warning 2] and F10.36 [Load Detection Warning Time 2].
Note: The warning is reported if the output current of AC drive exceeds F10.35 [Load Detection Warning2], the duration exceeds F10.36 [Load Detection Warning Time2], and the warning detection is enabled by the hundreds-bit and thousands-bit of F10.32 [Load Detection Setting] and the motor operation mode is set to “alarm and continue operation”.			
Code	**Name**	**Cause**	**Solution**
AbUS	Expansion card disconnection	Data transmission failure due to strong interference sources.	Check grounding and remove interference sources.
		Improper wiring or disconnection on expansion card.	Check the expansion card wiring.
Note: F12.50 [Expansion Card Communication Disconnection Handling] ones-bit can be used to set the action to be taken when the expansion card inserted into the EX-A port is detected as disconnection with the drive. **Note:** F12.50 [Expansion Card Communication Disconnection Handling] tens-bit can be used to set the action to be taken when the expansion card inserted into the EX-B port is detected as disconnection with the drive. **Note:** Available via F12.43 [CAN Master-Slave Disconnection Action = 2: Alarm and free stop]. **Note:** Available via F12.32 [DP Master-Slave Disconnection Action = 2: Alarm and free stop].			
Code	**Name**	**Cause**	**Solution**
AoH1	Module overheat fault	Working environment overheat.	Lower the ambient temperature.
		Overload.	Reduce the load.
		Fan error.	Confirm that the fan is operating normally, if the fan is abnormal, replace the fan and restart.
This fault is reported when the motor temperature exceeds the F10.27 [Motor Overheat Warning Level].			
Code	**Name**	**Cause**	**Solution**
AoH3	Motor overheat warning	Abnormal motor heat dissipation.	Improve motor heat dissipation.
		Overload.	Reduce the load.
Note: This alarm is reported when the motor temperature exceeds the F10.27 [Motor Overheat Warning Level]. Choose temperature sensor type (PT1000/KTY84) by F10.26 [Motor Overheat Protection] on the ones digit and motor action by F10.26 [Motor Overheat Protection] on the tens digit. **Note:** This function requires optional IO expansion cards.			

Code	Name	Cause	Solution
A.run1	Operation command conflict	Stop signal is valid when another command is valid.	Remove stop signals, including stop and emergency stop signal.
Code	**Name**	**Cause**	**Solution**
A.run2	Jogging terminal starting protection	Prevent direct jogging operation caused by valid terminal signal at the moment of power up.	Remove the command and re-enable it for normal operation.
Code	**Name**	**Cause**	**Solution**
A.run3	Terminal starting protection	Prevent direct operation caused by valid terminal signal at the moment of power up.	Remove the command and re-enable it for normal operation.
Code	**Name**	**Cause**	**Solution**
A.PA2	External keyboard disconnection	Data transmission failure due to strong interference sources.	Remove the source of strong interference.
		Improper wiring or disconnection of the external keyboard.	Check whether the external keyboard cable is faulty, re-plug the keyboard. Or seek technical support from the manufacturer if it still can't work.
Note: When the external keyboard disconnection warning occurs, and re-plugging can't solve it. After the warning is canceled, commands are switched to the built-in keyboard.			
Code	**Name**	**Cause**	**Solution**
A.161	Cooling fan lifetime warning	Cooling fan lifetime reaches 90%.	Replace the fan promptly and set F09.03 [Cooling Fan Maintenance] to 0.
Code	**Name**	**Cause**	**Solution**
A.163	Main relay lifetime warning	Main relay lifetime reaches 90%.	Contact the manufacturer to get a new one.
Code	**Name**	**Cause**	**Solution**
A.168	Given frequency lower than the starting frequency	Low operation frequency.	Wrong given frequency, please reset.
A.169	Given frequency lower than the brake releasing frequency	Given frequency lower than the brake releasing frequency.	Wrong given frequency, please reset.
A.FSrP	Free stop command valid	Free stop command input is detected.	Check the free stop terminal status on the control board.
A.FSrP	Emergency stop command valid	Emergency stop command input is detected.	Check the emergency stop terminal status on the control board.
A.178	Brake failure	The brake is released or insufficient brake torque.	Check whether the brake is released, adjust the braking torque or contact the manufacturer.
A.179	Anti-snag error	A sudden change in load detected during lifting acceleration.	Check the cause of the sudden load change and remove the cause before continuing operation.

6.6 Fault Reset Methods

If the AC drive stops running due to a malfunction, follow the steps below for troubleshooting and restart the AC drive after taking appropriate solutions.

Warning! Before performing maintenance, inspection, and component replacement of the AC drive, wear goggles to protect your eyes.

Warning! When the fuse is blown or the leakage circuit breaker is tripped, do not restart the AC drive or run external equipment within 5 minutes. Please confirm the wiring and the ratings of the external equipment to find out the cause of the trip. Or please consult the technical support department, otherwise it may cause a personal accident or drive damage.

6.6.1 Fault Finding

1. Confirm the fault code displayed on the keyboard.
2. Please refer to the sections on troubleshooting to eliminate the causes.

Note:

1. The fault that caused this power cut can be verified through C01.00 [Current Diagnosis Information]. Through C01.01~C01.09, the status of the AC drive (frequency, current, voltage, etc.) can be viewed when this fault occurs.
2. Check C01.10 [Last Fault Diagnosis Information] to confirm the fault caused the power cut. Through C01.11 ~C01.19, the status of the AC drive can be checked when the last fault occurred (frequency, current, voltage, etc.)
3. Perform a fault reset.

6.6.2 Fault Reset

To restore the AC drive to normal operation, first rectify the cause of the malfunction and then reset the fault. There are four fault reset methods:

1. Press the STOP/RESET key on the keyboard when a fault occurs.
2. Select fault reset via multi-function input terminal function to enable the terminal.
3. Send fault reset command through communication.
4. Repower the AC drive up.

Reset operation when multiple faults are triggered at the same time:

1.The Keypad displays the earliest fault among the faults to be reset.

2. Remove the cause of the fault according to the prompts. After resetting, the second trigger fault will be displayed. Remove the cause of the fault in turn, and reset until the fault is completely eliminated.

3. According to the fault type indicated by the fault monitoring parameter C01.xx, eliminate the cause of each fault, and reset multiple faults at one time.

6.7 Troubleshooting without Prompts on Keyboard

When the fault code or error code is not displayed on the keyboard, but the drive or motor operate abnormally, please refer to this section and take appropriate countermeasures.

◆ The parameter cannot be modified, the keypad displays "-----"

Cause	Solution
Modify the parameters that cannot be changed while the drive is running.	Modify this parameter after stopping the drive.
Modify read-only parameters.	Read-only parameters cannot be modified.

◆ The motor does not rotate after the running command input

Cause	Solution
Wrong channel setting of running command.	Check F01.01 [Command Channel].

Improper setting of the frequency setting method results in a given frequency of 0.	Check the F01.02 [Frequency Giving Method] setting and confirm that the frequency giving source is valid.
An emergency stop signal has been input.	Emergency stop signal is canceled.
Wrong wiring when terminal set as command channel.	Confirm that the control circuit terminals of the AC drives are connected properly and correctly. Check terminal status via C00.14[Input Terminal Status].
Low given frequency.	Check if C00.00[Given Frequency] is higher than F01.13[Lower Limit Frequency].

◆ Motor direction opposite to the command

Cause	Solution
Improper wiring of the motor.	Check whether the wiring from drive to motor is correct. Exchange any two wires of U, V, W of the motor.
Wrong motor operation direction setting.	Check whether the wiring from drive to motor is correct. Change F07.05[Direction Inversion] ones-bit to reverse the direction.

◆ Motor runs in only one direction

Cause	Solution
Operation direction disable function is set.	Modify the F07.05[Direction Inversion] tens-bit.

◆ Abnormal motor temperature

Cause	Solution
Overload.	Reduce load or replace with motors with higher power.
Motor runs at very low speed for a long time.	Change the operating speed or replace the motor with one dedicated to the drive.
Vector control is set but motor auto-tuning is not performed.	Perform motor auto-tuning. If possible, change to V/F control.
The motor's cooling fan is covered with excessive dust, causing the fan to block or stop.	Clean the fan. Improve the clean condition of the usage environment.

◆ Running not consistent to the set acceleration and deceleration time

Cause	Solution
Overload.	Reduce load or replace with motors with higher power.
Output current reaches limit.	Reduce load or replace with motors with higher power.
Short accel./decel. time.	Increase F01.22 and F01.23 [Acceleration/Deceleration Time 1].
Improper motor characteristic parameters.	Check F4.00 [V/F Curve] to confirm that a V/F curve that matches the motor characteristics. Dynamic auto-tuning is carried out.
Vector control is set but auto-tuning is not performed.	Perform motor auto-tuning. If possible, change to V/F control.

◆ Significant deviation between the motor speed and the frequency command

Cause	Solution
The frequency command gain of the analog input and the corresponding relationship of the analog are set improperly.	Confirm whether the relevant parameter value setting of the analog input terminal is appropriate. Terminal AI1: F05.50-F05.53 [AI1 Related Parameters]. Terminal AI2: F05.55-F05.58 [AI2 Related Parameters].
Whether there is overlap in the setting of frequency command source.	Check the F01.02 [Frequency Giving Channel].

◆ Mechanical vibration or imbalance during motor rotation

Cause	Solution
Analog frequency command input from an external source.	Confirm that the external signal wires are not affected by noise. Isolate the main circuit wiring from the control circuit wiring as much as possible, and use shielded or multi-stranded cables for wiring here. Increase the setting of the analog input filter time constant.
Long wiring distance between the drive and motor.	Shorten the wiring length as much as possible.

◆ Output frequency does not reach the commanded frequency commanded value

Cause	Solution
Set frequency command value within the jump frequency range.	Adjust F07.44, F07.46 [Jump Frequency 1/2] and F07.45, F07.47 [Jump Frequency Range 1/2]. **Note:** When the jump frequency is valid, the output frequency remains unchanged within the jump frequency range.
Given frequency beyond the upper limit frequency setting.	Check F01.02 [Upper Limit Frequency Channel].

Chapter 7 Inspection and Maintenance

This chapter describes the regular inspection and maintenance methods during the use of the AC drive, the replacement methods of cooling fans and other components, and the essentials for storage of the products.

7.1 Safety Precautions

DANGER

To prevent electric shock

- Do not perform wiring, inspection or repair work while the power is on. Before starting work, be sure to switch off the power of all machines. After the power is switch off, there is still residual voltage in the capacitor inside the drive. It is necessary to confirm that the main circuit voltage has fallen to a safe level, and wait 5 minutes before performing related operations. Personal accidents may result if care is not taken.
- During the operation of the drive, please do not change the wiring, remove the wiring and option cards, or replace the cooling fan.
- And when use it to drive a motor, even if the power to the AC drive is switched off, an induced voltage will be generated on the motor terminals during motor rotation, so wait until the motor cord is disconnected or confirm that the motor is no longer rotating before performing the above operation. There is a risk of electric shock if operated incorrectly.

WARNING

To prevent electric shock

- Do not operate with the drive cover removed, otherwise there will be a risk of electric shock.
- Be sure to operate the AC drive in accordance with the instruction manual with the specified cover or masking installed.
- Be sure to ground the ground terminals on the motor side, otherwise electric shock may result from human contact with the motor case.
- Non-electrical construction professionals are not allowed to perform wiring, installation, inspection, maintenance, component replacement or repair operations, otherwise there is a danger of electric shock.
- If you are wearing loose clothing or accessories, do not work on the drive. Please take off metal objects such as watches and rings and replace with suitable clothes before work, otherwise there will be a risk of electric shock.

To prevent fire

- Please tighten the terminal screws according to the torque in this manual. Insufficient torque may lead to fire due to overheat on the connection parts.
- If the tightening torque exceeds the specified tightening torque, it may cause malfunction of the device, damage to the terminal blocks, or cause a fire.
- Ensure to use the correct voltage of the main circuit power supply. Before energizing, please confirm whether the rated voltage of the AC drive is consistent with the power supply voltage. If the main circuit power supply voltage is used incorrectly, there is a danger of fire.
- Do not keep any flammable materials close to or attached to the AC drive. Please install the drive on a flame-retardant object such as metal. Otherwise, there will be a risk of fire.

CAUTION

- The heat sink of the drive will generate high temperature, so do not touch it.
- When operating the AC drive, follow the procedures specified in the electro-static discharge (ESD). Wrong operation may damage the circuits inside the AC drive due to static electricity.
- Please do not change the circuit, otherwise it will cause damage to the product. And the repair cost caused by this is not covered by our warranty.
- After completing the wiring of the drive and other machines, please make sure that all of the wirings are correct. If not, it may cause damage to the product.
- Please confirm the direction of rotation when the motor is under no load. Wrong direction may cause personal injury or property damage.
- Do not operate on a damaged drive. If there are obviously damaged or missing parts, please do not connect or operate it to avoid accidents.

7.2 Inspection

Electronic equipment is composed of various electronic components, etc. If the service life of the relevant components is exceeded, characteristics changes or malfunctions may occur. In order to prevent the occurrence of such failures, preventive maintenance such as daily overhaul, regular overhaul, and component replacement must be carried out.

It is recommended that the machine be inspected every 3 to 4 months after installation. The maintenance period of each machine varies with working conditions, environmental conditions and usage conditions.

In the following cases, please shorten the inspection cycle:

- Environment with high temperature and high altitude;
- Frequent start and stop;
- Environments with large fluctuations in AC power and loads;
- Environment with excessive vibration or shock;
- Environment with presence of dust, metal dust, salts, sulfuric acid, elemental chlorine;
- Harsh preservation.

Please perform regular maintenance according to the maintenance item list in this chapter.

◆ **Daily inspection**

To avoid the drive function deterioration and product damage, please check and confirm the following daily items every day and carry out valid records and tracking.

Note: Do not perform wiring, inspection or repair operations while the power is on. Before starting work, be sure to switch off the power of all machines. After the power is switch off, there is still residual voltage in the capacitor inside the drive. It is necessary to confirm that the main circuit voltage has fallen to a safe level, and wait 5 minutes before performing related operations to avoid personal accidents.

Item	Content	Solution
Surroundings	Whether the installation environment is suitable.	Remove pollution sources or improve the installation environment.
Power supply	Whether the power supply voltage meets the requirements and whether there is a lack of phase.	Use power supply according to the nameplate requirements.
Motor	Whether the motor has abnormal vibration or sound.	Confirm the connection with the machine; Tighten the screws at the connection; Do lubrication treatment.

Load	Check whether the output current of the drive is higher than the rated value of the motor and it runs for a certain period of time.	Check if the drive is overloaded; Confirm whether the settings of the motor parameters are correct.
Cooling system	Check whether there is abnormal heating and discoloration of the drive and motor.	Check if the drive is overloaded; Tighten the screws; Check whether the heat sink of the drive and the motor are dirty.
	Whether the cooling fan is working properly.	Check whether the fan is blocked or damaged.

◆Regular inspection

Under normal circumstances, a regular inspection is performed every 3 months to 4 months, but it needs to be combined with the usage and working environment to consider shortening the inspection cycle. Make relevant confirmations and make valid records during the inspection.

Note: Do not perform wiring, inspection or repair operations while the power is on. Before starting work, be sure to switch off the power of all machines. After the power is switch off, there is still residual voltage in the capacitor inside the drive. It is necessary to confirm that the main circuit voltage has fallen to a safe level, and wait 5 minutes before performing related operations to avoid personal accidents.

Item	Content	Solution
Overall	Check the environment to see if there is any dirt or dust.	Confirm whether the relevant cabinet doors can be closed tightly; Clean dirt or dust and improve the operating environment.
	Whether there is any discoloration due to overheating and aging; Whether there is any damage, deformation, or abnormal operation of the device.	Replace related components; If it cannot be repaired, the entire AC drive needs to be replaced.
Wiring	Whether the wires and their connections are discolored, damaged, or cracked.	Repair or replace wires.
Terminal block	Whether the wiring terminals are worn, damaged or loose.	Tighten the screws; Replace damaged screws or terminals.
Mechanical devices such as electromagnetic contactors, relays, etc.	Whether the wiring terminals are worn, damaged or poorly contacted; Whether the screws are loose.	Tighten the screws; Replace screws or terminals; If it cannot be replaced effectively, the drive needs to be replaced.
Diode, IGBT (power transistor)	Whether there is rubbish and dust.	Remove rubbish or dust to avoid touching any parts.
Electrolytic capacitor	Whether there is leakage, discoloration, or cracks; Whether the safety valve has arched out, whether there is a bulge, whether there is a crack or leakage.	Replace the electrolytic capacitor; If there are damaged parts that cannot be repaired or replaced, replace the entire drive.
Brake options	Whether the insulating material has changed color due to overheat.	When discoloration occurs, check whether the wiring is defective.

Printed circuit board	Whether there is a peculiar smell, discoloration or significant rust; Whether the plug is effectively connected; Whether it is stained with dust and oil.	Reconnect the plug; Replace the circuit board; Do not use solvents when cleaning the circuit board; A vacuum cleaner can be used to remove rubbish or dust to avoid touching any parts; If there are damaged parts that cannot be repaired or replaced, replace the entire drive.
Cooling fan	Whether the has abnormal vibration or sound; Whether there is damage or missing blades.	Clean or replace the fan.
Heat sink	Whether there is rubbish and dust; Whether it is dirty.	A vacuum cleaner can be used to remove rubbish or dust to avoid touching any parts.
Vent	Whether the air intake and exhaust ports are blocked by foreign matters.	Remove obstructions and dust.
Display	Whether the screen display is correct; Whether the operation keys are dirty.	If the screen or operation keys are defective, please contact our company's agent or sales person in charge; Clean up.

7.3 Maintenance

All equipment and components have a service life. Proper maintenance can ensure that the service life is extended, but it cannot solve the damage of the equipment and components. Please replace the devices that have reached or are about to reach the end of their service life as required.

Note: Do not perform wiring, inspection or repair operations while the power is on. Before starting work, be sure to switch off the power of all machines. After the power is switch off, there is still residual voltage in the capacitor inside the drive. It is necessary to confirm that the main circuit voltage has fallen to a safe level, and wait 5 minutes before performing related operations to avoid personal accidents.

Name	Life
Fan	2~3 years
Electrolytic capacitor	4~5 years
Printed circuit board	8~10 years

7.4 Replacing Cooling Fan

When replacing the cooling fan, please use the original fan. To purchase the original fan, please contact the agent where you purchased the product or the sales department of our company. There are several models equipped with multiple cooling fans in the AC drive. In order to maximize the service life of the product, all fans need to be replaced at the same time.

Replacement of other devices requires maintenance techniques and product knowledge, and replacement must be strictly tested before it is put into use, so we do not recommend users to replace other internal devices. If replacement is indeed necessary, please contact the agent from whom you purchased the product or our sales department.

Note: Do not perform wiring, inspection or repair operations while the power is on. Before starting work, be sure to switch off the power of all machines. After the power is switch off, there is still residual voltage in the capacitor inside

the drive. It is necessary to confirm that the main circuit voltage has fallen to a safe level, and wait 5 minutes before performing related operations to avoid personal accidents.

7.5 Replacing AC Drive

Note: Do not perform wiring, inspection or repair operations while the power is on. Before starting work, be sure to switch off the power of all machines. After the power is switch off, there is still residual voltage in the capacitor inside the drive. It is necessary to confirm that the main circuit voltage has fallen to a safe level, and wait 5 minutes before performing related operations to avoid personal accidents. Non-electrical construction professionals are not allowed to perform wiring, installation, inspection, maintenance, component replacement or repair operations, otherwise there is a danger of electric shock.

Note: When operating the AC drive or disassembling the printed circuit board, follow the procedures specified in the electro-static discharge (ESD). Wrong operation may damage the circuits inside the AC drive due to static electricity.

Precautions when wiring the main circuit terminal block

Please use copper wire. Wires other than copper wires, such as aluminum wires, cannot be used.

Please be careful not to allow foreign objects to enter the wiring parts of the terminal block.

Please strip the cladding of the wire end according to the bare wire length specified in this manual.

Do not use wires that are bent or squeezed. Cut the end of the wire that was bent and deformed due to the connection before using it.

Do not solder when using stranded core wire.

When using twisted core wire, please do not make wire whiskers appear at the connection. Do not twist the stranded core wire excessively.

The wires must be inserted deeply into the terminal block. After stripping the wire end coating to the specified length, the coating can enter the resin protection hole.

The tightening torque of each terminal is different. Please tighten the screws according to the specified tightening torque. Please tighten the terminal screws according to the torque in this manual.

Please use tools such as torque wrenches that match the screws. The connection of screw-type terminals requires the use of flat-head or hexagonal tools. Please refer to the recommended condition described in this manual to select tools.

When using an electric screwdriver, please pay attention to tightening at a low speed of 300r/min~400r/min.

Wiring tools can also be purchased from our company. For details, please contact our agent or sales person in charge.

When replacing the old product with this product, the size of some of the wires in use may exceed the allowable range. Regarding the size of the wire, please consult our company’s agent or sales person in charge.

When tightening the terminal screws, do not tilt more than 5°.

When tightening the slotted screw, be sure to insert the screwdriver vertically into the slotted slot of the screw, and the bit should not go out of the slot.

After wiring, gently pull the wire to confirm whether it will fall off.

Please cut only the wire cover at the terminal to be wired.

The screws of the terminal block should be re-tightened regularly according to the specified tightening torque.

If external force may be applied to the wiring, please use a clamp to increase the strength of the wiring.

7.6 Storage Instructions

Drives, like other electronic products, use electrolytic capacitors that are prone to chemical reactions, as well as

tiny electronic parts. For long-term storage, in order to ensure service life and reliability, please observe the following precautions:

◆ **Storage sites**

Ambient temperature and humidity: Please keep it in a place where the temperature is-30°C~+60°C, below 95%RH, there will be no condensation and ice, and no direct sunlight.

During transportation, please pack the AC drive and keep it properly to avoid vibration or impact.

Dust and oil mist: Do not store in the environment where there is a lot of dust and oil mist, such as cement factories and textile factories.

Corrosive gas: Do not store it in places where corrosive gas may be generated, such as chemical plants, oil refineries, or sewage treatment plants.

Salt erosion: Do not store it in salt-eroded places such as near the coast, especially in certain salt-eroded areas.

In addition, please do not store it in other harsh environments, but should be stored in warehouses, offices, etc. that are not affected by the above factors.

◆ **Regularly power-on**

In order to prevent the capacitors from deteriorating, please energize them for at least 30 minutes per year.

If there is no power on for more than two years, please use the adjustable power supply to slowly increase the voltage from 0V to the rated voltage of the AC drive within 2 minutes to 3 minutes, and then activate the main circuit electrolytic capacitor (no-load power on for more than 1 hour). In the subsequent operation, please perform normal wiring and confirm that there is no abnormality of the AC drive, overcurrent, motor vibration, speed change, etc. during operation.

Chapter 8 End-Of-Life Disposal

8.1 Safety Precautions

DANGER

To prevent electric shock

- **Do not perform wiring, inspection or repair work while the power is on.** Before starting work, be sure to switch off the power of all machines. After the power is switch off, there is still residual voltage in the capacitor inside the drive. It is necessary to confirm that the main circuit voltage has fallen to a safe level, and wait 5 minutes before performing related operations. I Personal accidents may result if care is not taken.
- During the operation of the drive, please do not change the wiring, remove the wiring and option cards, or replace the cooling fan.
- And when use it to drive a motor, even if the power to the AC drive is switched off, an induced voltage will be generated on the motor terminals during motor rotation, so wait until the motor cord is disconnected or confirm that the motor is no longer rotating before performing the above operation. There is a risk of electric shock if operated incorrectly.

WARNING

To prevent electric shock

- Do not operate with the drive cover removed, otherwise there will be a risk of electric shock.
- Be sure to operate the AC drive in accordance with the instruction manual with the specified cover or masking installed.
- Be sure to ground the ground terminals on the motor side, otherwise electric shock may result from human contact with the motor case.
- Non-electrical construction professionals are not allowed to perform wiring, installation, inspection, maintenance, component replacement or repair operations, otherwise there is a danger of electric shock.
- If you are wearing loose clothing or accessories, do not work on the drive. Please take off metal objects such as watches and rings and replace with suitable clothes before work, otherwise there will be a risk of electric shock.

To prevent fire

- Please tighten the terminal screws according to the torque in this manual. Insufficient torque may lead to fire due to overheat on the connection parts.
- If the tightening torque exceeds the specified tightening torque, it may cause malfunction of the device, damage to the terminal blocks, or cause a fire.
- Ensure to use the correct voltage of the main circuit power supply. Before energizing, please confirm whether the rated voltage of the AC drive is consistent with the power supply voltage. If the main circuit power supply voltage is used incorrectly, there is a danger of fire.
- Do not keep any flammable materials close to or attached to the AC drive. Please install the drive on a flame-retardant object such as metal. Otherwise, there will be a risk of fire.

CAUTION

- The heat sink of the drive will generate high temperature, so do not touch it.
- When operating the AC drive, follow the procedures specified in the electro-static discharge (ESD). Wrong operation may damage the circuits inside the AC drive due to static electricity.
- Please do not change the circuit, otherwise it will cause damage to the product. And the repair cost caused by this is not covered by our warranty.
- After completing the wiring of the drive and other machines, please make sure that all of the wirings are correct. If not, it may cause damage to the product.
- Please confirm the direction of rotation when the motor is under no load. Wrong direction may cause personal

injury or property damage.

- Do not operate on a damaged drive. If there are obviously damaged or missing parts, please do not connect or operate it to avoid accidents.

8.2 Disposal Related Precautions

Disposal of products and components should be carried out in accordance with local regulations and the relevant laws or regulations of each country or region.

1) Main body of the AC drive.

2) Packaging materials.

3) Expansion card.

Note! In order to prevent injury, please dispose it properly after powering off and discharging to prevent safety accidents.

Chapter 9 External Equipment and Options

9.1 Safety Precautions

When using external equipment and options, please comply with the following safety precautions and related requirements.

DANGER	Do not carry out work with the power supply on, as there is a risk of electric shock and death. Do not perform wiring work while the power is on, as there is a risk of death by electric shock. Before performing wiring, inspection, maintenance, etc., disconnect the power supply to all associated equipment and make sure that the DC voltage in the main circuit has dropped to a safe level for 5 minutes.
WARNING	Do not operate with the drive cover removed, otherwise there will be a risk of electric shock. Do not remove the outer cover of the product or touch the printed circuit board when the power is on. This product, external equipment and optional parts must be installed, commissioned and maintained by professional personnel, otherwise it may lead to danger. When performing installation, commissioning, maintenance, etc., please do not wear loose clothing and use relevant protective tools and protection measures. During the operation of the AC drive, please do not change the wiring, remove the jumper, option card, or replace the cooling fan, otherwise there will be a risk of electric shock. Please tighten the terminal screws according to the specified torque. If the connection of the main circuit wire is loose, it may cause a fire due to overheating of the wire connection. This product, external equipment and options must be reliably grounded to prevent damage to the human body due to leakage and induced electric potential.
NOTICE	Please follow the measures and methods specified in ESD prevention measures during operation on the AC drive, otherwise it may be damaged. Do not switch off the power supply while the AC drive is outputting voltage, otherwise it will be damaged.

9.2 External Equipment

Commonly used external devices are shown in the following table. For the order of external equipment, please consult our company's agent or sales department.

