WANSHSIN®

User Manual

Simple Version

V3. 1

WS600

Preface

Thank you for purchasing the AC drive developed by our company.

AC drives are general type inverters with vector control based on BD330. High quality, multiple functions and low noise, developed independently by ourselves. It can realize open loop and close loop control of different mode, and also signal detection of PT100/PT1000 motor temperature. It support speed sensor-less vector control, sensor vector control and V/F control. Performance of motor control has been improved obviously. Easy operation, perfect self-learning of motor static and dynamic state.

AC drives are compact structure, easy installation, and reasonable heat dissipation design, that ensure reliability of product. Various of expansion cards are available for your choice.

We provide information of model selection, installation, parameter setting, field debugging, fault diagnosis and daily maintenance for users in this manual.

First-time Use

For the users who use this product for the first time, read the manual carefully. If in doubt concerning some functions or performances, contact the technical support personnel of Our company to ensure correct use.

ATTENTIONS
Ø Please power off when wiring. Ø Electronic components inside AC drive are especially sensitive to static electricity, do not put anything into internal of AC drive. And do not touch main circuit board. Ø After power cut, if indicator is still lamp, it still have high voltage in AC drive. It is very dangerous, please do not touch internal circuit and components. Ø Please ensure the grounding terminals of AC drive is grounded correctly. Ø Never connect input power supply with output terminal U,V,W of AC drive.

1. Safety and Attentions

Safety signs in this manual	
 DANGER	Dangers caused by operations beyond requirements may lead to serious injury,and even death.
 CAUTION	angers caused by operations beyond requirements may lead to moderate damages or minor injuries, as well equipment damages.

1.1 Safety Matters

Use Stage	Safety Grade	Precautions
Before Installation	 DANGER	●Do not install the product if the package is with water, or component is missing or broken; ●Do not install the product if the label on the package is not identical to that on the inverter.
	 CAUTION	●Be careful of carrying or transportation. Risk of devices damage; ●Do not use damaged product or the inverters missing component.Risk of injury; ●Do not touch the parts of control system with bare hands. Risk of ESD hazard.
Installation	 DANGER	●Installation base shall be metal or other non-flammable material. Risk of fire; ●Do not install inverter in an environment containing explosive gases, otherwise there is danger of explosion; ● Do not unscrew the fixing bolts, especially the bolts with red mark.
	 CAUTION	●Do not leave cable strips or screws in the inverter. Risk of inverter damage; ●Install the product at the place with less vibration and no direct sunlight;

Use Stage	Safety Grade	Precautions
Installation	 DANGER	●Consider the installation space for cooling purpose when two or more inverters are placed in the same cabinet.
Wiring	 DANGER	●Wiring must be performed by authorized and qualified personnel. Risk of danger; ●Circuit-breaker should be installed between inverter and the mains. Risk of fire; ●Make sure the input power supply has been completely disconnected before wiring. Failure to comply may result in personnel injury and/or equipment damage; ●Since overall leakage current of this equipment may be bigger than 3.5mA, for safety's sake, this equipment and its associated motor must be well grounded so as to avoid risk of electric shock; ●Never connect the power cables to the output terminals (U,V,W) of the AC drive. Pay attention to the marks of the wiring terminals and ensure correct wiring. Failure to comply will result in damage to the AC drive; ●Install braking resistors at terminals (P+)and (P- or PB) only. Failure to comply may result in equipment damage.
	 CAUTION	●Since all adjustable frequency AC drives from Our company have been subjected to hi-pot test before delivery, users are prohibited from implementing such a test on this equipment. Failure to comply may result in equipment damage. ●Signal wires should to the best of the possibility be away from main power lines. If this cannot be ensured, ● vertical cross-arrangement shall be implemented, otherwise interference noise to control signal may occur. ●If motor cables are longer than 100m, it is recommend- ed output AC reactor be

Use Stage	Safety Grade	Precautions
		used. Failure to comply may result in faults.
Before Power-on	 DANGER	●Inverter shall be power-on only after the front cover is assembled. Risk of electrical hazard.
	 CAUTION	●Verify that the input voltage is identical to the rated voltage of product, correct wiring of input terminals R,S, T or L1, L2 and output terminals U, V, and W, wiring of inverter and its peripheral circuits, and all wires should be in good connection. Risk of inverter damage.
After Power-on	 DANGER	●Do not open the cover after power. Rick of electrical hazard; ●Do not touches any input/output terminals of inverter with bare hands. Rick of electrical hazard.
	 CAUTION	●If auto tuning is required, be careful of personal injury when motor is running. Risk of accident; ●Do not change the defaults of parameters. Risk of devices damage.
During Operation	 DANGER	●Non-professionals shall not detect signals during operation. Risk of personal injury or device damage; ●Do not touch the fan or the discharging resistor to check the temperature. Failure to comply will result in personal burnt.
	 CAUTION	●Prevent any foreign items from being left in the devices during operation. Risk of device damage; ●Do not control start/stop of inverter by ON/OF of contactor. Risk of device damage.
Maintenance	 DANGER	●Please do not make repair and maintenance over equipment in a charged state, or it will give rise to electric shock hazard! ●AC drive can be put into maintenance and

Use Stage	Safety Grade	Precautions
		repair only you confirm the AC drive charge light out, or the remaining electric charge of capacitance will cause damages to people! ●Any people who are not trained professionally cannot make repair and maintenance, or it will cause personal injuries or equipment troubles!

1.2 Use Considerations

Motor Insulation Inspection

When the motor is used for the first time or when the motor is reused after being kept, or when periodical inspection is performed, insulation inspection shall be conducted with motor so as to avoid damaging the inverter because of the insulation failure of the motor winding. The motor wires must be disconnected from the inverter during the insulation inspection. It is recommended to use the 500V mega meter, and the insulating resistance measured shall be 5MΩ at least.

Motor Thermal Protection

If the motor rating does not match that of the inverter, especially when the rated power of the inverter is higher than that of the motor, adjust motor protection parameters in the inverter or install thermal relay to protect motor.

Operating with the Frequency Higher than Grid Power Frequency

Output frequency of is 0.00Hz~500Hz. If product is required to operate above 50.00Hz, please take the endurance of mechanical devices into consideration.

Mechanical Vibrations

Inverter may encounter mechanical resonance point of the load device at certain output frequencies which can be avoided by setting the skip frequency parameters of the inverter.

Motor Heat and Noise

Since output voltage of inverter is PWM wave and contains a certain amount

of harmonics, so that the temperature, noise and vibration of the motor will be higher than those when the inverter runs at grid power frequency.

Voltage-sensitive device or capacitor on output side of the AC drive

Do not install the capacitor for improving power factor or lightning protection voltage-sensitive resistor on the output side of the AC drive because the output of the AC drive is PWM wave. Otherwise, the AC drive may suffer transient overcurrent or even be damaged.

Contactor at the I/O terminal of the AC drive

When a contactor is installed between the input side of the AC drive and the pow- er supply, the AC drive must not be started or stopped by switching the contactor on or off. If the AC drive has to be operated by the contactor, ensure that the time interval between switching is at least one hour since frequent charge and discharge will shorten the service life of the capacitor inside the AC drive;When a contactor is installed between the output side of the AC drive and the motor, do not turn off the contactor when the AC drive is active. Otherwise, modules inside the AC drive may be damaged.

Applied with the Rated Voltage

Apply product with the rated voltage. Failure to comply will damage inverter. If required, take a transformer to boost or step-down voltage.

Do Not Apply a 3-Phase Input Inverter to 2-Phase Input Applications

Do not apply a 3-phase input FR inverter to 2-phase input applications. Otherwise, it will result in faults or damage inverter.

Lightning Protection

The product has integrated lightning over-current protection device which has certain self-protection capacity against the lightning. Additional protection devices have to be installed between inverter and power supply in the area where lightning occurs frequently.

Altitude Derating

In places where the altitude is above 1000 m and the cooling effect reduces due to thin air, it is necessary to derate the AC drive. Contact Our company for technical support.

Adaptable Motor

Standard adaptive motor is quadruple squirrel- cage asynchronous induction motor. If it is not above- mentioned motor, please select AC drive upon rated current of motor. If you need to drive permanent magnet synchronous motor, please consult our company;

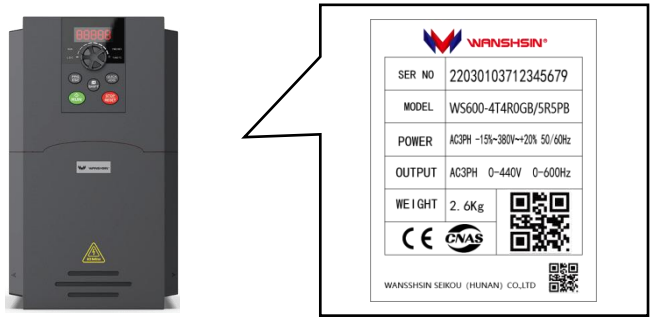
The cooling fan of non variable frequency motor and rotor spindle are coaxially connected. While despinning, the fan cooling effect also declines at the same time.Hence, for overheated occasion of motor, you shall install strong exhaust fan or change variable frequency motor;

AC drives have built- in adaptive motor standard parameters. It is necessary to make motor parameter identification or amend default values to accord with actual values, or it will influence operation effects and protective values;

As short circuit existing inside cable or motor will cause inverter alarming, even explosion. Therefore, please make insulation short- circuit test of initial installed motor and cable first. And the test also is necessary in routine maintenance.

2. Product Brief Introduction

2.1 Position and content of nameplate



2.2 Nameplate model description and rated parameters

WS600	S	-	A	4T	4R0	G	B	5R5	P	B
①	②		③	④	⑤	⑥	⑦	⑧	⑨	⑩

①	Product Line
②	For synchronous machines
③	Design Version:A/B/C
④	Voltage Rating:Single-phase 110V/220V Three-phase 220V/380V/690V
⑤	Adapted motor power mark: R75 1R5 011 015 Motor power(kW): 0.75 1.5 11 15
⑥	Applicable motors: G-General Purpose;p-Fan and pump type
⑦	B:Built-in brake unit
⑧	Adapted motor power mark: R75 1R5 011 015 Motor power(kW): 0.75 1.5 11 15
⑨	Applicable motors: G-General Purpose;p-Fan and pump type
⑩	B:Built-in brake unit

2.3 Specifications and models of AC drives

Models	Input Current (A)	Output Current (A)	Adapted motor (kW)
Input Voltage Single-phase 220V range: -15%~20%			
WS600-3SR40GB	5.4	2.3	0.4
WS600-3SR75GB	8.2	4	0.75
WS600-3S1R5GB	14	7	1.5
WS600-3S2R2GB	23	9.6	2.2
WS600-3S4R0GB	40	17	4
WS600-3S5R5GB	60	25	5.5
WS600-3S7R5GB	75	32	7.5
WS600-3S11R0GB	100	45	11
WS600-3S15R0G	130	60	15
Input Voltage Three-phase 380V range: -15%~20%			
WS600-4TR75GB/1R5PB	3.4/5.0	2.1/3.8	0.75/1.5
WS600-4T1R5GB/2R2PB	5.0/5.8	3.8/5.1	1.5/2.2
WS600-4T2R2GB/4R0PB	5.8/10.5	5.1/9.0	2.2/4.0
WS600-4T4R0GB/5R5PB	10.5/14.6	9.0/13.0	4.0/5.5
WS600-4T5R5GB/7R5PB	14.6/20.5	13.0/17.0	5.5/7.5
WS600-4T7R5GB/9R0PB	20.5/22.0	17.0/20.0	7.5/9.0
WS600-4T9R0GB/011PB	22.0/26.0	20.0/25.0	9.0/11.0
WS600-4T011GB/015PB	26.0/35.0	25.0/32.0	11.0/15.0
WS600-4T015GB/018PB	35.0/38.5	32.0/37.0	15.0/18.5
WS600-4T018GB/022PB	38.5/46.5	37.0/45.0	18.5/22.0
WS600-4T022GB/030PB	46.5/62.0	45.0/60.0	22.0/30.0
WS600-4T030G(B)/037P(B)	62.0/76.0	60.0/75.0	30.0/37.0
WS600-4T037G(B)/045P(B)	76.0/92.0	75.0/90.0	37.0/45.0
WS600-4T045G(B)/055P(B)	92.0/113.0	90.0/110.0	45.0/55.0
WS600-4T055G(B)/075P(B)	113.0/157.0	110.0/152.0	55.0/75.0
WS600-4T075G(B)/093P(B)	157.0/180.0	152.0/176.0	75.0/93.0
WS600-4T093G/110P	180.0/214.0	176.0/210.0	93.0/110.0
WS600-4T110G/132P	214.0/256.0	210.0/253.0	110.0/132.0

Models	Input Current	Output Current	Adapted motor
	(A)	(A)	(kW)
WS600-4T132G/160P	256.0/307.0	253.0/304.0	132.0/160.0
WS600-4T160G/185P	307.0/345.0	304.0/340.0	160.0/185.0
WS600-4T185G/200P	345.0/385.0	340.0/380.0	185.0/200.0
WS600-4T200G/220P	385.0/430.0	380.0/426.0	200.0/220.0
WS600-4T220G/250P	430.0/468.0	426.0/465.0	220.0/250.0
WS600-4T250G/280P	468.0/525.0	465.0/520.0	250.0/280.0
WS600-4T280G/315P	525.0/590.0	520.0/585.0	280.0/315.0
WS600-4T315G/355P	590.0/665.0	585.0/650.0	315.0/355.0
WS600-4T355G/400P	665.0/785.0	650.0/725.0	355.0/400.0
WS600-4T400G/450P	785.0/883.0	725.0/820.0	400.0/450.0
WS600-4T450G/500P	883.0/920.0	820.0/900.0	450.0/500.0
WS600-4T500G/550P	920.0/1020.0	900.0/1000.0	500.0/550.0
WS600-4T550G/630P	1020.0/1120.0	1000.0/1100.0	550.0/630.0
WS600-4T630G	1120	1100	630
WS600-4T710G	1315	1250	710
WS600-4T800G	1560	1450	800
WS600-4T900G	1760	1710	900
WS600-4T1000G	1960	1900	1000
Input Voltage 660-690V			
WS600-7T030GB	42	38	30
WS600-7T037GB	49.5	47	37
WS600-7T045GB	58	55	45
WS600-7T055GB	70	65	55
WS600-7T075G	90	86	75
WS600-7T093G	105	100	93
WS600-7T110G	130	120	110
WS600-7T132G	170	150	132
WS600-7T160G	200	175	160
WS600-7T185G	208	198	185

Models	Input Current	Output Current	Adapted motor
	(A)	(A)	(kW)
WS600-7T200G	235	215	200
WS600-7T220G	247	245	220
WS600-7T250G	265	260	250
WS600-7T280G	305	299	280
WS600-7T315G	350	330	315
WS600-7T355G	382	374	355
WS600-7T400G	435	410	400
WS600-7T450G	490	465	450
WS600-7T500G	595	550	500
WS600-7T550G	605	600	550
WS600-7T630G	684	650	630
WS600-7T710G	768.5	730	710
WS600-7T800G	860	825	800
WS600-7T900G	955	920	900
WS600-7T1000G	1060	1025	1000

Models	Input Current	Output Current	Adapted motor
	(A)	(A)	(kW)
Input Voltage Single-phase 380V range: -15%~20%			
WS600B-4T110G	214	210	110
WS600B-4T132G	256	253	132
WS600B-4T160G	307	304	160
WS600B-4T185G	345	340	185
WS600B-4T200G	385	380	200
WS600B-4T220G	430	426	220
WS600B-4T250G	468	465	250
WS600B-4T280G	525	520	280
WS600B-4T315G	590	585	315
WS600B-4T355G	665	650	355
WS600B-4T400G	785	725	400
WS600B-4T450G	883	820	450

Models	Input Current (A)	Output Current (A)	Adapted motor (kW)
Input Voltage Single-phase 220V range: -15%~20%			
WS600S-3SR40GB	5.4	2.3	0.4
WS600S-3SR75GB	8.2	4	0.75
WS600S-3S1R5GB	14	7	1.5
WS600S-3S2R2GB	23	9.6	2.2
WS600S-3S4R0GB	40	17	4
WS600S-3S5R5GB	60	25	5.5
Input Voltage Three-phase 380V range: -15%~20%			
WS600S-4TR75GB/1R5PB	3.4/5.0	2.1/3.8	0.75/1.5
WS600S-4T1R5GB/2R2PB	5.0/5.8	3.8/5.1	1.5/2.2
WS600S-4T2R2GB/4R0PB	5.8/10.5	5.1/9.0	2.2/4.0
WS600S-4T4R0GB/5R5PB	10.5/14.6	9.0/13.0	4.0/5.5
WS600S-4T5R5GB/7R5PB	14.6/20.5	13.0/17.0	5.5/7.5
WS600S-4T7R5GB/9R0PB	20.5/22.0	17.0/20.0	7.5/9.0
WS600S-4T9R0GB/011PB	22.0/26.0	20.0/25.0	9.0/11.0
WS600S-4T011GB/015PB	26.0/35.0	25.0/32.0	11.0/15.0
WS600S-4T015GB/018PB	35.0/38.5	32.0/37.0	15.0/18.5
WS600S-4T018GB/022PB	38.5/46.5	37.0/45.0	18.5/22.0
WS600S-4T022GB/030PB	46.5/62.0	45.0/60.0	22.0/30.0
WS600S-4T030G(B)/037P(B)	62.0/76.0	60.0/75.0	30.0/37.0
WS600S-4T037G(B)/045P(B)	76.0/92.0	75.0/90.0	37.0/45.0
WS600S-4T045G(B)/055P(B)	92.0/113.0	90.0/110.0	45.0/55.0
WS600S-4T055G(B)/075P(B)	113.0/157.0	110.0/152.0	55.0/75.0
WS600S-4T075G(B)/093P(B)	157.0/180.0	152.0/176.0	75.0/93.0
WS600S-4T093G/110P	180.0/214.0	176.0/210.0	93.0/110.0
WS600S-4T110G/132P	214.0/256.0	210.0/253.0	110.0/132.0
WS600S-4T132G/160P	256.0/307.0	253.0/304.0	132.0/160.0
WS600S-4T160G/185P	307.0/345.0	304.0/340.0	160.0/185.0
WS600S-4T185G/200P	345.0/385.0	340.0/380.0	185.0/200.0

Models	Input Current	Output Current	Adapted motor
	(A)	(A)	(kW)
WS600S-4T200G/220P	385.0/430.0	380.0/426.0	200.0/220.0
WS600S-4T220G/250P	430.0/468.0	426.0/465.0	220.0/250.0
WS600S-4T250G/280P	468.0/525.0	465.0/520.0	250.0/280.0
WS600S-4T280G/315P	525.0/590.0	520.0/585.0	280.0/315.0
WS600S-4T315G/355P	590.0/665.0	585.0/650.0	315.0/355.0
WS600S-4T355G/400P	665.0/785.0	650.0/725.0	355.0/400.0
WS600S-4T400G/450P	785.0/883.0	725.0/820.0	400.0/450.0
WS600S-4T450G/500P	883.0/920.0	820.0/900.0	450.0/500.0
WS600S-4T500G/550P	920.0/1020.0	900.0/1000.0	500.0/550.0
WS600S-4T550G/630P	1020.0/1120.0	1000.0/1100.0	550.0/630.0
WS600S-4T630G	1120	1100	630
WS600S-4T710G	1315	1250	710
WS600S-4T800G	1560	1450	800
Input Voltage 660-690V			
WS600S-7T030GB	42	38	30
WS600S-7T037GB	49.5	47	37
WS600S-7T045GB	58	55	45
WS600S-7T055GB	70	65	55
WS600S-7T075G	90	86	75
WS600S-7T093G	105	100	93
WS600S-7T110G	130	120	110
WS600S-7T132G	170	150	132
WS600S-7T160G	200	175	160
WS600S-7T185G	208	198	185
WS600S-7T200G	235	215	200
WS600S-7T220G	247	245	220
WS600S-7T250G	265	260	250
WS600S-7T280G	305	299	280
WS600S-7T315G	350	330	315

Models	Input Current	Output Current	Adapted motor
	(A)	(A)	(kW)
WS600S-7T355G	382	374	355
WS600S-7T400G	435	410	400
WS600S-7T450G	490	465	450
WS600S-7T500G	595	550	500
WS600S-7T550G	605	600	550
WS600S-7T630G	684	650	630
WS600S-7T710G	768.5	730	710
WS600S-7T800G	860	825	800
WS600S-7T900G	955	920	900
WS600S-7T1000G	1060	1025	1000

Models	Input Current	Output Current	Adapted motor
	(A)	(A)	(kW)
Input Voltage Single-phase 380V range: -15%~20%			
WS600BS-4T110G	214	210	110
WS600BS-4T132G	256	253	132
WS600BS-4T160G	307	304	160
WS600BS-4T185G	345	340	185
WS600BS-4T200G	385	380	200
WS600BS-4T220G	430	426	220
WS600BS-4T250G	468	465	250
WS600BS-4T280G	525	520	280
WS600BS-4T315G	590	585	315
WS600BS-4T355G	665	650	355
WS600BS-4T400G	785	725	400
WS600BS-4T450G	883	820	450

2.4 Technical Features

	Technical Features	Description
Control performance	Highest frequency	Vector control: 0～600Hz VF control: 0～1200Hz
	Carrier frequency	1K～15kHz; the carrier frequency can be adjusted automatically according to the load characteristics.
	Input frequency resolution	Digital setting: 0.01Hz Analog setting: maximum frequency × 0.1%
	Control mode	Open loop vector control (SVC), V/F control
	Starting torque	G type machine: 0.5Hz/180% (open loop vector control) P type machine: 0.5Hz/120% (open loop vector control)
	Speed range	1: 200 (open loop vector control)
	Steady speed accuracy (speed control accuracy)	Open-loop vector control: ≤±0.5% (rated synchronous speed)
	Speed control stability	Open-loop vector control: ≤±0.3% (rated synchronous speed)
	Torque Response	≤40ms (open loop vector control)
	Technical Features	Description
	Overload capability	Model G: 150% rated current for 60 seconds; 180% rated current for 5 seconds P-type machine: 120% rated current for 60 seconds; 150% rated current for 5 seconds
	Torque boost	Automatic torque boost; manual torque boost 0.1%～ 30.0%
	V/F curve	Three ways: linear type; multi-point type; square type V/F curve
	Acceleration and deceleration curve	Linear or S-curve acceleration and deceleration mode; four kinds of acceleration and deceleration time; acceleration and deceleration time range 0.0s 3000.0s
	DC brake	DC braking frequency: 0.0Hz～ maximum frequency, braking time: 0.0～36.0 seconds, braking action current value: 0.0%～100.0%
	Jogging Control	Jog frequency range: 0.00Hz～ 50.00Hz; Jog acceleration and deceleration time 0.0s～3000.0s
	Simple PLC & multi step speed operation	Built-in PLC or control terminal,16 steps speed can be set

	Built-in PID	Process control closed-loop control system can be easily realized
Control performance	Automatic voltage regulation(AVR)	When the grid voltage changes, it can automatically keep the output voltage constant
	Torque Limiting and Control	"Excavator" feature, automatically limit the torque during operation to prevent frequent overcurrent tripping; closed-loop vector mode can realize torque control
Personalization	Power-on peripheral device safety self-check	It can realize safety detection of peripheral equipment such as grounding, short circuit, etc.
	Common DC bus function	It can realize the function of sharing the DC bus of multiple inverters
	JOG key	Programmable keys: forward and reverse running/jog running function selection
	Textile swing frequency control	Various triangular wave frequency control functions
	Fast current limiting function	The built-in fast current limiting algorithm reduces the probability of overcurrent reported by the inverter and improves the anti-interference ability of the whole machine
	Timing control	Timing control function: Set time range 0h~65535h
	Standardized keyboard extension cables	Customers can use standard network cables to extend the keyboard.

	Technical Features	Description
Run	Run command channel	Three channels: operation panel given, control terminal given, serial communication port given. Switchable in a variety of ways
	Frequency source	There are 10 kinds of frequency sources: digital given, analog voltage given, analog current given, pulse given, serial port given. Switchable in a variety of ways
	Auxiliary frequency source	10 auxiliary frequency sources. Auxiliary frequency fine-tuning and frequency synthesis can be flexibly realized
	Input terminal	Standard five digital input terminals, up to ten digital input terminals (AI1, AI2 can be used as DI terminals), compatible with active PNP or NPN input mode Two analog input terminals, of which AI1 can only be used as voltage input, and AI2 can be used as voltage or current input. (If you need to expand the functions of input and output terminals, please choose an expansion card)

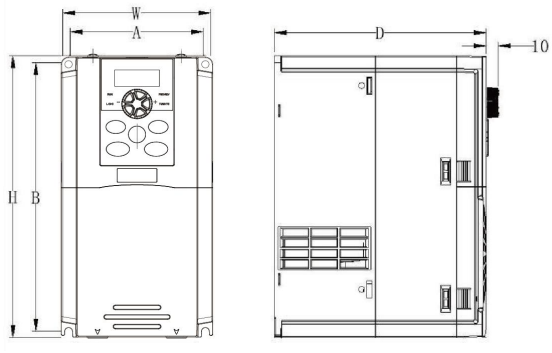
Display and keyboard	LED Display	Display parameters
	LCD Display	Optional, Chinese/English prompt operation content
	LCD parameter copy	Fast replication of parameters using LCD
	Key lock and function selection	Part or all of the keys can be locked, and the scope of action of some keys can be defined to prevent misoperation
Protection and Options	Protective function	Power-on motor short-circuit detection, input and output phase loss protection, overcurrent protection, overvoltage protection, undervoltage protection, overheating protection, overload protection, etc.
	Optional accessories	LCD operation panel, brake assembly, etc.

	Technical Features	Description
State	Place of use	Indoor, no direct sunlight, no dust, corrosive gas, flammable gas, oil mist, water vapor, dripping water or salt, etc.
	Altitude	Below 1000 meters
	Ambient temperature	-10℃～+50℃ (Ambient temperature is 40℃～50℃, please use with derating)
	Humidity	Less than 95%RH, no condensation
	Vibration	Less than 5.9m/s2 (0.6g)
	Storage temperature	-20℃～+60℃
	Pollution level	2
Product	Product implementa- tion of safety standards	IEC61800-5-1:2007
	Products comply with EMC standards	IEC61800-3:2005

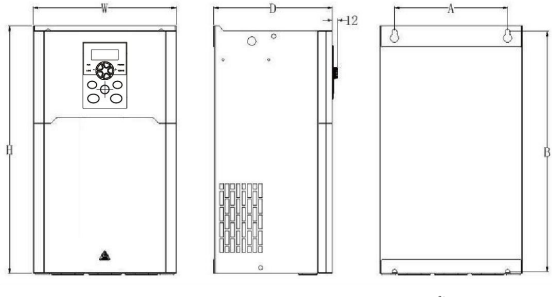
2.5 All components schematic diagram of AC drive

No.	Name	Description
❶	Cabinet-cover	Protect the internal components.
❷	Keypad	Refer to chapter4 "Keypad operating procedures."
❸	Lower-cover	Protect the internal components.
❹	Fan-cover	Protection fan.
❺	Bottom Board	Inverter protection
❻	Middle frame	Including Power Boards
❼	Series Label	Refer to 2.3 "Naming Rules".
❽	Dust prevention	To Prevent Dust
❾	Screw Hole	To make VFD firm with screw

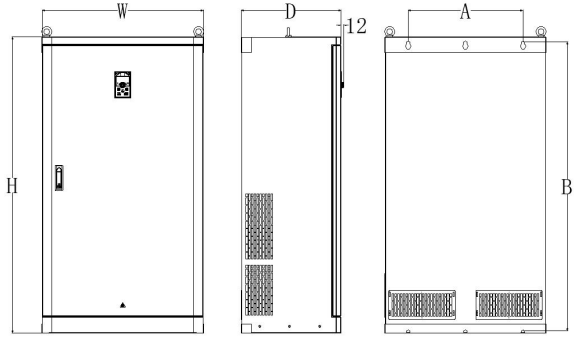
2.6 Appearance and installation dimensions



Schematic diagram of plastic dimensions and installation dimensions below 22KW



Schematic diagram of overall dimensions and installation dimensions of 30~132KW sheet metal chassis



160KW Inverter Dimensions and Installation Dimensions

Model Description: Product model number followed by "B" indicates that the brake unit is standard, "(B)" indicates that the brake unit is optional, if there is demand, please specify when ordering.

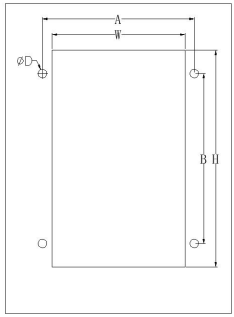
Lower inlet and lower outlet model opening size and installation hole size

Model	Installation(mm)		Dimensions(mm)			Aperture(mm)
	A	B	H	W	D	
WS600-3SR40G WS600-3SR75G	64	138	148	74	130	φ4.5
WS600-3S1R5G WS600-3S2R2GB	76	156	165	86	140	φ5
WS600-3S4R0GB	111	223	234	123	176	φ6
WS600-3S5R5GB	147	264	275	160	186	φ6
WS600-3S7R5GB	147	264	275	160	186	Φ6
WS600-3S11R0GB	174	319	330	189	186	Φ6
WS600-3S15R0G	200	410	425	255	206	Φ6
WS600-4TR75GB/1R5PB WS600-4T1R5GB/2R2PB WS600-4T2R2GB/4R0PB	76	156	165	86	140	φ5
WS600-4T4R0GB/5R5PB WS600-4T5R5GB/7R5PB	98	182	192	110	165	φ5
WS600-4T7R5GB/9R0PB WS600-4T9R0GB/011PB	111	223	234	123	176	φ6
WS600-4T011GB/015PB WS600-4T015GB/018PB	147	264	275	160	186	φ6
WS600-4T018GB/022PB WS600-4T022GB/030PB	174	319	330	189	186	φ6

Model	Installation(mm)		Dimensions(mm)			Aperture(mm)
	A	B	H	W	D	
WS600-4T030G(B)/037P(B)	200	410	425	255	206	φ7
WS600-4T037G(B)/045P(B)						
WS600-4T045G(B)/055P(B)	245	518	534	310	258	φ10
WS600-4T055G(B)/075P(B)						
WS600-4T075G(B)/093P(B)	290	544	560	350	268	φ10
WS600-4T093G/110P						
WS600-4T110G/132P	320	678	695	410	295	φ10
WS600-4T132G/160P						
WS600-4T160G/185P	380	1025	1050	480	330	φ10
WS600-4T185G/200P						
WS600-4T200G/220P						
WS600-4T220G/250P	500	1170	1200	590	365	φ14
WS600-4T250G/280P						
WS600-4T280G/315P						
WS600-4T315G/355P	500	1255	1290	700	400	φ14
WS600-4T355G/400P						
WS600-4T400G/450P						
WS600-4T450G/500P						
WS600-4T500G/550P	/	/	1800	1000	500	Vertical
WS600-4T550G/630P						
WS600-4T630G						
WS600-4T710G	/	/	2200	1200	600	Vertical
WS600-4T800G						
WS600-4T900G	/	/	2300	1500	600	Vertical
WS600-4T1000G	/	/	2300	1500	600	Vertical
WS600-7T030G(B)	245	554	570	310	264	φ10
WS600-7T037G(B)						
WS600-7T045G(B)						
WS600-7T055G(B)						
WS600-7T075G	220	705	725	350	275	φ10
WS600-7T093G						
WS600-7T110G						
WS600-7T132G	320	815	835	440	295	φ10
WS600-7T160G						
WS600-7T185G						
WS600-7T200G						
WS600-7T220G						
WS600-7T250G	380	1115	1140	550	330	φ12
WS600-7T280G						
WS600-7T315G						
WS600-7T355G	500	1348	1380	700	400	φ14
WS600-7T400G						
WS600-7T450G						
WS600-7T500G						
WS600-7T550G	/	/	2200	800	600	Vertical
WS600-7T630G						
WS600-7T710G						
WS600-7T800G	/	/	2200	1050	600	Vertical
WS600-7T900G						
WS600-7T1000G						

Upper inlet and lower outlet model opening size and installation hole size

Model	Installation(mm)		Dimensions(mm)			Aperture(mm)
	A	B	H	W	D	
WS600B-4T110G	300	725	750	410	340	Φ12
WS600B-4T132G	380	795	820	480	350	Φ12
WS600B-4T160G	500	940	970	590	365	Φ14
WS600B-4T185G	500	1030	1060	700	400	Φ14
WS600B-4T200G	300	725	750	410	340	Φ12
WS600B-4T220G	380	795	820	480	350	Φ12
WS600B-4T250G	500	940	970	590	365	Φ14
WS600B-4T280G	500	1030	1060	700	400	Φ14
WS600B-4T315G	300	725	750	410	340	Φ12
WS600B-4T355G	380	795	820	480	350	Φ12
WS600B-4T400G	500	940	970	590	365	Φ14

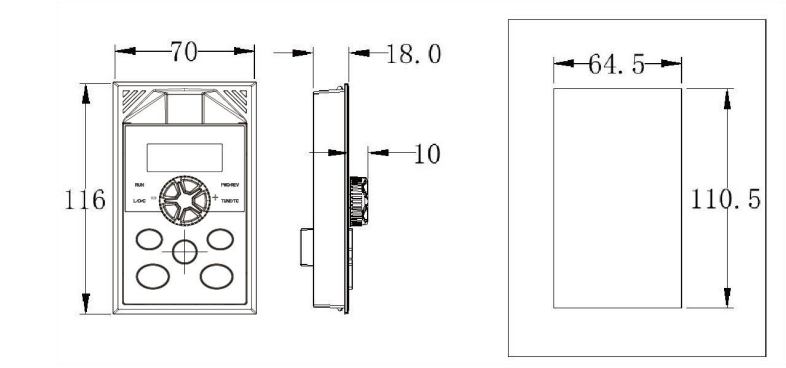


WS600/WS600S inverter below 93kW through-wall opening size and installation hole size

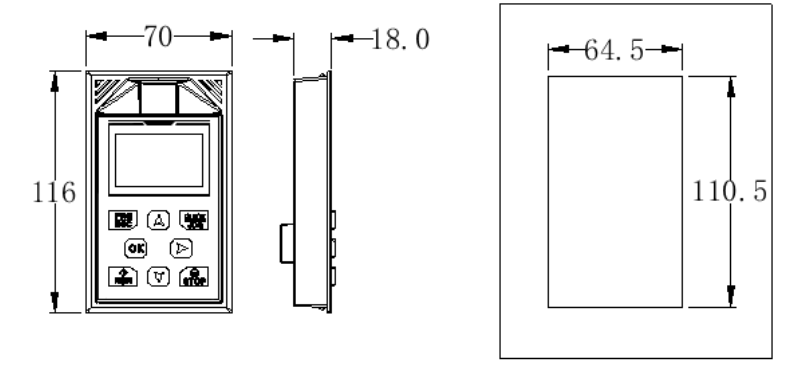
Model	Installation(mm)		Dimensions(mm)		Aperture(mm)
	A	B	H	W	
WS600-4TR75GB/1R5PB	144	127	167	88	φ5
WS600-4T1R5GB/2R2PB					
WS600-4T2R2GB/4R00PB					
WS600-4T4R0GB/5R5PB	129	144	194	112	φ5
WS600-4T5R5GB/7R5PB					
WS600-4T7R5GB/9R0PB	142	196	236	125	φ6
WS600-4T9R0GB/011PB					
WS600-4T011GB/015PB	180	227	277	162	φ6
WS600-4T015GB/018PB					
WS600-4T018GB/022PB	209	283	333	191	φ6
WS600-4T022GB/030PB					
WS600-4T030G(B)/037P(B)	275	358	408	257	φ7

Model	Installation(mm)		Dimensions(mm)		Aperture(mm)
	A	B	H	W	
WS600-4T037G(B)/045P(B)					
WS600-4T045G(B)/055P(B)	330	477	527	312	Φ9
WS600-4T055G(B)/075P(B)					
WS600-4T075G(B)/093P(B)	370	503	553	352	Φ9
WS600-4T093G/110P					

2.7 External keyboard with tray installation dimension drawing



Digital display external lead keypad with tray mounting dimensions



LCD external keyboard with tray installation dimensions

2.8 Optional accessories

For the detailed functions and usage instructions of the optional accessories, see the related optional accessories description.

If you need the above options, please specify when ordering.

Name	Model	Function	Remarks
Built-in braking unit	"B" after the product model number	For dynamic braking	Built-in braking unit is standard
	"(B)" after the product model number	For dynamic braking	Built-in braking unit is optional
External LED operation panel	WS600-LED	External LED display and operation keyboard	WS series general RJ45 interface
External LCD operation panel	WS600E-LCD	External LCD display and operating keyboard	Expansion board RJ45 interface
External LED2 operation panel	WS600-LED2	External LED display and pure key keyboard	WS series general RJ45 interface
Keyboard gusset	WS600KB	When running without a keyboard or when the keyboard is externally drawn, using this keyboard gusset will have a good protective and aesthetic effect.	Optional
Extension cable	CA-CAB	Standard 8-core network cable, can be connected with WS600-LED, WS600-LCD, WS600-LED2	Available in 4 sizes: 1m, 3m, 5m and 10m
If other function modules are needed to expand functions (such as: I/O card, PG card, EPS card, etc.), please choose WS600 series expansion board, and specify the function module card when ordering.			

3. Installation

3.1Mechanical Installation

3.1.1Installation Environment

● Environment temperature: Surrounding environment temperature has a great impact on lifetime of AC drive, and the operation environment temperature of AC drive shall not exceed allowable temperature range (- 10℃～40℃).

● While AC drive is installed on the surface of inflaming retardants, and enough space around is necessary for heat dissipation. When AC drive works, it will produce plenty of heats. And make vertical installation onto supporting holder with screw.

● Please install it in some places that are not easy to vibrate. And the vibration shall not be larger than 0. 6G. Especially pay attention to keep away from punching machine and other equipment.

● Avoid to be installed where there are direct sunlight, moist surroundings and water drops.

● Avoid to be installed where there are corrosivity, inflammability and explosive gas.

● Avoid to be installed where there are oil contamination, dirt and metal dusts.

3.1.2 Reminder of installation site

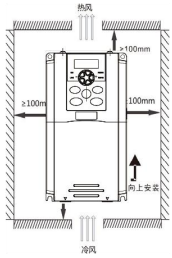
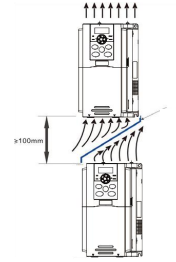
<table>
<tr>
<td> 
</td>
<td> 
</td>
</tr>
<tr>
<td>Explanation: When power of AC drive≤ 22kw it means taking no account of size A is permissible. When the power＞ 22KW, A shall be larger than 50mm.</td>
<td>Explanation: When AC drive is installed upside and underside, please install thermal insulation guide plate as picture shows.</td>
</tr>
</table>

Figure 3-1 Installation diagram of AC drive

3.1.3 The installation of the model needs to pay attention to the problem of heat dissipation. So please note the following:

● Please install the inverter vertically so that the heat can be dissipated upwards.
But not upside down. If there are many inverters in the cabinet, it is better to install them side by side. In the occasions that need to be installed up and down, please refer to Figure 3-1 to install the heat insulation deflector.
● The installation space is as shown in Figure 3-1 to ensure the cooling space of the inverter. However, please consider the heat dissipation of other components in the cabinet when arranging.
● The mounting bracket must be made of flame retardant material.
● For applications with metal dust, it is recommended to install the radiator outside the cabinet. At this time, the space in the fully sealed cabinet should be
as large as possible.