External Device Name		Purpose
	Breaker	In the event of a short-circuit accident, it protects the power supply system, prevents the extension of the fault from affecting the operation of other normal equipment, and plays a role in overload protection.
	Leakage circuit breaker	Grounding protection to prevent electric shock accidents (recommended to use to prevent high-frequency leakage current).
	Electromagnetic contactor	Separate the power supply and the AC drive, and realize the basic relay control.
	AC input reactor	Improve the power factor of the power supply side and isolate the interference of the noise signal on the power supply side to the drive.

	DC reactor	Suppress high-order harmonics and improve the power factor of the power supply.
	Input side noise filter	Reduce the drive's interference to the power supply, while effectively reducing the interference from the power grid.
	Braking resistor	Passive energy consumption unit for electric braking.
	Dynamic braking unit	The electric brake control unit is used to control the brake resistor to effectively consume the regenerative electric energy of the motor.
	Output side noise filter	Reduces electromagnetic interference from the wires on the output side of the drive.
	Backup system	Backup control system when the drive fails.
	Thermal relay	Protect the motor in case of overload.
	Zero-phase reactor	Reduce the electromagnetic induction interference of the AC drive (applicable to either side of the input side and output side).
	Main circuit surge absorption unit	Suppress the surge voltage generated during the operation of the main circuit switching device.
	Coil surge absorption unit	Suppress the surge voltage generated during the operation of the AC contactor.

9.3 Use of External Equipment

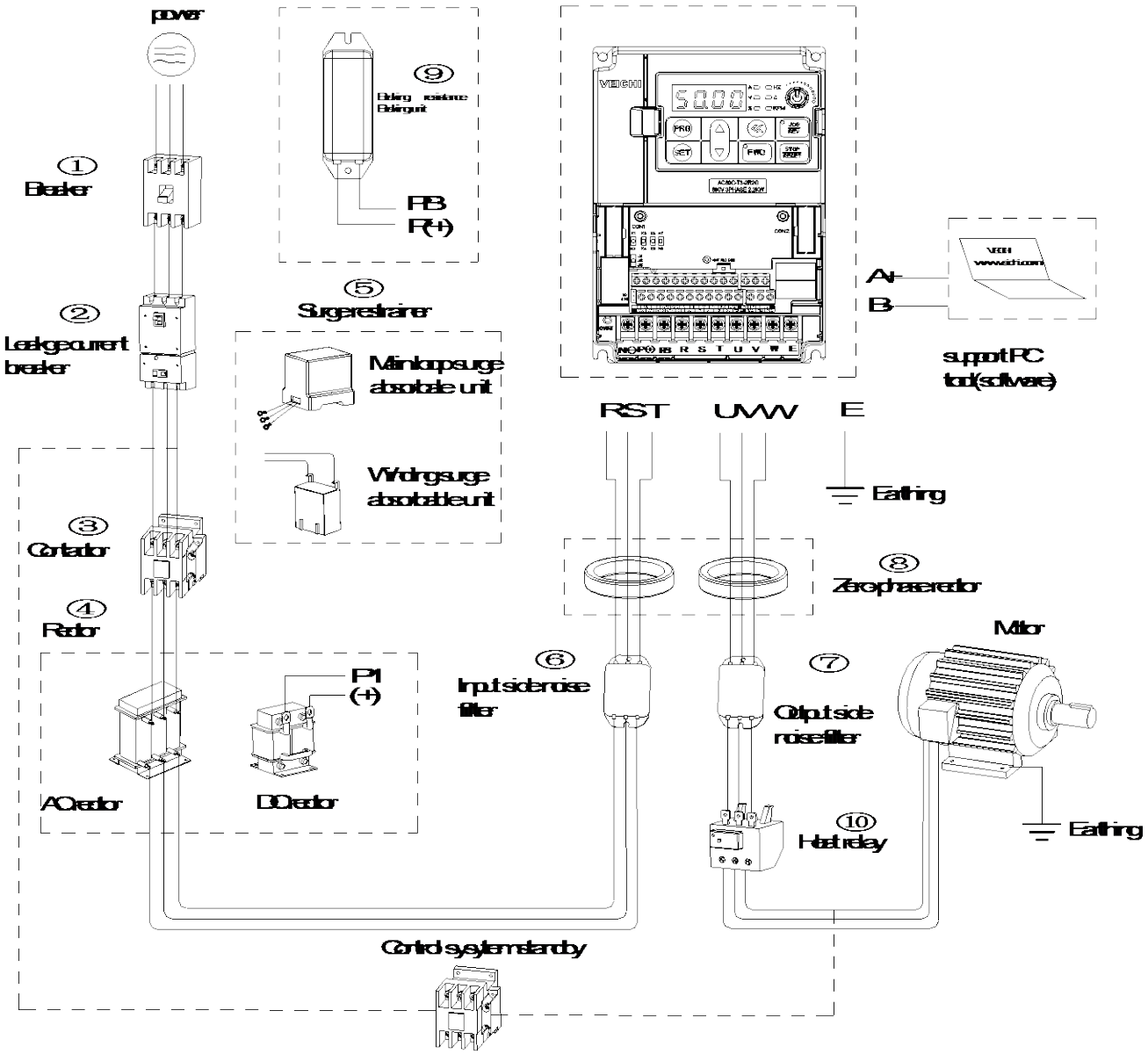


Figure 9-1 External Equipment

Note:

Circuit breaker for wiring

In the event of a short-circuit accident, it protects the power supply system, prevents the extension of the fault from affecting the operation of other normal equipment, and plays a role in overload protection. Be sure to use a circuit breaker for wiring between the power supply and the main circuit power input terminals R, S,T.

CAUTION : When selecting the circuit breaker, its capacity should be roughly equal to 1.5 to 2 times the rated output current of the AC drive. When selecting, please compare the time characteristics of the circuit breaker with the time characteristics of the drive protection (150% of the rated output current, 1 minute) to ensure no false trips.

WARNING :Before wiring the main circuit terminals, please switch off the circuit breaker and electromagnetic contactor, otherwise there will be a risk of electric shock.

Leakage circuit breaker

Since the output of the drive is a square wave with high-speed switching of peak voltage, high-frequency leakage current will be generated. In order to implement grounding protection to prevent electric shock accidents and induced leakage fires, install a leakage circuit breaker. Generally, one drive generates a leakage current of about 100mA (when the power cable length is 1m), each extension of the power cable by 1m, the leakage current will increase about 5mA. Therefore, the circuit breaker used on the input side of power supply should be a leakage circuit breaker specially

designed for high-frequency leakage current. The high-frequency leakage current can be removed by a special circuit breaker, and only the frequency band leakage current that is harmful to the human body can be detected. The factors that affect the leakage current are as follows: the capacity of the drive, the carrier frequency, the type of the motor cable and the length of the wiring.

EMI/RFI filter

In order to protect the operator and product, please select a leakage circuit breaker that can use both AC and DC power supplies and can handle high-frequency leakage current. On each AC drive, a leakage circuit breaker with a sensitivity current of more than 200mA should be selected and installed. Depending on the output waveform of the AC drive, the high-frequency leakage current may increase, which may cause the leakage circuit breaker to malfunction.

In this case, please take the following measures:

1. Increase the induced current of the leakage circuit breaker.
2. Reduce the carrier frequency of the AC drive.

Electromagnetic contactor

The electromagnetic contactor is an external device installed to effectively separate the power supply from the drive. When the drive protection function is valid or an emergency stop operation is performed, the main circuit power supply can be disconnected through the external controller. Do not connect the electromagnetic switch or electromagnetic contactor to the output circuit of the AC drive, otherwise the drive may be damaged. After an instantaneous power failure occurs during operation, the power supply is restored. If it is necessary to prevent the drive from automatically re-running, install a control electromagnetic contactor on the input side.

AC reactor and DC reactor

In order to suppress sharp current changes and high-order harmonic currents, AC input reactors and DC reactors are required. Suppressing high-order harmonic currents will also improve the power factor on the input side. In the following situations, an AC input reactor or a DC reactor must be used (the effect of using an AC input reactor and a DC reactor at the same time is more significant).

1. Suppress high-order harmonics and improve the power factor of the power supply;
2. When the phase-in capacitor needs to be switched;
3. When connecting the AC drive to a large-capacity power transformer (above 600kVA);
4. When a thyristor converter such as a DC motor driver is connected to the same power supply system.

If the user has higher suppression requirements for other harmonics, please connect an external DC reactor. Before connecting an external DC reactor, be sure to remove the short link between the P1 and (+) terminals of the drive.

Surge suppressor

Depending on the location of use, surge suppressors can be classified as coil surge suppressors and main circuit surge suppressors. Please select the appropriate surge suppressor for the application. The purpose of installing a surge suppressor is to suppress the surge voltage generated when the switching components of the inductive load (electromagnetic contactor, electromagnetic relay, electromagnetic valve, electromagnetic coil, electromagnetic brake, etc.) connected around the drive. Do not connect the surge suppressor to the output side of the AC drive, otherwise the AC drive will be damaged.

Input side noise filter

Since the rectifier bridge of the drive is uncontrollable, the current on the input side is a discontinuous pulse current, so the noise signal generated by the harmonic current flows into the power line from the AC drive, which may adversely affect surrounding equipment (radios, phones, non-contact switches, sensors). At this time, it is recommended to install a noise filter on the input side to reduce the noise flowing into the power line. In addition, the noise filter can also attenuate the noise entering the drive from the power line.

：Please use the noise filter dedicated to the AC drive, and try to shorten the connection length between the noise filter and the AC drive.

Output side noise filter

Since the output of the AC drive is a square wave with high-speed switching of peak voltage, there is high-speed dv/dt conversion on the output cable. This high-speed dv/dt conversion will generate a lot of radio interference and induced interference signals. By installing a noise filter on the output side of the AC drive, the effects of radio interference and inductive interference can be effectively mitigated. Do not connect the phase-in capacitor and the noise filter with capacitor to the output circuit, otherwise the drive will be damaged.

Zero-phase reactor

The zero-phase reactor is used to reduce the electromagnetic induction interference of the AC drive suitable for the input side and output side of the drive. It is equivalent to a three-phase common-mode inductor. In actual use, according to the actual magnetic core size and cable specifications, it is best to ensure the winding ratio of 3 to 5 turns in order to maximize the role of the zero-phase reactor.

Braking resistor or braking unit

For details on the consumption units for regenerative energy, see Chapter 3, Section 8, "Braking Resistor Setting".

Thermal relay

Install a thermal relay on the output side of the AC drive. When the motor enters an overload state, the thermal relay will switch off the power source of the motor to protect it. When using one AC drive for one motor, there is no need to install a thermal relay. In this case, the overload protection is performed by the motor overload protection curve coefficient [F10.59]. If one AC drive works for multiple motors or when the motor is directly operated by grid power, please install a thermal relay between the drive and the motor. When installing the thermal relay, please design to switch off the sequence control circuit of the electromagnetic contactor (MC) on the main circuit input side through the contact of the thermal relay or input the action of the thermal relay as an external fault into the drive. When installing a thermal relay, please pay attention to the following items to avoid malfunction of the thermal relay or overheating of the motor during low-speed operation.

1. When running at low speed
2. When one drive works for multiple motors
3. When the motor cable is too long
4. When the fault is detected due to the high carrier frequency
5. Low speed operation and thermal relay

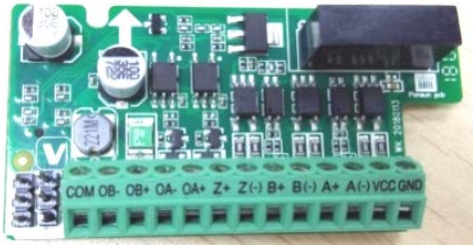
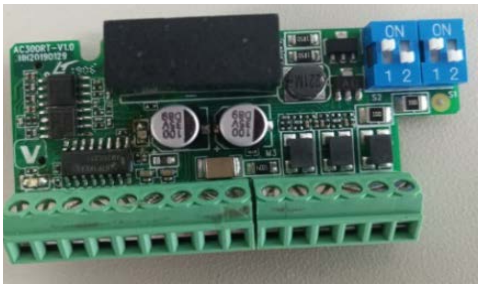
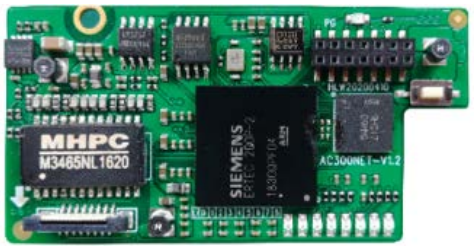
In general, thermal relays are suitable for general-purpose motors. When running a general-purpose motor (standard motor) with the AC drive, the motor current will increase by 5% to 10% compared to when running with a commercial power supply. In addition, during low-speed operation, even if the motor is operated within the rated current range of the motor, the cooling capacity of the fan driven by the motor shaft will decrease, which may cause the motor to overheat. Therefore, please try to set the motor overload protection parameter [F10.55~F10.59] function in the drive to a reasonable value.

When the motor cable is very long

When the wiring of the motor cable is very long and the carrier frequency is high, the thermal relay may be faulty due to the leakage current. To avoid this, reduce the carrier frequency or set a higher detection value for the thermal relay operation. Before increasing the action detection value of the thermal relay, be sure to confirm whether there are other causes to motor overload, otherwise it may be dangerous.

9.4 Installation and Wiring of Option Cards

Option card model:

Photo	Model	Description
	**AC300-PG01 (5V)** Differential PG	5V differential signal input, 500kHz max, with input signal disconnection detection.
	AC300-PG01 (12V) Differential PG	12V differential signal or OC signal input, 500kHz max, with input signal disconnection detection.
	**AC300RT1** Card	4 different ratios of 0.219, 0.286, 0.5, 0.58, factory default ratio 0.5.
	**AC300CAN1**	CANopen communication
	**AC300DP01**	Profibus communication
	**AC300PN**	PROFINET communication

	**KBD300-25** Dual-line keyboard	Dual-line external five-digit display keyboard, silicone buttons, digital potentiometer.
	**KBD300-L1** LCD keyboard	User-friendly HMI
	**GPRS-AC300**	Equipment positioning and maintenance, real-time monitoring, data collection.

Note: Expansion cards are not allowed to be plugged or unplugged with power-on.

9.4.1 AC300CAN1

AC300CAN1 communication card is specially configured for our CH310 series machines. The CAN bus port is fully compliant with ISO/DIS11898 standard to realize CAN communication between multiple AC drives. The AC drive can be connected to the high-speed CAN communication network for field bus control. Before using the AC300CAN1 communication card, please read the AC300CAN1 communication card manual carefully.

The connection port of the AC300CAN1 communication card adopts terminal wiring, and it can be installed on the EX-A extension port and EX-B extension port of the AC drive.

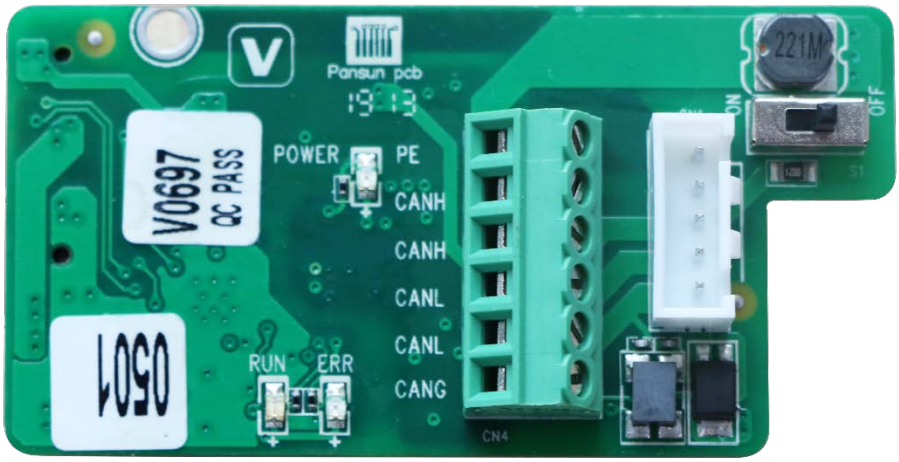


Figure 9-2 Front View of AC300CAN1

Terminal

The 6-pin European terminal is used as the port to connect to the CAN bus with number CN4, located on the front of the communication card, which greatly facilitates the parallel connection of customers (CANH, CANL can realize one input and one output). The pin diagram and function table are as follows:

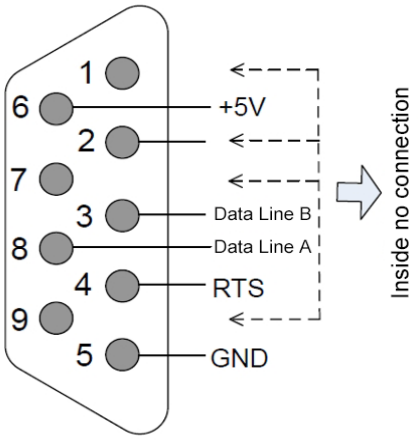
Table 9.1 Port Description

CN4 Serial Port Function		
Pin No.	**Name**	**Function**
1	PE	Ground terminal of the cable shielding layer.
2	CANH	Connect the positive terminal of the CAN bus.
3	CANH	Connect the positive terminal of the CAN bus.
4	CANL	Connect the negative terminal of the CAN bus.
5	CANL	Connect the negative terminal of the CAN bus.
6	CANG	Connect the CAN bus signal reference ground.

9.4.2 AC300DP01

AC300DP01 is suitable for CH310 hoisting special drive to realize the control of fieldbus; It adopts standard DB9 type socket to connect with Profibus master station. Please read AC300 Profibus-DP card manual carefully before using it.

This is shown in the figure below:



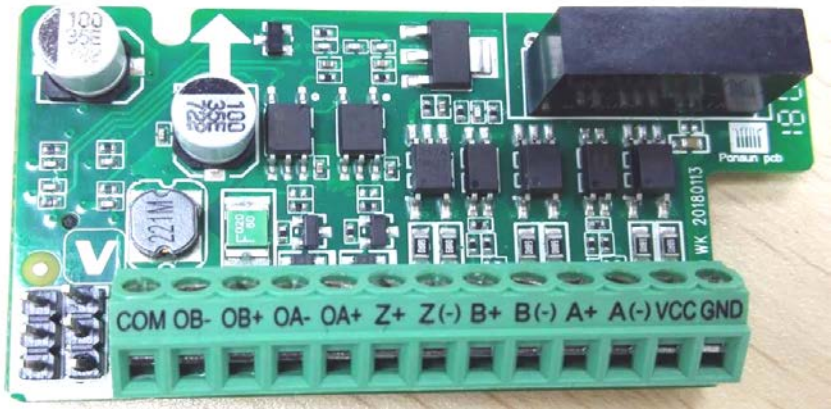
Profibus DB9 terminals are described below:

Mark	Name	Description
1, 2, 7, 9	NC	Suspended inside
3	Data cable B	Data cable positive
4	RTS	Sending signal request
5	GND	Isolate the 5V power ground.
6	+5V	Isolate the 5 V power supply.
8	Data cable A	Data cable negative

9.4.3 AC300PG01

AC300-PG01 is a PG feedback extension card that can be used for CH310 full series AC drives with differential frequency input of 500 kHz max. It supports two output modes: differential and transistor open collector. The AC300-PG01 extension card can only be installed in the EX-B extension port. Please read the "AC300-PG01 Expansion Card Manual" carefully before using.

AC300-PG01 expansion card terminals are arranged as follows:



Functional description of signal terminals

Definition	Name	Description
Encoder signal and power supply terminal	A+, A-	Encoder phase A feedback input signal.
	B+, B-	Encoder phase B feedback input signal.

	Z+, Z-	Encoder phase Z feedback input signal.
	VCC	Encoder power supply +, + 5V.
	GND	Encoder power supply-, 0V.
PG signal output terminal	OA+, OA-	PG card phase A signal output (differential, OC).
	OB+, OB-	PG card phase B signal output (differential, OC).
	COM	Reference ground for OC signal output.

Encoder wiring instructions

1、 When a PNP-type OC encoder is used, the encoder signal is connected to the push-button terminals (A+, B+, and Z+), as shown in Figure 9-3.

2、 When an NPN-type OC encoder is used, the encoder signal is connected to the push-button terminals (A-, B-, and Z-), as shown in Figure 9-4.

3、 When using differential or complementary push-pull output encoders, connect the corresponding signal wires directly to the PG card terminals, see Figure 9-5 for details.

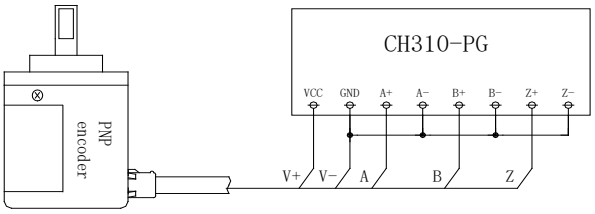


Figure 9-3 Wiring of PNP-type OC Encoder

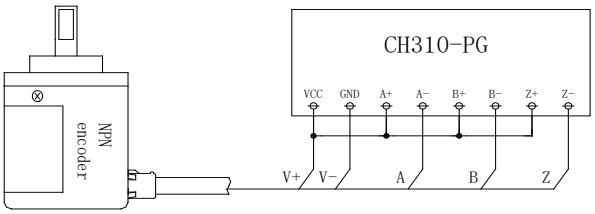


Figure 9-4 Wiring of NPN-type OC Encoder

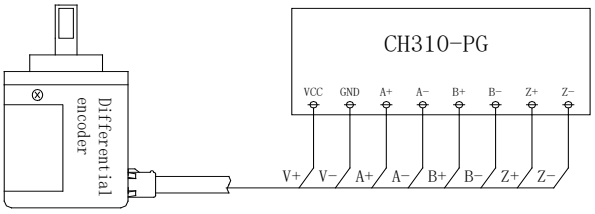


Figure 9-5 Wiring of Differential or Complementary Push-Pull Encoder

9.4.4 AC300RT1

The AC300RT1 is a kind of rotary transformer-specific PG card for CH310 series AC drives. It can only be installed onto the EX-B extension port. Please read AC300RT1-PG card manual carefully before using it.

The terminals of AC300RT1 are arranged as follows. Dial the S4 to right side (for CH310).

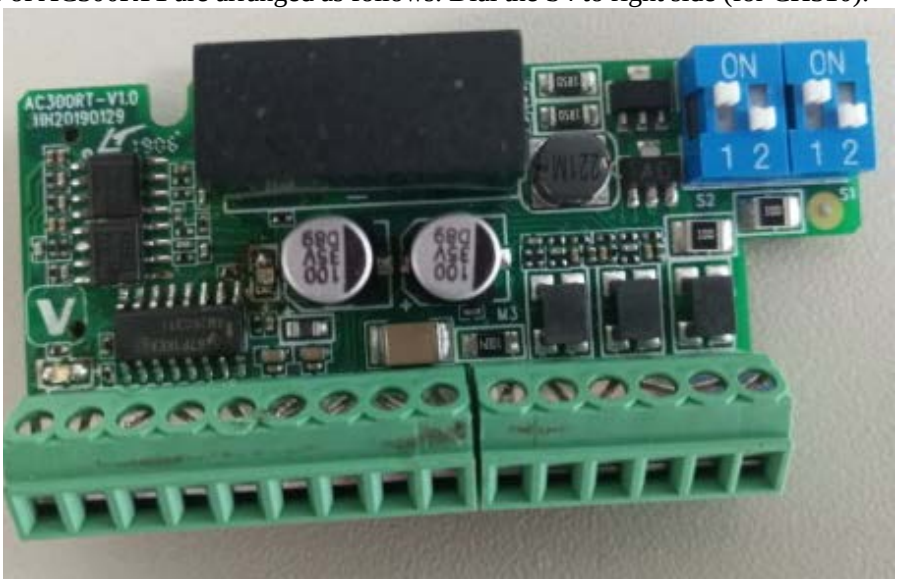


Figure 9-6 Front View of AC300RT1

Terminal wiring description

There are two European terminals (9-pin and 6-pin) on the resolver, with position numbers of M5 and M3 respectively and spacing of 3.5 mm. The terminal signals are defined as follows:

6-Pin European Terminal			9-Pin European Terminal		
Pin No.	**Name**	**Description**	**Pin No.**	**Name**	**Description**
1	SIN+	Sine feedback signal positive.	1	PA+	Crossover output signal A positive.
2	SIN-	Sine feedback signal negative.	2	PA-	Crossover output signal A negative.
3	COS+	Cos feedback signal positive.	3	PB+	Crossover output signal B positive.
4	COS-	Cos feedback signal negative.	4	PB-	Crossover output signal B negative.
5	EXC+	Excitation output signal positive.	5	PZ+	Crossover output signal Z positive.
6	EXC-	Excitation output signal negative.	6	PZ-	Crossover output signal Z negative.
-	-	-	7	DIR+	Crossover output direction signal positive.
-	-	-	8	DIR-	Crossover output direction signal negative.
-	-	-	9	PE	Ground terminal of the cable shielding layer.

Chapter 10 Parameter List

10.1 Safety Precautions

DANGER
Please pay attention to all information in this book regarding safety.
Please note that failure to observe the warnings may result in death or serious injuries. VEICHI will not be held liable for injuries and equipment damage caused by your company or your customers' failure to comply with the contents of this book.

10.2 Parameter List Reading Method

◆Icons and terminology of control modes

Mark	Content
V/F	Valid parameters under AM V/F control.
SVC	Valid parameters under AM open-loop vector control.
FVC	Valid parameters under AM closed-loop vector control.
PMVF	Valid parameters under PM V/F control.
PMSVC	Valid parameters under PM open-loop vector control.
PMFVC	Valid parameters under PM closed-loop vector control.

Note: The unshaded control mode icon indicates that the parameter is invalid for that control mode.

10.3 Parameter Group

10.3.1 Types of Parameters

Parameter		Name
F00 Environmental Applications	F00.0x	Environment setting.
	F00.1x	Common parameters.
F01 Basic Settings	F01.0x	Basic command.
	F01.1x	Frequency command.
	F01.2x~F01.3x	Acceleration/deceleration time.
	F01.4x	PWM control.
F02 Motor 1 Parameter	F02.0x	Basic motor parameters and auto-tuning.
	F02.1x	Advanced AM parameters.
	F02.2x	Advanced PM parameters.
	F02.3x~F02.4x	Encoder parameters.
	F02.5x	Motor application parameters.
F03 Vector Control	F03.0x	Velocity loop.
	F03.1x	Current loop and torque limit.
	F03.2x	Torque optimization control.
	F03.3x	Flux optimization.
	F03.4x~F03.5x	Torque control.
	F03.6x	PM high-frequency injection.
	F03.7x	Position compensation.
	F03.8x	Expansion control.
F04 V/F Control	F04.0x	V/F control.
	F04.1x	User-defined V/F curves.
F05 Input Terminal	F05.0x	DI terminal function.
	F05.1x	DI terminal detection delay.
	F05.2x	Digit input terminal action.
	F05.4x	Analog type processing.
	F05.5x	Analog linearity processing.
	F05.6x	AI Curve 1 processing.
	F05.7x	AI Curve 2 processing.
	F05.8x	AI as DI terminal.