3.1.4 Mechanical installation methods and steps

installation structure	Installation Notes	instructions
Plastic structure through wall installation	● Remove the bottom plate of the inverter; ● Insert the box into the cabinet with holes in the installation size, and fix it with M4x12 screws and M4 nuts; ● Put the bottom plate back into the inverter;	Figure 3-2
Sheet metal structure through wall installation	● Install the flange type hanging angle to the upper and lower parts of the inverter body; ● Put the inverter into the cabinet with the installation holes opened according to the size, and fix it with M6 screws and nuts;	Figure 3-3

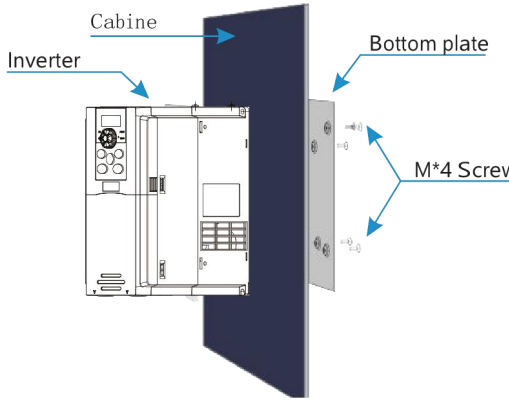


Figure 3-2 Plastic structure through wall installation drawing

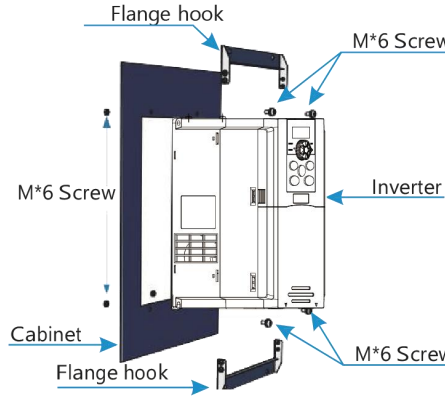


Figure 3-3 Sheet metal structure through-wall installation drawing

3.1.5 Terminal Cover Removal and Installation

WS600 series inverters use plastic casing. For the removal of the terminal cover of the plastic casing, see Figure 3-4. Use a tool to push the hook of the terminal cover to the inside and forcefully push it out.

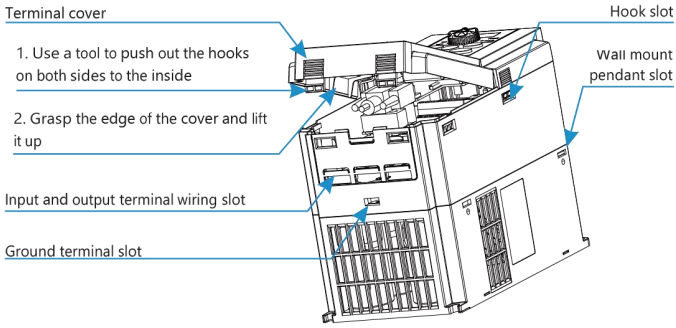


Figure 3-4 Removal drawing of plastic housing terminal cover

3.2 Electrical Installation

3.2.1 Model Selection of Main Circuit Peripheral Devices

Models	MCCB (A)	Contactor (A)	Cable of Input Side Main Circuit (mm²)	Cable of Output Side Main Circuit (mm²)	Control circuit wire (mm²)	Grounding wire (mm²)
WS600-3SR4GB	10	9	2.5	2.5	1.5	2.5
WS600-3SR75GB	16	12	2.5	2.5	1.5	2.5
WS600-3S1R5GB	25	18	2.5	2.5	1.5	2.5
WS600-3S2R2GB	32	25	2.5	2.5	1.5	2.5
WS600-3S4R0GB	50	40	4	4	1.5	4
WS600-3S5R5GB	80	63	4	4	1.5	4
WS600-4TR75GB	6	9	2.5	2.5	1.5	2.5
WS600-4T1R5GB	10	9	2.5	2.5	1.5	2.5
WS600-4T2R2GB	10	12	2.5	2.5	1.5	2.5
WS600-4T4R0GB	16	16	2.5	2.5	1.5	2.5
WS600-4T5R5GB	20	18	2.5	2.5	1.5	2.5
WS600-4T7R5GB	32	25	4.0	4.0	1.5	4
WS600-4T9R0GB	40	32	4.0	4.0	1.5	6
WS600-4T011GB	40	32	4.0	4.0	1.5	6
WS600-4T015GB	50	40	6.0	6.0	1.5	6
WS600-4T018GB	63	40	10	10	1.5	10

Models	MCCB (A)	Contactor (A)	Cable of Input Side Main Circuit (mm²)	Cable of Output Side Main Circuit (mm²)	Control circuit wire (mm²)	Grounding wire (mm²)
WS600-4T022GB	80	50	10	10	1.5	16
WS600-4T030G(B)	100	65	16	16	1.5	16
WS600-4T037G(B)	100	80	25	25	1.5	25
WS600-4T045G(B)	125	115	35	35	1.5	25
WS600-4T055G(B)	160	150	50	50	1.5	25
WS600-4T075G(B)	225	170	70	70	1.5	25
WS600-4T093G(B)	250	205	95	95	1.5	25
WS600-4T110G	315	245	120	120	1.5	25
WS600-4T132G	350	300	120	120	1.5	25
WS600-4T160G	400	400	150	150	1.5	25
WS600-4T185G	500	410	185	185	1.5	25
WS600-4T200G	500	410	185	185	1.5	25
WS600-4T220G	630	475	240	240	1.5	25
WS600-4T250G	630	475	2×120	2×120	1.5	25
WS600-4T280G	700	620	2×120	2×120	1.5	25
WS600-4T315G	800	620	2×150	2×150	1.5	35
WS600-4T355G	1000	800	2×185	2×185	1.5	35
WS600-4T400G	1250	800	2×240	2×240	1.5	35
WS600-4T450G	1250	1000	2×240	2×240	1.5	35
WS600-4T500G	1720	1500	3×183	3×183	1.5	35
WS600-4T550G	1900	1500	3×240	3×240	1.5	35
WS600-4T630G	2200	1650	3×240	3×240	1.5	35
WS600-4T710G	2500	1650	3×240	4×185	1.5	35
WS600-4T800G	2800	1800	3×240	4×185	1.5	35
WS600-7T011GB	32	25	4.0	4.0	1.5	6
WS600-7T015GB	40	32	4.0	4.0	1.5	6
WS600-7T018GB	50	40	6.0	6.0	1.5	6
WS600-7T022GB	63	40	10	10	1.5	10
WS600-7T030G(B)	80	50	10	10	1.5	16
WS600-7T037G(B)	100	65	16	16	1.5	16
WS600-7T045G(B)	100	80	25	25	1.5	25
WS600-7T055G(B)	125	115	35	35	1.5	25

Models	MCCB (A)	Contactor (A)	Cable of Input Side Main Circuit (mm²)	Cable of Output Side Main Circuit (mm²)	Control circuit wire (mm²)	Grounding wire (mm²)
WS600-7T075G(B)	160	150	50	50	1.5	25
WS600-7T093G(B)	225	170	70	70	1.5	25
WS600-7T110G	250	205	95	95	1.5	25
WS600-7T132G	315	245	120	120	1.5	25
WS600-7T160G	350	300	120	120	1.5	25
WS600-7T185G	400	400	150	150	1.5	25
WS600-7T200G	400	400	150	150	1.5	25
WS600-7T220G	500	410	185	185	1.5	25
WS600-7T250G	500	410	185	185	1.5	25
WS600-7T280G	630	475	240	240	1.5	25
WS600-7T315G	630	475	2×120	2×120	1.5	35
WS600-7T355G	700	620	2×120	2×120	1.5	35
WS600-7T400G	800	620	2×150	2×150	1.5	35
WS600-7T450G	800	620	2×150	2×150	1.5	35
WS600-7T500G	1000	800	2×185	2×185	1.5	35
WS600-7T550G	1000	800	2×185	2×185	1.5	35
WS600-7T630G	1250	800	2×240	2×240	1.5	35
WS600-7T710G	1250	800	2×240	2×240	1.5	35

3.2.2 Peripheral device wiring diagram

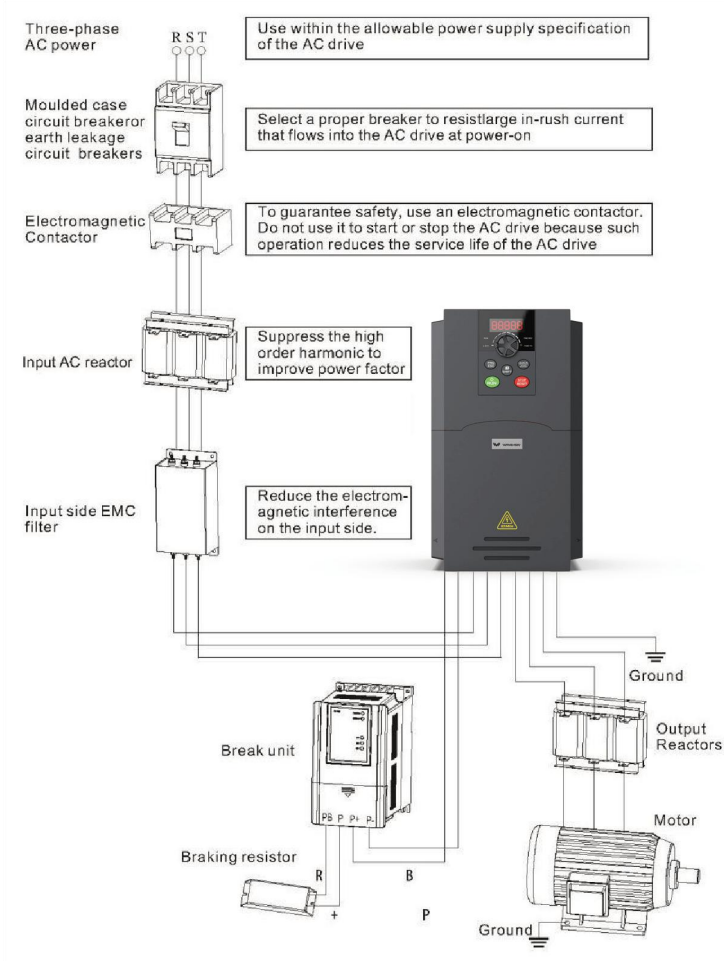


Figure 3-5 Peripheral device wiring diagram

3.3 Basic wiring diagram

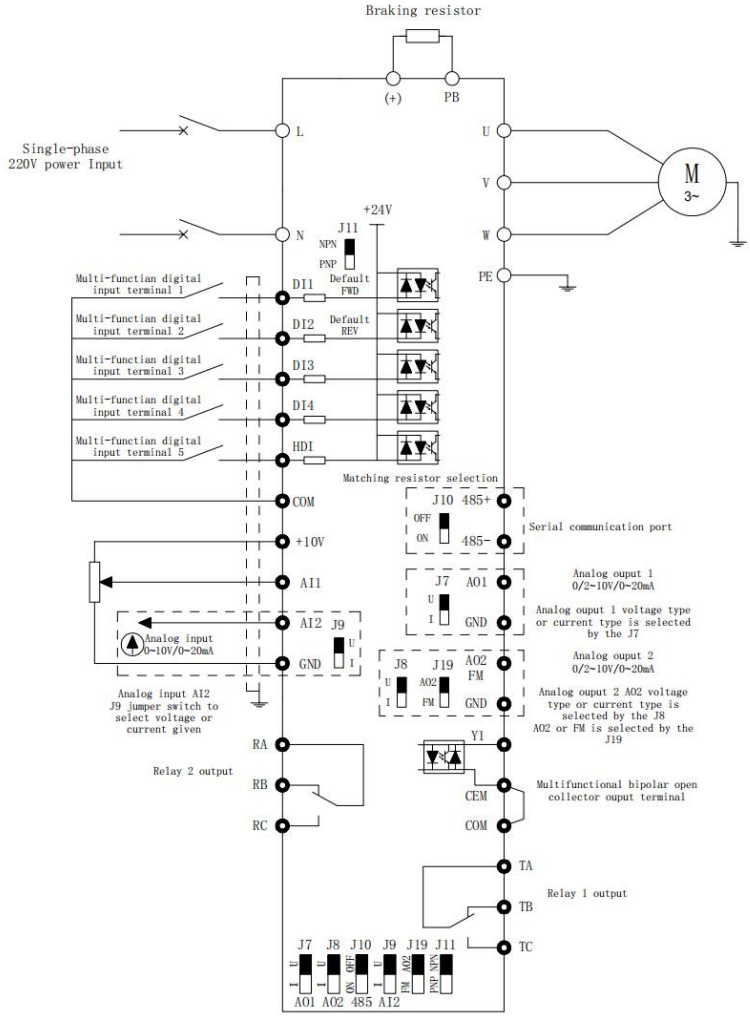


Figure 3-6 Single-phase inverter below 2.2kW

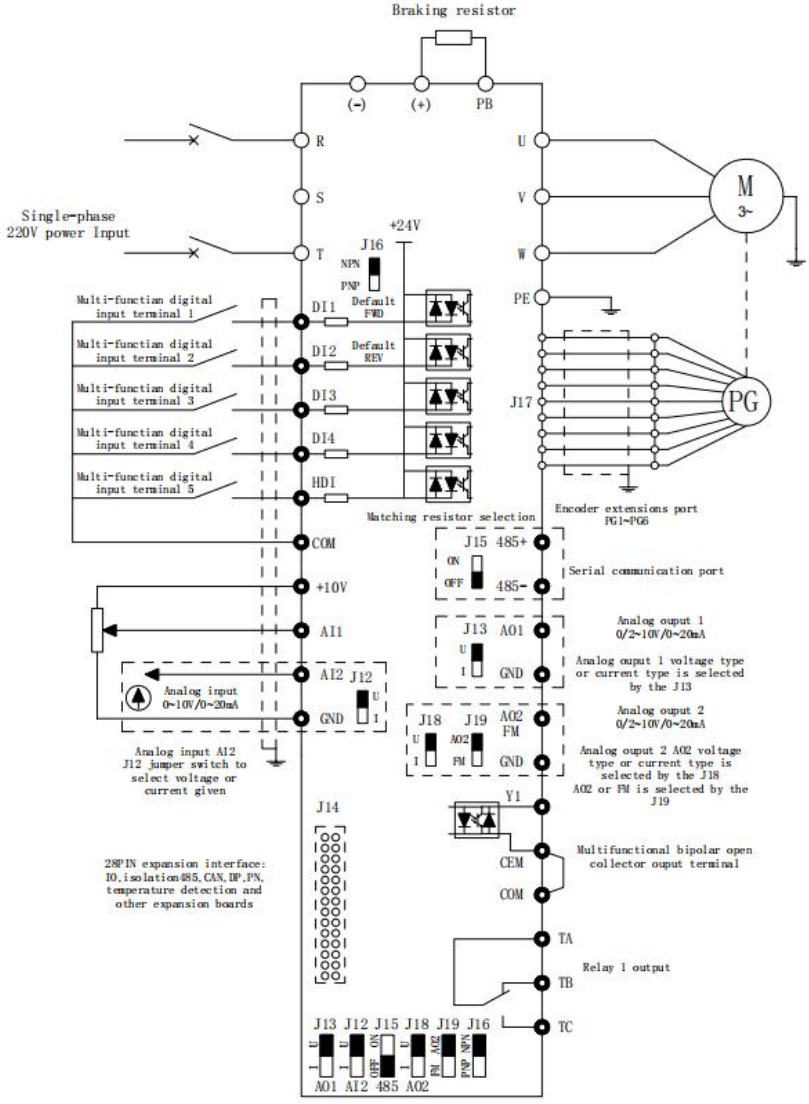


Figure 3-7 Single-phase inverter above 4.0kW

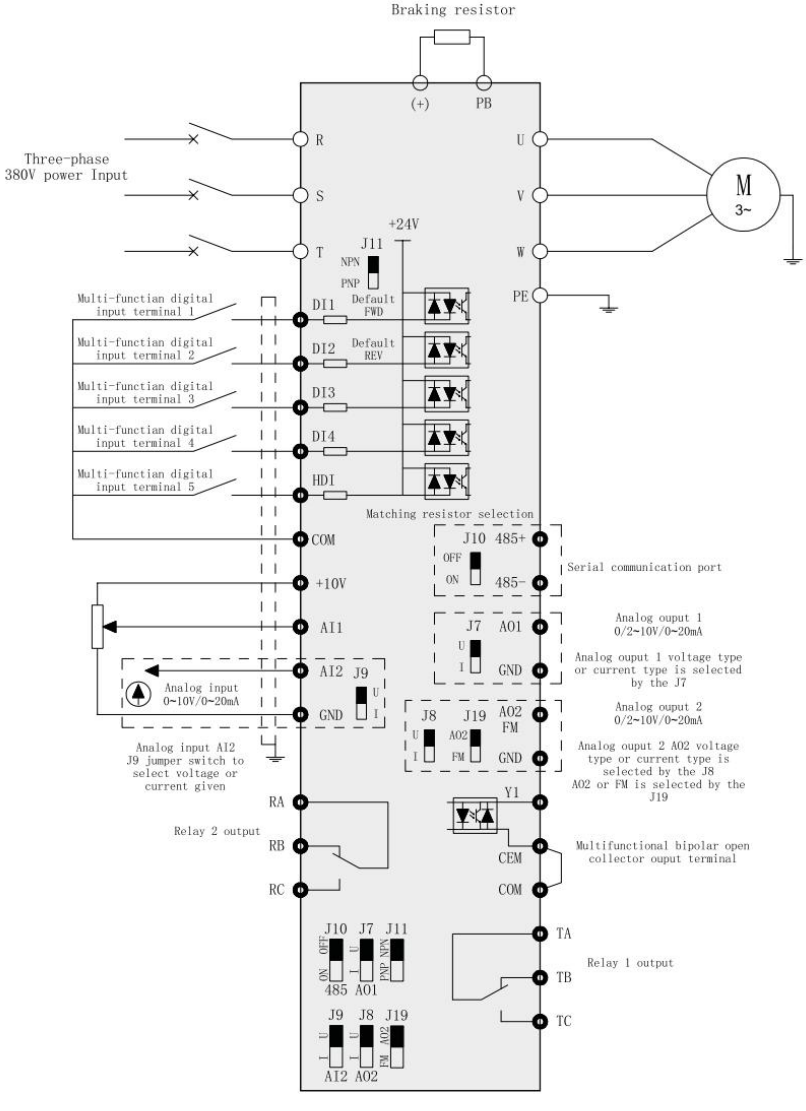


Figure 3-8 Three-phase inverter below 2.2kW

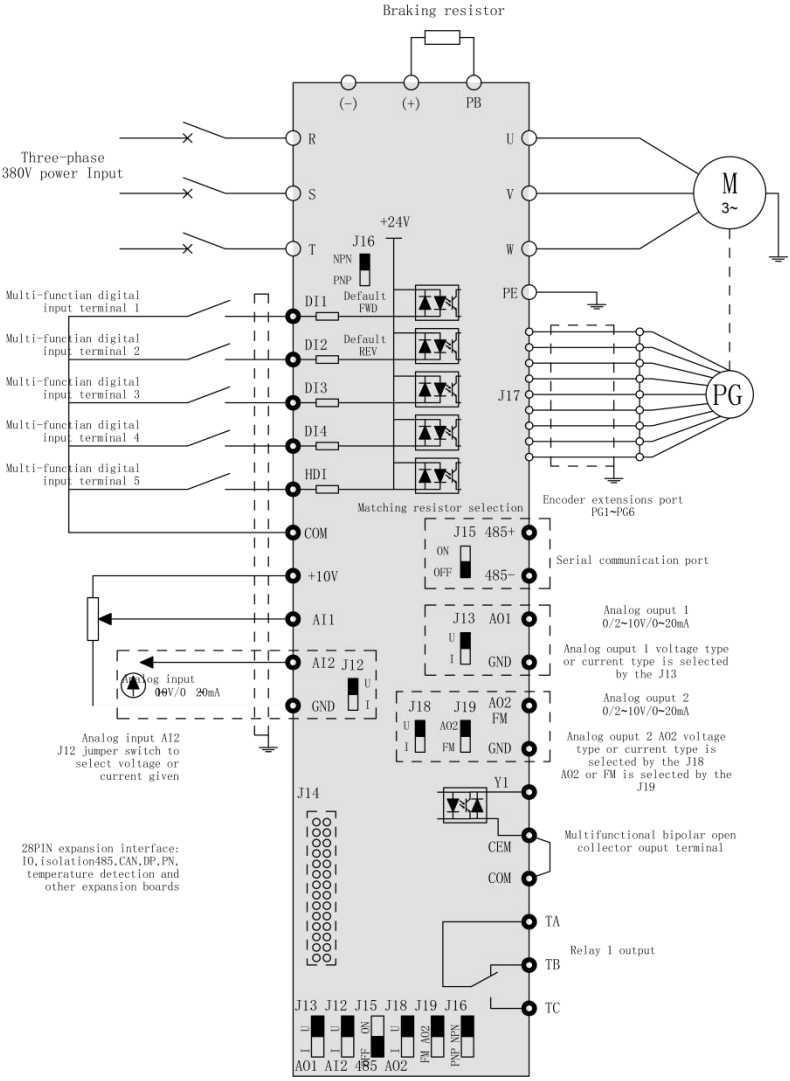


Figure 3-9 (4T/7T) Three-phase inverter above 4.0kW

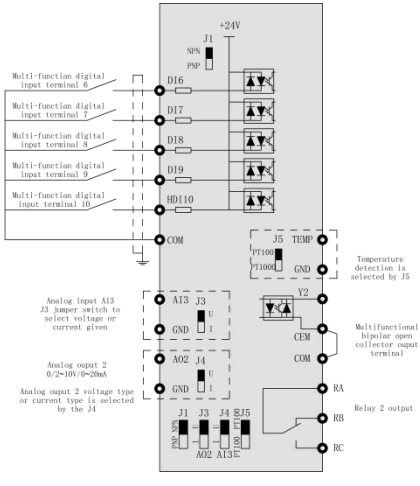


Figure 3-10 IO1 expansion card

Note:

The parts above 4KW of the WS600 series are optional functions. If you need it, please specify when ordering.

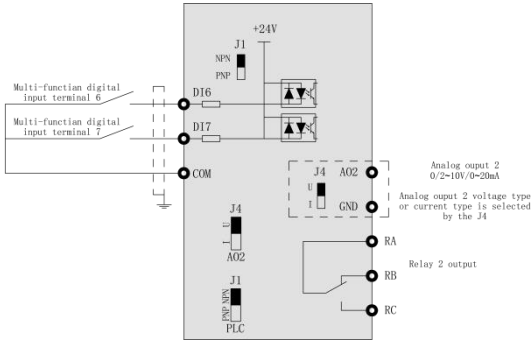


Figure 3-11 IO2 expansion card

Note:

The parts above 4KW of WS600 series are optional functions. If you need it, please specify when ordering.

3.4 Control terminals and wiring

3.4.1 Control terminals and wiring

GND	AO1	485-	DI1	DI2	DI3	DI4	HDI5	+24V	RA	RB	RC
+10V	AI1	AI2	485+	CME	COM	Y1	AO2 FM	COM	TA	TB	TC

Figure 3-10 Three phase 380V 2.2 KW or less

+10V	AI1	AI2	DI1	DI2	DI3	DI4	HDI	T/A	T/B	T/C
GND	GND	AO1	485+	485-	CME	COM	Y1	AO2 FM	COM	+24V

RA	RB	RC	COM	DI6	DI7	DI8
GND	TEMP	AI3	AO2	DI9	DI10	Y2

IO1 expansion card

RA	RB	RC	AO2
DI6	DI7	COM	GND

IO2 expansion card

3.4.2 inverter control terminal function description

Sort	Terminal	Name	Function Description
Power supply	+10V-GND	External +10V power supply	Provide +10V power supply to the outside, the maximum output current: 10mA Generally used as working power supply of external potentiometer, potentiometer resistance range: 1~5kΩ
	24V-COM	External +24V power supply	Provide +24V power supply to the outside, generally used as the working power supply of digital input and output terminals and external sensor power supply, Maximum output current: 200mA
Analog input	AI1-GND	Analog input terminal 1	1. Input voltage range: DC0~10V 2. Input impedance: 100KΩ
	AI2-GND	Analog input terminal 2	Input range: DC0~10V/4~20mA, determined by the J12 DIP switch on the control board, the factory is voltage mode. Input impedance: 100kΩ for voltage input, 500Ω for current input. (Optional accessories: IO1 supports AI3 function)
	AI3-GND	Analog input terminal 3	
Digital input	DI1-COM	Digital input 1	Optical coupling isolation, compatible with bipolar input, switch by DI DIP switch, the factory is NPN mode Input impedance: 3.3kΩ Voltage range for level input: 9~30V HDI5 can be used as high-speed input port, the maximum input frequency is 50KHz
	DI2-COM	Digital input 2	
	DI3-COM	Digital input 3	
	DI4-COM	Digital input 4	
	DI5-COM	Digital input 5	

Sort	Terminal	Name	Function Description
Digital input	DI6-COM	Digital input 6	(Optional accessories: IO2 card supports DI6, DI7 expansion; IO1 card supports DI6, DI7, DI8, DI9, DI10 expansion.)
	DI7-COM	Digital input 7	
	DI8-COM	Digital input 8	
	DI9-COM	Digital input 9	
	DI10-COM	Digital input 10	
Analog output	AO1-GND	Analog output 1	The voltage or current output is determined by the DIP switch on the control board (refer to the bit number of the terminal wiring diagram). (Optional accessories: IO1, IO2 support AO2 function) Output voltage range: 0~10V Output current range: 0~20mA
	AO2-GND	Analog output 2	
Digital output	Y1-CME	Digital output 1	Optocoupler isolation, bipolar open collector output Output voltage range: 0~24V Output current range: 0~50mA Note: The digital output ground CME and the digital input ground COM are internally isolated, but the CME and COM have been externally short-circuited at the factory (the Y terminal is driven by +24V by default). When the Y terminal is to be driven by an external power supply, the external short connection between CME and COM must be disconnected. (Optional accessories: IO2 supports Y2 function)
	Y2-CME	Digital output 2	
	FM	High-speed pulse output	Programmable optocoupler isolation, open collector output. The highest frequency: 50KHz; when the collector is open-circuit output, it is consistent with the Y1 specification. Output voltage range: 0/24VDC, output current range: 50mA.

Sort	Terminal	Name	Function Description
Communication Interface	485+ , 485-	Modbus communication interface	Modbus communication interface, you can choose whether to need communication matching resistance through the DIP switch (refer to the bit number of the terminal wiring diagram). If Profibus communication function is required, please select WS600 series expansion card and Profibus DP card.
Relay output 1	TA-TB	Normally closed	Contact drive capability: AC250V, 3A, COSΦ=0.4. DC30V, 1A
	TA-TC	Normally open terminal	
Relay output 2	RA-RB	Normally closed	Contact drive capability:(Optional accessories: IO1, IO2 support function) AC250V, 3A, COSΦ=0.4. DC30V, 1A
	RA-RC	Normally open terminal	
Keyboard extension cable	Control board RJ45	External keyboard interface	External keyboard interface, can use standard network cable for external extension.

3.5 Main circuit terminals and connection

3.5.1 Main circuit terminal description

Single-phase inverter main circuit terminal description		
Terminal	Name	Function description
L、N	Single-phase power input terminal	Single-phase 220V AC power connection point
P(+)、(-)	DC bus positive and negative terminals	Common DC bus input point
P(+)、PB	Braking resistor connection terminal	Connect the braking resistor
U、V、W	Inverter output terminal	Connecting a three-phase motor
⏚	Ground terminal	Ground terminal

Three-phase inverter main circuit terminal description		
Terminal	Name	Function description
R、S、T	Three-phase power input terminal	AC input three-phase power connection point
P(+)、(-)	DC bus positive and negative terminals	Common DC bus input point
P(+)、PB	Braking resistor connection terminal	Connect the braking resistor
U、V、W	Inverter output terminal	Connecting a three-phase motor
⏚	Ground terminal	Ground terminal

3.5.2 Wiring Precautions

● Confirm power switch stays in the state of OFF and then start wiring operation or it will give rise to electric shock hazard!

● Wiring personnel must be those professional trainees or it will cause equipment damages and personal injuries!

● Reliable ground connection is necessary or it will give rise to electric shock or fire alarm!

● Confirm the input power is in accordance with the rated value of AC drive, or it will cause damages to AC drive!

● Confirm motor is adaptive with AC drive or it will cause damages to motor or cause AC drive protection!

● Power supply shall not be connected to the terminals of U, V and W, or it will cause damages to AC drive!

● Brake resistance shall not be connected directly to DC bus + 2 , - or it will cause damages to AC drive!

3.5.3 Attentions of wiring

A. Input power L, N or R, S and T:

The connection of inverter input side has no phase sequence requirements.

B. DC bus ⊕2 , ⊖terminals:

At the moment of power failure, DC bus⊕2 , ⊖terminals still have residual voltage, you just can touch it after internal "charge" power light is off confirming the voltage is less than 36V, it may cause electric shock.

When you select external brake unit for AC drive ≥30KW, the polarity of⊕2 and⊖cannot be connected inversely or it will cause damages to AC drive, or even fire hazard.

The wiring length of brake unit shall not be more than 10m, and only twisted pair or tight double-line is available in parallel.

Brake resistance cannot be connected onto DC bus directly, or it may cause damages to AC drive, or even fire hazard.

C. Brake resistance connection terminal (+) and PB:

AC drive ≤22KW and built- in brake unit.

The recommended value of brake resistance model selection reference and wiring distance shall be less than 5m, or it may cause damages to AC drive.

D. AC drive output side U, V and W:

AC drive output side shall not be connected to capacitor or surge absorber, or it will frequent protection of AC drive, or even damages.

When the cable of motor is overlong, the effects of distributed capacitance will generate electric resonance easily, and give rise to dielectric breakdown of motor.

The generated large leakage current makes AC drive suffer overcurrent protection. If cable length is more than 100m, alternating current output reactor shall be installed.

E. Grounding terminal ⏚:

Terminals must have been reliable ground connection, and resistance value of ground wire shall be less than 4Ω , or it will cause abnormal work of equipment, and even damages.

Grounding terminal⏚ and null line N terminal of power supply cannot be shared.

3.6 Control circuit terminal and wiring

3.6.1 Schematic diagram of control circuit wiring terminal

GND	AO1	485-	DI1	DI2	DI3	DI4	HDI5	+24V	RA	RB	RC
+10V	AI1	AI2	485+	CME	COM	Y1	AO2 FM	COM	TA	TB	TC

Figure 3-11 Three-phase 220V/380V below 2.2 KW

+10V	AI1	AI2	DI1	DI2	DI3	DI4	HDI	T/A	T/B	T/C
GND	GND	AO1	485+	485-	CME	COM	Y1	AO2 FM	COM	+24V

RA	RB	RC	COM	DI6	DI7	DI8
GND	TEMP	AI3	AO2	DI9	DI10	Y2

Figure 3-11 Three-phase 380V/660V 4.0KW or more

3.6.2 Control terminal function description

Sort	Terminal	Name	Function Description
Power supply	+10V-GND	External +10V power supply	Provide +10V power supply to the outside, the maximum output current: 10mA Generally used as working power supply of external potentiometer, potentiometer resistance range: 1~5kΩ
	24V-COM	External +24V power supply	Provide +24V power supply to the outside, generally used as the working power supply of digital input and output terminals and external sensor power supply, Maximum output current: 200mA

Sort	Terminal	Name	Function Description
Analog input	AI1-GND	Analog input terminal 1	1. Input voltage range: DC0~10V 2. Input impedance: 100KΩ
	AI2-GND	Analog input terminal 2	Input range: DC0~10V/4~20mA, determined by the J12 DIP switch on the control board, the factory is voltage mode. Input impedance: 100kΩ for voltage input, 500Ω for current input.
Digital input	DI1-COM	Digital input 1	Optical coupling isolation, compatible with bipolar input, switch by DI DIP switch, the factory is NPN mode Input impedance: 3.3kΩ Voltage range for level input: 9~30V HDI5 can be used as high-speed input port, the maximum input frequency is 50KHz DI6~DI10 are expansion board interfaces.
	DI2-COM	Digital input 2	
	DI3-COM	Digital input 3	
	DI4-COM	Digital input 4	
	DI5-COM	Digital input 5	
	DI6-COM	Digital input 6	
	DI7-COM	Digital input 7	
	DI8-COM	Digital input 8	
	DI9-COM	Digital input 9	
	DI10-COM	Digital input 10	
Analog output	AO1-GND	Analog output 1	The voltage or current output is determined by the DIP switch on the control board (refer to the bit number of the terminal wiring diagram). Output voltage range: 0~10V Output current range: 0~20mA
	AO2-GND	Analog output 2	
Digital output	Y1-CME	Digital output 1	Optocoupler isolation, bipolar open collector output Output voltage range: 0~24V Output current range: 0~50mA Note: The digital output ground CME and the digital input ground COM are internally isolated, but the CME and COM have been externally short-circuited before leaving the factory (in this case, Y1 is driven by +24V by default). When Y1 wants to drive with an external power supply, the external short connection between CME and COM must be disconnected.

Sort	Terminal	Name	Function Description
Digital output	FM (optional Y2)	High-speed pulse output	Analog voltage/current input,Choose voltage or current input by Setting JP3 jumper. Factory default: voltage input(Grounding: GND)
Communication Interface	485+, 485-	Modbus communication interface	Modbus communication interface, you can choose whether to need communication matching resistance through the DIP switch (refer to the bit number of the terminal wiring diagram). If Profibus communication function is required, please select WS600 series expansion card and Profibus DP card.
Relay output 1	TA-TB	Normally closed terminal	Contact drive capability: AC250V, 3A, COSΦ=0.4. DC30V, 1A
	TA-TC	Normally open terminal	
Relay output 2	RA-RB	Normally closed terminal	Contact drive capability: AC250V, 3A, COSΦ=0.4. DC30V, 1A
	RA-RC	Normally open terminal	
Keyboard extension cable interface	Control board RJ45 interface	External keyboard interface	External keyboard interface, can use standard network cable for external extension.

3.6.3 Signal input terminal wiring instructions:

A. AI analog input terminal:

Because weak analog voltage signals are particularly susceptible to external interference,

shielded cables are generally required, and the wiring distance should be as short as possible, not exceeding 20m, as shown in Figure 3-12. In some occasions where the analog signal is severely interfered, a filter capacitor or a ferrite core should be added on the analog signal source side.

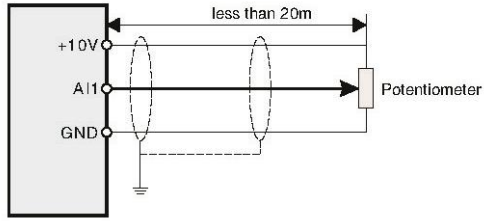


Figure 3-12 Wiring diagram of analog input terminal

At some occasion where analog signal suffers severe interference, filter condenser or ferrite core shall be installed at the side of analog signal source, as Figure 3-13 shows:

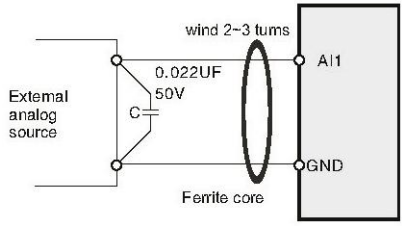
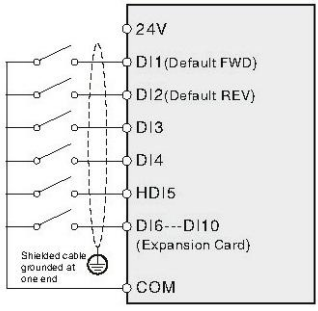
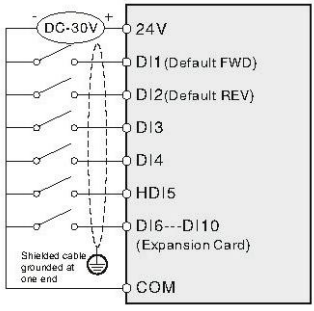


Figure 3-13 Analog input terminal with filter devices

B. Digital input terminal:

DI wiring mode 1 (factory default wiring mode): When the DI DIP switch is in NPN mode, no external power supply is used	DI wiring mode 2 : Use an external power supply when the DI DIP switch is in NPN mode
	

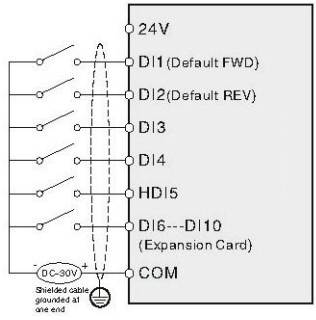
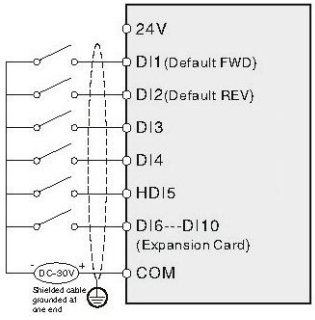
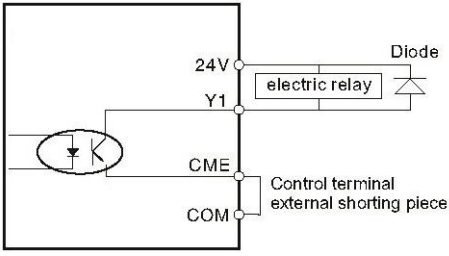
DI wiring mode 3 : No external power supply is used when the DI DIP switch is in PNP mode	DI wiring mode 4 : Use an external power supply when the DI DIP switch is in PNP mode
	

Figure 3-14 Wiring diagram of digital input terminals in four different modes

C. Y1 digital output terminal:

When the digital output terminal needs to drive the relay, an absorption diode should be installed on both sides of the relay coil, and the driving capacity is not more than 50mA. Otherwise, it is easy to cause damage to the DC 24V power supply. Note: The polarity of the absorption diode must be installed correctly, as shown in Figure 3-15, otherwise when the digital output terminal has output, the DC 24V power supply will be burned out immediately.