F06 Output Terminal	F06.0x	AO(analog, frequency).
	F06.1x	Expansion AO.
	F06.2x~F06.3x	Digital, relay output.
	F06.4x	Frequency detection.
F07 Operation Control	F07.0x	Start control.
	F07.1x	Stop control.
	F07.2x	DC brake and speed tracking.
	F07.3x	Jogging.
	F07.4x	Start /stop frequency holding and jump.
F10 Protection Parameter Group	F10.0x	Current protection.
	F10.1x	Voltage protection.
	F10.2x	Auxiliary protection.
	F10.3x	Load protection.
	F10.4x	Stall protection.
	F10.5x	Fault recovery and motor overload protection.
F11 Keyboard Parameter	F11.0x	Key operation.
	F11.1x	Cyclic monitoring of status interface.
	F11.2x	Monitoring parameter control.
F12 Communication Parameter	F12.0x	Modbus slave parameter.
	F12.1x	Modbus master parameter.
	F12.2x	Modbus special function.
	F12.3x	PROFIBUS-DP communication.
	F12.4x	CAN communication.
	F12.5x	Expansion port EX_A, EX_B communication.
F14 Multi-step speed Control	F14.00~F14.14	Multi-step speed frequency setting.
F27 Lifting-specific control	F27.00~F27.65	Lifting-specific functions.
Monitoring parameters	C00.xx	Basic monitoring.
	C01.xx	Fault monitoring.
	C02.xx	App monitoring.
	C03.xx	Maintenance monitoring.
Communications Variable Group	Modbus basic communication group	Communication addresses: 0x3000~0x301F, 0x2000~0x201F.
	Optional card basic communication group	Communication addresses: 0x3100~0x311F.
	I/O port parameter group	Communication addresses: 0x3400~0x341F.
	Cache register parameter group	Communication addresses: 0x3500~0x350F.
	Expansion Fault and Power-Down Save Parameter Group	Communication addresses: 0x3600~0x361F.

10.3.2 Product Parameter Properties

The following table describes the adjustable attributes of the parameters.

Property	Description
STOP	"○": the parameter can't be modified when AC drive is operating.
RUN	"●": the parameter can be modified when AC drive is operating.
READ	This parameter is read-only.

10.4 Group F00: Environmental Applications

F00.0x: Environment Setting

Code (Address)	Name	Content	Factory	Property
F00.00 (0x0000)	Parameter Access Level	**V/F SVC FVC PMVF PMSVC PMFVC** Set the parameter access level according to access restriction. 0: Standard parameter (Fxx.yyy, Cxx.yyy) 1: Common parameter (F00.00, Pxx.yyy) 2: Monitoring parameter (F00.00, Cxx.yyy) 3: Modified parameter (F00.00, Hxx.yy) Range: (0~3)	0	RUN
F00.02 (0x0002)	Reserved			
F00.03 (0x0003)	Initialization	**V/F SVC FVC PMVF PMSVC PMFVC** Set the drive initialization mode. 0: Initialization off 11: Set parameters according to actual needs (motor parameters are not included) 22: All parameters initialized 33: Clear fault records Range: (0~33)	0	STOP
F00.04 (0x0004)	Keyboard Parameter Copy	**V/F SVC FVC PMVF PMSVC PMFVC** 0: None 11: Upload parameters to keyboard 22: Download parameters to the drive Range: (0~30)	0	STOP
F00.05 (0x0005)	Reserved			
F00.06 (0x0006)	Reserved			
F00.07 (0x0007)	Free Parameter 1	**V/F SVC FVC PMVF PMSVC PMFVC** As the machine number when multiple machines are used. As the mode number for each application when multiple machines are used. Range: (0~65535)	0	RUN
F00.08 (0x0008)	Free Parameter 2	**V/F SVC FVC PMVF PMSVC PMFVC** As the machine number when multiple machines are used. As the mode number for each application when multiple machines are used. Range: (0~65535)	0	RUN

F00.09 (0x0009)	Mode Selection	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Application mode 1: Debugging mode **Note:** In the debugging mode, all limits, output phase loss protection, and holding current detection are shielded, which is convenient for users to debug new equipment. This parameter is automatically cleared after re-powering. Range: (0~1)	0	STOP

10.5 Group F01: Basic Settings

F01.0x: Basic Command

Code (Address)	Name	Content	Factory	Property
F01.00 (0x0100)	Motor Control Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Set the motor control mode. AM: 0: AM-V/F, V/F control 1: AM-SVC, Open loop vector control, current closed loop control 2: AM-FVC, Close-loop vector control PM: 10: PM-V/F, V/F control 11: PM-SVC, Close-loop vector control 12: PM-FVC, Close-loop vector control POWER: 20: The V/F split function only supports for T3 motor (7.5kW and above) and T2 motor (5.5kW and above). Range: (0~20)	1	STOP
F01.01 (0x0101)	Command Channel	**V/F SVC FVC PMVF PMSVC PMFVC** Used to select the channel on which the drive receives run/stop commands and the direction of operation. 0: Keyboard controlled (external keyboard first) 1: Terminal controlled 2: RS485 communication controlled 3: Optional card Range: (0~3)	1	RUN

<table>
<tr><td>F01.02
(0x0102)</td><td>Frequency Source A</td><td>V/F SVC FVC PMVF PMSVC PMFVC
Set frequency giving source.<table><tr><td>0: Via keyboard</td><td>1: Via keyboard potentiometer on an external single-line keyboard</td></tr><tr><td>2: Via AI1 current/voltage analog</td><td>3: Via AI2 current/voltage analog</td></tr><tr><td>4~5: reserved</td><td>6: Via RS485 communication</td></tr><tr><td>7: Via terminal UP/DW control</td><td>8~9: Reserved</td></tr><tr><td>10: Via optional card</td><td>11: Via multi-step speed frequency setting</td></tr></table>Range: (0~11)</td><td>0</td><td>RUN</td></tr>
<tr><td>F01.03
(0x0103)</td><td>Frequency Source A Gain</td><td>V/F SVC FVC PMVF PMSVC PMFVC
Set gain of channel A.
Range: (0.0%~500.0%)</td><td>100.0%</td><td>STOP</td></tr>
<tr><td>F01.04
(0x0104)</td><td>Frequency Source B</td><td>V/F SVC FVC PMVF PMSVC PMFVC
Set frequency giving source.
The same as [F01.02]
Range: (0~11)</td><td>2</td><td>RUN</td></tr>
<tr><td>F01.05
(0x0105)</td><td>Frequency Source B Gain</td><td>V/F SVC FVC PMVF PMSVC PMFVC
Set the gain of channel B
Range: (0.0%~500.0%)</td><td>100.0%</td><td>STOP</td></tr>
<tr><td>F01.06
(0x0106)</td><td>Reference of Source B</td><td>V/F SVC FVC PMVF PMSVC PMFVC
The reference source for frequency channel B is selected by this parameter.<table><tr><td>0: Max. output frequency as reference source</td><td>1: Given frequency from channel A as reference source</td></tr></table>Range: (0~1)</td><td>0</td><td>RUN</td></tr>
<tr><td>F01.07
(0x0107)</td><td>Frequency Source</td><td>V/F SVC FVC PMVF PMSVC PMFVC
Used to select the combination method of frequency channel A and channel B of the drive.<table><tr><td>0: Source A</td><td>1: Source B</td></tr><tr><td>2: Source A + Source B</td><td>3: Source A-Source B</td></tr><tr><td>4: Max (A, B)</td><td>5: Min (A, B)</td></tr></table>Range: (0~5)</td><td>0</td><td>RUN</td></tr>
</table>

<table>
<tr><td>F01.08
(0x0108)</td><td>Frequency Binding Command</td><td>V/F SVC FVC PMVF PMSVC PMFVC
Used to bind each command channel to frequency sources when this parameter is valid.
Ones-bit: Bind via keyboard
Tens-bit: Bind via terminal
Hundreds-bit: Bind via communication
Thousands-bit: Bind via optional cards
<table><tr><td>0: No binding</td><td>1: Via keyboard</td></tr><tr><td>2: Via keyboard potentiometer on an external single-line keyboard</td><td>3: Via AI1 current/voltage analog</td></tr><tr><td>4: Via AI2 current/voltage analog</td><td>5~6: Reserved</td></tr><tr><td>7: Via communication</td><td>8: Via terminal UP/DW control</td></tr><tr><td>9~A: Reserved</td><td>B: Via optional cards</td></tr><tr><td>C: Via multi-step speed frequency</td><td>-</td></tr></table>Range: (0x0000~0xDDDD)</td><td>0x0000</td><td>RUN</td></tr>
<tr><td>F01.09
(0x0109)</td><td>Give Frequency via Keyboard</td><td>V/F SVC FVC PMVF PMSVC PMFVC
Used to set and modify the frequency of via keyboard digits.
Range:(0.00Hz ~Upper limit frequency)</td><td>15.00Hz</td><td>RUN</td></tr>
</table>

F01.1x: Frequency Command

<table>
<tr><th>Code (Address)</th><th>Name</th><th>Content</th><th>Factory</th><th>Property</th></tr>
<tr><td>F01.10
(0x010A)</td><td>Max. Frequency</td><td>V/F SVC FVC PMVF PMSVC PMFVC
Set the maximum frequency for the drive.
Range: (Upper limit frequency~500.00Hz)</td><td>100.00 Hz</td><td>STOP</td></tr>
<tr><td>F01.11
(0x010B)</td><td>Upper Limit Frequency</td><td>V/F SVC FVC PMVF PMSVC PMFVC
Select the upper limit frequency source.
<table><tr><td>0: Upper limit frequency setting</td><td>1: Via keyboard potentiometer on an external single-line keyboard</td></tr><tr><td>2: Via AI1 current/voltage analog</td><td>3: Via AI2 current/voltage analog</td></tr><tr><td>4~5: Reserved</td><td>6: Via RS485 communication</td></tr><tr><td>7: Via optional card</td><td>-</td></tr></table>Range: (0~7)</td><td>0</td><td>RUN</td></tr>
</table>

F01.12 (0x010C)	Upper Limit Frequency Setting via Keyboard	**V/F SVC FVC PMVF PMSVC PMFVC** The upper limit frequency-given channel when F01.11 is set to 0. Range: (Lower limit frequency. frequency)	100.00 Hz	RUN
F01.13 (0x010D)	Lower Limit Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the lower limit to limit the given frequency. Range:(0.00~Upper limit frequency)	0.00Hz	RUN

F01.2x-F01.3x: Acceleration/Deceleration Time

Code (Address)	Name	Content	Factory	Property
F01.20 (0x0114)	Acceleration/Deceleration Time Reference Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the reference frequency to calculate the acceleration and deceleration time. 0: Maximum frequency;1: Fixed frequency 50Hz 2: Set frequency Range: (0~2)	1	STOP
F01.22 (0x0116)	Acceleration Time 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the time required for the output frequency to accelerate from 0.00 Hz to the reference frequency. Range: (0.01s~650.00s)	Up to model	RUN
F01.23 (0x0117)	Deceleration Time 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the time required for the output frequency to decelerate from the reference frequency to 0.00 Hz. Range: (0.01s~650.00s)	Up to model	RUN
F01.24 (0x0118)	Acceleration Time 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the time required for the output frequency to accelerate from 0.00Hz to the reference frequency. Range: (0.01s~650.00s)	Up to model	RUN
F01.25 (0x0119)	Deceleration Time 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the time required for the output frequency to decelerate from the reference frequency to 0.00 Hz. Range: (0.01s~650.00s)	Up to model	RUN
F01.26 (0x011A)	Acceleration Time 3	**V/F SVC FVC PMVF PMSVC PMFVC** Set the time required for the output frequency to accelerate from 0.00Hz to the reference frequency. Range: (0.01s~650.00s)	Up to model	RUN
F01.27 (0x011B)	Deceleration Time 3	**V/F SVC FVC PMVF PMSVC PMFVC** Set the time required for the output frequency to decelerate from the reference frequency to 0.00 Hz. Range: (0.01s~650.00s)	Up to model	RUN
F01.28 (0x011C)	Acceleration Time 4	**V/F SVC FVC PMVF PMSVC PMFVC** Set the time required for the output frequency to accelerate from 0.00Hz to the reference frequency. Range: (0.01s~650.00s)	Up to model	RUN

F01.29 (0x011D)	Deceleration Time 4	**V/F SVC FVC PMVF PMSVC PMFVC** Set the time required for the output frequency to decelerate from the reference frequency to 0.00Hz. Range: (0.01s~650.00s)	Up to model	RUN
F01.30 (0x011E)	S-curve Acceleration/Deceleration	**V/F SVC FVC PMVF PMSVC PMFVC** Set S-curve acceleration /deceleration. 0: Invalid; 1: Valid 2: Flexible S-curve Range: (0~2)	0	STOP
F01.31 (0x011F)	Acceleration S-Curve Start Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the S-curve time from acceleration start point. Range: (0.00s~10.00s)	0.20s	STOP
F01.32 (0x0120)	Acceleration S-Curve End Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the S-curve time from acceleration end point. Range: (0.00s~10.00s)	0.20s	STOP
F01.33 (0x0121)	Deceleration S-Curve Start Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the S-curve time from deceleration start point. Range: (0.00s~10.00s)	0.20s	STOP
F01.34 (0x0122)	Deceleration S-Curve End Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the S-curve time from deceleration end point. Range: (0.00s~10.00s)	0.20s	STOP
F01.35 (0x0123)	Switching Frequency between Acceleration Time 1 and 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the switching frequency between acceleration time 1 and 2. Range: (0.00~Max. frequency)	0.00Hz	RUN

F01.4x: PWM Control

Code (Address)	Name	Content	Factory	Property
F01.40 (0x0128)	Carrier Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Used to set the switching frequency of the drive's IGBT. Range: (1.0kHz~16.0kHz)	3.0kHz	RUN
F01.41 (0x0129)	PWM Control Mode	**V/F SVC FVC PMVF PMSVC PMFVC** **Ones-bit: Carrier-temperature correlation** 0: Temp. irrelevant;1: Temp. relevant **Tens-bit: Carrier-output frequency correlation** 0: Output frequency irrelevant; 1: output frequency relevant **Hundreds-bit: Random PWM enable** 0: Disable; 1: Valid in V/F control; 2: Valid in vector control **Thousands-bit: PWM modulation mode** 0: Three-phase only/1: Automatic switching between two-/three-phase Range: (0x0000~0x1211)	0x1111	RUN

F01.43 (0x012B)	Deadband Compensation Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set deadband compensation gain Range: (0~512)	306	RUN
F01.46 (0x012E)	PWM Random Depth	**V/F SVC FVC PMVF PMSVC PMFVC** The larger the setting, the greater the carrier fluctuation when random PWM is in effect. Range: (0~20)	0	RUN

10.6 Group F02: Motor 1 Parameters

10.6.1 F02.0x: Basic Motor Parameters and Auto-Tuning

Code (Address)	Name	Content	Factory	Property
F02.00 (0x0200)	Motor Type	**V/F SVC FVC PMVF PMSVC PMFVC** Set the motor type. 0: Asynchronous motor (AM)1: Permanent magnet synchronous motor (PMSM) Range: (0~1)	0	READ
F02.01 (0x0201)	Motor Pole No.	**V/F SVC FVC PMVF PMSVC PMFVC** Set the motor pole number. Range: (2~48)	4	STOP
F02.02 (0x0202)	Motor Rated Power	**V/F SVC FVC PMVF PMSVC PMFVC** Set the rated power of the motor. Range: (0.1kW~1000.0kW)	Up to model	STOP
F02.03 (0x0203)	Motor Rated Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the rated frequency of the motor. Range: (0.01~Max. frequency)	Up to model	STOP
F02.04 (0x0204)	Motor Rated Speed	**V/F SVC FVC PMVF PMSVC PMFVC** Set the rated speed of the motor. Range: (0rpm~65000rpm)	Up to model	STOP
F02.05 (0x0205)	Motor Rated Voltage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the rated voltage of the motor. Range: (0V~1500V)	Up to model	STOP
F02.06 (0x0206)	Motor Rated Current	**V/F SVC FVC PMVF PMSVC PMFVC** Set the rated current of the motor. Range: (0.1A~3000.0A)	Up to model	STOP
F02.07 (0x0207)	Motor Parameter Auto-tuning	**V/F SVC FVC PMVF PMSVC PMFVC** After the parameter auto-tuning is finished, [F02.07] will be set to "0" automatically. 0: None; 1: Dynamic auto-tuning; 2: Static auto-tuning; 3: Stator resistance auto-tuning Range: (0~20)	0	STOP

Note: When F02.00 [Motor Type] is a synchronous motor, F2.04 [Motor Rated Speed] is calculated from F2.01 [Motor Pole No.] and F2.03 [Motor Rated Frequency], please set the corresponding parameters correctly. The calculation formula is: F2.04[Motor Rated Speed] = 60* F2.03[Motor Rated Frequency]/(F2.01[Motor Pole No.]/2).

10.6.2 F02.1x: AM Advanced Parameters

Code (Address)	Name	Content	Factory	Property
F02.10 (0x020A)	AM No-Load Current	**V/F SVC FVC PMVF PMSVC PMFVC** Set AM No-load Current. Range: (0.1A~3000.0A)	Up to model	STOP
F02.11 (0x020B)	AM Stator Resistance	**V/F SVC FVC PMVF PMSVC PMFVC** Set AM stator inductance. Range: (0.01mΩ~60000mΩ)	Up to model	STOP
F02.12 (0x020C)	AM Rotor Resistance	**V/F SVC FVC PMVF PMSVC PMFVC** Set AM stator resistance. Range: (0.01mΩ~60000mΩ)	Up to model	STOP
F02.13 (0x020D)	AM Stator Leakage Inductance	**V/F SVC FVC PMVF PMSVC PMFVC** Set AM stator leakage inductance. Range: (0.001mH~6553.5mH)	Up to model	STOP
F02.14 (0x020E)	AM Stator Inductance	**V/F SVC FVC PMVF PMSVC PMFVC** Set AM stator inductance. Range: (0.01mH~65535mH)	Up to model	STOP
F02.15 (0x020F)	Per-Unit Stator Resistance	**V/F SVC FVC PMVF PMSVC PMFVC** Set per-unit stator resistance. Range: (0.01%~50.00%)	Up to model	READ
F02.16 (0x0210)	Per-Unit Rotor Resistance	**V/F SVC FVC PMVF PMSVC PMFVC** Set per-unit rotor resistance. Range: (0.01%~50.00%)	Up to model	READ
F02.17 (0x0211)	Per-Unit Stator Leakage Inductance	**V/F SVC FVC PMVF PMSVC PMFVC** Set per-unit stator leakage inductance. Range: (0.01%~50.00%)	Up to model	READ
F02.18 (0x0212)	Per-Unit Stator Inductance	**V/F SVC FVC PMVF PMSVC PMFVC** Set per-unit stator inductance. Range: (0.1%~999.0%)	Up to model	READ
F02.19 (0x0213)	F02.11 F02.14 decimal point selection	**V/F SVC FVC PMVF PMSVC PMFVC** Set the decimal point of the four parameters from F02.11 to F02.14. Range: (0x0000~0x2322)	0x2322	READ

10.6.3 F02.2x: PM Advanced Parameters

Code (Address)	Name	Content	Factory	Property
F02.20 (0x0214)	PM Stator Resistance	**V/F SVC FVC PMVF PMSVC PMFVC** Set PM stator resistance. Range: (0.01mΩ~60000mΩ)	Up to model	STOP
F02.21 (0x0215)	PM D-Axis Inductance	**V/F SVC FVC PMVF PMSVC PMFVC** Set the PM D-axis inductance. Range: (0.001mH~6553.5mH)	Up to model	STOP

F02.22 (0x0216)	PM Q-Axis Inductance	**V/F SVC FVC PMVF PMSVC PMFVC** Set the PM Q-axis inductance. Range: (0.001mH~6553.5mH)	Up to model	STOP
F02.23 (0x0217)	PM Back Emf	**V/F SVC FVC PMVF PMSVC PMFVC** Set the PM back emf. Only dynamic auto-tuning is recognized. Range: (0V~1500V)	Up to model	STOP
F02.24 (0x0218)	PM Encoder Installation Angle	**V/F SVC FVC PMVF PMSVC PMFVC** Set PM encoder installation angle. Range: (0.0°~360.0°)	Up to model	RUN
F02.25 (0x0219)	Per-unit PM Stator Resistance	**V/F SVC FVC PMVF PMSVC PMFVC** Set per-unit PM stator resistance.	Up to model	READ
F02.26 (0x021A)	Per-Unit PM D-Axis Inductance	**V/F SVC FVC PMVF PMSVC PMFVC** Set per-unit PM d-axis inductance.	Up to model	READ
F02.27 (0x021B)	Per-Unit PM Q-Axis Inductance	**V/F SVC FVC PMVF PMSVC PMFVC** Set per-unit PM d-axis inductance.	Up to model	READ
F02.28 (0x021C)	PM Pulse Width Factor	**V/F SVC FVC PMVF PMSVC PMFVC** Set the PM pulse width factor. Range: (00.00~99.99)	Up to model	STOP
F02.29 (0x021D)	F02.20~F02.22 decimal point selection	**V/F SVC FVC PMVF PMSVC PMFVC** Set the decimal point of the three parameters from F02.20 ~F02.22. Range: (0x0000~0x2332)	0x0332	READ

10.6.4 F02.3x~F02.4x: Encoder Parameters

Code (Address)	Name	Content	Factory	Property
F02.30 (0x021E)	Speed Feedback Encoder Type	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Common ABZ encoder (connect to expansion EX-B) 1: Rotary transformer (connect to expansion port EX-B) Range: (0~1)	0	STOP
F02.31 (0x021F)	Encoder Direction	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Same direction; 1: Opposite direction Range: (0~1)	0	STOP
F02.32 (0x0220)	ABZ Encoder Z Pulse Detection	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF; 1: ON (positive pulse) 2: ON (negative pulse) Range: (0~2)	0	STOP
F02.33 (0x0221)	ABZ Encoder Line No.	**V/F SVC FVC PMVF PMSVC PMFVC** Set the line number of the ABZ encoder. Range: (1~10000)	1024	STOP

F02.34 (0x0222)	Rotary Transformer Pole No.	**V/F SVC FVC PMVF PMSVC PMFVC** Set the pole number of the rotary transformer. Range: (2~128)	2	STOP
F02.35 (0x0223)	Encoder Ratio Numerator	**V/F SVC FVC PMVF PMSVC PMFVC** Set the encoder transmission ratio numerator. Range: (1~32767)	1	RUN
F02.36 (0x0224)	Encoder Ratio Denominator	**V/F SVC FVC PMVF PMSVC PMFVC** Set the encoder transmission ratio denominator. Range: (1~32767)	1	RUN
F02.37 (0x0225)	Encoder Speed Detection Filter Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the encoder speed measurement filter time. Range: (0.0ms~100.0ms)	1.0ms	RUN
F02.38 (0x0226)	Encoder Disconnection Detection Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the encoder disconnection detection time. Range: (0.100s~60.000s)	0.050s	RUN
F02.49 (0x0231)	Encoder Debug Register	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: Monitor PG feedback under open loop 0: Invalid; 1: Valid Range: (0x0000~0x1111)	0x0001	RUN

10.6.5 F02.6x: Motor Application Parameters

Code (Address)	Name	Content	Factory (Range)	Property
F02.50 (0x0232)	Stator Resistance Auto-tuning	V/F SVC **FVC** PMVF PMSVC PMFVC 0: Invalid; 1: Auto-tuning only without updating; >1: Tuning and updating Range: (0~3)	0	STOP
F02.51 (0x0233)	Stator Resistance Tuning Factor 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set the stator resistance tuning factor 1. Range: (0~1000)	0	RUN
F02.52 (0x0234)	Stator Resistance Tuning Factor 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the stator resistance tuning factor 2. Range: (-20.00%~20.00%)	0.00	RUN
F02.53 (0x0235)	Stator Resistance Tuning Factor 3	**V/F SVC FVC PMVF PMSVC PMFVC** Set the stator resistance tuning factor 3. Range: (0~65535)	0	RUN
F02.60 (0x023C)	PM Pole Search	**V/F SVC FVC PMVF PMSVC PMFVC** **Ones-bit: Closed-loop vector** 0: OFF; 1: ON 2: ON during the first power-up **Tens-bit: Open-loop vector control** 0: OFF; 1: ON 2: ON during the first power-up **Hundreds-bit: V/F** 0: OFF; 1: ON 2: ON during the first power-up **Thousands-bit: Reserved** Range: (0000~3223)	0010	STOP

F02.61 (0x023D)	Pole Search Current Setting	**V/F SVC FVC PMVF PMSVC PMFVC** Set the value of pole search current. Range: (0.0%~6553.5%)	0.0%	STOP

10.7 Group F03: Vector Control

F03.0x: ASR (Velocity Loop)

Code (Address)	Name	Content	Factory	Property
F03.00 (0x0300)	ASR Rigidity Level	**V/F SVC FVC PMVF PMSVC PMFVC** Set rigidity level, the higher the level, the better the speed rigidity. Range: (1~128)	32	RUN
F03.01 (0x0301)	ASR Rigidity Mode	**V/F SVC FVC PMVF PMSVC PMFVC** Set ASR speed rigidity mode. Range: (0x0000~0xFFFF)	0x0000	RUN
F03.02 (0x0302)	ASR Proportional Gain 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set ASR velocity loop proportional gain 1. Range: (0.01~100.00)	10.00	RUN
F03.03 (0x0303)	ASR Integral Time 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set ASR (velocity loop) integral time 1. Range: (0.000s~6.000s)	0.100s	RUN
F03.04 (0x0304)	ASR Filter Time 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set ASR filter time 1. Range: (0.0ms~100.0ms)	0.0ms	RUN
F03.05 (0x0305)	ASR Switching Frequency 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set ASR switching frequency 1. Range: (0.00Hz~Max. frequency)	15.00Hz	RUN
F03.06 (0x0306)	ASR Proportional Gain 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set ASR velocity loop proportional gain 2. Range: (0.01~100.00)	10.00	RUN
F03.07 (0x0307)	ASR Integral Time 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set ASR (velocity loop) integral time 2. Range: (0.000s~6.000s)	0.050s	RUN
F03.08 (0x0308)	ASR Filter Time 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set ASR filter time 2. Range: (0.0ms~100.0ms)	4.0ms	RUN
F03.09 (0x0309)	ASR Switching Frequency 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set ASR switching frequency 2. Range: (0.00Hz~Max. frequency)	5.00Hz	RUN

F03.1x: Current Loop and Torque Limit

Code (Address)	Name	Content	Factory	Property
F03.10 (0x030A)	Current Loop D-Axis Proportional Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set current loop d-axis proportional gain. Range: (0.001~4.000)	1.000	RUN