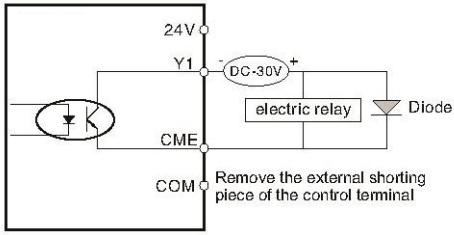


Figure 3-15 Wiring diagram of digital output terminal Y1

3.7 Treatment of EMC problem

3.7.1 Effects of harmonic wave

● Higher harmonic wave of power supply will cause damages to inverter. So in some places with bad power grid quality, we advise to install AC input reactor.

● As higher harmonic wave exists at the output side of AC drive, the application of capacitor to improve power factor and surge suppressor at output side may lead to electric shock, or even damages to equipment, so capacitor or surge suppression device cannot be installed at output side.

3.7.2 Electromagnetic interference and treatment

❶Electromagnetic interference has two categories: One is peripheral electromagnetic noise's interference on AC drive, which will give rise to false operations of inverter itself. But the effects of such interference usually are small, because AC drive has been processed internally in design about this interference, and it has a strong anti-interference capability. The other one is AC drive's effects on peripheral equipment.

● AC drive and other electrical products should ground well, and the ground resistance shall not more than 4Ω.

● It will be better if power line of AC drive won't be placed in parallel with circuit of control line. If condition permission, please arrange power lines vertically.

● At those occasions with a high anti- interference requirement, shield cable shall be used between AC drive and power line of motor, and reliable ground connection also is necessary for shielding layer.

❷Handling methods of interference from peripheral electromagnetic equipment on AC drive.Electromagnetic effects on inverter generally result from the installation of many relays, contactors or electromagnetic contactors near AC drive. When AC drive has false operation from the interference, please try to solve it with following methods:

- Install surge suppressor on the devices that make interference
- Install filter at signal input terminal of AC drive;
- The leading wire of AC drive's control signal line and detection circuit shall be shield cable, and reliable ground connection also is necessary for shielding layer.

❸The handling methods of interference on peripheral equipment from the noises of AC drive:

This part of noise can be divided into two categories: One is the radiation of AC drive itself, and the other one is the radiation of the leading wire from inverter motor. These two kinds of radiations make the leading wires surface of peripheral electrical equipment suffer electromagnetic and electrostatic induction, which will lead to false operations of equipment. About these several different disturbed conditions, please refer to following methods to resolve them:

- Instrument, receiver, sensor and other equipment for measurement,generally have a weaker signal. If they are placed near AC drive or in a same control cabinet, they will suffer interference and operate falsely. So we advise to take following methods: Keep away from interference source; Signal line shall not be placed with power line in parallel, especially shall not be tied up together in parallel, and please adopt shield cable signal line and power line;Install linear filter or radio noise filter at the input and output sides of AC drive.
- When interrupted equipment and AC drive share a same power supply, if above methods still cannot help to eliminate interference, you shall install linear filter or radio noise filter between AC drive and power supply.

- Separated ground connection for peripheral equipments can help to eliminate

the interference from ground wires' leakage current of AC drive while common grounding.

3.7.3 Leakage current and treatment

❶The factors of influencing leakage current over the ground and solutions:

Leakage current has two categories when inverter is in service: One is leakage current over the ground: and the other is leakage current between lines.

Distributed capacitance exist between wire and ground. The larger distributed capacitance are, the larger the leakage current will be: Effectively decreasing the distance between AC drive and motor can reduce distributed capacitance.

The larger carrier frequency is, the larger the leakage current will be. Reducing carrier frequency can decrease leakage current effectively. But reducing carrier frequency will result in the increase of motor noise, so please note this. Installing electric reactor also is an effective method to solve leakage current.

Leakage current will increase with enlargement of loop current,so when the power of motor is large, the relevant leakage current also will be large.

❷The factors of influencing electric current between lines and solutions:

Distributed capacitance exit between output wires of AC drive. If the electric current passing the circuit contains higher harmonic, it may give rise to resonance and leakage current. If you use thermal relay, it may cause false operation at this time.

The solution is to decrease carrier frequency or install output reactor. We advise not to install thermal relay before you use the motor of AC drive, but apply the electronic overcurrent protection function of AC drive.

4. Operation and Display

4.1 Keypad description

4.1.1 Keypad explanation and function

Using the operation panel, you can modify the function parameters of the inverter, monitor the working status of the inverter, and control the operation of the inverter (start, stop). Its appearance and functions are shown in the following figure.

Figure 4-1 Operation panel diagram (standard configuration LED keyboard)

Figure 4-2 Operation panel diagram (standard configuration LCD keyboard)

4.1.2 Function indicator description

Indicator sign	Name	meaning	Color
RUN	Operating status indicator	On - the inverter is running Off - Inverter is in stop state Flashing - the inverter is in sleep state	Green
L/D/C	Control mode indicator	Off - Inverter is in keypad control mode On - the inverter is in terminal control mode Flashing-Inverter is in remote communication control mode	Red
FWD/REV	Running direction indication	Off - Forward state On - inversion state Flashing - the target frequency is opposite to the actual frequency or is in the reverse running prohibited state	Red
TUNE/TC	Tuning/Torque Control/Fault Indicator	On - torque control Flashing - Tuning\Fault status	Red

4.1.3 Digital display area

5-digit LED display can display the set frequency, output frequency, various monitoring data and alarm codes. The function code is usually displayed as a decimal number. For example, the value of the P0-11 function code is displayed as "50.00", which means the decimal number "50.00". When the function code value is displayed in hexadecimal, the highest digit of the nixie tube displays "H.", indicating that the current function code value is displayed in hexadecimal. For example, the value of the P7-29 function code is displayed as "H. At this time, the value of P7-29 is the hexadecimal number "0x3f".

The user can freely set the monitoring data of stop and running status according to function code P7-29/P7-30, see function code P7-29/P7-30 for details.

4.1.4 Description of keyboard buttons

Button	Name	Function Description
	Program / Escape key	Enter or exit the first-level menu, return to the upper-level menu
	Enter	Enter the menu screen step by step, set parameters to confirm
	Increment key (+)	Increment of data or function code
	Decrement key (-)	Decrement of data or function code
	Shift key	In the stop display interface and the running display interface, the display parameters can be selected cyclically. For the specific display meaning, please refer to P7-29 and P7-30; when modifying the parameters, you can select the modification bit of the parameter
	Run key	In keyboard operation mode, used to run operation
	Stop/Reset key	In the running state, pressing this key can be used to stop the running operation; in the fault alarm state, it can be used to reset the operation. The characteristics of this key are restricted by the function code P7-27.
	Jog run/Direction keys	When P7-28 is set to 0, it is the jog running button, and when P7-28 is set to 1, it is the direction button. Press this button to reverse the direction.

Button	Name	Function Description

	Program / Escape key	Enter or exit the first-level menu, return to the upper-level menu
	Enter	Enter the menu screen step by step, set parameters to confirm
	Increment key (+)	Increment of data or function code
	Decrement key (-)	Decrement of data or function code
	Shift key	In the stop display interface and the running display interface, the display parameters can be selected cyclically. For the specific display meaning, please refer to P7-29 and P7-30; when modifying the parameters, you can select the modification bit of the parameter
	Run key	In keyboard operation mode, used to run operation
	Stop/Reset key	In the running state, pressing this key can be used to stop the running operation; in the fault alarm state, it can be used to reset the operation. The characteristics of this key are restricted by the function code P7-27.
	Jog run/Direction keys	When P7-28 is set to 0, it is the jog running button, and when P7-28 is set to 1, it is the direction button. Press this button to reverse the direction.

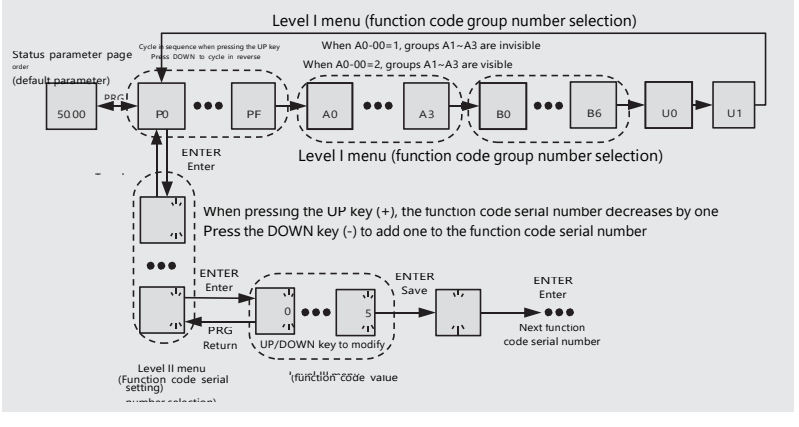
4.2 Organization of Inverter Function Codes

Function code group	Function description	Illustrate
P0～PF	Basic function parameter group	Compatible with WS600 series function codes
A0～A3	Second motor parameter group	The second motor parameters, acceleration and deceleration time, control mode, etc. can be set independently
B0～B6	Enhanced function parameter group	System parameter setting, user function code customization, optimization control, AI/AO correction, master-slave control, brake function and sleep function;
C0～CF	Special plane function selection group	Choose to use different professional inverter functions;
U0～U1	Monitoring parameter group	U0 is the fault record parameter group, and U1 is the user monitoring parameter, which is convenient to check the relevant output status;

4.3 Function code viewing and modification method description

AC drives adopts three-level menu structure for parameter setting and other operations. The three-level menus respectively are: functional parameter group(firstlevel menu)→function code (second- level menu)-function code setting value (third-level menu). Operational process is shown in Figure 4-2:

Figure 4-2 Three-level menu operation flow chart



Note:

When operating in the third-level menu, you can press PRG key or ENTER key to return to the second-level menu. But pressing the ENTER key will save the current parameter modification value and transfer to the next function code; while pressing the PRG key will abandon the current parameter modification.

Example: Change function code P1-04 from 0.00Hz to 5.00Hz.

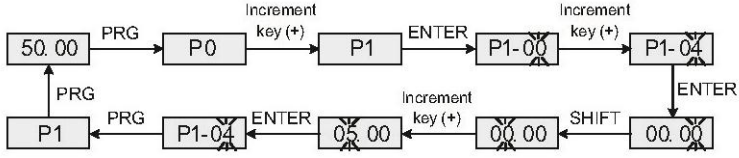


Figure 4-3 Parameter setting operation flow chart

In the third-level menu state, if the parameter has no flashing bit, it means that the parameter value of the function code cannot be modified. For the specific reason, please refer to the description of the function code attribute.

5. Synchronous Motor Open Loop Vector (SVC) Commissioning Instructions

5.1 Set the synchronization type, control method and motor parameters

❶The motor type is set to synchronous motor and the control mode is SVC, that is, P0-03=11.

Note:

The ten digit of P0-03 is the motor type selection, and the one digit is the control

mode;

Tens place: 1: synchronous motor, 0: asynchronous motor;

Ones place: 1: SVC, 2: VF, 3: Closed loop vector (reserved)

❷Set P4-01~P4-06 according to the actual motor parameters.

5.2 Parameter identification

❶Connect the motor, if there is a load, set P4-00 to 1; if it is an empty shaft, set P4-00 to 2, the digital tube will display TUNE, in order to ensure the control effect, the motor is best to be no-load and set P4 -00 is 2.

❷Press the RUN key to perform parameter identification, and wait for TUNE to disappear, then the parameter identification ends.

❸ The identification process lasts for about 1 minute, and you can press the STOP button in the middle to exit. During this period, current will be sent, run the motor at the set acceleration and deceleration time to 60% of the rated frequency of the motor to observe whether the motor runs smoothly, if not, press STOP to exit, reach 60% of the rated frequency of the motor, and decelerate to stop after a period of time.

❹After parameter identification, check whether the parameters of P4-17~ P4-20 are normal.

5.3 No-load test run

❶Set the speed to a smaller range, such as P0-11= 20Hz.

❷Press the run key to check whether the motor can accelerate to the set frequency and whether the motor current is small. If the motor can accelerate to the set frequency and the motor current is small, the inverter is basically normal. Set the frequency to the rated frequency of the motor and check whether the motor can accelerate to the set frequency.

5.4 Quick start test run, set it when quick start and stop are required,otherwise skip this step

Reduce the motor acceleration time (for example, set it to 1 second), change the speed loop and current loop PI parameter settings, and press the run key to check whether the motor can quickly accelerate to the set frequency.

5.5 Load and run

After the above 5 steps, you can run the motor with load and use the inverter normally.

Note:

Loading or changing the moment of inertia of the system, if the system response cannot achieve the expected effect, it is necessary to adjust the two parameters P3-04 and P3-06 appropriately. If you replace it with another motor, you generally need to set the rated frequency and rated current of the motor, and then perform parameter identification.

6. Troubleshooting and Countermeasures

6.1 Fault alarm and countermeasures

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

Table 9-1 Fault alarm and countermeasures

Fault name	Panel displa	Troubleshooting	Troubleshooting Countermeasures
Inverter module protecti on	Err01	◆Whether the motor connection terminals U, V and W are short-circuited between phases or to ground ◆Is the module overheated? ◆Whether the internal wiring of the inverter is loose ◆Whether the main control board, driver board or module is normal	◆Contact short circuit ◆Are the fans and air ducts normal? ◆Connect all loose wires ◆Seek technical support
Overcurr ent during accelera tion	Err04	◆There is grounding or short circuit in the output circuit of the inverter ◆The motor parameters are incorrect ◆The acceleration time is too short ◆V/F torque boost or inappropriate curve ◆The input voltage is low ◆Start the rotating motor ◆Sudden load during acceleration ◆Inverter selection is too small	◆Eliminate peripheral faults ◆Check parameters and parameter identification ◆Increase the acceleration time ◆Adjust the V/F boost torque or curve ◆Adjust the voltage to the normal range ◆Select the speed tracking start or wait for the motor to stop before starting ◆Cancel sudden load ◆Use inverters with larger power levels

Fault name	Panel display	Troubleshooting	Troubleshooting Countermeasures
Overcurrent during deceleration	Err05	◆There is grounding or short circuit in the output circuit of the inverter ◆The motor parameters are incorrect ◆The deceleration time is too short uThe input voltage is low ◆Sudden load during deceleration ◆No braking unit and braking resistor ◆The magnetic flux braking gain is too large	◆Eliminate peripheral faults ◆Perform motor parameter identification ◆Increase the deceleration time ◆Adjust the voltage to the normal range ◆Cancel sudden load ◆Install braking unit and resistance ◆Reduce the magnetic flux braking gain
Overcurrent in constant speed operation	Err06	◆There is grounding or short circuit in the output circuit of the inverter ◆The motor parameters are incorrect ◆The input voltage is low ◆Is there a sudden load during operation? ◆Inverter selection is too small	◆Eliminate peripheral faults ◆Check parameters and parameter identification ◆Adjust the voltage to the normal range ◆Cancel sudden load ◆Select the inverter with a larger power level
Overvoltage during acceleration	Err08	◆The input voltage is too high ◆There is an external force driving the motor to run during the acceleration process ◆The acceleration time is too short ◆No braking unit and braking resistor ◆The motor parameters are incorrect	◆Adjust the voltage to the normal range ◆Cancel external power or install braking resistor ◆Increase the acceleration time ◆Install braking unit and resistor ◆Check parameters and parameter identification
Overvoltage during deceleration	Err09	◆The input voltage is too high ◆There is an external force driving the motor to run during the deceleration process ◆The deceleration time is too short ◆No braking unit and braking resistor	◆Adjust the voltage to the normal range ◆Cancel external power or install braking resistor ◆Increase the deceleration time ◆Install braking unit and resistor

Fault name	Panel display	Troubleshooting	Troubleshooting Countermeasures
Overvoltage during constant speed operation	Err10	◆The input voltage is too high ◆There is an external force driving the motor to run during the acceleration process	◆Adjust the voltage to the normal range ◆Cancel external power or install braking resistor
Undervoltage fault	Err12	◆Instantaneous power failure ◆The input voltage of the inverter is not within the range required by the specification ◆The bus voltage is abnormal ◆The rectifier bridge and buffer resistance are abnormal ◆Abnormal drive board ◆The control panel is abnormal	◆Reset fault ◆Adjust the voltage to the normal range ◆Seek technical support
Drive overload fault	Err13	◆Whether the load is too large or the motor is blocked ◆Inverter selection is too small	◆Reduce the load and check the motor and mechanical conditions ◆Select the inverter with a larger power level
Motor overload fault	Err14	◆Whether the setting of motor protection parameter P9-01 is appropriate ◆Whether the load is too large or the motor is blocked ◆Inverter selection is too small	◆Correctly set this parameter ◆Reduce the load and check the motor and mechanical condition ◆Select the inverter with a larger power level
drive overheati ng	Err15	◆The ambient temperature is too high ◆The air duct is blocked ◆The fan is damaged ◆The module thermistor is damaged ◆The inverter module is damaged	◆Lower the ambient temperature ◆Clean the air duct uReplace the fan ◆Replace the thermistor ◆Replace the inverter module

Fault name	Panel display	Troubleshooting	Troubleshooting Countermeasures
Current detection failure	Err17	◆Whether the internal wiring of the inverter is loose ◆Is the current detection device normal? ◆Whether the main control board or driver board is normal	◆Check the wiring ◆Seek technical support
Short to ground fault	Err20	◆Motor short circuit to ground	◆Replace the cable or motor
Input phase loss fault	Err23	◆The three-phase input power supply is abnormal ◆The driver board is abnormal ◆The lightning protection board is abnormal ◆The main control board is abnormal	◆Check and eliminate problems in peripheral circuits ◆Seek technical support
Output phase loss fault	Err24	◆The lead wire from the inverter to the motor is abnormal ◆The three-phase output of the inverter is unbalanced when the motor is running ◆The driver board is abnormal ◆Module exception	◆Eliminate peripheral faults ◆Check whether the three-phase windings of the motor are normal and troubleshoot ◆Seek technical support
read and write failure	Err25	◆EEPROM chip damaged	◆Replace the main control board
Parameter	Err27	◆Is the host computer working? ◆Is the communication connection normal? ◆Whether the communication parameter P8 group is correct	◆Check the wiring of the host computer, etc. ◆Check the communication wiring ◆Check the parameters of P8 group
Parameter	Err28	◆Input external normally open or normally closed fault signal through multi-function DI terminal	◆Fault reset
Excessive speed deviation	Err29	◆The load is too heavy and the set acceleration time is too short ◆The setting of fault detection parameters P9-31 and P9-32 is unreasonable	◆Extend the set acceleration and deceleration time ◆Reset P9-31 and P9-32

Fault name	Panel display	Troubleshooting	Troubleshooting Countermeasures
User-defined fault 1	Err30	◆User-defined fault 1 signal input through multi-function terminal DI	◆Reset
User-defined fault 2	Err31	◆User-defined fault 2 signal input through multi-function terminal DI	◆Reset
PID feedback lost at runtime	Err32	◆PID feedback value is less than the set value of PA-13	◆Check the feedback signal or reset the PA-13
Fast current limiting	Err33	◆The load is too large or the stall occurs ◆The set acceleration time is too short	◆Reduce the load or replace the inverter with a higher power ◆Properly extend the acceleration time
load drop failure	Err34	◆When the load drop detection condition is reached, please refer to P9-28-P9-30 for specific use.	◆Reset or reset detection conditions
input power failure	Err35	◆The input voltage is not within the specified range ◆Power on and off too frequently	◆Adjust the input voltage ◆Extend the power cycle
parameter storage exception	Err37	◆Abnormal communication between DSP and EEPROM chip	◆Replace the main control board ◆Seek manufacturer service
The running time has arrived	Err39	◆The current running time of the inverter > the set value of P7-38	◆Reset
Accumulated running time reached	Err40	◆The accumulated running time reaches the set value P7-20	◆Use parameter initialization function 2 to clear the recording time or reset the accumulated running time
Switching motors during operation	Err42	◆Switch the motor through the terminals during operation	◆Motor switch after shutdown

Fault name	Panel display	Troubleshooting	Troubleshooting Countermeasures
Master-slave control communication dropped	Err46	◆The master is not set but the slave is set ◆The communication line is abnormal or the communication parameters are incorrect	◆Set the host and reset the fault ◆Check the communication line and communication parameter P8 group

6.2 Common faults and their solutions

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

Table 9-2 Common faults and their solutions

Serial number	Fault phenomenon	Possible reason	Solution
1	No display when power on	◆The grid voltage is not available or too low ◆The switching power supply on the drive board of the inverter is faulty ◆The rectifier bridge is damaged ◆The buffer resistance of the inverter is damaged ◆Control panel and keyboard failure ◆The connection between the control board, the driver board and the keyboard is broken	◆Check the input power ◆Check the bus voltage ◆Re-plug the keyboard and the 30-pin cable ◆Seek manufacturer service
2	Display "Err20" alarm when power on	◆The motor or output line is short- circuited to ground uThe inverter is damaged	◆Use a shaker to measure the insulation of the motor and output line ◆Seek manufacturer service

Serial number	Fault phenomenon	Possible reason	Solution
3	Err15 (module overheating) fault is reported frequently	◆The carrier frequency setting is too high ◆The fan is damaged or the air duct is blocked ◆The internal components of the inverter are damaged (thermocouple or other)	◆Reduce the carrier frequency (P0-26) ◆Replace the fan and clean the air duct ◆Seek manufacturer service
4	The motor does not rotate after the inverter is running	◆Motor and motor wire ◆Incorrect setting of inverter parameters (motor parameters) ◆Poor connection between the drive board and the control board ◆Drive board failure	◆Reconfirm the connection between the inverter and the motor ◆Replace the motor or clear the mechanical fault ◆Check and reset the motor parameters
5	DI terminal failure	◆Parameter setting error ◆External signal error ◆The position of the DI DIP switch is wrong ◆Control board failure	◆Check and reset the relevant parameters of the P5 group ◆Reconnect the external signal line ◆Re-confirm whether the position of the DI DIP switch is consistent with the wiring method ◆Seek manufacturer service
6	The inverter frequently reports overcurrent and overvoltage faults	◆The motor parameters are set incorrectly ◆Inappropriate acceleration and deceleration time ◆Load fluctuation	◆Reset the motor parameters or perform motor tuning ◆Set the appropriate acceleration and deceleration time ◆Seek manufacturer service

6.3 Common faults of synchronous motors and their solutions

If the motor does not start normally with load, you can try the following operations:

6.3.1 Motor starts with heavy load

❶Increase the upper limit of torque current (P3-21)

When the load is greater than the torque output of the inverter, the inverter will be in a locked-rotor state, and P3-21 can be appropriately increased at this time.

❷Increase the speed PI adjustment parameter, modify the resistance value or static identification to correct the motor resistance.

The motor resistance parameter (P4-17) will significantly affect the load carrying capacity of the motor at low speed. When the resistance parameter (P4-17) exceeds the actual resistance value by too much (for example, 200% of the actual resistance value), it may cause the motor to reverse at low speed at the upper torque limit current. When the resistance parameter (P4-17) is too much lower than the actual resistance value (for example, 50% of the actual resistance value),it may cause the motor to run in a step-by-step manner, or rotate for a period of time and stop for a period of time. Increasing the speed P value P3-04 at low speed and reducing the speed loop integral time P3-05 may improve the problem caused by too small resistance parameters.

6.3.2 Adjust the speed loop PI parameters (under normal circumstances do not need to adjust)

❶In general, if the proportional coefficient of speed PI adjustment is too large, it
will cause high-frequency vibration of the speed, and the mechanical vibration or electromagnetic noise will increase significantly; if the proportional coefficient is too small and the integration time is too small or the load inertia is too large, it will cause low-frequency vibration of the speed and overshoot of the speed. Obviously, if there is no discharge measures, there may be overvoltage.

❷If you need to adjust the speed PI parameter, first increase the integral time,increase the ratio if the speed does not oscillate, and then decrease the integral time if the effect is not satisfactory. Generally, the larger the inertia of the system,the smaller the integral time and the larger the proportional

coefficient. If the speed filter coefficient is increased, the integral time should be increased, and
the proportion can be increased appropriately.

Note:

The inertia of the drive system is equal to the motor inertia plus the load inertia.

The inertia of the motor is proportional to the mass of the motor and the square of the diameter of the motor; the inertia of the transmission load is proportional to the mass of the load and the square of the diameter of the transmission wheel; if there is a deceleration or speed-up device, the inertia is proportional to the speed-up ratio and inversely proportional to the deceleration ratio .

For loads with large inertia, if fast speed response is required, the integration time needs to be reduced, but it is easy to cause speed overshoot, resulting in overvoltage of the inverter, and a discharge device is required to discharge. If there is no discharge device, the integration time can be increased.

6.3.3 Adjust the PI parameters of the current loop (under normal circumstances, do not need to adjust)

Under normal circumstances, increasing the proportional coefficient and the integral coefficient will speed up the current response speed, but if too large, it will cause speed shock (specifically, the motor does not rotate, or rotates in random directions, and emits high-frequency electromagnetic noise at the same time). If you need to adjust it, first Adjust the proportional coefficient, and adjust the integral coefficient if the effect is not satisfactory. The PI parameters of the current loop are related to the motor stator resistance, inductance, carrier frequency of the system, and current sampling filter time. When the carrier frequency of the system remains unchanged, the proportional coefficient is proportional to the inductance,and the integral coefficient is proportional to the resistance. Therefore,by identifying The output parameter can roughly determine the adjustment direction of this parameter.

7. Modbus communication protocol

WS600 series inverter provides RS232/RS485 communication interface and supports Modbus communication protocol. Users can realize centralized control through computer or PLC, set inverter running commands, modify or read function code parameters, and read inverter working status and fault information through this communication protocol.

7.1 Agreement

The serial communication protocol defines the content and format of information transmitted in serial communication. It includes: host polling (or broadcast) format; host encoding method, including: function code required for action, transmission data and error checking, etc. The response of the slave also adopts the same structure, including: action confirmation, return data and error checking, etc. If the slave has an error in receiving the information, or cannot complete the action required by the master, it will organize a fault message as a response and feed it back to the master.

7.2 Application method

The inverter is connected to the "single master and multiple slave" PC/PLC control network with RS232/RS485 bus.

7.3 Bus structure

(1) The interface way RS232/RS485 hardware interface

(2) Transfer method

Asynchronous serial, half-duplex transmission mode. At the same time, only one of the mast- er and slave can send data and the other can only receive data. In the process of serial asynchronous communication, data is sent frame by frame in the form of messages.

(3) Topology

Single master multi-slave system. The setting range of the slave address is 1 to 247, and 0 is the broadcast communication address. Slave addresses in the network must be unique.

7.4 Protocol description

WS600 series inverter communication protocol is an asynchronous serial master-slave Mod- bus communication protocol. Only one device (host) in the network can establish a protocol (called "query/command"), other devices (slave) can only provide The data responds to the "query/command" of the host, or makes

corresponding actions according to the "query/command" of the host. The host here refers to personal computer (PC), industrial control equipment or programmable logic controller (PLC), etc., and the slave refers to the WS600 inverter. The master can not only communicate with a certain slave, but also publish broadcast information to all the lower slaves. For the "inquiry/command" of the host that is accessed individually, the slave must return a message (called a response). For the broadcast information sent by the host, the slave does not need to respond to the host.

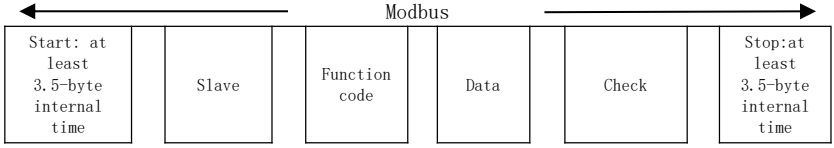
7.5 Communication frame structure

The Modbus protocol communication data format of WS600 series inverter is as follows.

Using RTU mode, message transmission starts with a pause interval of at least 3.5 character times. This is the easiest to implement with various character times at the network baud rate (as shown in T1-T2-T3-T4 in the figure below). The first field of the transfer is the device address.The transfer characters that can be used are 0...9,A...F in hexadecimal. The network device continuously detects the network bus, including the pause interval. When the first field (address field) is received, each device decodes it to determine whether it is destined for its own. After the last transmitted character, a pause of at least 3.5 character times marks the end of the message. A new message can start after this pause.

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

RTU Data Frame Format



RTU frame format:

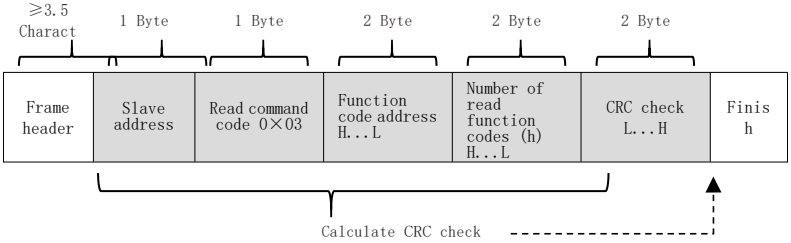
Frame header START	3.5 character time
Slave address ADR	Communication address: 1～247 (set by P8-02)
Command code CMD	03: Read slave parameters; 06: Write slave parameters

Data content DATA (N-1)	Data content: Function code parameter address, function code parameter number, function code parameter value, etc.
Data content DATA (N-2)	
...	
Data content DATA0	
CRC CHK low order	Detection value: CRC16 check value. When transmitting, the low byte comes first and the high byte follows. For the calculation method, please refer to the description of CRC check in this
CRC CHK high bits	
END	3.5 character time

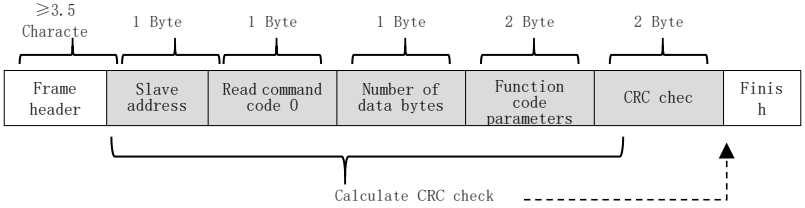
Command command (CMD) and data description (DATA)

Command code: 03H, read N words (Word), can read up to 12 words and N=1～12. The specific format is as follows:

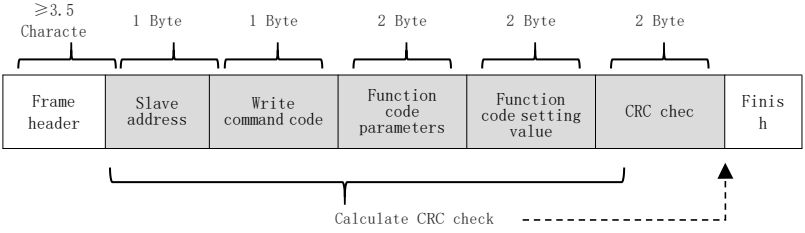
Host read command frame



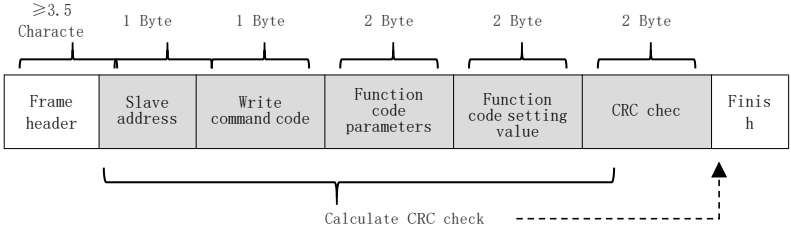
Slave read response frame



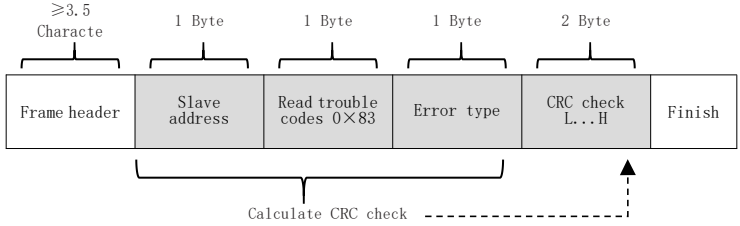
Host write command frame



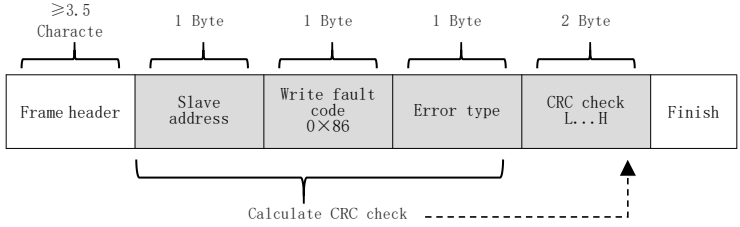
Slave write response frame



If the slave detects a communication frame error, or fails to read and write due to other reasons, it will reply with an error frame. Slave read response error frame:



Slave write response error frame



Example: read the contents of two consecutive parameters starting from P0-03 of the inverter whose slave address P8-02 is 01.

The frame sent by the host is shown in the figure:

Frame header ≥3.5 Character	Slave address 0×01	Read command code 0×03	Function code address 0×F0 0×03	Number of read function codes 0×00 0×02	CRC check 0×07 0×0B	Finish

The slave reply frame is as shown in the figure:

Frame header ≥3.5 Character	Slave address 0×01	Read command code 0×03	Data bytes 0×04	P0.03 parameter value 0×00 0×00	P0.04 parameter value 0×00 0×00	CRC check 0×FA 0×33	Finish

Note: If the write command is unsuccessful, the failure reason will be returned.

7.6 Check method (CRC check method)

CRC (Cyclical Redundancy Check) uses the RTU frame format, and the message includes an error detection field based on the CRC method. The CRC field detects the content of the entire message. The CRC field is two bytes containing a 16-bit binary value. It is calculated by the transmitting device and added to the message. The receiving device recalculates the CRC of the received message and compares it with the value in the received CRC field. If the two CRC values a re not equal, it means that there is an error in the transmission.

The CRC is stored in 0xPFPF first, and then a process is called to process the consecutive 8-bit bytes in the message with the value in the current register. Only the 8Bit data in each character is valid for CRC, and the start and stop bits and parity bits are invalid. In the process of CRC generation, each 8-bit character is XORed with the contents of the register independently, and the result is moved to the direction of the least significant bit, and the most significant bit is filled with 0. The LSB is extracted and detected. If the LSB is 1, the register is individually ORed with the preset value. If the LSB is 0, it is not performed. The whole process is repeated 8 times. After the last bit (8th bit) is completed, the next 8-bit byte is XORed with the current value of the register independently. The value in the final
register is the CRC value after all bytes in the message are executed. When the CRC is added to the message, the low byte is added first, then the high byte. The CRC simple function is as follows:

```
unsigned int crc_chk_value (unsigned char *data_value,unsigned char length) {
        unsigned int crc_value=0xPFPF;
        int I;
        while (length--)              {
              crc_value^=*data_value++;
              for (i=0;i<8;i++)                    {
                    if (crc_value&0x0001)                  {
                          crc_value= (crc_value>>1) ^0xa001;
                    }
                    else
                    {
```

```
                    crc_value=crc_value>>1;
                }
            }
        }
        return (crc_value) ;
        }
```

7.7 Address Definition of Communication Parameters

This part is the content of communication, which is used to control the operation of the inverter, the status of the inverter and the setting of related parameters.

Read and write function code parameters (some function codes cannot be changed,and are only used by manufacturers or monitored):

Function code parameter address marking rules:

The rules are represented by the function code group number and label as the parameter

address:

High-order byte: P0~PF (group P), A0~AF (group A), B0~BF (group B), C0~CF (group C),D0~DF (group D), 70~7F (group U) low byte: 00~PF

Such as: P0-11, the address is expressed as F00B;

Notice:

PF group: parameters can neither be read nor changed;

Group U: can only be read, parameters cannot be changed.

Some parameters cannot be changed when the inverter is running; some parameters cannot be changed no matter what state the inverter is in; when changing the function code parameters, pay attention to the range, unit, and related descriptions of the parameters.

Function code group	Communication visit address	Function code address of communication change RAM
P0～PE	0xF000～0xPEPF	0x0000～0x0EPF
A0～AF	0xA000～0xAPFF	0x4000～0x4PFF
B0～BF	0xB000～0xBPFF	0x5000～0x5PFF
C0～CF	0xC000～0xCPFF	0x6000～0x6PFF
U0、U1	0x70xx、0x71xx	

Note that, because the EEPROM is frequently stored, the service life of the EEPROM will be reduced. Therefore, some function codes do not need to be stored in the communication mode, just change the value in the RAM.

If it is a parameter of group P, to realize this function, it can be realized only by changing the high-order F of the function code address to 0.

If it is a group A parameter, to realize this function, just change the high-order A of the function code address to 4 to realize it.

The corresponding function code addresses are expressed as follows: high byte:00~0F (group P), 40~4F (group A) low byte: 00~PF

For example, the function code P0-11 is not stored in the EEPROM, and the address is expressed as 000B; this address indicates that it can only be written to RAM, but cannot be read. When reading, it is an invalid address.

Stop/Run parameter section:

Address	Parameter Description
0X1000/ 0X9000	1000:*communication setting value (-10000～10000) (decimal) (unit: 0.01%), readable and writable
	9000: Communication setting frequency: 0HZ～P0-14 (minimum unit: 0.01HZ), readable and writable
0x1001	Set frequency (unit: 0.01Hz), read only
0x1002	Running frequency (unit: 0.01Hz), read only
0x1003	Bus voltage (unit: 0.1V), read only
0x1004	Output voltage (unit: 0.1V), read only
0x1005	Output current (unit: 0.1A), read only
0x1006	Output power (unit: 0.1kW), read only
0x1007	DI input flag (unit: 1), read only
0x1008	DO output flag (unit: 1), read only
0x1009	PID setting (unit: 1), read only
0x100A	PID feedback (unit: 1), read only
0x100B	Ai1 voltage (unit: 0.01V), read only
0x100C	Ai2 voltage (unit: 0.01V), read only
0x100D	Ao1 output voltage (unit: 0.01V) read only
0x100E	PLC step (unit: 1), read only
0x100F	Speed (unit: 1rpm), read only
0x1010	Count value input (unit: 1), read only
0x1011	Input pulse frequency (unit: 0.01kHz), read only
0x1012	Feedback speed (unit: 0.1Hz), read only
0x1013	Remaining running time (unit: 0.1min), read only
0x1014	AI1 voltage before calibration (unit: 0.001V), read only
0x1015	AI2 voltage before calibration (unit: 0.001V), read only
0x1016	Actual linear speed (unit: 1m/min), read only
0x1017	Load speed (unit: user-defined, refer to P7-31), read only
0x1018	Current power-on time (unit: 1min), read only

0x1019	Current running time (unit: 0.1min) read only
0x101A	Input pulse frequency (unit: 1Hz), read only

Address	Parameter Description
0x101B	Main frequency X display (unit: 0.01Hz), read only
0x101C	Auxiliary frequency Y display (unit: 0.01Hz), read only
0x101D	Target torque (unit: 0.1%), Take the motor rated torque as 100%, read only
0x101E	Output torque (unit: 0.1%), Take the motor rated torque as 100%, read only
0x101F	Output torque (unit: 0.1%), Take the inverter rated current as 100%, read only
0x1020	Torque upper limit (unit: 0.1%, Take the inverter rated current as 100%, read only
0x1021	VF separation target voltage (unit: 1V), read only
0x1022	VF separate output voltage (unit: 1V), read only
0x1023	Reserved, read only
0x1024	Motor 1\2 indication (unit: 1), read only
0x1025	Length value input (unit: 1) read only
0x1026	AO2 output voltage (unit: 0.01V), read only
0x1027	Inverter status (unit: 1), read only
0x1028	Current fault (unit: 1), read only

Example 1: Read the operating frequency of the first device: 0x01 0x03 0x10 0x02 0x00 0x01 0x21 0x0A

0x10 0x02 (1002) operating frequency address, 0x00 0x01 (0001) a data

0x21 0x0A (210A) CRC check value

Example 2: Read the bus voltage, output voltage and output current of the first device at the same time: 0x01 0x03 0x10 0x03 0x00 0x03 CRC check value, the meaning of the data is similar to that of example 1.