<table>
<tr><td>F03.11
(0x030B)</td><td>Current Loop D-Axis Integral Gain</td><td>V/F SVC FVC PMVF PMSVC PMFVC
Set current loop d-axis proportional gain.
Range: (0.001~4.000)</td><td>1.000</td><td>RUN</td></tr>
<tr><td>F03.12
(0x030C)</td><td>Current Loop Q-Axis Proportional Gain</td><td>V/F SVC FVC PMVF PMSVC PMFVC
Set current loop q-axis proportional gain.
Range: (0.001~4.000)</td><td>1.000</td><td>RUN</td></tr>
<tr><td>F03.13
(0x030D)</td><td>Current Loop Q-Axis Integral Gain</td><td>V/F SVC FVC PMVF PMSVC PMFVC
Set current loop q-axis proportional gain.
Range: (0.001~4.000)</td><td>1.000</td><td>RUN</td></tr>
<tr><td>F03.15
(0x030F)</td><td>Torque Limit under Power Consumption</td><td>V/F SVC FVC PMVF PMSVC PMFVC
Set the torque limit when motor is running with load.
Range: (0.0%~400.0%)</td><td>180.0%</td><td>RUN</td></tr>
<tr><td>F03.16
(0x0310)</td><td>Torque Limit under Power Generation</td><td>V/F SVC FVC PMVF PMSVC PMFVC
Set the torque limit in power generation mode.
Range: (0.0%~400.0%)</td><td>180.0%</td><td>RUN</td></tr>
<tr><td>F03.17
(0x0311)</td><td>Regenerative Torque Limit at Low Speed</td><td>V/F SVC FVC PMVF PMSVC PMFVC
Set regenerative torque limit at low speed.
Range: (0.0%~400.0%)</td><td>0.0%</td><td>RUN</td></tr>
<tr><td>F03.18
(0x0312)</td><td>Frequency Range for Torque Limit Working at Low Speed</td><td>V/F SVC FVC PMVF PMSVC PMFVC
Set regenerative torque limit at low speed.
Range: (0.00Hz~30.00Hz)</td><td>6.00Hz</td><td>RUN</td></tr>
<tr><td>F03.19
(0x0313)</td><td>Torque Limit</td><td>V/F SVC FVC PMVF PMSVC PMFVC
Ones-bit: Torque limit channel under motoring
<table>
<tr><td>0: Via keyboard</td><td>1: Reserved</td></tr>
<tr><td>2: AI1</td><td>3: AI2</td></tr>
<tr><td>4~5: Reserved</td><td>6: Via RS485 communication(0x3014)</td></tr>
<tr><td>7: Via optional card</td><td>-</td></tr>
</table>
Tens-bit: Torque limit under generating
<table>
<tr><td>0: Via keyboard</td><td>1: Reserved</td></tr>
<tr><td>2: AI1</td><td>3: AI2</td></tr>
<tr><td>4~5: Reserved</td><td>6: Via RS485 communication(0x3015)</td></tr>
<tr><td>7: Via optional card</td><td>-</td></tr>
</table>
Hundreds-bit: C00.06 display selection
<table>
<tr><td>0: Torque limit value under motoring</td><td>1: Torque limit value under generating</td></tr>
</table>
Thousands-bit: Reserved
Range: (0x0000~0x0177)</td><td>0x0000</td><td>RUN</td></tr>
</table>

F03.2x: Torque Optimization Control

Code (Address)	Name	Content	Factory	Property
F03.20 (0x0314)	PM Low-frequency Pull-in Current	**V/F SVC FVC PMVF PMSVC PMFVC** When the SVC mode of the PM is on, the larger the pull-in current, the larger the torque output. Range: (0.0%~50.0%)	20.0%	RUN
F03.21 (0x0315)	PM High-Frequency Pull-In Current	**V/F SVC FVC PMVF PMSVC PMFVC** When the SVC mode of the PM is on, the larger the pull-in current, the larger the torque output. Range: (0.0%~50.0%)	10.0%	RUN
F03.22 (0x0316)	PM Pull-In Current Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** The set value 100.0% corresponds to F01.10 [Maximum Frequency]. Range: (0.0%~100.0%)	10.0%	RUN
F03.23 (0x0317)	Slip Compensation	**V/F SVC FVC PMVF PMSVC PMFVC** Set the motor slip compensation. Range: (0.0%~250.0%)	100.0%	RUN
F03.24 (0x0318)	Starting Torque Initial Value	**V/F SVC FVC PMVF PMSVC PMFVC** Set starting torque. Range: (0.0%~250.0%)	0.0%	RUN

F03.3x: Flux Optimization

Code (Address)	Name	Content	Factory	Property
F03.30 (0x031E)	Field-Weakening Feed-Forward Coefficient	**V/F SVC FVC PMVF PMSVC PMFVC** Set the field-weakening feedforward coefficient. Range: (0.0%~500.0%)	10.0%	RUN
F03.31 (0x031F)	Field-Weakening Control Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set the field-weakening control gain. Range: (0.0%~500.0%)	10.0%	RUN
F03.32 (0x0320)	Field-Weakening Current Upper Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the field-weakening current upper limit. Range: (0.0%~250.0%)	60.0%	RUN
F03.33 (0x0321)	Field-Weakening Voltage Coefficient	**V/F SVC FVC PMVF PMSVC PMFVC** Set the field-weakening voltage coefficient. Range: (0.0%~120.0%)	97.0%	RUN
F03.34 (0x0322)	Axis Output Power Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the axis output power limit. Range: (0.0%~400.0%)	250.0%	RUN
F03.35 (0x0323)	Over-Excitation Brake Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set the over-excitation brake gain. Range: (0.0%~500.0%)	100.0%	RUN

F03.36 (0x0324)	Overexcitation Brake Limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the over-excitation brake amplitude. Range: (0.0%~250.0%)	100.0%	RUN
F03.37 (0x0325)	Energy-saving Operation	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF; 1: ON Range: (0~1)	0	RUN
F03.38 (0x0326)	Lower Excitation Limit in Energy-Saving Operation	**V/F SVC FVC PMVF PMSVC PMFVC** Set the lower limit of energy-saving excitation. Range: (0.0%~80.0%)	50.0%	RUN
F03.39 (0x0327)	Energy-Saving Operation Filter Coefficient	**V/F SVC FVC PMVF PMSVC PMFVC** Set the filter coefficient of energy-saving running. Range: (0.000s~6.000s)	0.010s	RUN

F03.4x~F03.5x: Torque Control

<table>
<tr><th>Code (Address)</th><th>Name</th><th>Content</th><th>Factory</th><th>Property</th></tr>
<tr><td>F03.40 (0x0328)</td><td>Torque Control</td><td>V/F SVC FVC PMVF PMSVC PMFVC
0: Torque limited by speed control
1: Speed limited by torque control
Range: (0~1)</td><td>0</td><td>RUN</td></tr>
<tr><td>F03.41 (0x0329)</td><td>Torque Command</td><td>V/F SVC FVC PMVF PMSVC PMFVC
Ones-bit: Source A; Tens-bit: Source B
<table>
<tr><td>0: Via keyboard</td><td>1: Reserved</td></tr>
<tr><td>2: Via AI1 current/voltage analog</td><td>3: Via AI2 current/voltage analog</td></tr>
<tr><td>4: Reserved</td><td>5: Reserved</td></tr>
<tr><td>6: Via RS485 communication</td><td>7: Via optional card</td></tr>
<tr><td>8: Reserved</td><td>9: Reserved</td></tr>
</table>
Hundreds-bit: Combination method
<table>
<tr><td>0: Source A</td><td>1: Source B</td></tr>
<tr><td>2: Source A + Source B</td><td>3: Source A-Source B</td></tr>
<tr><td>4: MIN (Source A, Source B)</td><td>5: MAX (Source A, Source B)</td></tr>
</table>
Range: (0x0000~0x0599)</td><td>0x0000</td><td>RUN</td></tr>
<tr><td>F03.42 (0x032A)</td><td>Torque Setting via Keyboard</td><td>V/F SVC FVC PMVF PMSVC PMFVC
Set the torque given.
Range: (0.0%~100.0%)</td><td>0.0%</td><td>RUN</td></tr>
<tr><td>F03.43 (0x032B)</td><td>Torque Input Lower Limit</td><td>V/F SVC FVC PMVF PMSVC PMFVC
Set the torque input lower limit.
Range: (0.00%~100.00%)</td><td>0.00%</td><td>RUN</td></tr>
<tr><td>F03.44 (0x032C)</td><td>Torque Input Lower Limit Percentage</td><td>V/F SVC FVC PMVF PMSVC PMFVC
Set the lower limit percentage.
Range: (-250.00%~300.00%)</td><td>0.00%</td><td>RUN</td></tr>
</table>

<table>
<tr><td>F03.45
(0x032D)</td><td>Torque Input Upper Limit</td><td>V/F SVC FVC PMVF PMSVC PMFVC
Set the torque input upper limit.
Range: (0.00%~100.00%)</td><td>100.00%</td><td>RUN</td></tr>
<tr><td>F03.46
(0x032E)</td><td>Torque Input Upper Limit Percentage</td><td>V/F SVC FVC PMVF PMSVC PMFVC
Set the upper limit percentage.
Range: (-250.00%~300.00%)</td><td>100.00%</td><td>RUN</td></tr>
<tr><td>F03.47
(0x032F)</td><td>Torque Filter Time</td><td>V/F SVC FVC PMVF PMSVC PMFVC
Set regenerative torque limit at low speed.
Range: (0.000s~6.000s)</td><td>0.100s</td><td>RUN</td></tr>
<tr><td>F03.52
(0x0334)</td><td>Output Torque Upper Limit</td><td>V/F SVC FVC PMVF PMSVC PMFVC
Set the upper limit for torque command.
Range: (0.0%~300.0%)</td><td>150.0%</td><td>RUN</td></tr>
<tr><td>F03.53
(0x0335)</td><td>Output Torque Lower Limit</td><td>V/F SVC FVC PMVF PMSVC PMFVC
Set lower limit for torque command
Range: (0.0%~300.0%)</td><td>0.0%</td><td>RUN</td></tr>
<tr><td>F03.54
(0x0336)</td><td>Torque-Controlled FWD Speed Limit</td><td>V/F SVC FVC PMVF PMSVC PMFVC
<table><tr><td>0: F03.56</td><td>1: Reserved</td></tr><tr><td>2: AI1 × F03.56</td><td>3: AI2 × F03.56</td></tr><tr><td>4~5: Reserved</td><td>6: RS485 communication setting × F03.56</td></tr><tr><td>7: optional card × F03.56</td><td>8: Reserved</td></tr></table>Range: (0~8)</td><td>0</td><td>RUN</td></tr>
<tr><td>F03.55
(0x0337)</td><td>Torque-Controlled REV Speed Limit</td><td>V/F SVC FVC PMVF PMSVC PMFVC
<table><tr><td>0: F03.57</td><td>1: Reserved</td></tr><tr><td>2: AI1 × F03.57</td><td>3: AI2 × F03.57</td></tr><tr><td>4~5: Reserved</td><td>6: Via RS485 communication × F03.57</td></tr><tr><td>7: Optional card × F03.57</td><td>8: Reserved</td></tr></table>Range: (0~8)</td><td>0</td><td>RUN</td></tr>
<tr><td>F03.56
(0x0338)</td><td>Torque-Controlled Max. FWD Speed Limit</td><td>V/F SVC FVC PMVF PMSVC PMFVC
Set torque-controlled max. forward speed limit.
Range: (0.0%~100.0%)</td><td>100.0%</td><td>RUN</td></tr>
<tr><td>F03.57
(0x0339)</td><td>Torque-Controlled Max. REV Speed Limit</td><td>V/F SVC FVC PMVF PMSVC PMFVC
Set the torque-controlled max. reverse speed limit.
Range: (0.0%~100.0%)</td><td>100.0%</td><td>RUN</td></tr>
<tr><td>F03.58
(0x033A)</td><td>Given Torque Gain Switching Frequency</td><td>V/F SVC FVC PMVF PMSVC PMFVC
Set the given torque gain switching frequency.
Range: (0.00Hz~50.00Hz)</td><td>1.00Hz</td><td>RUN</td></tr>
<tr><td>F03.59
(0x033B)</td><td>Given Torque Gain</td><td>V/F SVC FVC PMVF PMSVC PMFVC
Set the given torque gain.
Range: (0.0%~500.0%)</td><td>100.0%</td><td>RUN</td></tr>
</table>

F03.6x group: PM High-Frequency Injection

Code (Address)	Name	Content	Factory	Property
F03.60 (0x033C)	High-Frequency Injection	**V/F SVC FVC PMVF PMSVC PMFVC** PM open-loop control valid: please select 0 with SPM and 0 to 5 with IPM. 0: Disable 1~5: Enable, the greater the value, the higher the injection frequency. Range: (0~5)	0	STOP
F03.61 (0x033D)	High-Frequency Injection Voltage	**V/F SVC FVC PMVF PMSVC PMFVC** Injection voltage range relative to rated voltage. It is the result of auto-tuning, so there's no need to modify it. Range: (0.0%~100.0%)	10.0%	RUN
F03.62 (0x033E)	High-frequency Injection Cut-off Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** The high-frequency injection range (relative to motor rated frequency). It is valid when the motor speed is less than this value. Range: (0.0%~20.0%)	10.0%	RUN

F03.7x: Position Compensation

Code (Address)	Name	Content	Factory	Property
F03.70 (0x0346)	Position Compensation Control	**V/F SVC FVC PMVF PMSVC PMFVC** Position compensation control under speed control enables zero servo or enhances system rigidity. Range: (0.0~100.0)	50.0	RUN
F03.71 (0x0347)	Deadband Compensation Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set the slip compensation gain. Range: (0.00~250.00)	0.00	RUN
F03.72 (0x0348)	Slip Compensation Range	**V/F SVC FVC PMVF PMSVC PMFVC** Set the slip compensation range. Range: (0.0%~100.0%)	0.0%	RUN
F03.73 (0x0349)	Compensation Range	**V/F SVC FVC PMVF PMSVC PMFVC** Set the position compensation range. Range: (0.0%~100.0%)	10.0%	RUN

F03.8x: PWM Control

Code (Address)	Name	Content	Factory	Property
F03.80 (0x0350)	PM MTPA Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set the MTPA gain of synchronous motor. Range: (0.0%~400.0%)	100.0%	RUN
F03.81 (0x0351)	PM MTPA Filter Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the MTPA filter time of synchronous motor. Range: (0.0ms~100.0ms)	1.0ms	RUN

10.8 Group F04: V/F Control

F04.0x: V/F Control

Code (Address)	Name	Content	Factory	Property
F04.00 (0x0400)	V/F Curve Selection	**V/F SVC FVC PMVF PMSVC PMFVC** Select the type of V/F curve according to different load characteristics. 0: linear V/F curve; 1~9: 1.1-1.9 power V/F curves respectively 10: Square V/F curve; 11: Custom V/F curve Range: (0~11)	0	STOP
F04.01 (0x0401)	Torque Boost	**V/F SVC FVC PMVF PMSVC PMFVC** 0.0%: automatic torque boost 0.1%~30.0%: Manual torque boost Range: (0.0%~30.0%)	Up to model	RUN
F04.02 (0x0402)	Torque Boost Cutoff Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the range of the torque boost function. The torque boost function will be cut off when the output frequency exceeds this value. Range: (0.0%~100.0%)	100.0%	RUN
F04.03 (0x0403)	Slip Compensation Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set the slip compensation gain. Range: (0.0%~200.0%)	0.0%	RUN
F04.04 (0x0404)	Slip Compensation Range	**V/F SVC FVC PMVF PMSVC PMFVC** Set the slip compensation range. Range: (0.0%~300.0%)	100.0%	RUN
F04.05 (0x0405)	Slip Compensation Filter Time	**V/F SVC FVC PMVF PMSVC PMFVC** Enter the parameters on the motor's nameplate correctly to implement parameter tuning for best effect. Range: (0.000s~6.000s)	0.100s	RUN
F04.06 (0x0406)	Vibration Suppression Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Adjust this value to suppress low frequency resonance. But an excessive value will cause instability. Range: (0.0%~900.0%)	100.0%	RUN
F04.07 (0x0407)	Vibration Suppression Filter Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the oscillation suppression filter time. Range: (0.0s~100.0s)	1.0s	RUN
F04.08 (0x0408)	Output Voltage Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the output voltage percentage. 100% of it corresponds to the motor rated voltage. Range: (25.0%~120.0%)	100.0%	STOP

F04.1x: User-Defined V/F Curve

Code (Address)	Name	Content	Factory	Property
F04.10 (0x040A)	V1 (User-Defined Voltage)	**V/F SVC FVC PMVF PMSVC PMFVC** Set V1 (user-defined voltage). Range: (0.0%~100.0%)	3.0%	STOP
F04.11 (0x040B)	F1 (User-Defined Frequency)	**V/F SVC FVC PMVF PMSVC PMFVC** Set F1 (user-defined frequency). Range: (0.00Hz~Max. frequency)	1.00Hz	STOP
F04.12 (0x040C)	V2 (User-Defined Voltage)	**V/F SVC FVC PMVF PMSVC PMFVC** Set V2 (user-defined voltage). Range: (0.0%~100.0%)	28.0%	STOP
F04.13 (0x040D)	F2 (User-Defined Frequency)	**V/F SVC FVC PMVF PMSVC PMFVC** Set F2 (user-defined frequency). Range: (0.00Hz~Max. frequency)	10.00Hz	STOP
F04.14 (0x040E)	V3 (User-Defined Voltage)	**V/F SVC FVC PMVF PMSVC PMFVC** Set V3 (user-defined voltage). Range: (0.0%~100.0%)	55.0%	STOP
F04.15 (0x040F)	F3 (user-defined frequency)	**V/F SVC FVC PMVF PMSVC PMFVC** Set F3 (user-defined frequency). Range: (0.00Hz~Max. frequency)	25.00Hz	STOP
F04.16 (0x0410)	V4 (User-Defined Voltage)	**V/F SVC FVC PMVF PMSVC PMFVC** Set V4 (user-defined voltage). Range: (0.0%~100.0%)	78.0%	STOP
F04.17 (0x0411)	F4 (User-Defined Frequency)	**V/F SVC FVC PMVF PMSVC PMFVC** Set F4 (user-defined frequency). Range: (0.00Hz~Max. frequency)	37.50Hz	STOP
F04.18 (0x0412)	V5 User-Defined Voltage	**V/F SVC FVC PMVF PMSVC PMFVC** Set V5 (user-defined voltage). Range: (0.0%~100.0%)	100.0%	STOP
F04.19 (0x0413)	F5 (User-Defined Frequency)	**V/F SVC FVC PMVF PMSVC PMFVC** Set F5 (user-defined frequency). Range: (0.00Hz~Max. frequency)	50.00Hz	STOP

10.9 Group F05: Input Terminal

F05.0x: DI Terminal

Code (Address)	Name	Content	Factory	Property
F05.00 (0x0500)	X1 function	**V/F SVC FVC PMVF PMSVC PMFVC** See the function of terminal X. Range: (0~95)	1	STOP
F05.01 (0x0501)	X2 function	**V/F SVC FVC PMVF PMSVC PMFVC** See the function of terminal X. Range: (0~95)	2	STOP

F05.02 (0x0502)	X3 function	**V/F SVC FVC PMVF PMSVC PMFVC** See the function of terminal X. Range: (0~95)	16	STOP
F05.03 (0x0503)	X4 function	**V/F SVC FVC PMVF PMSVC PMFVC** See the function of terminal X. Range: (0~95)	17	STOP
F05.04 (0x0504)	X5 function	**V/F SVC FVC PMVF PMSVC PMFVC** See the function of terminal X. Range: (0~95)	18	STOP
F05.05 (0x0505)	X6 function	**V/F SVC FVC PMVF PMSVC PMFVC** See the function of terminal X. Range: (0~95)	8	STOP
F05.06 (0x0506)	X7 function	**V/F SVC FVC PMVF PMSVC PMFVC** See the function of terminal X. Range: (0~95)	7	STOP
F05.07 (0x0507)	X8 function	**V/F SVC FVC PMVF PMSVC PMFVC** See the function of terminal X. Range: (0~95)	0	STOP
F05.08 (0x0508)	X9 function	**V/F SVC FVC PMVF PMSVC PMFVC** See the function of terminal X. Range: (0~95)	0	STOP
F05.09 (0x0509)	X10 function	**V/F SVC FVC PMVF PMSVC PMFVC** See the function of terminal X. Range: (0~95)	0	STOP

Refer to the table below to set the function of F05.0x [the function of terminal X].

X	Description	X	Description	X	Description
0	No functions	18	Multi-step speed terminal 3	51	Command channel switched to expansion card
1	FWD	19	Multi-step speed terminal 4	52	Operation disable
2	REV	20~31	Reserved	53	Forward operation off
3	Three-wire operation (Xi)	32	Acceleration/ deceleration terminal 1	54	Reverse operation off
4	FWD jogging	33	Acceleration/ deceleration terminal 2	55~59	Reserved
5	REV jogging	34	Acceleration/ deceleration pause	60	Speed/ torque switching
6	Free stop	35	Swing frequency operation	61	Reserved
7	Emergency stop	36	Swing frequency pause	62	Jogging frequency limit as torque mode frequency upper limit
8	Fault reset	37	Swing frequency reset	63~81	Reserved

9	External fault input	38~43	Reserved	82	Braking torque
10	Frequency up (UP)	44	DC brake command	83	Emergency evacuation mode
11	Frequency down (DW)	45	Pre-excitation command terminal	84~85	Reserved
12	Frequency UP/DOWN reset (UP/DW reset)	46~47	Reserved	86	DO OFF Delay Interrupt
13	Source A to source B	48	Command channel to keyboard	87	Slow Positioning (Antspeed)
14	Combined frequency channel to channel A	49	Command channel to terminal	88	Pre-brake control
15	Combined frequency channel to channel B	50	Command channel to communication	89	Reserved
16	Multi-step speed terminal 1	-	-	90	Anti-swing control
17	Multi-step speed terminal 2	-	-	91	Brake output feedback

F05.1x: X1-X5 Detection Delay

Code (Address)	Name	Content	Factory	Property
F05.10 (0x050A)	X1 ON detection delay	**V/F SVC FVC PMVF PMSVC PMFVC** Output delay time for terminal X1 from OFF to ON. Range: (0.000s~6.000s)	0.010s	RUN
F05.11 (0x050B)	X1 OFF detection delay	**V/F SVC FVC PMVF PMSVC PMFVC** Output delay time for terminal X1 from ON to OFF. Range: (0.000s~6.000s)	0.010s	RUN
F05.12 (0x050C)	X2 ON detection delay	**V/F SVC FVC PMVF PMSVC PMFVC** Output delay time for terminal X2 from OFF to ON. Range: (0.000s~6.000s)	0.010s	RUN
F05.13 (0x050D)	X2 OFF detection delay	**V/F SVC FVC PMVF PMSVC PMFVC** Output delay time for terminal X2 from ON to OFF. Range: (0.000s~6.000s)	0.010s	RUN
F05.14 (0x050E)	X3 ON detection delay	**V/F SVC FVC PMVF PMSVC PMFVC** Output delay time for terminal X3 from OFF to ON. Range: (0.000s~6.000s)	0.010s	RUN
F05.15 (0x050F)	X3 OFF detection delay	**V/F SVC FVC PMVF PMSVC PMFVC** Output delay time for terminal X3 from ON to OFF. Range: (0.000s~6.000s)	0.010s	RUN
F05.16 (0x0510)	X4 ON detection delay	**V/F SVC FVC PMVF PMSVC PMFVC** Output delay time for terminal X4 from OFF to ON. Range: (0.000s~6.000s)	0.010s	RUN
F05.17 (0x0511)	X4 OFF detection delay	**V/F SVC FVC PMVF PMSVC PMFVC** Output delay time for terminal X4 from ON to OFF. Range: (0.000s~6.000s)	0.010s	RUN

F05.18 (0x0512)	X5 ON detection delay	**V/F SVC FVC PMVF PMSVC PMFVC** Output delay time for terminal X5 from OFF to ON. Range: (0.000s~6.000s)	0.010s	RUN
F05.19 (0x0513)	X5 OFF detection delay	**V/F SVC FVC PMVF PMSVC PMFVC** Output delay time for terminal X5 from ON to OFF. Range: (0.000s~6.000s)	0.010s	RUN

F05.2x: DI Terminal

Code (Address)	Name	Content	Factory	Property
F05.20 (0x0514)	Terminal-Controlled Operation Mode	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Two-wire 1 1: Two-wire 2 2: Three-wire 1 3: Three-wire 2 Range: (0~3)	0	STOP
F05.22 (0x0516)	X1~X4 terminal characteristics	**V/F SVC FVC PMVF PMSVC PMFVC** **0: Valid when closed;1: Valid when open** Ones-bit: X1; Tens-bit: X2 Hundreds-bit: X3; Thousands-bit: X4 Range: (0x0000~0x1111)	0x0000	RUN
F05.23 (0x0517)	X5~X8 terminal characteristics	**V/F SVC FVC PMVF PMSVC PMFVC** **0: Valid when closed;1: Valid when open** Ones-bit: X5; Tens-bit: X6 Hundreds-bit: X7; Thousands-bit: X8 Range: (0x0000~0x1111)	0x0000	RUN
F05.24 (0x0518)	X9~X10 terminal characteristics	**V/F SVC FVC PMVF PMSVC PMFVC** **0: Valid when closed;1: Valid when open** Ones-bit: X9; Tens-bit: X10 Hundreds-bit and thousands-bit: Reserved Range: (0x0000~0x0011)	0x0000	RUN
F05.25 (0x0519)	Terminal UP/DW	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Power-down save on;1: Power-down save off 2: Modifiable during operation, reset after stop Range: (0~2)	0	STOP
F05.26 (0x051A)	Terminal UP/DW controlled frequency increase/ decrease rate	**V/F SVC FVC PMVF PMSVC PMFVC** Set terminal UP/DW controlled frequency increase/decrease rate. Range: (0.01Hz/s~50.00Hz/s)	0.50Hz/s	RUN
F05.27 (0x051B)	Terminal controlled emergency stop decel. time	**V/F SVC FVC PMVF PMSVC PMFVC** Set terminal emergency stop deceleration time. Range: (0.01s~650.00s)	1.00s	RUN

F05.4x: AI Type Processing

Code (Address)	Name	Content	Factory	Property
F05.41 (0x0529)	AI1 signal type	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Voltage 0.00V~10.00V 1: Current 0.00mA~20.00mA Range: (0~1)	0	RUN
F05.42 (0x052A)	AI2 signal type	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Voltage 0.00V~10.00V 1: Current 0.00mA~20.00mA Range: (0~1)	0	RUN
F05.43 (0x052B)	AI Curve	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Straight line (default) ;1: Curve 1 2: Curve 2 **Ones-bit: AI1** **Tens-bit: AI2** **Hundreds-bit and thousands-bit: Reserved** Range: (0x0000~0x0022)	0x0000	RUN

F05.5x: AI Linear Processing

Code (Address)	Name	Content	Factory	Property
F05.50 (0x0532)	AI1 lower limit	**V/F SVC FVC PMVF PMSVC PMFVC** Define the signal received by the terminal. The voltage signal below this value is processed as the lower limit. Range: (0.0%~100.0%)	0.0%	RUN
F05.51 (0x0533)	AI1 lower limit percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of the set value. Range: (-100.00%~100.00%)	0.00%	RUN
F05.52 (0x0534)	AI1 upper limit	**V/F SVC FVC PMVF PMSVC PMFVC** Define the signal received by the terminal. The voltage signal higher than this value is processed as the upper limit. Range: (0.0%~100.0%)	100.0%	RUN
F05.53 (0x0535)	AI1 upper limit percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of the set value. Range: (-100.00%~100.00%)	100.00%	RUN
F05.54 (0x0536)	AI1 Filter Time	**V/F SVC FVC PMVF PMSVC PMFVC** Define the size of the filter applied to the analog signal to remove interfering signals. Range: (0.000s~6.000s)	0.100s	RUN
F05.55 (0x0537)	AI2 lower limit	**V/F SVC FVC PMVF PMSVC PMFVC** Define the signal received by the terminal. The voltage signal below this value is processed as the lower limit. Range: (0.0%~100.0%)	0.0%	RUN

F05.56 (0x0538)	AI2 lower limit percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of the set value. Range: (-100.00%~100.00%)	0.00%	RUN
F05.57 (0x0539)	AI2 upper limit	**V/F SVC FVC PMVF PMSVC PMFVC** Define the signal received by the terminal. The voltage signal higher than this value is processed as the upper limit. Range: (0.0%~100.0%)	100.0%	RUN
F05.58 (0x053A)	AI2 upper limit percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of the set value. Range: (-100.00%~100.00%)	100.00%	RUN
F05.59 (0x053B)	AI2 Filter Time	**V/F SVC FVC PMVF PMSVC PMFVC** Define the size of the filter applied to the analog signal to remove interfering signals. Range: (0.000s~6.000s)	0.100s	RUN

F05.6x: AI Curve 1

Code (Address)	Name	Content	Factory	Property
F05.60 (0x053C)	Curve 1 lower limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the lower limit for Curve 1. Range: (0.0%~100.0%)	0.0%	RUN
F05.61 (0x053D)	Curve 1 Lower Limit Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of the set value. Range: (0.00%~100.00%)	0.00%	RUN
F05.62 (0x053E)	Curve 1 Inflection Point1 Input Voltage	**V/F SVC FVC PMVF PMSVC PMFVC** Set Curve 1 inflection point1 input voltage. Range: (0.0%~100.0%)	30.0%	RUN
F05.63 (0x053F)	Curve 1 inflection point1 percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of the set value. Range: (0.00%~100.00%)	30.00%	RUN
F05.64 (0x0540)	Curve 1 Inflection Point2 Input Voltage	**V/F SVC FVC PMVF PMSVC PMFVC** Set Curve 1 inflection point1 input voltage. Range: (0.0%~100.0%)	60.0%	RUN
F05.65 (0x0541)	Curve 1 inflection point2 percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of the set value. Range: (0.00%~100.00%)	60.00%	RUN
F05.66 (0x0542)	Curve 1 upper limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the upper limit for Curve 1. Range: (0.0%~100.0%)	100.0%	RUN
F05.67 (0x0543)	Curve 1 Upper Limit Percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of the set value. Range: (0.00%~100.00%)	100.00%	RUN

F05.7x: AI Curve 2

Code (Address)	Name	Content	Factory	Property
F05.70 (0x0546)	Curve 2 lower limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the lower limit for Curve 2. Range: (0.0%~100.0%)	0.0%	RUN
F05.71 (0x0547)	Curve 2 lower limit percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of the set value. Range: (0.00%~100.00%)	0.00%	RUN
F05.72 (0x0548)	Curve 2 inflection point1 input voltage	**V/F SVC FVC PMVF PMSVC PMFVC** Set Curve 2 inflection point1 input voltage. Range: (0.0%~100.0%)	30.0%	RUN
F05.73 (0x0549)	Curve 2 inflection point1 percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of the set value. Range: (0.00%~100.00%)	30.00%	RUN
F05.74 (0x054A)	Curve 2 inflection point2 input voltage	**V/F SVC FVC PMVF PMSVC PMFVC** Set Curve 2 inflection point1 input voltage. Range: (0.0%~100.0%)	60.0%	RUN
F05.75 (0x054B)	Curve 2 inflection point 2 percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of the set value. Range: (0.00%~100.00%)	60.00%	RUN
F05.76 (0x054C)	Curve 2 upper limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set the upper limit for Curve 2. Range: (0.0%~100.0%)	100.0%	RUN
F05.77 (0x054D)	Curve 2 upper limit percentage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the percentage of the set value. Range: (0.00%~100.00%)	100.00%	RUN

F05.8x: AI as DI Terminal

Code (Address)	Name	Content	Factory	Property
F05.80 (0x0550)	AI as DI Terminal Characteristic	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Valid at low level;1: Valid at high level Ones-bit: AI1; Tens-bit: AI2 Hundreds-bit and thousands-bit: Reserved Range: (0x0000~0x0011)	0x0000	RUN
F05.81 (0x0551)	AI1 Terminal (as X Terminal)	**V/F SVC FVC PMVF PMSVC PMFVC** See X terminal functions. Range: (0~95)	0	STOP
F05.82 (0x0552)	AI1 High Level Setting	**V/F SVC FVC PMVF PMSVC PMFVC** Any value beyond this setting is considered as high level. Range: (0.00%~100.00%)	70.00%	RUN
F05.83 (0x0553)	AI1 Low Level Setting	**V/F SVC FVC PMVF PMSVC PMFVC** Any value below this setting is considered as low level. Range: (0.00%~100.00%)	30.00%	RUN

F05.84 (0x0554)	AI2 Terminal (as X Terminal)	**V/F SVC FVC PMVF PMSVC PMFVC** See X terminal functions. Range: (0~95)	0	STOP
F05.85 (0x0555)	AI2 high level	**V/F SVC FVC PMVF PMSVC PMFVC** Any value beyond this setting is considered as high level. Range: (0.00%~100.00%)	70.00%	RUN
F05.86 (0x0556)	AI2 low level	**V/F SVC FVC PMVF PMSVC PMFVC** Any value below this setting is considered as low level. Range: (0.00%~100.00%)	30.00%	RUN

10.10 Group F06: Output Terminal

F06.0x: AO (Analog, Frequency Output)

Code (Address)	Name	Content	Factory	Property
F06.00 (0x0600)	AO selection	**V/F SVC FVC PMVF PMSVC PMFVC** 0: 0V~10V / 1: 4.00mA~20.00mA 2: 0.00mA~20.00mA / 3: FM high-speed pulse output 4: Fixed frequency ratio output / - Range: (0~4)	0	RUN
F06.01 (0x0601)	AO mode selection	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Given frequency / 1: Output frequency 2: Output current / 3: Input voltage 4: Output voltage / 5: Mechanical speed 6: Given torque / 7: Output torque 8~9: Reserved / 10: Output power 11: Bus voltage / 12: AI1 value 13: AI2 value / 14~15: Reserved 16: Module temperature 1 / 17: Module temperature 2 18: RS485 communication setting / - Range: (0~18)	0	RUN
F06.02 (0x0602)	AO gain	**V/F SVC FVC PMVF PMSVC PMFVC** Adjust the value of the terminal analog output. Range: (0.0%~300.0%)	100.0%	RUN
F06.03 (0x0603)	AO bias	**V/F SVC FVC PMVF PMSVC PMFVC** Set AO bias. Used to adjust the zero point of the terminal output. Range: (-10.0%~10.0%)	0.0%	RUN
F06.04 (0x0604)	AO filter time	**V/F SVC FVC PMVF PMSVC PMFVC** Define the size of the filter applied to the analog signal to remove interfering signals. Range: (0.000s~6.000s)	0.010s	RUN

F06.05 (0x0605)	AO as the lower limit of the FM frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set the output signal lower limit. Range: (0.00kHz~100.00kHz)	0.20kHz	RUN
F06.06 (0x0606)	AO as the upper limit of the FM frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set AO as the upper limit of the FM frequency. Range: (0.00kHz~100.00kHz)	50.00 kHz	RUN

F06.1x: Expanded AO

Code (Address)	Name	Content	Factory	Property
F06.10 (0x060A)	Expansion card AO selection	**V/F SVC FVC PMVF PMSVC PMFVC** 0: 0V~10V;1: 4.00mA~20.00mA 2: 0.00mA~20.00mA Range: (0~2)	0	RUN
F06.11 (0x060B)	Expansion card AO selection	**V/F SVC FVC PMVF PMSVC PMFVC** Correspond to expansion card AO output, same as F06.01. Range: (0~18)	1	RUN
F06.12 (0x060C)	Expansion card AO gain	**V/F SVC FVC PMVF PMSVC PMFVC** Adjust the value of the terminal analog output. Range: (25.0%~300.0%)	100.0%	RUN
F06.13 (0x060D)	Expansion card AO bias	**V/F SVC FVC PMVF PMSVC PMFVC** Used to adjust the zero point of the terminal output. Range: (-10.0%~10.0%)	0.0%	RUN
F06.14 (0x060E)	Expansion card AO filter	**V/F SVC FVC PMVF PMSVC PMFVC** Define the size of the filter applied to the analog signal to remove interfering signals. Range: (0.000s~6.000s)	0.010s	RUN

F06.2x~F06.3x: Digital and Relay Output

Code (Address)	Name	Content	Factory	Property
F06.20 (0x0614)	Output terminal polarity	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Positive polarity; 1: Negative polarity Ones-bit: Y terminal / Tens-bit: Relay terminal 1 Hundreds-bit: Expansion Y2 terminal / Thousands-bit: Expansion relay output terminal Range: (0x0000~0x1111)	0x0000	RUN
F06.21 (0x0615)	Output terminal Y	**V/F SVC FVC PMVF PMSVC PMFVC** See terminal Y functions. Range: (0~63)	40	RUN
F06.22 (0x0616)	Relay 1 output (TA-TB-TC)	**V/F SVC FVC PMVF PMSVC PMFVC** See terminal Y functions. Range: (0~63)	40	RUN

F06.23 (0x0617)	Output Y2 Terminal	**V/F SVC FVC PMVF PMSVC PMFVC** See terminal Y functions. Range: (0~63)	42	RUN
F06.24 (0x0618)	Expansion relay 2 output (TA2-TB2-TC2)	**V/F SVC FVC PMVF PMSVC PMFVC** See terminal Y functions. Range: (0~63)	4	RUN
F06.25 (0x0619)	Y output ON delay time	**V/F SVC FVC PMVF PMSVC PMFVC** Set Y output ON delay time. Range: (0.000s~60.000s)	0.010s	RUN
F06.26 (0x061A)	Relay1 output ON delay time	**V/F SVC FVC PMVF PMSVC PMFVC** Set relay 1 output ON delay time. Range: (0.000s~60.000s)	0.010s	RUN
F06.27 (0x061B)	Expansion Y ON delay time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the expansion Y terminal ON delay time. Range: (0.000s~60.000s)	0.010s	RUN
F06.28 (0x061C)	Expansion relay 2 output ON delay time	**V/F SVC FVC PMVF PMSVC PMFVC** Set relay 2 output ON delay time. Range: (0.000s~60.000s)	0.010s	RUN
F06.29 (0x061D)	Y output OFF delay time	**V/F SVC FVC PMVF PMSVC PMFVC** Set Y output OFF delay time. Range: (0.000s~60.000s)	0.010s	RUN
F06.30 (0x061E)	Relay1 output OFF delay time	**V/F SVC FVC PMVF PMSVC PMFVC** Set relay 1 output OFF delay time. Range: (0.000s~60.000s)	0.010s	RUN
F06.31 (0x061F)	Expansion Y2 output OFF delay time	**V/F SVC FVC PMVF PMSVC PMFVC** Set Y2 output OFF delay time. Range: (0.000s~60.000s)	0.010s	RUN
F06.32 (0x0620)	Expansion relay 2 output OFF delay time	**V/F SVC FVC PMVF PMSVC PMFVC** Set relay 2 output OFF delay time. Range: (0.000s~60.000s)	0.010s	RUN

Refer to the table below to set the function of F06.2x [terminal Y functions].

Y	Description	Y	Description	Y	Description
0	No output	11	Given frequency arrival	28	Underload warning output 2
1	Drive in operation	12	Zero-speed in operation	29	Drive in warning
2	Drive in reverse operation	13	Upper Limit Frequency Completion	30	Communication address 0x3018
3	Drive in forward operation	14	Lower limit frequency arrival	31	Drive overheat warning
4	Fault trip alarm 1 (alarm during fault auto-recovery)	15	Program running cycle completion	32~39	Reserved
5	Fault trip alarm 2(no alarm during fault self-recovery)	16	Program phase completion	40	Brake-specific control

6	Stop due to external faults	17~23	Reserved	41	Input phase loss alarm
7	AC drive undervoltage	24	Dynamic brake in progress	42	Brake failure
8	AC drive ready for operation	25	Reserved	43	Insufficient brake torque
9	Output frequency detection 1 (FDT1)	26	Emergency stop in progress	44~47	Extended use for industry applications
10	Output frequency detection 2 (FDT2)	27	Overload warning output 1	48~63	Optional card use

F06.4x: Frequency Detection

Code (Address)	Name	Content	Factory	Property
F06.40 (0x0628)	Frequency detection value 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set frequency detection value 1. Range: (0.00Hz~Max. frequency)	2.00Hz	RUN
F06.41 (0x0629)	Frequency detection range 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set frequency detection range1. Range: (0.00Hz~Max. frequency)	1.00Hz	RUN
F06.42 (0x062A)	Frequency detection value 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set frequency detection value 2. Range: (0.00Hz~Max. frequency)	2.00Hz	RUN
F06.43 (0x062B)	Frequency detection range 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set frequency detection range 2. Range: (0.00Hz~Max. frequency)	1.00Hz	RUN
F06.44 (0x062C)	Given frequency reaching detection range	**V/F SVC FVC PMVF PMSVC PMFVC** Set the detection range of the given frequency. Range: (0.00Hz~Max. frequency)	2.00Hz	RUN

10.11 Group F07: Operation Control

F07.0x: Start Control

Code (Address)	Name	Content	Factory	Property
F07.00 (0x0700)	Start Mode	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Start at starting frequency 1: Start from DC braking and then at starting frequency 2: Start from speed and direction tracking Range: (0~2)	0	STOP
F07.01 (0x0701)	Pre-excitation start time	**V/F SVC FVC PMVF PMSVC PMFVC** Only the asynchronous motor in vector control supports pre-excitation, which is not supported in other cases. When it is set to 0, pre-excitation is started as motor parameter. When it is not set to 0, pre-excitation is started at the set time. Range: (0.00s~60.00s)	0.00s	STOP

F07.02 (0x0702)	Starting frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Stay in standby status instead of starting when the given frequency is lower than this value. Range:(0.00Hz~Upper limit frequency)	0.00Hz	STOP
F07.03 (0x0703)	Starting Protection	**V/F SVC FVC PMVF PMSVC PMFVC** 0: OFF; 1: ON **Ones-bit: Terminal protection under abnormal exit** **Tens-bit: Jogging terminal protection under abnormal exit** **Hundreds-bit: Terminal protection during command channel-terminal switching** **Thousands-bit:** Reserved **Note:** The terminal starting protection is enabled by default when the free stop, emergency stop or forced stop command are valid. Range: (0x0000~0x0111)	0x1111	STOP
F07.05 (0x0705)	Rotation direction	**V/F SVC FVC PMVF PMSVC PMFVC** **Ones-bit: REV direction** 0: Keep the direction; 1: Invert the direction **Tens-bit: Direction disable** 0: FWD/REV allowed; 1: Only FWD allowed 2: Only REV command allowed **Hundreds-bit: Frequency controlled command direction** 0: Invalid;1: Valid **Thousands-bit: Reserved** **Note:** This value will not be reset during initialization; And the ones-bit value will not be changed after parameter download. Range: (0x0000~0x1121)	0x0000	STOP
F07.06 (0x0706)	Power-Down Restart Selection	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Invalid;1: From speed tracking 2: Start as start mode setting Range: (0~2)	0	STOP
F07.07 (0x0707)	Power-Down Restart Waiting Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set power-down restart waiting time. Range: (0.00s~60.00s)	0.50s	STOP

F07.1x: Stop Control

Code (Address)	Name	Content	Factory	Property
F07.10 (0x070A)	Stop mode	**V/F SVC FVC PMVF PMSVC PMFVC** 0:Decel.stop;1:Free stop Range: (0~1)	0	RUN
F07.11 (0x070B)	Stop detection frequency	**V/F SVC FVC PMVF PMSVC PMFVC** In deceleration stop mode, the drive will stop if the output frequency is lower than this value. Range:(0.00Hz~Upper limit frequency)	1.00Hz	RUN

F07.12 (0x070C)	Pause-restart time limit	**V/F SVC FVC PMVF PMSVC PMFVC** Set pause-restart time limit. Range: (0.000s~60.000s)	0.000s	STOP
F07.15 (0x070F)	Action Selection below Lower Limit Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Run at frequency command 1: Free stop and pause 2: Run at lower limit frequency 3: Run at zero-speed Range: (0~3)	2	RUN
F07.16 (0x0710)	Zero-speed torque holding coefficient	**V/F SVC FVC PMVF PMSVC PMFVC** 100.0% of the rated motor current, the upper limit of the braking current is the rated current of the drive. Range: (0.0%~150.0%)	60.0%	RUN
F07.17 (0x0711)	Zero-speed torque holding time	**V/F SVC FVC PMVF PMSVC PMFVC** Set zero-speed torque holding time. Range: (0.0s~6000.0s)	0.0s	RUN
F07.18 (0x0712)	Forward and reverse deadtime	**V/F SVC FVC PMVF PMSVC PMFVC** Set zero frequency holding time during FWD/REV switching. Range: (0.0s~120.0s)	0.0s	STOP

F07.2x: DC Brake and Speed Tracking

Code (Address)	Name	Content	Factory	Property
F07.20 (0x0714)	Braking current before startup	**V/F SVC FVC PMVF PMSVC PMFVC** 100.0% of the rated motor current, the upper limit of the braking current is the rated current of the drive. Range: (0.0%~150.0%)	130.0%	STOP
F07.21 (0x0715)	Braking time before startup	**V/F SVC FVC PMVF PMSVC PMFVC** Set braking time before startup. Range: (0.0s~60.0s)	0.8s	STOP
F07.22 (0x0716)	DC braking working frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set DC braking working frequency. Range: (0.00Hz~50.00Hz)	0.50Hz	STOP
F07.23 (0x0717)	DC Braking Current	**V/F SVC FVC PMVF PMSVC PMFVC** 100.0% of the rated motor current, the upper limit of the braking current is the rated current of the drive. Range: (0.0%~150.0%)	40.0%	STOP
F07.24 (0x0718)	DC braking time during stop	**V/F SVC FVC PMVF PMSVC PMFVC** Set DC braking time during stop. Range: (0.0s~60.0s)	0.0s	STOP

F07.25 (0x0719)	Speed tracking mode	**V/F SVC FVC PMVF PMSVC PMFVC** **Ones-bit: Search mode** 0: Search from max. frequency; 1: Search from stop frequency **Tens-bit: Reverse search** 0: OFF; 1: ON **Hundreds-bit and thousands-bit: Reserved** Range: (0x0000~0x0111)	0x0000	STOP
F07.26 (0x071A)	Speed tracking time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the speed tracking time. Range: (0.00s~60.00s)	0.50s	STOP
F07.27 (0x071B)	Speed Tracking Stop Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set speed tracking stop delay. Range: (0.00s~60.00s)	1.00s	STOP
F07.28 (0x071C)	Speed tracking current	**V/F SVC FVC PMVF PMSVC PMFVC** Set speed tracking current. Range: (0.0%~400.0%)	120.0%	STOP

F07.3x: Jogging

Code (Address)	Name	Content	Factory	Property
F07.30 (0x071E)	Jogging frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Set jogging frequency. Range: (0.00Hz~Max. frequency)	5.00Hz	RUN
F07.31 (0x071F)	Jogging acceleration time	**V/F SVC FVC PMVF PMSVC PMFVC** Set jogging acceleration time. Range: (0.00s~650.00s)	10.00s	RUN
F07.32 (0x0720)	Jogging deceleration time	**V/F SVC FVC PMVF PMSVC PMFVC** Set jogging deceleration time. Range: (0.00s~650.00s)	10.00s	RUN
F07.33 (0x0721)	Jogging S-curve	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Invalid; 1: Valid Range: (0~1)	1	RUN
F07.34 (0x0722)	Jogging stop mode	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Same as F7.10; 1: Deceleration stop only Range: (0~1)	0	RUN

F07.4x: Start /Stop Holding Frequency and Jump Frequency

Code (Address)	Name	Content	Factory	Property
F07.40 (0x0728)	Holding frequency at start	**V/F SVC FVC PMVF PMSVC PMFVC** It is higher than the starting frequency and lower than the upper limit frequency set via keyboard. Range:(0.00Hz~Upper limit frequency)	0.00Hz	STOP

F07.41 (0x0729)	Holding frequency during start	**V/F SVC FVC PMVF PMSVC PMFVC** The set value should be greater than the starting frequency, and if it is insufficient, start at starting frequency. Range: (0.00s~60.00s)	0.00s	STOP
F07.42 (0x072A)	Holding frequency during stop	**V/F SVC FVC PMVF PMSVC PMFVC** Set holding frequency at stop. Range:(0.00Hz~Upper limit frequency)	0.00Hz	STOP
F07.43 (0x072B)	Frequency holding time during stop	**V/F SVC FVC PMVF PMSVC PMFVC** Set holding frequency during stop. Range: (0.00s~60.00s)	0.00s	STOP
F07.44 (0x072C)	Jump frequency 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set jump frequency 1. Range: (0.00Hz~Max. frequency)	0.00Hz	RUN
F07.45 (0x072D)	Jump frequency range 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set jump frequency range. Range: (0.00Hz~Max. frequency)	0.00Hz	RUN
F07.46 (0x072E)	Jump frequency 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set jump frequency 2. Range: (0.00Hz~Max. frequency)	0.00Hz	RUN
F07.47 (0x072F)	Jump frequency range 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set jump frequency range. Range: (0.00Hz~Max. frequency)	0.00Hz	RUN

10.12 Group F10: Protection Parameters

F10.0x: Current Protection

Code (Address)	Name	Content	Factory (Range)	Property
F10.00 (0x0A00)	Overcurrent suppression	**V/F SVC FVC PMVF PMSVC PMFVC** Auto limit below the set overcurrent suppression point to prevent faults triggered by excessive current. 0: Always on 1: ON during accel./decel and off at constant speed 2: Overcurrent suppression off Range: (0~2)	2	RUN
F10.01 (0x0A01)	Overcurrent suppression point	**V/F SVC FVC PMVF PMSVC PMFVC** Set load current limit level, 100% of the drive rated current. Range: (0.0%~300.0%)	160.0%	RUN
F10.02 (0x0A02)	Overcurrent suppression gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set the response effect of overcurrent suppression. Range: (0.0%~500.0%)	100.0%	RUN

F10.03 (0x0A03)	Current protection setting 1	**V/F SVC FVC PMVF PMSVC PMFVC** Set current-related protection on/off. **Ones-bit: CBC current limit** 0: OFF; 1: ON **Tens-bit: OC protection interference suppression** 0: Normal; 1: L1 interference suppression 2: L2 interference suppression **Hundreds-bit: SC protection interference suppression** 0: Normal; 1: L1 interference suppression 2: L2 interference suppression **Thousands-bit: Reserved** Range: (0x0000~0xf221)	0x0000	STOP
F10.04 (0x0A04)	Current protection setting 2	**V/F SVC FVC PMVF PMSVC PMFVC** **Ones-bit: three-phase current sum protection** 0: OFF; 1: ON **Tens-bit: three-phase current imbalance protection** 0: OFF; 1: ON Range: (0x0000~0x0011)	0x0001	STOP
F10.05 (0x0A05)	Current imbalance threshold	**V/F SVC FVC PMVF PMSVC PMFVC** Compare the ratio of the largest to the smallest phase of the three-phase current with the set value here to judge current imbalance. Range: (0%~500%)	160%	STOP
F10.06 (0x0A06)	Current imbalance filter coefficient	**V/F SVC FVC PMVF PMSVC PMFVC** Increase this parameter under high current fluctuation. Range: (0.0s~60.0s)	2.0s	STOP

F10.1x: Voltage Protection

Code (Address)	Name	Content	Factory	Property
F10.11 (0x0A0B)	Busbar Overvoltage Suppression	**V/F SVC FVC PMVF PMSVC PMFVC** If the bus voltage is higher than the overvoltage suppression point, acceleration and deceleration will be slowed down or canceled to prevent overvoltage faults. **Ones-bit: Overvoltage suppression** 0: OFF; 1: ON **Tens-bit: Overexcitation** 0: OFF; 1: ON during deceleration 2: ON during operation Range: (0x0000~0x0021)	0x0010	STOP
F10.12 (0x0A0C)	Busbar overvoltage suppression point	**V/F SVC FVC PMVF PMSVC PMFVC** Set bus voltage value to trigger the overvoltage suppression function. Range: (0V~S2: 400V; T3: 400V)	S2: 370V; T3: 750V	STOP

F10.13 (0x0A0D)	Bus overvoltage suppression gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set the response effect of overvoltage suppression. Range: (0.0%~500.0%)	100.0%	RUN
F10.14 (0x0A0E)	Dynamic brake enable	**V/F SVC FVC PMVF PMSVC PMFVC** Set dynamic brake on or off. 0: OFF 1: ON, with overvoltage suppression off 2: ON, with overvoltage suppression on Range: (0~2)	1	RUN
F10.15 (0x0A0F)	Dynamic brake start voltage	**V/F SVC FVC PMVF PMSVC PMFVC** Set the dynamic brake voltage to start when the bus voltage is higher than this value. Range: (0V~S2: 400V; T3: 400V)	S2: 360V; T3: 740V	RUN
F10.16 (0x0A10)	Bus undervoltage suppression	**V/F SVC FVC PMVF PMSVC PMFVC** Auto adjust the operation frequency when the bus voltage is lower than the undervoltage suppression point to prevent undervoltage fault. 0: OFF; 1: ON Range: (0~1)	0	STOP
F10.17 (0x0A11)	Bus undervoltage suppression point	**V/F SVC FVC PMVF PMSVC PMFVC** Set bus voltage value to trigger the undervoltage suppression function. Range: (0V~S2: 400V; T3: 400V)	S2: 240V; T3: 430V	STOP
F10.18 (0x0A12)	Bus undervoltage suppression gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set the response effect of undervoltage suppression. Range: (0.0%~500.0%)	100.0%	RUN
F10.19 (0x0A13)	Bus Undervoltage Protection Point	**V/F SVC FVC PMVF PMSVC PMFVC** Set the lower limit voltage of the busbar voltage allowed, report undervoltage fault when below this value. Range: (0V~S2: 400V; T3: 400V)	S2: 190V; T3: 320V	STOP

F10.2x: Auxiliary Protection

Code (Address)	Name	Content	Factory	Property
F10.20 (0x0A14)	I/O Phase Loss Protection Selection	**V/F SVC FVC PMVF PMSVC PMFVC** Set I/O phase loss protection function on or off. **Ones-bit: Output phase loss** 0: OFF; 1: ON **Tens-bit: Input phase loss** 0: OFF 1: ON, report A.iLF when input phase loss is detected, continue operation 2: ON, report E.iLF when input phase loss is detected, free stop **Hundreds-bit and thousands-bit: Reserved** Range: (0x0000~0x1121)	0x0021	STOP

F10.21 (0x0A15)	Input Phase Loss Threshold	**V/F SVC FVC PMVF PMSVC PMFVC** Set voltage detection percentage for the input phase loss detection, 100% of the rated bus voltage. Range: (0.0%~30.0%)	10.0%	STOP
F10.22 (0x0A16)	Grounded Short Circuit Protection	**V/F SVC FVC PMVF PMSVC PMFVC** Set drive output and cooling fan to ground short circuit protection on/off. **Ones-bit: Output to ground short circuit protection** 0: OFF; 1: Detect after power on 2: Detect before operation **Tens-bit: Fan to ground short circuit protection** 0: OFF; 1: ON **Hundreds-bit: Power short circuit protection** 0: OFF; 1: ON Range: (0x0000~0x0112)	0x0111	STOP
F10.23 (0x0A17)	Fan On/OFF Selection	Set the drive cooling fan operation mode. 0: Fan runs after the drive is powered up 1: Fan runs according to temperature, and runs with the drive 2: Fan runs for the set time of F10.24 and stops. Fan operation relates to temperature Range: (0~2)	1	RUN
F10.24 (0x0A18)	Fan Control Delay Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the time from running command releasing to cooling fan stopping. Range: (0.00s~600.00s)	30.00s	STOP
F10.25 (0x0A19)	Drive Overheat oH1 Warning	**V/F SVC FVC PMVF PMSVC PMFVC** Set the value for overheating, report an alarm when it is above this value. Range: (0.0℃~100.0℃)	80.0℃	RUN
F10.26 (0x0A1A)	Motor Overheat Protection (Expansion Card)	**V/F SVC FVC PMVF PMSVC PMFVC** Set the function related to motor overheat protection when IO expansion card is used. **Ones-bit: Temperature detection type** 0: PT1000 1: KTY84 (Note: PT100 is prior by hardware switch) **Tens-bit: Temperature detection identification time** 0: 2s;1: Fault identification off; 2: 5s 3: 30s; 4: 60s; 5: 120s 6: 300s (5min)-default; 7: 600s 8: 1200s; 9: 1800s(30 min) **Hundreds-bit: Reserved** **Thousands-bit: Motor temperature disconnection detection action** 0: Detection off 1: Warning and free stop 2: Warning and continue operation Range: (0x0000~0xA1A)	0x0061	RUN