Note: The communication setting value is a percentage of the relative value, 10000 corresponds to 100.00%, -10000 corresponds to -100.00%.

For frequency dimension data, the percentage is relative to the maximum frequency (P0-14); for torque dimension data, the percentage is P3-21, P3-23, A3-21, A3-23.

Note: DO output terminal needs to select 16 (communication control) function. AO output needs to select 7 (communication control output) function.

Type	Command address	Command content
Control command input (write only)	0x2000	0001: Forward run 0002: Reverse run 0003: Forward jog 0004: Reverse jog 0005: Coast to stop 0006: Decelerate to stop 0007: Fault reset 0008: Fault reset (only in communication control mode can fault reset)
Status read (read only)	0x3000	0001: Forward running 0002: Reverse running 0003: Stop
Digital output terminal control (write only)	0x2001	BIT0: RELAY1 output control BIT1: DO1 output control BIT2: RELAY2 output control
Analog output AO1 control (write only)	0x2002	0～7PFF means 0%～100%
Analog output AO2 control (write only)	0x2003	0～7PFF means 0%～100%

Inverter fault address	0x8000	0000: No fault 0001: Reserved 0002: Reserved 0003: Reserved 0004: Acceleration overcurrent 0005: Deceleration overcurrent 0006: Constant speed overcurrent 0007: Stop overcurrent 0008: Acceleration overvoltage 0009: Deceleration overvoltage 000A: Constant speed overvoltage 000B: Stop overvoltage 000C: Undervoltage fault 000D: Inverter overload 000E: Motor overload 000F: Module overheat 0010: Reserved 0011: Current detection fault 0012: Reserved 0013: Reserved 0014: Motor short circuit fault to ground 0015: Motor tuning fault 0016: Reserved

Type	Command	Command content
Inverter fault address	0x8000	0017: Input phase loss 0018: Output phase loss 0019: EEPROM read and write abnormality 001A: Password input exceeded times 001B: Communication abnormal 001C: External fault 001D: Excessive speed deviation 001E: User-defined fault 1 001F: User-defined fault 2 0020: Loss of PID feedback during runtime 0021: Hardware current limit fault 0022: Loss of load 0023: Overload fault of buffer resistor 0024: The contactor is abnormal 0025: The agent running time has arrived 0026: Motor over temperature (reserved) 0027: Current running time reached 0028: Cumulative running time reached 0029: Power-on time reached 002A: Switching motor failure during operation 002B: Motor overspeed

The return address when communication fails: read fault 83XX, write fault 86X.

8. Function & Parameter Table

The function code symbols are explained as follows:

Icons	Content
☆	Indicates that the inverter parameters can be modified during stop and running (0)
★	Indicates that the inverter is in a running state and cannot be modified (1)
○	Indicates that this parameter is a manufacturer's parameter and cannot be changed by the user (3)
●	Indicates the actual detection value of the inverter or the manufacturer's fixed value, which cannot be changed (2)

The communication address in the function parameter table is written in hexadecimal.

Enhanced function codes: Group A0~Group A3, Group B0~Group B6, opened by function parameter P7-75.

Function code	Name	Description (setting range)	Factory Default	Change	Communication Address
Group P0: Basic function group					
P0-00	Product number	Product model: 5 digits display, 2 decimal places	60#.##	●	F000
P0-01	Inverter GP type display	0: G type 1: P type	0	★	F001
P0-02	Rated current	0.1A~3000.0A	Model is determined	●	F002
P0-03	Motor control method	Ones place: motor control mode selection 1: Open loop vector control (speed sensor-less vector) 2: VF Control 3: Closed loop vector (with speed sensor vector) Tens place: motor type selection 0: Asynchronous motor 1: Synchronous motor	2	★	F003
P0-04	Run command source	0: Operation panel running command channel (LED off) 1: Terminal command channel (LED on) 2: Communication command channel (LED flashes)	0	★	F004

Function code	Name	Description (setting range)	Factory Default	Change	Communication Address
P0-05	Up\Down to modify the frequency command reference during runtime	0: Running frequency 1: Setting frequency	1	★	F005
P0-06	Main frequency source X selection	0: Up/Down modification frequency, no memory after shutdown 1: Up/Down modification frequency power-off memory 2: AI1 3: AI2 4: Multi-speed 5: Simple PLC 6: PID 7: Communication given 8: PULSE pulse setting 9: Up/Down modifies the frequency, and the memory is stopped when the power is turned off.	1	★	F006
P0-07	Auxiliary frequency source Y selection	0: Up/Down modification frequency, no memory after shutdown 1: Up/Down modification frequency power-off memory 2: AI1 3: AI2 4: Multi-speed 5: Simple PLC 6: PID 7: Communication given 8: PULSE pulse setting 9: Up/Down modifies the frequency, and the memory is stopped when the power is turned off.	0	★	F007
P0-08	Auxiliary frequency source Y range selection	0: relative to the maximum frequency 1: Relative to frequency source X 2: The range is the same as 0 but the main and auxiliary have no negative frequency output	0	☆	F008

Function code	Name	Description (setting range)	Factory Default	Change	Communication Address
P0-09	Auxiliary frequency source Y range	0% to 100%	100%	☆	F009
P0-10	Frequency source selection	Ones place: frequency source selection 0: Main frequency source X 1: Main and auxiliary operation results (the operation relationship is determined by ten digits) 2: Switch between main frequency source X and auxiliary frequency source Y 3: Switch between the main frequency source X and the main and auxiliary operation results 4: Switch between auxiliary frequency source Y and main and auxiliary operation results Tens place: main and auxiliary operation relationship of frequency source 0: main + auxiliary 1: Primary-Secondary 2: the maximum value of the two 3: the minimum value of the two	00	☆	F00A
P0-11	Preset frequency	0.00Hz～Maximum frequency P0-14	50.00Hz	☆	F00B
P0-13	Motor running direction selection	0: Consistent with the current motor direction 1: Opposite to the current motor direction 2: Inversion is prohibited	0	☆	F00D
P0-14	Maximum output frequency	When P0-20=1, the adjustable range is 50.0Hz～1200.0Hz; When P0-20=2, the adjustable range is 50.00Hz～600.00Hz;	50.00Hz	★	F00E
P0-15	Upper limit frequency source	0: Digital given (P0-16) 1: AI1 2: AI2 3: Communication given 4: PULSE setting	0	★	F00F

Function code	Name	Description (setting range)	Factory Default	Change	Communication Address
P0-16	Upper limit frequency	Lower limit frequency P0-18～maximum frequency P0-14	50.00Hz	☆	F010
P0-17	Upper limit frequency offset	0.00～Maximum frequency P0-14	0.00Hz	☆	F011
P0-18	Lower frequency	0.00Hz～upper limit frequency P0-16	0.00Hz	☆	F012
P0-19	Command source binding selection	Units digit: selection of frequency source bound by operation panel command 0: no binding 1: Digital setting frequency 2: AI1 3: AI2 4: Multi-speed 5: Simple PLC 6: PID 7: Communication given 8: PULSE pulse setting (DI5) Tens place: Terminal command binding frequency source selection Hundreds place: Communication command binding frequency source selection Thousands: reserved	000	☆	F013
P0-20	Frequency Decimal Selection	1: 1 decimal point 2: 2 decimal places	2	★	F014
P0-21	Acceleration and deceleration time unit	0: 1 second 1: 0.1 seconds 2: 0.01 seconds	1	★	F015
P0-22	Acceleration and deceleration time reference frequency	0: Maximum frequency (P0-14) 1: Preset frequency (P0-11) 2: Motor rated frequency (P4-05 or A1- 05)	0	★	F016
P0-23	Acceleration time 1	0s～30000s(P0-21=0) 0.0s～3000.0s(P0-21=1) 0.00s～300.00s(P0-21=2)	10.0s	☆	F017
P0-24	Deceleration time 1	0s～30000s(P0-21=0) 0.0s～3000.0s(P0-21=1) 0.00s～300.00s(P0-21=2)	10.0s	☆	F018

Function code	Name	Description (setting range)	Factory Default	Change	Communication Address
P0-25	Overmodulation voltage boost value	0%～10%	3%	★	F019
P0-26	Carrier frequency	0.5kHz～16.0kHz	Model is determined	☆	F01A
P0-27	The carrier frequency is adjusted with temperature	0: Invalid; 1: Valid;	1	☆	F01B
P0-28	Parameter initialization	0: No operation 1: Restore factory parameters, excluding motor parameters, record information and frequency decimal point P0-20 2: Clear record information 3: Backup current user parameters 4: Restore user backup parameters	0	★	F01C
Group P1: Start-stop control					
P1-00	Start method	0: direct start 1: Speed Tracking 2: Asynchronous motor pre- excitation start	0	☆	F100
P1-01	Speed tracking method	0: start from stop frequency 1: Start with target frequency 2: start from maximum frequency	0	★	F101
P1-02	Maximum speed tracking current	30%～150%	100%	★	F102
P1-03	Speed tracking speed	1～100	20	☆	F103
P1-04	Start frequency	0.00Hz～10.00Hz	0.00Hz	☆	F104
P1-05	Start frequency hold time	0.0s～100.0s	0.0s	★	F105
P1-06	Start DC braking current	0%～100%	0%	★	F106

Function code	Name	Description (setting range)	Factory Default	Change	Communication Address
P1-07	Start DC braking time	0.0s～100.0s	0.0s	★	F107
P1-08	Selection of acceleration and deceleration frequency curve mode	0: Straight line 1: S curve A 2: S curve B (P1-09～ P1-12 unit is 0.01s)	0	★	F108
P1-09	S-curve acceleration start time	0.0%～100.0%	20.0%	★	F109
P1-10	S-curve acceleration end time	0.0%～100.0%	20.0%	★	F10A
P1-11	S-curve deceleration start time	0.0%～100.0%	20.0%	★	F10B
P1-12	S-curve deceleration end time	0.0%～100.0%	20.0%	★	F10C
P1-13	Stop mode	0: Decelerate to stop 1: Free stop	0	☆	F10D
P1-14	DC braking start frequency at stop	0.00Hz～P0-14	0.00Hz	☆	F10E
P1-15	DC braking waiting time at stop	0.0s～100.0s	0.0s	☆	F10F
P1-16	Stop braking DC current	0%～100%	0%	☆	F110
P1-17	DC braking time at stop	0.0s～36.0s	0.0s	☆	F111
P1-21	Demagnetization time	0.01s～3.00s	0.50s	★	F115
P1-23	Instantaneous stop and non-stop mode selection	0: invalid 1: Automatically adjust the deceleration rate 2: Decelerate to stop	0	★	F117
P1-24	The deceleration time of the momentary stop and non-stop deceleration stop	0.0s～100.0s	10.0s	★	F118
P1-25	Instantaneous power failure and non-stop effective voltage	60%～85%	80%	★	F119
P1-26	Instantaneous power failure and non-stop recovery of voltage	85%～100%	90%	★	F11A
P1-27	Instantaneous power failure and non-stop recovery voltage judgment	0.0s～300.0s	0.3s	★	F11B
P1-28	Instantaneous stop and non-stop automatic gain adjustment	0～100	40	☆	F11C

Function code	Name	Description (setting range)	Factory Default	Change	Communication Address
P1-29	Instantaneous stop and non- stop automatic adjustment of integral	1～100	20	☆	F110D
Group P2: V/F control parameters					
P2-00	V/F curve setting	0: Straight line VF curve 1: Multi-point VF curve 2: Square VF curve 3: 1.7th power curve 4: 1.5 power curve 5: 1.3 power curve 6: VF full separation mode 7: V/F half separation mode	0	★	F200
P2-01	Torque boost	0.0%～30.0%	0.0%	☆	F201
P2-02	Torque boost cut-off frequency	0.00Hz～Maximum frequency	25.00Hz	★	F202
P2-03	V/F frequency point P1	0.00Hz～P2-05	1.30Hz	★	F203
P2-04	V/F voltage point V1	0.0%～100.0%	5.2%	★	F204
P2-05	V/F frequency point P2	P2-03～P2-07	2.50Hz	★	F205
P2-06	V/F voltage point V2	0.0%～100.0%	8.8%	★	F206
P2-07	V/F frequency point P3	P2-05～Motor rated frequency	15.00Hz	★	F207
P2-08	V/F voltage point V3	0.0%～100.0%	35.0%	★	F208
P2-09	Slip Compensation Coefficient	0.0%～200.0%	50.0%	☆	F209
P2-10	Flux Brake Gain	0～200	100	☆	F20A
P2-11	Oscillation suppression gain	0～100	Model is determined	☆	F20B
P2-13	VF slip compensation time constant	0.02s～1.00s	0.30s	☆	F20D
P2-15	Output voltage source selection when VF is separated	0: Digital setting (P2-14) 1: AI1 2: AI2 3: Multi-segment instruction 4: Simple PLC 5: PID	0	☆	F20F

Function code	Name	Description (setting range)	Factory Defaul	Change	Communication Address
P2-15	Output voltage source selection when VF is separated	6: Communication given 7: PULSE pulse setting (Di5) 100.0% corresponds to the rated voltage of the motor	0	☆	F20F
P2-16	V/F separation output voltage digital setting	0V～Motor rated voltage	0V	☆	F210
P2-17	V/F separation output voltage acceleration time	0.0～3000.0s	1.0s	☆	F211
P2-18	V/F separation output voltage deceleration time	0.0～3000.0s	1.0s	☆	F212
P2-19	V/F separation and stop mode selection	0: Frequency and output voltage deceleration time are independent 1: After the voltage is reduced to 0, the frequency is reduced again	0	☆	F213
Group P3: Vector control parameters					
P3-00	Switching frequency P1	0.00～P3-02	5.00 Hz	☆	F300
P3-02	Switching frequency P2	P3-00～P0-14	10.00 Hz	☆	F302
P3-04	Low frequency speed proportional gain	0.1～10.0	4.0	☆	F304
P3-05	Low frequency speed integration time	0.01s～10.00s	0.50s	☆	F305
P3-06	High frequency speed proportional gain	0.1～10.0	2.0	☆	F306
P3-07	High frequency speed integration time	0.01～10.00s	1.00s	☆	F307
P3-08	Speed loop integral attribute selection	0: Points take effect 1: Integral separation	0	★	F308
P3-11	Torque current regulator Kp	0～30000	2200	☆	F30B
P3-12	Torque current regulator Ki	0～30000	1500	☆	F30C
P3-13	Excitation current regulator Kp	0～30000	2200	☆	F30D
P3-14	Excitation current regulator Ki	0～30000	1500	☆	F30E
P3-15	Flux Brake Gain	0～200	0	☆	F30F

Function code	Name	Description (setting range)	Factory Defaul	Change	Communication Address
P3-16	Field weakening torque correction factor	50%～200%	100%	☆	F310
P3-17	Slip compensation gain	50%～200%	100%	☆	F311
P3-18	Speed loop feedback filter time constant	0.000～1.000s	0.015s	☆	F312
P3-19	Speed loop output filter time constant	0.000～1.000s	0.000s	☆	F313
P3-20	Electric torque upper limit source	0: P3-21 1: AI1 2: AI2 3: Communication given 4: PLUSE given (The analog range corresponds to P3-21)	0	☆	F314
P3-21	Electric torque upper limit	0.0%～200.0%	150.0%	☆	F315
P3-22	Braking torque upper limit source	0: P3-23 1: AI1 2: AI2 3: Communication given 4: PLUSE given (The analog range corresponds to P3-23)	0	☆	F316
P3-23	Braking torque upper limit	0.0～200.0%	150.0%	☆	F317
P3-24	Low-speed magnetizing current of synchronous motor	0.0%～50.0%	25.0%	★	F318
P3-25	Magnetizing cut-off frequency of synchronous motor	0%～100%	10%	★	F319
P3-26	Pre-excitation time	0s～5s	0.1s	★	F31A
P3-27	Synchronous motor initial position identification enable selection	0: Disable 1: Identification method one 2: Identification method 2	1	★	F31B
P3-28	Initial position identification voltage given percentage	30%～130%	80%	★	F31C
Group P4: First motor parameter					
P4-00	Motor parameter tuning	0: no function 1: Static tuning 2: Rotary tuning	0	★	F400

Function code	Name	Description (setting range)	Factory Default	Change	Communication Address
P4-01	Motor 1 rated power	0.1kw～1000.0kw	Model is determined	★	F401
P4-02	Motor 1 rated voltage	1V～1500V	380V	★	F402
P4-03	Motor 1 Number of motor poles	2 to 64	Model is determined	○	F403
P4-04	Motor 1 rated current	0.01A～600.00A(Motor rated power<=30.0KW) 0.1A～6000.0A(Motor rated power>30.0KW)	P4-01 OK	★	F404
P4-05	Motor 1 rated frequency	0.01Hz～P0-14	50.00 Hz	★	F405
P4-06	Motor 1 rated speed	1rpm～60000rpm	P4-01 OK	★	F406
P4-07	Motor 1 no-load current	0.01A～P4-04 (Motor rated power<=30.0KW) 0.1A～P4-04 (Motor rated power>30.0KW)	Model is determined	★	F407
P4-08	Motor 1 stator resistance	0.001Ω～65.535Ω	Model is determined	★	F408
P4-09	Motor 1 rotor resistance	0.001Ω～65.535Ω	Model is determined	★	F409
P4-10	Motor 1 mutual inductance	0.1Mh～6553.5Mh	Model is determined	★	F40A

Function code	Name	Description (setting range)	Factory Default	Change	Communication Address
P4-11	Motor 1 leakage inductance	0.01Mh～655.35Mh	Model is determined	★	F40B
P4-12	Acceleration at Dynamic Full Tuning	1.0s～6000.0s	10.0s	☆	F40C
P4-13	Deceleration at dynamic full tuning	1.0s～6000.0s	10.0s	☆	F40D
P4-17	Synchronous motor stator resistance	0.001Ω～65.535Ω	Model is determined	★	F411
P4-18	Synchronous motor D-axis inductance	0.01Mh～655.35Mh	Model is determined	★	F412
P4-19	Synchronous motor Q-axis inductance	0.01Mh～655.35Mh	Model is determined	★	F413
P4-20	Synchronous motor back EMF	1V～65535V	Model is determined	★	F414
P4-21	No-load current of synchronous motor	0.0%～50.0%	10.0%	★	F415
P4-28	Number of encoder pulse lines (before 4 x frequency)	1-65535	1024	★	F41C
P4-29	Encoder phase sequence selection	0:forward direction 1:opposite direction	0	★	F41D
P4-30	Encoder type	0:ABZ encoder 1:UVW encoder 2:Provincial line encoder 3:rotary transformer 4:Positive cosine encoder	0	★	F41E
P4-31	Rotary transformer pole-log	1-65535	1	★	F41F
P4-32	Encoder installation position angle	0.0° -359. 9°	0.0°	★	F420