F10.27 (0x0A1B)	Motor Overheat Warning Level (Expansion Card)	**V/F SVC FVC PMVF PMSVC PMFVC** Set the value for overheat, report fault when it is above this value. Range: (0.0℃~200.0℃)	110.0℃	RUN
F10.28 (0x0A1C)	Motor Overheat Alarm Level (Expansion Card)	**V/F SVC FVC PMVF PMSVC PMFVC** Set the value for overheat, report an alarm when it is above this value. Range: (0.0℃~F10.27)	90.0℃	RUN

F10.3x: Load Protection

<table>
<tr><th>Code (Address)</th><th>Name</th><th>Content</th><th>Factory</th><th>Property</th></tr>
<tr><td>F10.32 (0x0A20)</td><td>Load warning detection</td><td>V/F SVC FVC PMVF PMSVC PMFVC
Set the drive load detection mode and the warning mode at this time.
Ones-bit: Load detection 1
<table><tr><td>0: Detection off</td><td>1: Detect overload</td></tr><tr><td>2: Detect overload only at constant speed</td><td>3: Detect underload</td></tr><tr><td>4: Detect underload at constant speed only</td><td>-</td></tr></table>Tens-bit: Load detection 1 warning mode
<table><tr><td>0: Continue to run, report A. Ld1</td><td>1: Free stop and report E. Ld1</td></tr></table>Hundreds-bit: Load detection 2
<table><tr><td>0: Detection off</td><td>1: Detect overload</td></tr><tr><td>2: Detect overload only at constant speed</td><td>3: Detect underload</td></tr><tr><td>4: Detect underload at constant speed only</td><td>-</td></tr></table>Thousands-bit: Load detection 2 warning mode
<table><tr><td>0: Continue to run, report A. Ld2</td><td>1: Free stop and report E. Ld2</td></tr></table>Range: (0x0000~0x1414)</td><td>0x0000</td><td>STOP</td></tr>
<tr><td>F10.33 (0x0A21)</td><td>Load Warning 1</td><td>V/F SVC FVC PMVF PMSVC PMFVC
Set the value 1 for load warning.
For V/F control, 100% of the rated motor current.
For vector control, 100% of the motor rated output torque.
Range: (0.0%~200.0%)</td><td>130.0%</td><td>STOP</td></tr>
<tr><td>F10.34 (0x0A22)</td><td>Load Warning Detection Time 1</td><td>V/F SVC FVC PMVF PMSVC PMFVC
Set the duration of load detection 1, if the load is higher than the load warning for the set time, report load warning1.
Range: (0.0s~60.0s)</td><td>5.0s</td><td>STOP</td></tr>
</table>

F10.35 (0x0A23)	Load Warning 2	**V/F SVC FVC PMVF PMSVC PMFVC** Set the value 2 for load warning. For V/F control, 100% of the rated motor current. For vector control, 100% of the motor rated output torque. Range: (0.0%~200.0%)	30.0%	STOP
F10.36 (0x0A24)	Load Warning 2 Detection Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the duration of load detection, if the load is higher than the load warning detection for the set time here, report load warning 2. Range: (0.0s~60.0s)	5.0s	STOP

F10.4x: Stall Protection

Code (Address)	Name	Content	Factory	Property
F10.40 (0x0A28)	Excessive Speed Deviation Protection	**V/F SVC FVC PMVF PMSVC PMFVC** Set the selection of the warning detection method and the alarm method when the deviation between the motor's given speed and the feedback speed is too large. **Ones-bit: Detection selection** 0: OFF 1: Detect only at constant speed 2: ON **Tens-bit: Alarm selection** 0: Free stop and report fault 1: Report alarm and continue operation Range: (0x0000~0x0012)	0x0000	STOP
F10.41 (0x0A29)	Excessive Speed Deviation Threshold	**V/F SVC FVC PMVF PMSVC PMFVC** Set the detection value for excessive speed deviation, 100% of F01.10 [Maximum Frequency]. Range: (0.0%~60.0%)	10.0%	STOP
F10.42 (0x0A2A)	Excessive Speed Deviation Detection Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the duration for detecting excessive speed deviation. If the deviation between the given speed and the feedback speed is greater than F10.41 and continues for this time, an excessive speed deviation warning is reported. Range: (0.0s~60.0s)	2.0s	STOP
F10.43 (0x0A2B)	Stall protection	**V/F SVC FVC PMVF PMSVC PMFVC** Set the detection mode and alarm mode. **Ones-bit: Detection selection** 0: OFF 1: Detect only at constant speed 2: ON **Tens-bit: warning selection** 0: Free stop and report fault 1: Report alarm and continue operation Range: (0x0000~0x0012)	0x0002	STOP

F10.44 (0x0A2C)	Stall Detection Threshold	**V/F SVC FVC PMVF PMSVC PMFVC** Set the value of the stall detection, 100% of F01.10 [Maximum Frequency]. Range: (0.0%~150.0%)	110.0%	STOP
F10.45 (0x0A2D)	Stall Detection Time	**V/F SVC FVC PMVF PMSVC PMFVC** Set the duration of stall detection, if the feedback speed is higher than F10.44 and lasts for the set time, report the stall warning. Range: (0.000s~2.000s)	0.100s	STOP

F10.5x: Fault Recovery and Motor Overload

Code (Address)	Name	Content	Factory	Property
F10.50 (0x0A32)	Fault Auto-Recovery No.	**V/F SVC FVC PMVF PMSVC PMFVC** Set the number of times allowed to perform fault recovery. Note: 0 indicates that the failure self-recovery function is disabled; otherwise, it is enabled. Range: (0~10)	0	STOP
F10.51 (0x0A33)	Fault Auto-Recovery Interval	**V/F SVC FVC PMVF PMSVC PMFVC** Set the waiting time after a fault occurs until reset. Range: (0.0s~100.0s)	3.0s	STOP
F10.52 (0x0A34)	Failures recovery number	**V/F SVC FVC PMVF PMSVC PMFVC** Indicate the times of already performed fault recovery. Read-only.	0	READ
F10.55 (0x0A37)	Motor Overload Model	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Common motor 1: Variable frequency motor (50Hz) 2: Variable frequency motor (60Hz) 3: Motor without cooling fan Range: (0~3)	0	RUN
F10.56 (0x0A38)	Motor Insulation Class	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Insulation class A 1: Insulation class E 2: Insulation class B 3: Insulation class F 4: Insulation class H 5: Special class S Range: (0~5)	3	STOP
F10.57 (0x0A39)	Motor Work Pattern	**V/F SVC FVC PMVF PMSVC PMFVC** 0-1: S1 pattern (continuous operation) 2: S2 pattern 3-9: S3-S9 Range: (0~9)	0	STOP
F10.58 (0x0A3A)	Motor Overload Start Threshold	**V/F SVC FVC PMVF PMSVC PMFVC** Motor overload start threshold, actual current is greater than cumulative increased overload. Range: (0.0%~130.0%)	105.0%	STOP
F10.59 (0x0A3B)	Motor overload current coefficient	**V/F SVC FVC PMVF PMSVC PMFVC** Motor overload current = actual current * motor overload current coefficient. Range: (0.0%~250.0%)	100.0%	STOP

10.13 Group F11: Keyboard Parameters

F11.0x: Key Operation

<table>
<tr><th>Code (Address)</th><th>Name</th><th>Content</th><th>Factory</th><th>Property</th></tr>
<tr><td>F11.00
(0x0B00)</td><td>Key Lock</td><td>V/F SVC FVC PMVF PMSVC PMFVC
0: Unlock
1: Parameter modification via keyboard locked
2: Parameters and non-start/stop key locked
3: Parameters and keys locked
Range: (0~3)</td><td>0</td><td>RUN</td></tr>
<tr><td>F11.01
(0x0B01)</td><td>Key Lock Password</td><td>V/F SVC FVC PMVF PMSVC PMFVC
Use with key lock; please remember the password after setting, otherwise it will not be operated if locked.
Range: (0~65535)</td><td>0</td><td>RUN</td></tr>
<tr><td>F11.02
(0x0B02)</td><td>Multi-function Key</td><td>V/F SVC FVC PMVF PMSVC PMFVC
<table><tr><td>0: Invalid</td><td>1: Reverse operation</td></tr><tr><td>2: Forward jogging</td><td>3: Reverse jogging</td></tr><tr><td>4: Switch command channel between keyboard and terminal</td><td>5: Switch command channel between keyboard and communication</td></tr><tr><td>6: Switch command channel between terminal and communication</td><td>7: Switch command channel among keyboard, terminal and communication cyclically</td></tr></table>Range: (0~7)</td><td>0</td><td>STOP</td></tr>
<tr><td>F11.03
(0x0B03)</td><td>STOP Key Selection</td><td>V/F SVC FVC PMVF PMSVC PMFVC
0: Non-keyboard control off
1: Non-keyboard stop works as stop mode
2: Non-keyboard stop works as free stop mode
Range: (0~2)</td><td>0</td><td>STOP</td></tr>
<tr><td>F11.04
(0x0B04)</td><td>Up/Down (Knob) on Status Screen</td><td>V/F SVC FVC PMVF PMSVC PMFVC
Ones-bit: UP/DW modification
0: Invalid
1: Adjust the frequency given via keyboard [F01.09]
2: Reserved
3: Adjust the function code of F11.05
Tens-bit: Power-down save
0: Power-down frequency save off
1: power-down frequency save on
Hundreds-bit: action limit
0: Modify during running and stop
1: Modify during running, keep during stop
2: Modifiable during operation, reset after stop
Thousands-bit: Reserved
Range: (0x0000~0x0213)</td><td>0x0010</td><td>STOP</td></tr>
</table>

F11.1x: Cyclic Monitoring of Status Interface

Code (Address)	Name	Content	Factory	Property
F11.10 (0x0B0A)	Left/Right function selection on status screen	**V/F SVC FVC PMVF PMSVC PMFVC** **Ones-bit:** left shift key to adjust the first row of monitoring 0: Invalid; 1: Valid **Tens-bit:** right shift key to adjust the second row of monitoring 0: Invalid; 1: Valid When the left/right shift key is invalid, the monitor display value is shown as parameter 1 after re-powering up. Range: (0x0000~0x0011)	0x0011	STOP
F11.11 (0x0B0B)	Cyclic display of parameter 1 on the 1st line	**V/F SVC FVC PMVF PMSVC PMFVC** **Ones-and tens-bit:** Set monitor parameter in Cxx.yy to yy 00~63 **Hundreds and thousands-bit:** Set monitor parameter in Cxx.yy to xx 00~07 Range: (0x0000~0x0763)	0x0001	RUN
F11.12 (0x0B0C)	Cyclic display of parameter 2 on the 1st line	**V/F SVC FVC PMVF PMSVC PMFVC** **Ones-and tens-bit:** Set monitor parameter in Cxx.yy to yy 00~63 **Hundreds and thousands-bit:** Set monitor parameter in Cxx.yy to xx 00~07 Range: (0x0000~0x0763)	0x0002	RUN
F11.13 (0x0B0D)	Cyclic display of parameter 3 on the 1st line	**V/F SVC FVC PMVF PMSVC PMFVC** **Ones-and tens-bit:** Set monitor parameter in Cxx.yy to yy 00~63 **Hundreds and thousands-bit:** Set monitor parameter in Cxx.yy to xx 00~07 Range: (0x0000~0x0763)	0x0000	RUN

F11.14 (0x0B0E)	Cyclic display of parameter 4 on the 1st line	**V/F SVC FVC PMVF PMSVC PMFVC** **Ones-and tens-bit:** Set monitor parameter in Cxx.yy to yy 00~63 **Hundreds and thousands-bit:** Set monitor parameter in Cxx.yy to xx 00~07 Range: (0x0000~0x0763)	0x0014	RUN
F11.15 (0x0B0F)	Cyclic display of parameter 1 on the 2nd line	**V/F SVC FVC PMVF PMSVC PMFVC** **Ones-and tens-bit:** Set monitor parameter in Cxx.yy to yy 00~63 **Hundreds and thousands-bit:** Set monitor parameter in Cxx.yy to xx 00~07 Range: (0x0000~0x0763)	0x0002	RUN
F11.16 (0x0B10)	Cyclic display of parameter 2 on the 2nd line	**V/F SVC FVC PMVF PMSVC PMFVC** **Ones-and tens-bit:** Set monitor parameter in Cxx.yy to yy 00~63 **Hundreds and thousands-bit:** Set monitor parameter in Cxx.yy to xx 00~07 Range: (0x0000~0x0763)	0x0004	RUN
F11.17 (0x0B11)	Cyclic display of parameter 3 on the 2nd line	**V/F SVC FVC PMVF PMSVC PMFVC** **Ones-and tens-bit:** Set monitor parameter in Cxx.yy to yy 00~63 **Hundreds and thousands-bit:** Set monitor parameter in Cxx.yy to xx 00~07 Range: (0x0000~0x0763)	0x0010	RUN
F11.18 (0x0B12)	Cyclic display of parameter 4 on the 2nd line	**V/F SVC FVC PMVF PMSVC PMFVC** **Ones-and tens-bit:** Set monitor parameter in Cxx.yy to yy 00~63 **Hundreds and thousands-bit:** Set monitor parameter in Cxx.yy to xx 00~07 Range: (0x0000~0x0763)	0x0012	RUN

F11.2x: Monitoring Parameter

Code (Address)	Name	Content	Factory	Property
F11.20 (0x0B14)	Display Item	**V/F SVC FVC PMVF PMSVC PMFVC** **Ones-bit: Output frequency display** 0: Target frequency; 1: Operating frequency 2~F: The larger the value, the deeper the filtering **Tens-bit: reserved** **Hundreds-bit: power display dimension** 0: In percentage (%); 1:In kilowatt (kW) **Thousands-bit: Reserved** Range: (0x0000~0x111F)	0x1000	RUN
F11.21 (0x0B15)	Speed Display Coefficient	**V/F SVC FVC PMVF PMSVC PMFVC** Adjust the C00.05 speed display. Range: (0.0%~500.0%)	100.0%	RUN
F11.22 (0x0B16)	Power Display Coefficient	**V/F SVC FVC PMVF PMSVC PMFVC** Adjust the C00.10 power display. Range: (0.0%~500.0%)	100.0%	RUN

10.14 Group F12: Communication Parameters

F12.0x: Modbus Slave Parameters

Code (Address)	Name	Content	Factory	Property
F12.00 (0x0C00)	Master/Slave selection	**V/F SVC FVC PMVF PMSVC PMFVC** **Ones-bit: Master/Slave selection** 0: Slave 1: Master **Tens-bit: Reserved**	0000	STOP
F12.01 (0x0C01)	Modbus communication address	**V/F SVC FVC PMVF PMSVC PMFVC** Set different values for different slaves. Range: (1~247)	1	STOP
F12.02 (0x0C02)	Communication Baud Rate	**V/F SVC FVC PMVF PMSVC PMFVC** 0: 1200 bps 1: 2400 bps 2: 4800 bps 3: 9600 bps 4: 19200 bps 5: 38400 bps 6: 57600 bps Range: (0~6)	5	STOP
F12.03 (0x0C03)	Modbus Data Format	**V/F SVC FVC PMVF PMSVC PMFVC** 0: (N, 8, 1) no parity, data bit: 8, stop bit: 1 1: (E, 8, 1) even parity, data bit: 8, stop bit: 1 2: (O, 8, 1) odd parity, data bit:8, stop bit:1 3: (N, 8, 2) no parity, data bit: 8, stop bit: 2 4: (E, 8, 2) even parity, data bit: 8, stop bit: 2 5: (O, 8, 2) odd parity, data bit: 8, stop bit: 2 Range: (0~5)	0	STOP

F12.04 (0x0C04)	Modbus Transmission Response	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Respond to write operation 1: No response to write operation Range: (0~1)	0	RUN
F12.05 (0x0C05)	Modbus Communication Response Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the Modbus communication response delay. Range: (0ms~5000ms)	0ms	RUN
F12.06 (0x0C06)	Modbus Communication Failure Timeout	**V/F SVC FVC PMVF PMSVC PMFVC** Set the Modbus communication failure timeout. Range: (0.1s~100.0s)	1.0s	RUN
F12.07 (0x0C07)	Communications Disconnection Processing	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Timeout fault detection off 1: Warning and free stop 2: Warning and continue operation; 3: Forced stop Range: (0~3)	0	RUN
F12.08 (0x0C08)	Received Data Zero Bias (Address 0x3000)	**V/F SVC FVC PMVF PMSVC PMFVC** Perform bias correction on address 0x3000 communication data. Range: (-100.00~100.00)	0.00	RUN
F12.09 (0x0C09)	Received Data Gain (Address 0x3000)	**V/F SVC FVC PMVF PMSVC PMFVC** Perform linear correction on address 0x3000 communication data. Range: (0.0%~500.0%)	100.0%	RUN

F12.1x: Modbus Master Parameters

Code (Address)	Name	Content	Factory	Property
F12.10 (0x0C0A)	Master Cycle Parameter	**V/F SVC FVC PMVF PMSVC PMFVC** Ones, tens, hundreds, and thousands all can be selected with: 0: Invalid / 1: Master running command 2: Master given frequency / 3: Master output frequency 4: Master upper limit frequency / 5: Master given torque 6: Master output torque / 7-C: Reserved Range: (0x0000~0xCCCC)	0x0031	RUN
F12.11 (0x0C0B)	User-Defined Frequency Address	**V/F SVC FVC PMVF PMSVC PMFVC** User-defined address to give frequency, compatible with the upper computer (PLC) command. Range: (0x0000~0xFFFF)	0x0000	RUN

F12.12 (0x0C0C)	User-Defined Command Address	**V/F SVC FVC PMVF PMSVC PMFVC** User-defined address to give command, compatible with upper computer (PLC) command. Range: (0x0000~0xFFFF)	0x0000	RUN
F12.13 (0x0C0D)	FWD Command Value	**V/F SVC FVC PMVF PMSVC PMFVC** User-defined address to forward running command value. Range: (0x0000~0xFFFF)	0x0001	RUN
F12.14 (0x0C0E)	REV Command Value	**V/F SVC FVC PMVF PMSVC PMFVC** User-defined address to reverse running command value. Range: (0x0000~0xFFFF)	0x0002	RUN
F12.15 (0x0C0F)	Stop Command Value	**V/F SVC FVC PMVF PMSVC PMFVC** User-defined address to stop command value. Range: (0x0000~0xFFFF)	0x0005	RUN
F12.16 (0x0C10)	Reset Command Value	**V/F SVC FVC PMVF PMSVC PMFVC** User-defined address to reset command value. Range: (0x0000~0xFFFF)	0x0007	RUN
F12.19 (0x0C13)	Master Sending Command	**V/F SVC FVC PMVF PMSVC PMFVC** Set master sending command. 0: Send running command ;1: Send running status Range: (0~1)	0	RUN

F12.2x: Modbus Special Functions

Code (Address)	Name	Content	Factory	Property
F12.20 (0x0C14)	RJ45 Communication Mode	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Dual-line keyboard communication 1: Modbus slave (via F12.2x) 2: Modbus master (via F12.1x) 3: VEICHI-defined **Note**: 45kW and above T3 models only support two-wire keyboard communication. Range: (0~3)	0	STOP
F12.21 (0x0C15)	RJ45 Port Communication Address	**V/F SVC FVC PMVF PMSVC PMFVC** Set the slave address when RJ45 port is for Modbus communication. Range: (1~247)	1	STOP
F12.22 (0x0C16)	RJ45 Port Communication Baud Rate	**V/F SVC FVC PMVF PMSVC PMFVC** Set the baud rate when RJ45 port is for Modbus communication. 0: 1200 bps 1: 2400 bps 2: 4800 bps 3: 9600 bps 4: 19200 bps 5: 38400 bps 6: 57600 bps Range: (0~5)	3	STOP

F12.23 (0x0C17)	RJ45 Port Data Format	**V/F SVC FVC PMVF PMSVC PMFVC** Set the data format when RJ45 port is for Modbus communication. 0: (N, 8, 1) no parity, data bit: 8, stop bit: 1 1: (E, 8, 1) even parity, data bit: 8, stop bit: 1 2: (O, 8, 1) odd parity, data bit:8, stop bit:1 3: (N, 8, 2) no parity, data bit: 8, stop bit: 2 4: (E, 8, 2) even parity, data bit: 8, stop bit: 2 5: (O, 8, 2) odd parity, data bit: 8, stop bit: 2 Range: (0~5)	0	STOP
F12.24 (0x0C18)	RJ45 Port Transmission Response	**V/F SVC FVC PMVF PMSVC PMFVC** Set the transmission response when RJ45 port is for Modbus communication. 0: Respond to write operation 1: No response to write operation Range: (0~1)	0	RUN
F12.25 (0x0C19)	RJ45 Port Transmission Response Delay	**V/F SVC FVC PMVF PMSVC PMFVC** Set the transmission response delay when RJ45 port is for Modbus communication. Range: (0ms~5000ms)	0ms	RUN
F12.26 (0x0C1A)	RJ45 Port Transmission Timeout	**V/F SVC FVC PMVF PMSVC PMFVC** Set the transmission timeout value when RJ45 port is for Modbus communication. Range: (0.1s~100.0s)	1.0s	RUN
F12.27 (0x0C1B)	RJ45 Port Transmission Disconnection	**V/F SVC FVC PMVF PMSVC PMFVC** Set the transmission disconnection action when RJ45 port is for Modbus communication. 0: Timeout fault detection off 1: Warning and free stop 2: Warning and continue operation 3: Forced stop Range: (0~3)	0	RUN

F12.3x: PROFIBUS-DP Communication

Code (Address)	Name	Content	Factory	Property
F12.30 (0x0C1E)	DP Card Address	**V/F SVC FVC PMVF PMSVC PMFVC** Set different values for different slaves. Range: (1~247)	1	RUN
F12.32 (0x0C20)	DP Master-Slave Communication Failure	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Detection off 1: Warning and free stop 2: Warning and continue operation Range: (0~2)	0	STOP

Note: Expansion cards are not allowed to be plugged or unplugged with power-on.

F12.4x: CAN Communication

Code (Address)	Name	Content	Factory	Property
F12.40 (0x0C28)	CAN Mode	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Slave 1: VEICHI-defined master Range: (0~1)	0	RUN
F12.41 (0x0C29)	CAN Communication Address	**V/F SVC FVC PMVF PMSVC PMFVC** Set the address of the slave. Range: (1~247)	1	RUN
F12.42 (0x0C2A)	CAN Communication Baud Rate	**V/F SVC FVC PMVF PMSVC PMFVC** 0: 20kbps 1: 50kbps 2: 100kbps 3: 125kbps 4: 250kbps 5: 500kbps 6: 1Mbps Range: (0~6)	3	RUN
F12.43 (0x0C2B)	CAN Master-Slave Communication Failure	**V/F SVC FVC PMVF PMSVC PMFVC** 0: Detection off 1: Warning and free stop 2: Warning and continue operation Range: (0~2)	0	RUN

Note: Expansion cards are not allowed to be plugged or unplugged with power-on.

F12.5x~F12.6x: Expansion Port EX_A and EX_B Communication

Code (Address)	Name	Content	Factory	Property
F12.50 (0x0C32)	Expansion port communication	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit: EX-A port disconnection action mode	0000	RUN
F12.51 (0x0C33)	Expansion port EX-A Parameter	**V/F SVC FVC PMVF PMSVC PMFVC** 0: No update; 1: Initial values updated on power up	0	RUN
F12.52 (0x0C34)	Expansion Port EX-B Parameter	**V/F SVC FVC PMVF PMSVC PMFVC** 0: No update; 1: Initial values updated on power up	0	RUN
F12.53 (0x0C35)	Expansion Port EX-A Monitor	**V/F SVC FVC PMVF PMSVC PMFVC** Ones-bit and tens-bit: Address low 8 bits 00~63	0001	RUN
F12.54 (0x0C36)	Expansion Port EX-A Monitor	**V/F SVC FVC PMVF PMSVC PMFVC** Same	0002	RUN
F12.55 (0x0C37)	Expansion Port EX-A Monitor	**V/F SVC FVC PMVF PMSVC PMFVC** Same	0007	RUN
F12.56 (0x0C38)	Expansion Port EX-A Monitor	**V/F SVC FVC PMVF PMSVC PMFVC** Same	0011	RUN
F12.57 (0x0C39)	Expansion Port EX-B Monitor	**V/F SVC FVC PMVF PMSVC PMFVC** Same	0001	RUN
F12.58 (0x0C3A)	Expansion Port EX-B Monitor	**V/F SVC FVC PMVF PMSVC PMFVC** Same	0002	RUN

F12.59 (0x0C3B)	Expansion Port EX-B Monitor	**V/F SVC FVC PMVF PMSVC PMFVC** Same	0007	RUN
F12.60 (0x0C3C)	Expansion Port EX-B Monitor	**V/F SVC FVC PMVF PMSVC PMFVC** Same	0011	RUN

Note: Expansion cards are not allowed to be plugged or unplugged with power-on.

10.15 Group F14 Multi-step speed Control

F14.00-F14.14: Multi-step speed Frequency

Code (Address)	Name	Content	Factory	Property
F14.00 (0x0E00)	PLC Multi-step speed 1	**V/F SVC FVC PMVF PMSVC PMFVC** This group of parameters is used to set the operating frequency of the 1st segment speed in program and multi-step speed control. Range: (0.00Hz~Max. frequency)	15.00Hz	RUN
F14.01 (0x0E01)	PLC Multi-step speed 2	**V/F SVC FVC PMVF PMSVC PMFVC** This group of parameters is used to set the operating frequency of the 2nd segment speed in program and multi-step speed control. Range: (0.00Hz~Max. frequency)	25.00Hz	RUN
F14.02 (0x0E02)	PLC Multi-step speed 3	**V/F SVC FVC PMVF PMSVC PMFVC** This group of parameters is used to set the operating frequency of the 3rd segment speed in program and multi-step speed control. Range: (0.00Hz~Max. frequency)	40.00Hz	RUN
F14.03 (0x0E03)	PLC Multi-step speed 4	**V/F SVC FVC PMVF PMSVC PMFVC** This parameter is used to set the operating frequency of the 4th segment speed of PLC program and multi-step speed control. Range: (0.00Hz~Max. frequency)	60.00Hz	RUN
F14.04 (0x0E04)	PLC Multi-step speed 5	**V/F SVC FVC PMVF PMSVC PMFVC** This parameter is used to set the operating frequency of the 5th segment speed of PLC program and multi-step speed control. Range: (0.00Hz~Max. frequency)	80.00Hz	RUN
F14.05 (0x0E05)	PLC Multi-step speed 6	**V/F SVC FVC PMVF PMSVC PMFVC** This parameter is used to set the operating frequency of the 6th segment speed of PLC program and multi-step speed control. Range: (0.00Hz~Max. frequency)	40.00Hz	RUN
F14.06 (0x0E06)	PLC Multi-step speed 7	**V/F SVC FVC PMVF PMSVC PMFVC** This parameter is used to set the operating frequency of the 7th segment speed of PLC program and multi-step speed control. Range: (0.00Hz~Max. frequency)	30.00Hz	RUN

F14.07 (0x0E07)	PLC Multi-step speed 8	**V/F SVC FVC PMVF PMSVC PMFVC** This parameter is used to set the operating frequency of the 8th segment speed of PLC program and multi-step speed control. Range: (0.00Hz~Max. frequency)	20.00Hz	RUN
F14.08 (0x0E08)	PLC Multi-step speed 9	**V/F SVC FVC PMVF PMSVC PMFVC** This parameter is used to set the operating frequency of the 9th segment speed of PLC program and multi-step speed control. Range: (0.00Hz~Max. frequency)	10.00Hz	RUN
F14.09 (0x0E09)	PLC Multi-step speed 10	**V/F SVC FVC PMVF PMSVC PMFVC** This parameter is used to set the operating frequency of the 10th segment speed of PLC program and multi-step speed control. Range: (0.00Hz~Max. frequency)	20.00Hz	RUN
F14.10 (0x0E0A)	PLC Multi-step speed 11	**V/F SVC FVC PMVF PMSVC PMFVC** This parameter is used to set the operating frequency of the 11st segment speed of PLC program and multi-step speed control. Range: (0.00Hz~Max. frequency)	30.00Hz	RUN
F14.11 (0x0E0B)	PLC Multi-step speed 12	**V/F SVC FVC PMVF PMSVC PMFVC** This parameter is used to set the operating frequency of the 12nd segment speed of PLC program and multi-step speed control. Range: (0.00Hz~Max. frequency)	40.00Hz	RUN
F14.12 (0x0E0C)	PLC Multi-step speed 13	**V/F SVC FVC PMVF PMSVC PMFVC** This parameter is used to set the operating frequency of the 13th segment speed of PLC program and multi-step speed control. Range: (0.00Hz~Max. frequency)	50.00Hz	RUN
F14.13 (0x0E0D)	PLC Multi-step speed 14	**V/F SVC FVC PMVF PMSVC PMFVC** This parameter is used to set the operating frequency of the 14th segment speed of PLC program and multi-step speed control. Range: (0.00Hz~Max. frequency)	40.00Hz	RUN
F14.14 (0x0E0E)	PLC Multi-step speed 15	**V/F SVC FVC PMVF PMSVC PMFVC** This parameter is used to set the operating frequency of the 15th segment speed of PLC program and multi-step speed control. Range: (0.00Hz~Max. frequency)	30.00Hz	RUN

10.16 Group C0x: Monitoring Parameters

C00.xx: Basic Monitoring

Code (Address)	Name	Mi. Unit	Content
C00.00 (0x2100)	Given Frequency	0.01Hz	Display the absolute value of drive given frequency.
C00.01 (0x2101)	Output Frequency	0.01Hz	Display the drive output frequency.
C00.02 (0x2102)	Output Current	0.1A	Display the drive output current.
C00.03 (0x2103)	Input Voltage	0.1V	Display the drive input voltage.
C00.04 (0x2104)	Output Voltage	0.1V	Display the drive output voltage.
C00.05 (0x2105)	Mechanical Speed	1rpm	Display the motor mechanical speed.
C00.06 (0x2106)	Given Torque	0.1%	Display drive given torque. Valid when vector is selected as the control mode.
C00.07 (0x2107)	Output Torque	0.1%	Display drive output torque.
C00.10 (0x210A)	Output Power	0.1%	Display drive current output power.
C00.11 (0x210B)	Bus Voltage	0.1V	Display current bus voltage.
C00.12 (0x210C)	Module Temperature 1	0.1℃	Drive Internal Temperature.
C00.13 (0x210D)	Module Temperature 2	0.1℃	-
C00.14 (0x210E)	Input terminal X Status	-	The status of the multi-function input terminal is indicated by 1 (ON) and 0 (OFF). For example, when both terminals X1 and X2 are ON, C00.14 displays .
C00.15 (0x210F)	Output terminal Y status	-	The status of the multi-functional output terminal is displayed by 1 (ON) and 0 (OFF). For example, when Y terminal and relay are ON, C00.15 displays .
C00.16 (0x2110)	AI1	0.001V/0.001mA	Set F05.41 for voltage and current input. F05.41to "0" for voltage input and to "1" for current input.
C00.17 (0x2111)	AI2	0.001V/0.001mA	Set F05.42 for voltage and current input. F05.42 Set to "0" for voltage input and set to "1" for current input.

C00.20 (0x2114)	Analog output	0.01V/0.01mA/0.01kHz	Set F06.00 to 0V~10V, 0mA~20mA or pulse output.
C00.21 (0x2115)	Expansion AO	0.01V/0.01mA	Can be selected as 0V~10V or 0mA~20mA, used with the optional cards.
C00.23 (0x2117)	Current Power-On Time	0.1: hour	-
C00.24 (0x2118)	Cumulative running time	hour	-
C00.25 (0x2119)	Drive Capacity	0.1kVA	AC drive capacity.
C00.26 (0x211A)	Drive Rated Voltage	1V	Drive rated voltage.
C00.27 (0x211B)	Drive Rated Current	0.1A	Drive rated current.
C00.28 (0x211C)	Software Version	00.00	Software version.
C00.29 (0x211D)	PG Feedback Frequency	0.01Hz	Convert the signal detected by PG encoder to frequency values.
C00.30 (0x211E)	Timer	1 Second/Minute/ Hour	The unit is determined by parameter F08.07.
C00.32 (0x2120)	Software Sub-Version	1	Software update time.
C00.33 (0x2121)	Encoder Feedback Angle	1	Encoder feedback angle.
C00.34 (0x2122)	Accumulated Z-Pulse Error	1	ABZ encoder detects A and B signals by Z pulse to judge whether the encoder has pulse loss.
C00.35 (0x2123)	Z-Pulse Count	1	Z pulse count through ABZ encoder.
C00.36 (0x2124)	Fault Code	1	The number corresponds to the fault code, and "0" means no fault.
C00.37 (0x2125)	Cumulative Power Consumption (Low)	1	Total electricity consumption = [C00.37 + C00.38*10000]°
C00.38 (0x2126)	Cumulative Power Consumption (High)	1	
C00.39 (0x2127)	Power factor angle	1°	-

C01.xx: Fault monitoring

Code (Address)	Name	Mi. Unit	Content
C01.00 (0x2200)	Fault type diagnostic information	-	Display form fault

C01.01 (0x2201)	Cause	1	Display the fault code and fault sub-code in digital form, and check the corresponding solutions in the fault diagnosis section.
C01.02 (0x2202)	Fault Operation Frequency	0.01Hz	Display output frequency during fault.
C01.03 (0x2203)	Fault Output Voltage	0.1V	Display output voltage during fault.
C01.04 (0x2204)	Fault Output Current	0.1A	Display output current during fault.
C01.05 (0x2205)	Fault Bus Voltage	0.1V	Display bus voltage during fault.
C01.06 (0x2206)	Fault Module Temperature	0.1	Display the temperature of the inner module of the drive during fault.
C01.07 (0x2207)	Drive Status during Fault	0x0000	**Ones-bit: Operation direction** 0: Forward; 1: Reverse **Tens-bit: Operation status** 0: Stop; 1: Stable running; 2: Accelerating; 3: Decelerating **Hundreds-bit: Overvoltage and overcurrent** 0: Normal; 1: Overvoltage; 2: Overcurrent; 3: Overvoltage and overcurrent **Thousands-bit: Reserved**
C01.08 (0x2208)	Input Terminal X Status during Fault	-	The status of the multi-functional input terminal is displayed by 1 (ON) and 0 (OFF). **For example**, when both terminals X1 and X2 are ON, C01.08 displays 11 .
C01.09 (0x2209)	Output Terminal Status during Fault	-	The status of the multi-functional output terminal is displayed by 1 (ON) and 0 (OFF). **For example**, when Y terminal and relay are ON, C01.09 displays 11 .
C01.10 (0x220A)	Previous 1 fault type	-	Display form fault.
C01.11 (0x220B)	Previous 1 fault diagnosis information	1	Display the fault code and fault sub-code in digital form, and check the corresponding solutions in the fault diagnosis section.
C01.12 (0x220C)	Previous 1 fault operation frequency	0.01Hz	Display output frequency during fault.
C01.13 (0x220D)	Previous 1 fault output voltage	0.1V	Display output voltage during fault.
C01.14 (0x220E)	Previous 1 fault output current	0.1A	Display output current during fault.

C01.15 (0x220F)	Previous 1 fault bus voltage	0.1V	Display bus voltage during fault.
C01.16 (0x2210)	Previous 1 fault module temperature	0.1	Display the temperature of the inner module of the drive during fault.
C01.17 (0x2211)	Previous 1 fault drive status	0x0000	Ones-bit: Operation direction 0: Forward; 1: Reverse Tens-bit: Operation status 0: Stop; 1: Stable running; 2: Accelerating; 3: Decelerating Hundreds-bit: Overvoltage and overcurrent 0: Normal; 1: Overvoltage; 2: Overcurrent; 3: Overvoltage and overcurrent Thousands-bit: Reserved
C01.18 (0x2212)	Previous 1 fault input terminal status	-	The status of the multi-functional input terminal is displayed by 1 (ON) and 0 (OFF). For example, when both terminals X1 and X2 are ON, C01.08 displays 11.
C01.19 (0x2213)	Previous 1 fault output terminal status	-	The status of the multi-functional output terminal is displayed by 1 (ON) and 0 (OFF). For example, when Y terminal and relay are ON, C01.09 displays 11.
C01.20 (0x2214)	Previous 2 fault type	-	Display form fault.
C01.21 (0x2215)	Previous 2 fault diagnosis information	1	Display the fault code and fault sub-code in digital form, and check the corresponding solutions in the fault diagnosis section.
C01.22 (0x2216)	Previous 3 fault type	-	Display form fault.
C01.23 (0x2217)	Previous 3 fault diagnosis information	1	Display the fault code and fault sub-code in digital form, and check the corresponding solutions in the fault diagnosis section.

C02: App Monitoring

Code (address)	Name	Code (address)	Name
C02.00 (0x2300)~ C02.07 (0x2307)	Reserved	C02.25 (0x2319)	IO expansion card analog 1
C02.08 (0x2308)	FWD/REV command	C02.26 (0x231A)	IO expansion card analog 2
C02.09 (0x2309)	Jogging command	C02.27 (0x231B)	IO expansion card analog 3
C02.10 (0x230A)	Voltage/current before AI1 correction	C02.28 (0x231C)	IO expansion card input terminal status
C02.11 (0x230B)	Voltage/current before AI2 correction	C02.29 (0x231D)	IO expansion card motor temperature detection

C02.12 (0x230C)	Voltage/current before AO correction	C02.30 (0x231E)	IO expansion card PUL count low
C02.13 (0x230D)	Voltage/current before expansion card AO correction	C02.31 (0x231F)	IO expansion card PUL count high
C02.14 (0x230E)	Reserved	C02.32 (0x2320)~ C02.47 (0x232F)	Power-down save parameter 1 ~16
C02.15 (0x230F)	AC drive overload timing factor	C02.48 (0x2330)~ C02.49 (0x2331)	Reserved
C02.16 (0x2310)	Motor overload timing factor	C02.50 (0x2332)~ C02.59 (0x233B)	Cache register 0~9
C02.17 (0x2311) ~ C02.18 (0x2312)	Reserved	C02.60 (0x233C)	Expansion card A version
C02.19 (0x2313)	CBC current limit No.	C02.61 (0x233D)	Expansion card B version
C02.20 (0x2314) ~ C02.24 (0x2318)	Reserved	C02.62 (0x233E)	External keyboard version

C03: Maintenance Monitoring

Code (address)	Name
C03.00 (0x2400)	Current Power-On Time
C03.01 (0x2401)	Cumulative runtime (Hour)
C03.02 (0x2402)	Cumulative power-up (Hour)
C03.03 (0x2403)	Cumulative power-Up (Minute)
C03.04 (0x2404)	Cooling fan running time
C03.05 (0x2405)	Cooling fan maintenance
C03.06 (0x2406)	Reserved
C03.07 (0x2407)	Main relay maintenance
C03.08 (0x2408) ~C03.19(0x2413)	Reserved
C03.50 (0x2432)	Machine code 1
C03.51 (0x2433)	Machine code 2
C03.52 (0x2434)	Machine code 3

10.17 Communications Variable Group

Modbus Communication (0x30xx/ 0x20xx)

Address	Name	R/W	Scale (Range)	Content
0x2000/ 0x3000	Given Frequency	R/W	0.01Hz (0.00Hz~320.00Hz)	Frequency given via communication.

0x2001/ 0x3001	Command giving	W	0x0000 (0x0000~0x0103)	0x0000: Invalid 0x0001: Forward; 0x0002: Reverse 0x0003: Forward jogging 0x0004: Reverse jogging 0x0005: Deceleration stop 0x0006: Free stop 0x0007: Reset 0x0008: Operation disable command, when writing address 3001 to 8 through communication, AC drive freely stops. It needs writing 9 to address 3001 or re-power on to run again. 0x0009: operation on 0X0101: Equivalent to F02.07 = 1 [Dynamic Auto-Tuning], plus operation command 0X0102: Equivalent to F02.07 = 2 [Static Auto-Tuning], plus operation command 0X0103: Equivalent to F02.07 = 3 [Stator Resistance Auto-Tuning], plus operation command
0x2002/ 0x3002	AC drive status	R	Binary	Bit0: 0-Stop;1-Operation Bit1: 0-Non-acceleration; 1-Acceleration Bit2: 0-Non-deceleration; 1-Deceleration Bit3: 0: Forward;1: Reverse Bit4: 0-Normal AC drive; 1-Faulty Bit5: 0-Unlocked; 1-Locked Bit6: 0-No warning; 1-Warning Bit7: 0-Operation enable; 1-Operation disable
0x2003/ 0x3003	Drive fault code	R	0 (0~127)	Read the corresponding value of the fault code via communication.
0x2004 /0x3004	Upper limit frequency	R/W	0.01Hz (0.00Hz~320.00Hz)	Upper limit frequency given via communication.
0x2005 /0x3005	Torque	R/W	0.0% (0.0%~100.0%)	Torque setting via communication.
0x2006/ 0x3006	Torque-controlled FWD speed limit	R/W	0.0% (0.0%~100.0%)	Torque-controlled FWD speed limit given via communication.
0x2007 /0x3007	Torque-controlled of REV speed limit	R/W	0.0% (0.0%~100.0%)	Torque-controlled REV speed limit given via communication.
0x200E/ 0x300E	Acceleration Time 1	R/W	0.00s 0.00s~600.00s	Read and write F01.22.
0x200F/ 0x300F	Deceleration Time 1	R/W	0.00s (0.00s~600.00s)	Read and write F01.23.
0x2010/ 0x3010	Error/Alarm code	R	0 (0~65535)	1~127: Error code, 128~159: alarm code, 0 means no error.

0x2012/ 0x3012	Torque Filter Time	R/W	0.000s (0.000s~6.000s)	Read and write F03.47.
0x2018/ 0x3018	Terminal output	W	Binary	Output terminal function, selected as F6.21~F06.24 to 30 [Communication Control Output]. Bit0: Y terminal Bit1: Relay Bit2: Expansion Y2 Bit3: Expansion relay
0x2019/ 0x3019	AO	W	0.01 (0.00~100.00)	F06.01 = 18 [AO Function = Given via RS485 communication].
0x201A /0x301A	Expansion AO	W	0.01 (0.00~100.00)	F06.11 = 18 [Expansion AO Function = Given via RS485 communication].

Option Card Communication Control Group (0x31xx)

Address	Name	R/W	Scale(Range)	Content
0x3100	Given Frequency	R/W	0.01Hz (0.00Hz~600.00Hz)	Frequency given via communication.
0x3101	Command giving	W	0x0000 (0x0000~0x0103)	0X0000: Invalid 0x0001: Forward; 0x0002: Reverse 0x0003: Forward jogging 0x0004: Reverse jogging 0x0005: Deceleration stop 0x0006: Free stop 0x0007: Reset 0x0008: Operation disable command, when writing address 3001 to 8 through communication, AC drive freely stops. It needs writing 9 to address 3001 or re-power on to run again. 0x0009: operation on 0X0101: Equivalent to F02.07 = 1 [Dynamic Auto-Tuning], plus operation command 0X0102: Equivalent to F02.07 = 2 [Static Auto-Tuning], plus operation command 0X0103: Equivalent to F02.07 = 3 [Stator Resistance Auto-Tuning], plus operation command
0x3102	AC drive status	R	Binary	Bit0: 0-Stop;1-Operation Bit1: 0-Non-acceleration; 1-Acceleration Bit2: 0-Non-deceleration; 1-Deceleration Bit3: 0: Forward;1: Reverse Bit4: 0-Normal AC drive; 1-Faulty Bit5: 0-Unlocked; 1-Locked Bit6: 0-No warning;1-Warning Bit7: 0-Operation enable; 1-Operation disable

0x3103	Drive fault code	R	0 (0~127)	Read the corresponding value of the fault code via communication.
0x3104	Upper limit frequency	R/W	0.01Hz (0.00Hz~F01.10 Hz)	Upper limit frequency given via communication.
0x3105	Torque	R/W	0.0% (0.0%~100.0%)	Torque setting via communication.
0x3106	Torque-controlled FWD speed limit	R/W	0.0% (0.0%~100.0%)	Torque-controlled FWD speed limit given via communication.
0x3107	Torque-controlled of REV speed limit	R/W	0.0% (0.0%~100.0%)	Torque-controlled REV speed limit given via communication.
0x310E	Acceleration Time 1	R/W	0.00s (0.00s~600.00s)	Read and write F01.22.
0x310F	Deceleration Time 1	R/W	0.00s (0.00s~600.00s)	Read and write F01.23.
0x3110	Error/Alarm code	R	0 (0~65535)	1~127: Error code, 128~159: alarm code, 0 means no error.
0x3112	Torque Filter Time	R/W	0.000s (0.000s~6.000s)	Read and write F03.47.
0x3118	Terminal output	W	Binary	Output terminal function, selected as F06.21~F06.24 to 30 [Communication Control Output]. Bit0: Y terminal Bit1: Relay Bit2: Expansion Y2 Bit3: Expansion relay
0x3119	AO	W	0.01 (0.00~100.00)	F06.01 = 18 [AO Function = Given via RS485 communication].
0x311A	Expansion AO	W	0.01 (0.00~100.00)	F06.11 = 18 [Expansion AO Function = Given via RS485 communication].

I/O Port Communication Parameter Group(0x34xx)

Address	Name	R/W	Scale (Range)	Content
0x3400	Expansion port SPI communication	R	0 (0~65535)	CH310 Series are default to 1.

0x3401	Input terminal X status	R	Binary	Bit0:X1, 0-OFF; 1-ON Bit1:X2, 0-OFF; 1-ON Bit2:X3, 0-OFF; 1-ON Bit3:X4, 0-OFF; 1-ON Bit4:X5, 0-OFF; 1-ON Bit5:X6, 0-OFF; 1-ON Bit6:X7, 0-OFF; 1-ON Bit7:X8, 0-OFF; 1-ON Bit8:X9, 0-OFF; 1-ON Bit9:X10, 0-OFF; 1-ON
0x3402	Output terminal status	R	Binary	Bit0: Y status, 0-OFF; 1-ON Bit1: Relay status, 0-OFF; 1-ON Bit2: Expansion Y2 status, 0-OFF; 1-ON Bit3: Expansion relay status, 0-OFF; 1-ON
0x3403	Reserved	R	-	-
0x3404	Reserved	R/W	-	-
0x3405	Multi-function input terminal group 0	R	Binary	Each function corresponds to one bit in 0~15. 0-OFF;1-ON
0x3406	Multi-function input terminal group 1	R	Binary	Each function corresponds to one bit in 16~31. 0-OFF;1-ON
0x3407	Multi-function input terminal group 2	R	Binary	Each function corresponds to one bit in 32~47. 0-OFF;1-ON
0x3408	Multi-function input terminal group 3	R	Binary	Each function corresponds to one bit in 48~63. 0-OFF;1-ON
0x3409	Multi-function input terminal group 4	R	Binary	Each function corresponds to one bit in 64~79. 0-OFF;1-ON
0x340A	Multi-function input terminal group 5	R	Binary	Each function corresponds to one bit in 80~95. 0-OFF;1-ON
0x340B	IO expansion card input terminal status	R	Binary	Bit0:X6, 0-OFF; 1-ON Bit1:X7, 0-OFF; 1-ON Bit2:X8, 0-OFF; 1-ON Bit3:X9, 0-OFF; 1-ON Bit4:X10, 0-OFF; 1-ON Bit5-Bit11 reserved Bit12-Bit15 corresponds to 4-bit virtual terminal signal 0-OFF;1-ON

0x340C	IO expansion card output terminal status	R	Binary	Bit0: Expansion Y2 status, 0-OFF; 1-ON Bit1: Expansion relay status, 0-OFF; 1-ON
0x340D	IO expansion card analog 1	R	0.00% (0.00%~100.00%)	IO expansion card analog detection(Motor temperature detection)
0x340E	IO expansion card analog 2	R	-	Reserved
0x340F	IO expansion card analog 3	R	-	Reserved
0x3410	IO expansion card analog 4	R	-	Reserved
0x3414	AO 24	R/W	0 (0~1000)	Use with optional cards.
0x3415	AO 25	R/W	0 (0~1000)	Use with optional cards.
0x3416	AO 26	R/W	0 (0~1000)	Use with optional cards.
0x3417	AO 27	R/W	0 (0~1000)	Use with optional cards.
0x3418	AO 28	R/W	0 (0~1000)	Use with optional cards.
0x3419	AO 29	R/W	0 (0~1000)	Use with optional cards.
0x341A	AO 30	R/W	0 (0~1000)	Use with optional cards.
0x341B	AO 31	R/W	0 (0~1000)	Use with optional cards.

Cache Register Communication Parameter Group(0x35xx)

Address	Name	R/W	Scale (Range)	Content
0x3500	Register 0	R/W	(0~65535)	Use with optional cards.
0x3501	Register 1	R/W	(0~65535)	Use with optional cards.
0x3502	Register 2	R/W	(0~65535)	Use with optional cards.
0x3503	Register 3	R/W	(0~65535)	Use with optional cards.
0x3504	Register 4	R/W	(0~65535)	Use with optional cards.
0x3505	Register 5	R/W	(0~65535)	Use with optional cards.
0x3506	Register 6	R/W	(0~65535)	Use with optional cards.
0x3507	Register 7	R/W	(0~65535)	Use with optional cards.
0x3508	Register 8	R/W	(0~65535)	Use with optional cards.
0x3509	Register 9	R/W	(0~65535)	Use with optional cards.
0x350A	Register 10	R/W	(0~65535)	Use with optional cards.

0x350B	Register 11	R/W	(0~65535)	Use with optional cards.
0x350C	Register 12	R/W	(0~65535)	Use with optional cards.
0x350D	Register 13	R/W	(0~65535)	Use with optional cards.
0x350E	Register 14	R/W	(0~65535)	Use with optional cards.
0x350F	Register 15	R/W	(0~65535)	Use with optional cards.

Expansion Fault and Power-Down Parameter Group (Address 0x36xx)

Address	Name	R/W	Scale (Range)	Content
0x3600	User-defined fault code register	R/W	0 (11~18)	11~18 correspond to faults E. FA1~E. FA8.
0x3601	User-defined warning code register	R/W	0 (11~16)	11~16 correspond to faults E. FA1~E. FA6.
0x3602	Reserved	R/W	-	-
0x3603	Reserved	R/W	-	-
0x3604	Reserved	R/W	-	-
0x3605	Reserved	R/W	-	-
0x3606	Reserved	R/W	-	-
0x3607	Reserved	R/W	-	-
0x3608	Reserved	R/W	-	-
0x3609	Reserved	R/W	-	-
0x360A	Power-down save parameter 1	R/W	(0~65535)	Use with optional cards, view via C02.32.
0x360B	Power-down save parameter 2	R/W	(0~65535)	Use with optional cards, view via C02.33.
0x360C	Power-down save parameter 3	R/W	(0~65535)	Use with optional cards, view via C02.34.
0x360D	Power-down save parameter 4	R/W	(0~65535)	Use with optional cards, view via C02.35.
0x360E	Power-down save parameter 5	R/W	(0~65535)	Use with optional cards, view via C02.36.
0x360F	Power-down save parameter 6	R/W	(0~65535)	Use with optional cards, view via C02.37.
0x3610	Power-down save parameter 7	R/W	(0~65535)	Use with optional cards, view via C02.38.
0x3611	Power-down save parameter 8	R/W	(0~65535)	Use with optional cards, view via C02.39.
0x3612	Power-down save parameter 9	R/W	(0~65535)	Use with optional cards, view via C02.40.
0x3613	Power-down save parameter 10	R/W	(0~65535)	Use with optional cards, view via C02.41.

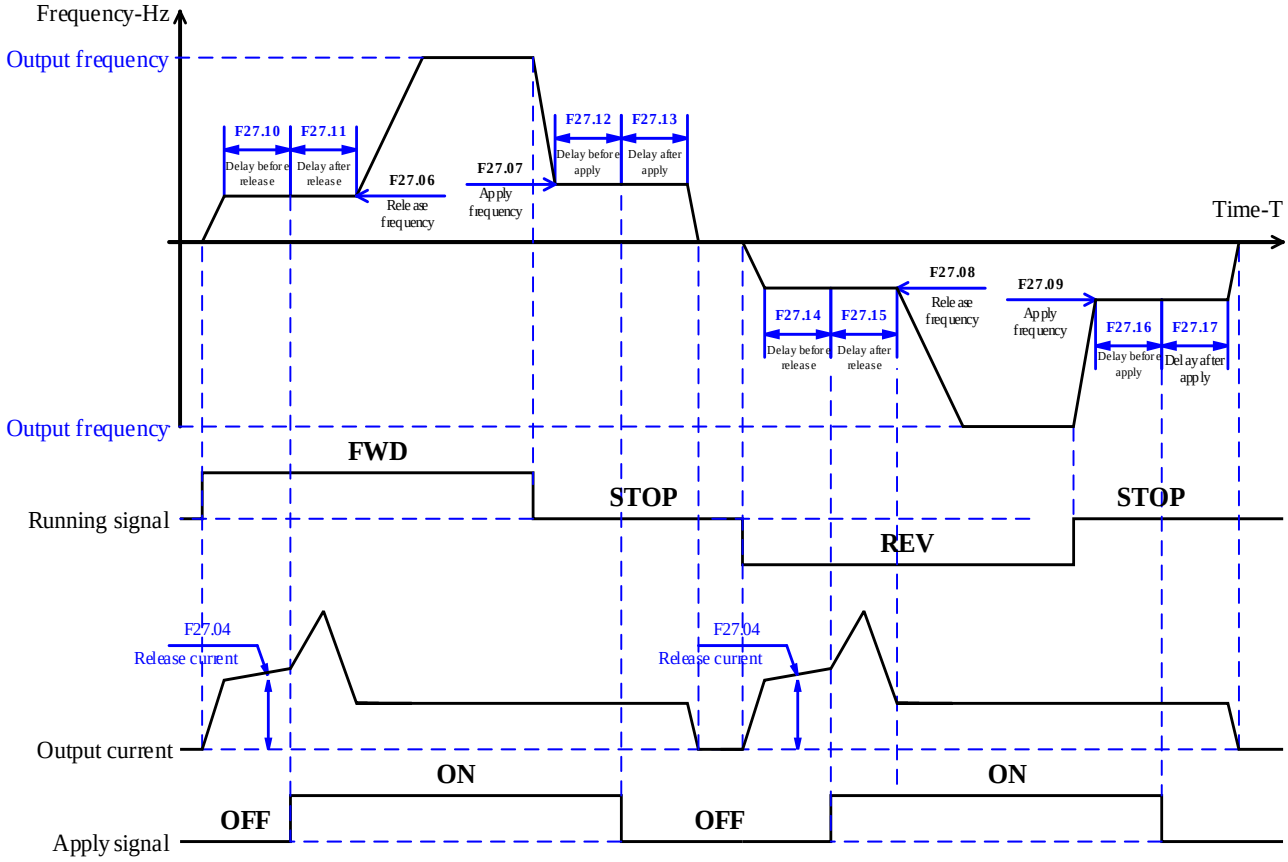
0x3614	Power-down save parameter 11	R/W	(0~65535)	Use with optional cards, view via C02.42.
0x3615	Power-down save parameter 12	R/W	(0~65535)	Use with optional cards, view via C02.43.
0x3616	Power-down save parameter 13	R/W	(0~65535)	Use with optional cards, view via C02.44.
0x3617	Power-down save parameter 14	R/W	(0~65535)	Use with optional cards, view via C02.45.
0x3618	Power-down save parameter 15	R/W	(0~65535)	Use with optional cards, view via C02.46.
0x3619	Power-down save parameter 16	R/W	(0~65535)	Use with optional cards, view via C02.47.

Chapter 11 Lifting-Specific Control

CH310 is a new generation of hoisting-specific products of VEICHI. The performance index of the product is further improved with excellent control performance and rich functions. It is mainly used for driving and controlling lifting, rotating and translating mechanisms in hoisting equipment.

11.1 Brake-Specific Control

Release/hold brake sequence: When the brake is not powered, the brake is now held, and it can only be released under the power; Through brake release frequency, brake release current, brake release time, brake applying time, etc., special brake logic control is realized to avoid hook slip to ensure the safety and reliability of the system.

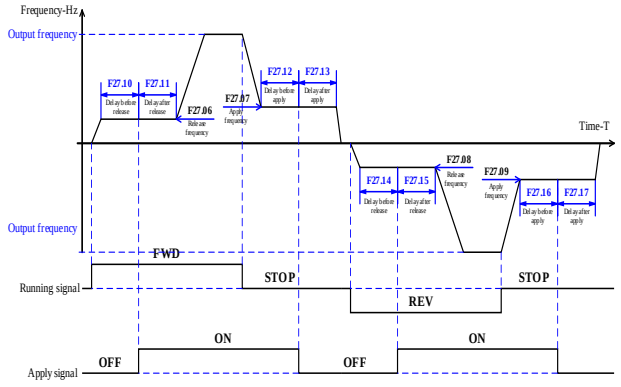


Brake control sequence diagram

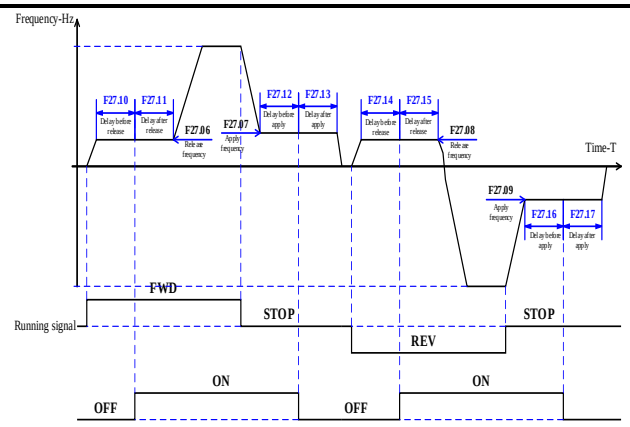
11.2 F27.00: Application Type

<table>
<tr><th>Code (Address)</th><th>Name</th><th>Content</th><th>Factory</th><th>Property</th></tr>
<tr><td>F27.00 (0x5B00)</td><td>Application Type</td><td>
V/F SVC FVC PMVF PMSVC PMFVC
0: General machine; 1: The crane cart
2: Trolley; 3: Rotation mechanism
4: Builder's hoist ; 5: Lifting mechanism
<table>
<tr><th>Type</th><th>Code</th><th>Description</th></tr>
<tr><td rowspan="3">Lifter</td><td>F01.00=0</td><td>V/F control</td></tr>
<tr><td>F27.01=1111</td><td>Brake control</td></tr>
<tr><td>F27.25=1</td><td>E.E63 fault valid</td></tr>
<tr><td rowspan="3">Lifting mechanism</td><td>F01.00=1</td><td>(Open-loop vector control)</td></tr>
<tr><td>F27.01=1001</td><td>Brake control</td></tr>
<tr><td>F27.25=1</td><td>E.E63 fault valid</td></tr>
<tr><td rowspan="2">Translation mechanism</td><td>F01.00=0</td><td>V/F control</td></tr>
<tr><td>F27.25=0</td><td>E.E63 Error invalid</td></tr>
<tr><td rowspan="2">Rotation mechanism</td><td>F01.00=1</td><td>(Open-loop vector control)</td></tr>
<tr><td>F27.25=0</td><td>E.E63 Error invalid</td></tr>
</table>
Select based on the application conditions.
Range: (0~5)
</td><td>5</td><td>STOP</td></tr>
</table>

11.3 F27.01: Brake Control

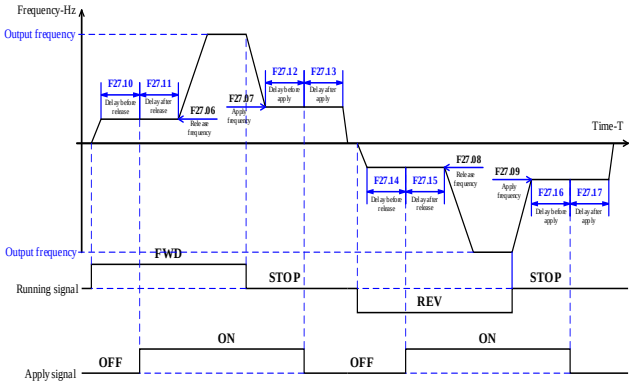
<table>
<tr><th>Code (Address)</th><th>Name</th><th>Content</th><th>Factory</th><th>Property</th></tr>
<tr><td>F27.01 (0x5B01)</td><td>Brake control</td><td>
V/F SVC FVC PMVF PMSVC PMFVC
Ones-bit: Brake release conditions
0: Frequency reached; 1: Frequency and current reached at the same time
2: Output torque arrival (valid in vector control mode)
Tens-bit:2: Brake release direction
0: Release torque in the same direction as operation


1: Release torque in forward direction
</td><td>0x0001</td><td>STOP</td></tr>
</table>

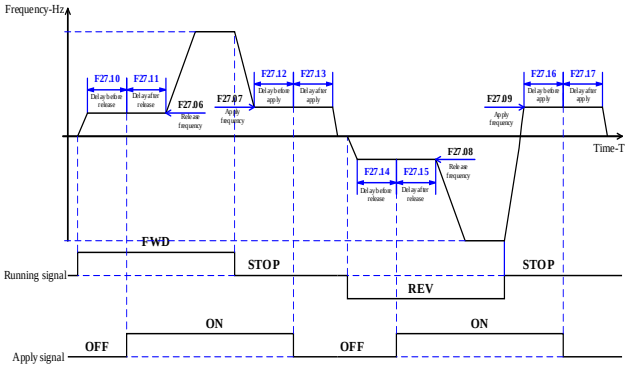


Hundreds-bit: Brake hold direction

0: Holding torque in the same direction as operation



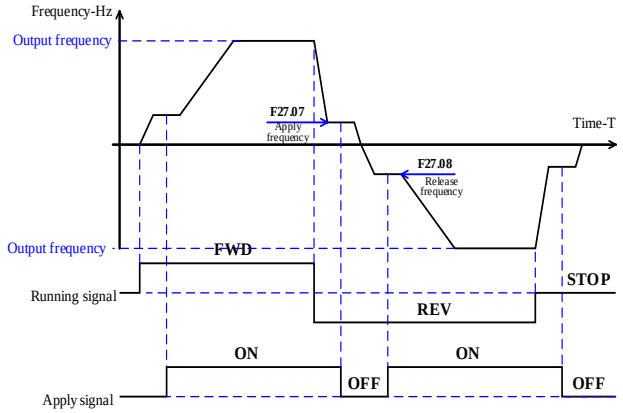
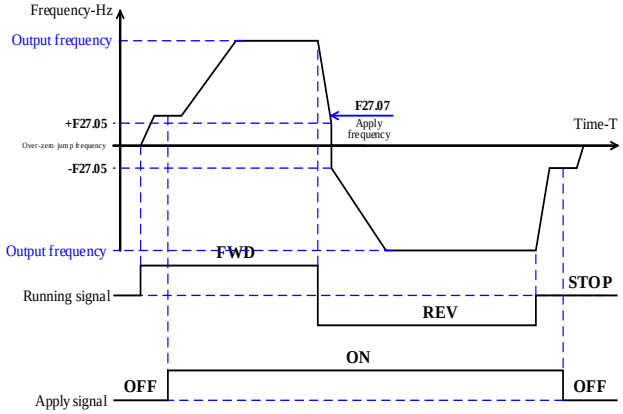
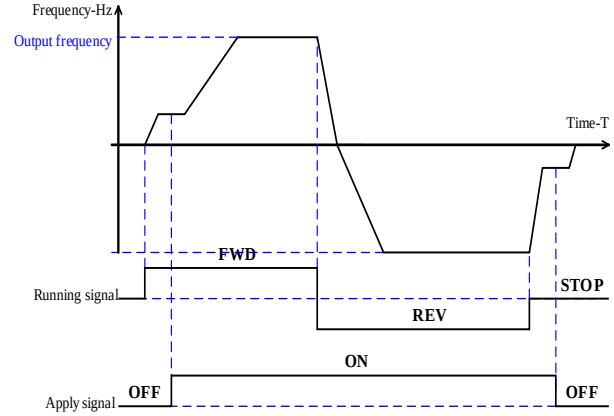
1: Holding torque in forward direction

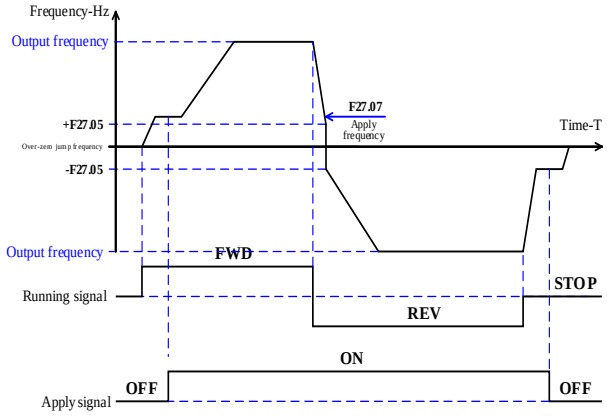
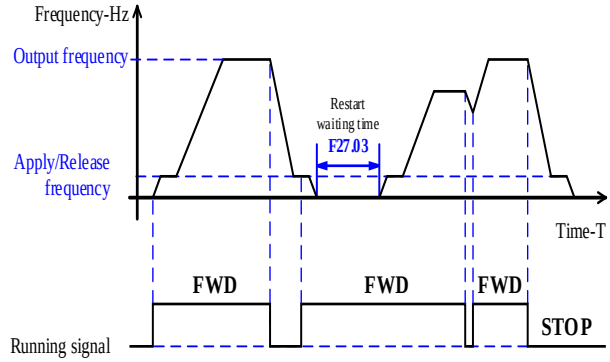


1: Zero crossing frequency jump when release/applying torque in forward direction

Range: (0x0000~0x1112)

11.4 F27.02~F27.05: Operation Command Reverse Control

Code (Address)	Name	Content	Factory	Property
F27.02 (0x5B02)	Reverse control of the operation command	**V/F** SVC **FVC** PMVF PMSVC PMFVC **Ones-bit: Reverse control of the operation command** 0: OFF  1: ON  **Tens-bit: Zero-crossing frequency jump** 0: OFF  1: ON	0x0010	STOP

		 **Hundreds-bit and thousands-bit: Reserved** Range: (0x0000~0x1111)		
F27.03 (0x5B03)	Operation Command Interval	**V/F** SVC **FVC** PMVF PMSVC PMFVC  The operation command received during shutdown and braking needs to wait for the interval after braking completion, and then be responded and performed. Range: (0.00s~10.00s)	0.30s	STOP
F27.04 (0x5B04)	Brake release current threshold	**V/F** SVC **FVC** PMVF PMSVC PMFVC This parameter represents the percentage of the rated current of the motor (F02.06); Set the current threshold value that must be reached when the drive sends the brake release command, otherwise the brake will not be released (output function 40 is valid). Note: When the current before releasing the brake is less than this value, report to E.E62. Range: (0.0%~100.0%)	20.0%	STOP
F27.05 (0x5B05)	Zero-Crossing Jump Frequency	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set the jump frequency during zero crossing in forward and reverse when the brake is held or released. Range: (0.00Hz~10.00Hz)	1.00Hz	STOP

11.5 F27.06~F27.09: Brake Apply/Release Frequency

Code (Address)	Name	Content	Factory	Property
F27.06 (0x5B06)	Forward brake release frequency	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set the operating frequency when the AC drive sends out the brake release command-forward. Range: (0.00Hz~10.00Hz)	2.00Hz	STOP

F27.07 (0x5B07)	Forward Braking Applying Frequency	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set the operating frequency when the AC drive sends out the brake applying command-forward. Range: (0.00Hz~10.00Hz)	2.00Hz	STOP
F27.08 (0x5B08)	Reverse Brake Release Frequency	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set the operating frequency when the AC drive sends out the brake release command-reverse. Range: (0.00Hz~10.00Hz)	2.00Hz	STOP
F27.09 (0x5B09)	Reverse Brake Applying Frequency	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set the operating frequency when the AC drive sends out the brake applying command-reverse. Range: (0.00Hz~10.00Hz)	2.00Hz	STOP

11.6 F27.10~F27.17: Brake Apply/Release Delay

Code (Address)	Name	Content	Factory	Property
F27.10 (0x5B0A)	Pre-Delay of Forward Brake Release	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set the time to hold the brake release frequency operation before the drive sends a brake release command-forward. Range: (0.00s~1.00s)	0.20s	STOP
F27.11 (0x5B0B)	Post-Delay of Forward Brake Release	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set the time to hold the brake release frequency operation after the drive sends a brake release command-forward. Range: (0.00s~1.00s)	0.10s	STOP
F27.12 (0x5B0C)	Pre-Delay of Forward Brake Applying	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set the time to hold the brake applying frequency operation before the drive sends a brake applying command-forward. Range: (0.00s~1.00s)	0.00s	STOP
F27.13 (0x5B0D)	Post-Delay of Forward Brake Applying	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set the time to hold the brake applying frequency operation after the drive sends a brake applying command-forward. Range: (0.00s~1.00s)	0.30s	STOP
F27.14 (0x5B0E)	Pre-Delay of Reverse Brake Release	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set the time to hold the brake release frequency operation before the drive sends a brake release command-reverse. Range: (0.00s~1.00s)	0.20s	STOP
F27.15 (0x5B0F)	Post-Delay of Reverse Brake Release	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set the time to hold the brake release frequency operation after the drive sends a brake release command-reverse. Range: (0.00s~1.00s)	0.10s	STOP

F27.16 (0x5B10)	Pre-Delay of Reverse Brake Applying	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set the time to hold the brake applying frequency operation before the drive sends a brake applying command-reverse. Range: (0.00s~1.00s)	0.00s	STOP
F27.17 (0x5B11)	Post-Delay of Reverse Brake Applying	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set the time to hold the brake applying frequency operation after the drive sends a brake applying command-reverse. Range: (0.00s~1.00s)	0.30s	STOP

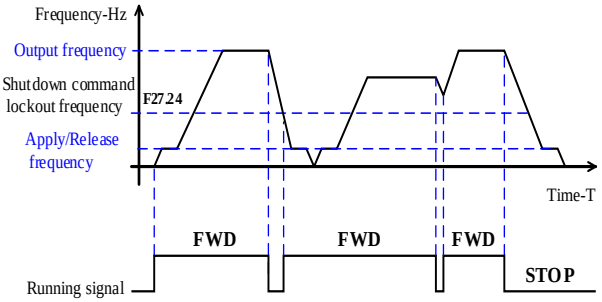
11.7 F27.18~F27.19: Brake Feedback

Code (Address)	Name	Content	Factory	Property
F27.18 (0x5B12)	Lifting functions	**V/F** SVC **FVC** PMVF PMSVC PMFVC **Ones-bit: Reserved** **Tens-bit: Brake applying control-open loop** 0: When the target frequency is lower than the brake applying frequency, it is limited to the brake applying frequency 1: Forced to apply brake when the target frequency is lower than the brake applying frequency 2: No functions **Hundreds-bit: Reserved** **Thousands-bit: Brake output feedback** 0: Brake feedback off 1: Brake release feedback 2: Brake apply feedback 3: Enable brake release feedback and brake apply feedback at the same time Range: (0x0000~0x3321)	0x0000	STOP
F27.19 (0x5B13)	Brake Feedback Detection Delay	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set the delay time for brake feedback detection. Range: (0.0s~5.00s)	0.30s	RUN

11.8 F27.21~F27.22: Zero-Crossing Acceleration/Deceleration Time

Code (Address)	Name	Content	Factory	Property
F27.21 (0x5B15)	Zero-Crossing Acceleration Time	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set forward/ reverse zero-crossing acceleration time for brake release and apply. Range: (0.00s~600.00s)	0.00s	RUN
F27.22 (0x5B16)	Zero-Crossing Deceleration Time	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set forward/ reverse zero-crossing deceleration time for brake release and apply. Range: (0.00s~600.00s)	0.00s	RUN

11.9 F27.24: Stop-Specific Setting

Code (Address)	Name	Content	Factory	Property
F27.24 (0x5B18)	Stop command locking frequency	**V/F** SVC **FVC** PMVF PMSVC PMFVC When the output frequency is lower than the setting value of this parameter, the machine will be stopped and locked from responding to the operation command. Range: (0.00Hz~600.00Hz) 	3.00Hz	RUN

11.10 F27.25~F27.27: Output Error Protection

Code (Address)	Name	Content	Factory	Property
F27.25 (0x5B19)	Output Error Protection	**V/F** SVC **FVC** PMVF PMSVC PMFVC The output current is continuously detected during operation, and when an abnormal output current is detected, a fault is reported and shutdown occurs (E.E63). 0: OFF; 1: ON Range: (0~1)	1	STOP
F27.26 (0x5B1A)	Output Current Error Detection Threshold	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set output current error detection threshold. Range: (0%~50%)	5%	STOP
F27.27 (0x5B1B)	Output Current Error Detection Time	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set output current error detection time. Range: (0.000s~1.000s)	0.300s	STOP

11.11 F27.28~F27.45: Constant Power Control Settings

Code (Address)	Name	Content	Factory	Property
F27.28 (0x5B1C)	Constant power	**V/F** SVC **FVC** PMVF PMSVC PMFVC Constant power control is commonly known as "speed changes with load". In operation, the highest running speed is calculated according to the current lifting weight to realize the function of "high speed at light load and low speed at heavy load" and improves the operation efficiency of lifting equipment. 0: OFF;1: ON Range: (0~1)	0	STOP

F27.29 (0x5B1D)	Load Calculation Frequency	**V/F** SVC **FVC** PMVF PMSVC PMFVC In constant power application, the maximum operating frequency allowed to operate is calculated by this frequency. Range: (0.0%~100.0%)	50.0%	STOP
F27.30 (0x5B1E)	Load Calculation Time	**V/F** SVC **FVC** PMVF PMSVC PMFVC In constant power application, the maximum operating frequency allowed to operate is calculated through this time. Range: (0.000s~3.000s)	0.500s	STOP
F27.31 (0x5B1F)	Max. Frequency under Constant Power	**V/F** SVC **FVC** PMVF PMSVC PMFVC The maximum operating frequency allowed during constant power. Range: (0.0%~400.0%)	200.0%	STOP
F27.32 (0x5B20)	Min. Torque under Constant Power	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set the min. torque under constant power. Range: (0.0%~50.0%)	20.0%	RUN
F27.33 (0x5B21)	Reserved			
F27.34 (0x5B22)	Reserved			
F27.35 (0x5B23)	Reserved			
F27.36 (0x5B24)	Forward Power Limit under Constant Power	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set forward power limit under constant power. Range: (0.0%~150.0%)	90.0%	STOP
F27.37 (0x5B25)	Reverse Power Limit under Constant Power	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set reverse power limit under constant power. Range: (0.0%~150.0%)	80.0%	STOP
F27.38 (0x5B26)	Forward Power Factor-Closed Loop	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set forward power factor of closed loop under constant power. Range: (0.0%~120.0%)	100.0%	STOP
F27.39 (0x5B27)	Reverse Power Factor-Closed Loop	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set reverse power factor of closed loop under constant power. Range: (0.0%~120.0%)	90.0%	STOP
F27.40 (0x5B28)	Forward Power Factor-Open Loop	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set forward power factor of open loop under constant power. Range: (0.0%~120.0%)	80.0%	STOP
F27.41 (0x5B29)	Reverse Power Factor-Open Loop	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set reverse power factor of open loop under constant power. Range: (0.0%~150.0%)	70.0%	STOP

F27.42 (0x5B2A)	Forward Detection Factor-Closed Loop	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set forward detection factor of closed loop under constant power. Range: (0.0%~100.0%)	90.0%	STOP
F27.43 (0x5B2B)	Reverse Detection Factor-Closed Loop	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set reverse detection factor of closed loop under constant power. Range: (0.0%~100.0%)	80.0%	STOP
F27.44 (0x5B2C)	Forward Detection Factor-Open Loop	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set forward detection factor of open loop under constant power. Range: (0.0%~100.0%)	90.0%	STOP
F27.45 (0x5B2D)	Reverse Detection Factor-Open Loop	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set reverse detection factor of closed loop under constant power. Range: (0.0%~100.0%)	80.0%	RUN

11.12 F27.46~F27.53: Antspeed (Slow Positioning) parameter setting

Code (Address)	Name	Content	Factory	Property
F27.46 (0x5B2E)	Antspeed First Gear	**V/F SVC FVC PMVF PMSVC PMFVC** Set the frequency of Antspeed 1st gear. Range: (0.00Hz~50.00Hz)	3.00Hz	RUN
F27.47 (0x5B2F)	Antspeed Second Gear	**V/F SVC FVC PMVF PMSVC PMFVC** Set the frequency of Antspeed 2nd gear. Range: (0.00Hz~50.00Hz)	5.00Hz	RUN
F27.48 (0x5B30)	Antspeed Third Gear	**V/F SVC FVC PMVF PMSVC PMFVC** Set the frequency of Antspeed 3rd gear. Range: (0.00Hz~50.00Hz)	10.00Hz	RUN
F27.49 (0x5B31)	Antspeed Forth Gear	**V/F SVC FVC PMVF PMSVC PMFVC** Set the frequency of Antspeed 4th gear. Range: (0.00Hz~50.00Hz)	15.00Hz	RUN
F27.50 (0x5B32)	Antspeed Firth Gear	**V/F SVC FVC PMVF PMSVC PMFVC** Set the frequency of Antspeed 5th gear. Range: (0.00Hz~50.00Hz)	20.00Hz	RUN
F27.51 (0x5B33)	Antspeed Frequency	**V/F SVC FVC PMVF PMSVC PMFVC** Select frequency giving method: 0: Via communication. Antspeed is mapped to the fixed frequency of gear (F27.46~F27.50) 1: Antspeed 1, given gear frequency * F27.52 [Antspeed Proportional Gain] 2: Antspeed 2, given to fixed frequency F27.53 Range: (0~2)	0	RUN
F27.52 (0x5B34)	Antspeed Proportional Gain	**V/F SVC FVC PMVF PMSVC PMFVC** Set the gain for the Antspeed frequency. Range: (0.0%~100.0%)	20.0%	RUN

F27.53 (0x5B35)	Antspeed Frequency	**V/F** **SVC** **FVC** **PMVF** **PMSVC** **PMFVC** Set the frequency of Antspeed. Range: (0.0Hz~50.00Hz)	5.00Hz	RUN

11.13 F27.55~F27.59: Brake Torque Detection

Code (Address)	Name	Content	Factory	Property
F27.55 (0x5B37)	Braking torque	**V/F** SVC **FVC** PMVF PMSVC PMFVC When the brake torque detection is turned on, the detection is triggered by the terminal input function 82, and when the brake torque is insufficient, E.104 fault is reported. 0: OFF;1: ON Range: (0~1)	0	STOP
F27.56 (0x5B38)	Braking Torque Detection No.	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set the detection number of insufficient brake torque. Range: (0~10)	2	STOP
F27.57 (0x5B39)	Insufficient Braking Torque	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set the detection value for insufficient brake torque. Range: (0.0%~150.0%)	100.0%	STOP
F27.58 (0x5B3A)	Braking Torque Detection Frequency	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set the insufficient braking torque detection frequency. Range: (0.00Hz~5.00Hz)	2.00Hz	STOP
F27.59 (0x5B3B)	Insufficient Braking Torque Detection Time	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set the insufficient braking torque detection time. Range: (0.000s~2.000s)	0.200s	STOP

11.14 F27.60~F27.65: Brake Failure Protection

Code (Address)	Name	Content	Factory	Property
F27.60 (0x5B3C)	Brake Failure Protection	**V/F** SVC **FVC** PMVF PMSVC PMFVC When the brake failure protection is on, the brake failure is detected during shutdown, and the zero-speed operation is started, and the brake failure alarm is output at the same time. 0: OFF;1: ON Range: (0~1)	0	STOP
F27.61 (0x5B3D)	Brake Failure Protection Threshold	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set the brake failure protection threshold. Range: (0.00Hz~5.00Hz)	1.00Hz	STOP
F27.62 (0x5B3E)	Brake Failure Protection Holding Time	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set the holing time of zero-speed operation when the brake fails. Range: (0.0s~3000.0s)	60.0s	STOP
F27.63 (0x5B3F)	Brake Failure Filter Time	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set brake failure filter time. Range: (0.000s~2.000s)	0.100s	STOP

F27.64 (0x5B40)	Brake Failure Upward Frequency Limit	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set the maximum operating frequency when the brake fails and goes upward. Range: (0.00Hz~100.00Hz)	0.00Hz	RUN
F27.65 (0x5B41)	Brake Failure Downward Frequency Limit	**V/F** SVC **FVC** PMVF PMSVC PMFVC Set the maximum operating frequency when the brake fails and goes downward. Range: (0.00Hz~100.00Hz)	50.00Hz	RUN

Version Change Log

Date	Content	Version
2023.12	First version issued	V1.0

VEICHI

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Official Website

Version:2024 V1.0