Function code	Name	Description (setting range)	Factory Default	Change	Communication Address
Group P5: Input terminal					
P5-00	DI1 terminal function	0: No function 1: Forward rotation (FWD) 2: Reverse operation (REV) 3: Three-wire running control 4: Forward jog (FJOG) 5: Reverse Jog (RJOG) 6: Terminal UP 7: Terminal DOWN 8: Free parking 9: Fault reset (RESET) 10: run pause 11: External fault normally open input 12: Multi-segment command terminal 1 13: Multi-segment command terminal 2 14: Multi-segment command terminal 3 15: Multi-segment command terminal 4 16: Acceleration and deceleration selection terminal 1 17: Acceleration and deceleration selection terminal 2 18: Frequency source switching 19: UP/DOWN setting clear (terminal, keyboard) 20: Running command switching terminal 21: Acceleration and deceleration prohibition 22: PID invalid (pause) 23: PLC status reset 24: Swing frequency pause 25: Timing trigger input 26: Immediate DC braking 27: External fault normally closed input 28: Counter input 29: Counter reset 30: Length count input 31: Length count reset 32: Torque control prohibited 33: PULSE (pulse) frequency input 34: Frequency modification prohibited 35: PID action direction is reversed 36: External parking terminal 1	1	★	F500
P5-01	DI2 terminal function		2	★	F501
P5-02	DI3 terminal function		9	★	F502
P5-03	DI4 terminal function		12	★	F503
P5-04	DI5 terminal function		13	★	F504
P5-05	DI6 terminal function		0	★	F505
P5-06	DI7 terminal function				F506

Function code	Name	Description (setting range)	Factory Default	Change	Communication Address
P5-07	DI8 terminal function	37: Control command switching terminal 2 38: PID integral pause terminal 39: Frequency source X and preset frequency switching terminal 40: Frequency source Y and preset frequency switching terminal 41: Switch between motor 1 and motor 2 42: reserved 43: PID parameter switching terminal 44: Speed control/torque control switching 45: Emergency stop 46: External parking terminal 2 47: Deceleration DC braking 48: This running time is cleared 49: Two-wire/three-wire switch 50: Inversion prohibited 51: User-defined fault 1 52: User-defined fault 2 53: Sleep Input (Optional accessories: IO2 card supports DI6, DI7 expansion; Io1 card supports DI6, DI7, DI8, DI9, DI10 expansion.)	0	★	F507
P5-08	DI9 terminal function				F508
P5-09	DI10 terminal function				F509
P5-10	DI terminal filter time	0.000～1.000s	0.010s	☆	F50A
P5-11	Terminal command method	0: Two-wire type 1 1: Two-wire type 2 2: Three-wire type 1 3: Three-wire type 2	0	★	F50B
P5-12	Terminal UP/ DOWN change rate	0.01Hz/s～100.00Hz/s	1.00Hz/s	☆	F50C
P5-13	Terminal valid logic 1	0: High level 1: low level Ones place: DI1; Tens place: DI2; Hundreds: DI3; Thousands: DI4; Ten thousand: DI5	00000	★	F50D

Function code	Name	Description (setting range)		Factory Default	Change	Communication Address
P5-15	AI1 minimum input value	0.00V~P5-17		0.00V	☆	F50F
P5-16	AI1 minimum input corresponding setting	-100.0%～100.0%		0.0%	☆	F510
P5-17	AI1 maximum input value	P5-15~10.00V		10.00V	☆	F511
P5-18	AI1 maximum input corresponding setting	-100.0%～100.0%		100.0%	☆	F512
P5-19	AI1 input filter time	0.00s～10.00s		0.10s	☆	F513
P5-20	AI2 minimum input value	0.00V~P5-22		0.00V	☆	F514
P5-21	AI2minimum input corresponding setting	-100.0%～100.0%		0.0%	☆	F515
P5-22	AI2 maximum input value	P5-20~10.00V		10.00V	☆	F516
P5-23	AI2 maximum input corresponding setting	-100.0%～100.0%		100.0%	☆	F517
P5-24	AI2 input filter time	0.00s～10.00s		0.10s	☆	F518
P5-25	AI3 minimum input value	0.00V～10.00V	Optional Parts IO1 Support function	0.00V	☆	F519
P5-26	AI3 minimum input corresponding setting	-100.0%～100.0%		0.0%	☆	F520
P5-27	AI3 maximum input value	0.00V～10.00V		10.00V	☆	F521
P5-28	AI3 maximum input corresponding setting	-100.0%～100.0%		100.0%	☆	F522
P5-29	AI3 input filter time	0.00s～10.00s		0.10s	☆	F523
P5-30	PULSE (pulse) input minimum frequency	0.00KHz~P5-32		0.00KHz	☆	F51E
P5-31	PULSE (pulse) input minimum frequency corresponding setting	-100.0%～100.0%		0.0%	☆	F51F
P5-32	PULSE (pulse) input maximum frequency	P5-30~50.00KHz		50.00KHz	☆	F520
P5-33	PULSE (pulse) input maximum frequency corresponding setting	-100.0%～100.0%		100.0%	☆	F521
P5-34	PULSE input filter time	0.00s～10.00s		0.10s	☆	F522
P5-35	DI1 turn-on delay time	0.0s～3600.0s		0.0s	☆	F523
P5-36	DI1 off delay time	0.0s～3600.0s		0.0s	☆	F524
P5-37	DI2 turn-on delay time	0.0s～3600.0s		0.0s	☆	F525
P5-38	DI2 off delay time	0.0s～3600.0s		0.0s	☆	F526

Function code	Name	Description (setting range)	Factory Default	Change	Communication Address
P5-39	DI3 turn-on delay time	0.0s～3600.0s	0.0s	☆	F527
P5-40	DI3 off delay time	0.0s～3600.0s	0.0s	☆	F528
P5-41	AI1 is selected as DI terminal	0～53, the function is the same as the common DI terminal	0	★	F529
P5-42	AI2 is selected as DI terminal	0～53, the function is the same as the common DI terminal	0	★	F52A
P5-44	Valid mode selection when AI is used as DI terminal	Ones place, AI1: 0: Active high, 1: Active low Ten, AI2: 0: Active high, 1: Active low Hundreds: reserved	0x00	☆	F52C
P5-45	AI curve selection	AI multi-point curve selection: Ones place: AI1 0: 2-point straight line P5-15～P5-19 1: Multi-point curve 1: PE-00～PE-07 2: Multi-point curve 2: PE-08～PE-15 Tenth place: AI2 0: 2-point straight line P5-20～P5-24 1: Multi-point curve 1: PE-00～PE-07 2: Multi-point curve 2: PE-08～PE-15 Hundreds: reserved	0x00	☆	F52D
Group P6: Output terminal					
P6-00	Control board relay RELAY1 output (TA/TB/TC) selection	0: no output 1: Inverter running signal (RUN) 2: fault output 3: Frequency level detection PDT1 arrival 4: Frequency Arrival (PAR) 5: Running at zero speed 6: Motor overload pre-alarm 7: Inverter overload pre-alarm 8: PLC cycle completed 9: Cumulative running time arrives 10: Frequency limited 11: Ready to run 12: AI1>AI2 13: The upper limit frequency is reached 14: The lower limit frequency is reached 15: Undervoltage status output 16: Communication settings 17: Timer output 18: Reverse running 19: reserved 20: Set length reached 21: Torque limited 22: Current 1 arrives 23: Frequency 1 arrives	1	☆	F600
P6-01	Control board relay RELAY2 output (RA/RB/RC) selection		1	☆	F601
P6-02	Y1 output selection		1	☆	F602
P6-03	Y2 output selection (optional accessory IO1 support function)		1	☆	F603

		24: Module temperature reached 25: Dropping 26: Cumulative power-on time arrives 27: Timed arrival output 28: The running time has arrived 29: Set count value reached 30: The specified count value arrives 31: Motor 1, Motor 2 indication 32: Brake control output 33: Running at zero speed 2 34: Frequency level detection PDT2 arrival 35: Zero current state 36: Software current overrun 37: The lower limit frequency is reached, and the output is also output4010when stopped 38: Alarm output 39: Reserved 40: All input overrun 41:Reserved 42: reserved 43: Frequency reached 2 44: Current reaches 2 45: Fault output			

Function code	Name	Description (setting range)	Factory Default	Change	Communication Address
P6-04	FM terminal output mode selection	0: Pulse output (FMP) 1: Open collector switch output (FMR)	0	☆	F604
P6-05	FMR output selection	Same as Y1 output selection	0	☆	F605

P6-09	AO1 output selection	0: Running frequency 1: set frequency 2: Output current (100% corresponds to twice the rated current of the motor) 3: Output power (100% corresponds to twice the rated power of the motor) 4: Output voltage (100% corresponds to 1.2 times the rated voltage of the inverter) 5: Analog AI1 input value 6: Analog AI2 input value 7: Communication settings 8: Output torque 9: length 10: count value 11: Motor speed 12: Bus voltage (0 to 3 times the rated voltage of the inverter) 13: Pulse input 14: Output current (100% corresponds to 1000.0A) 15: Output voltage (100.0% corresponds to 1000.0V) 16: Output torque (actual torque value - 2 times rated to 2 times rated)	0	☆	F609
P6-10	AO2 output selection		0	☆	F60A
P6-11	FMP output selection		0	☆	F60B
P6-12	FMP output maximum frequency	0.01KHz～100.00KHz	50.00	☆	F60C
P6-13	AO1 output lower limit	-100.0%～P6-15	0.0%	☆	F60D
P6-14	The lower limit corresponds to AO1 output	0.00V～10.00V	0.00V	☆	F60E
P6-15	AO1 output upper limit	P6-13～100.0%	100.0%	☆	F60F

Function code	Name	Description (setting range)	Factory Default	Change	Communication Address
P6-16	The upper limit corresponds to AO1 output	0.00～10.00V	10.00V	☆	F610
P6-17	AO2 output lower limit	-100.0%～P6-19	0.0%	☆	F611
P6-18	The lower limit corresponds to the AO2 output	0.00V～10.00V	0.00V	☆	F612
P6-19	Ao2 output upper limit	P6-17～100.0%	100.0%	☆	F613
P6-20	The upper limit corresponds to AO2 output	0.00～10.00V	10.00V	☆	F614
P6-21	Main relay T pick-up delay	0.0s～3600.0s	0.0s	☆	F615
P6-22	Main relay R pick-up delay	0.0s～3600.0s	0.0s	☆	F616
P6-23	Y1 high level output delay	0.0s～3600.0s	0.0s	☆	F617
P6-26	Main relay T off delay	0.0s～3600.0s	0.0s	☆	F61A
P6-27	Main relay R off delay	0.0s～3600.0s	0.0s	☆	F61B
P6-28	Y1 low level output delay	0.0s～3600.0s	0.0s	☆	F61C
P6-29	Y2 low level output delay	0.0～3600.0s	0.0s	☆	F61D
Group P7: Accessibility and keyboard display					
P7-00	Jog running frequency	0.00Hz～Maximum frequency	6.00Hz	☆	F700
P7-01	Jog acceleration time	0.0s～3000.0s	10.0s	☆	F701
P7-02	Jog deceleration time	0.0s～3000.0s	10.0s	☆	F702
P7-03	Acceleration time 2	0.0s～3000.0s	10.0s	☆	F703
P7-04	Deceleration time 2	0.0s～3000.0s	10.0s	☆	F704
P7-05	Acceleration time 3	0.0s～3000.0s	10.0s	☆	F705
P7-06	Deceleration time 3	0.0s～3000.0s	10.0s	☆	F706
P7-07	Acceleration time 4	0.0s～3000.0s	10.0s	☆	F707
P7-08	Deceleration time 4	0.0s～3000.0s	10.0s	☆	F708
P7-09	Hop Frequency 1	0.00Hz～Maximum frequency	0.00Hz	☆	F709
P7-10	Hop Frequency 1 Amplitude	0.00Hz～Maximum frequency	0.00Hz	☆	F70A
P7-11	Hop Frequency 2	0.00Hz～Maximum frequency	0.00Hz	☆	F70B
P7-12	Hop Frequency 2 Amplitude	0.00Hz～Maximum frequency	0.00Hz	☆	F70C
P7-15	Forward and reverse dead time	0.0s～3000.0s	0.0s	☆	F70F

Function code	Name	Description (setting range)	Factory Default	Change	Communication Address
P7-16	Keyboard Knob Accuracy	0: default mode 1: 0.1Hz 2: 0.5Hz 3: 1Hz 4: 2Hz 5: 4Hz 6: 5Hz 7: 8Hz 8: 10Hz 9:0.01Hz 10:0.05Hz	2	☆	F710
P7-17	The frequency is lower than the lower limit frequency processing	0: run at the lower frequency limit 1: shutdown 2: Running at zero speed	0	☆	F711
P7-18	Sag rate	0.0%～100.0%	0.0%	☆	F712
P7-19	Delay time for frequency lower than lower limit shutdown	0.0s～600.0s	0.0s	☆	F713
P7-20	Set cumulative operating time	0h～65000h	0h	☆	F714
P7-21	Jog priority	0: invalid 1: Jog priority mode 1 2: Jog priority mode 2 When the user fails or the PID is lost, the jog is still valid Stop mode and DC braking can be set	1	☆	F715
P7-22	Frequency detection value (PDT1 level)	0.00Hz～Maximum frequency	50.00Hz	☆	F716
P7-23	Frequency check hysteresis value (PDT1 hysteresis)	0.0%～100.0%	5.0%	☆	F717
P7-24	Frequency arrival detection width	0.0%～100.0%	0.0%	☆	F718
P7-25	Reserve	--	0	●	F719
P7-26	Fan control	0: The fan keeps running 1: The fan runs when the inverter is running	1	★	F71A

Function code	Name	Description (setting range)	Factory Defaul	Change	Communication Address
P7-26	Fan Control	(When the temperature is higher than 40°, the fan will also run under shutdown)	0	★	F71A
P7-27	STOP/RESET function	0: Only valid in keyboard control 1: The stop or reset function is valid in all control modes	0	☆	F71B
P7-28	Quick /JOG key function selection	0: Forward jog 1: Forward and reverse switching 2: Reverse jog 3: Switch between panel and remote control	0	★	F71C
P7-29	LED running display	0000～0xFFFF (hexadecimal number) 0000 to 0xFFFF Bit00: Running frequency 0001 Bit01: Set frequency 0002 Bit02: Bus voltage 0004 Bit03: Output voltage 0008 Bit04: Output current 0010 Bit05: Output power 0020 Bit06: DI input status 0040 Bit07: DO output status 0080 Bit08: AI1 voltage 0100 Bit09: AI2 voltage 0200 Bit10: PID setting value 0400 Bit11: PID feedback value 0800 Bit12: Count value 1000 Bit13: Length value 2000 Bit14: Load speed display 4000 Bit15: PLC stage 8000	H.441F	☆	F71D
P7-30	LED stop display	1～0x1FFF (hexadecimal number) Bit00: Set frequency 0001 Bit01: Bus voltage 0002 Bit02: DI input status 0004 Bit03: DO output status 0008 Bit04: AI1 voltage 0010 Bit05: AI2 voltage 0020 Bit06: PID setting value 0040 Bit07: PID feedback value 0080 Bit08: Count value 0100 Bit09: Length value 0200 Bit10: Load speed display 0400 Bit11: PLC stage 0800 Bit12: Input pulse frequency 1000 Bit13～Bit15: Reserved	H.0043	☆	F71E

Function code	Name	Description (setting range)	Factory Default	Change	Communication Address
P7-31	Load speed display factor	0.001～655.00	1.000	☆	F71F
P7-32	Radiator temperature	12℃～100℃	Measured value	●	F720
P7-33	Cumulative power-on time	0h～65535h	Measured value	●	F721
P7-34	Cumulative running time	0h～65535h	Measured value	●	F722
P7-36	Current running timing enable selection	0: Disable 1: enable 2: Enable, no fault is reported after the time	0	★	F724
P7-37	Selection of timing source for the current run	0: Digital setting P7-38 1: AI1 2: AI2 (AI takes P7-38 as 100%)	0	★	F725
P7-38	Current running time set value	0.0min～6500.0min	0.0min	☆	F726
P7-39	High level timing	0.0s～6000.0s	2.0s	☆	F727
P7-40	low level timing	0.0s～6000.0s	2.0s	☆	F728
P7-41	Activate the protection function	0: Invalid (start terminal command is valid and start directly) 1: Valid	1	☆	F729
P7-43	Frequency reaches detection value 1	0.00Hz～P0-14	50.00Hz	☆	F72B
P7-44	Frequency detection value 1 arrival width	0.0%～100.0%	0.0%	☆	F72C
P7-45	Current reaches detection value 1	0.0%～300.0%	100.0%	☆	F72D
P7-46	Current detection value 1 arrival width	0.0%～300.0%	0.0%	☆	F72E
P7-49	user password	0～65535	0	☆	F731

Function code	Name	Description (setting range)	Factory Default	Change	Communication Address
P7-50	Whether the jump frequency is valid during acceleration and deceleration	0: invalid 1: Valid	0	☆	F732
P7-51	Set the power-on arrival time	0h～65530h	0h	☆	F733
P7-53	Acceleration time 1/2 switching frequency point	0.00Hz～Maximum frequency (P0-14)	0.00Hz	☆	F735
P7-54	Deceleration time 1/2 switching frequency point	0.00Hz～Maximum frequency (P0-14)	0.00Hz	☆	F736
P7-55	Frequency detection value (PDT2 level)	0.00Hz～Maximum frequency (P0-14)	50.00Hz	☆	F737
P7-56	Frequency detection PDT2 hysteresis value	0.0%～100.0%	5.0%	☆	F738
P7-57	Frequency reaches detection value 2	0.00Hz～Maximum frequency (P0-14)	50.00Hz	☆	F739
P7-58	Frequency arrival detection 2 amplitude	0.0%～100.0%	0.0%	☆	F73A
P7-59	Zero current detection value	0.0%～300.0%	10.0%	☆	F73B
P7-60	Zero current detection delay time	0.01s～300.00s	1.00s	☆	F73C
P7-61	Output current amplitude detection	20.0%～400.0%	200.0%	☆	F73D
P7-62	Software overcurrent maximum allowable time	0s～6500.0s	0s	☆	F73E
P7-63	Current reaches detection value 2	20.0%～300.0%	100.0%	☆	F73F
P7-64	Current arrival detection 2 amplitude	0.0%～300.0%	0.0%	☆	F740
P7-65	LED running display parameter 2	0x0～0x1PF Bit00: Target torque% 0001 Bit01: Output torque% 0002 Bit02: Pulse input pulse frequency (KHz) 0004 Bit03: DI5 high-speed pulse sampling linear speed (m/min) 0008 Bit04: Motor speed (rmp) 0010	H.010	☆	F741

Function code	Name	Description (setting range)	Factory Default	Change	Communication Address
P7-65	LED running display parameter 2	Bit05: AC incoming line current (A) 0020 Bit06: Cumulative running time (h) 0040 Bit07: Current running time (min) 0080 Bit08: Cumulative power consumption (kWh) 0100 Bit09～Bit15: Reserved	H.010	☆	F741
P7-67	AI1 input voltage lower limit	0.00V～P7-68	2.00V	☆	F743
P7-68	AI1 input voltage upper limit	P7-67～11.00V	8.00V	☆	F744
P7-69	Module temperature reached	0℃～90℃	70℃	☆	F745
P7-70	Output power display correction factor	0.001～3.000	1.000	☆	F746
P7-71	Linear velocity display correction factor	Linear speed=P7-71*Number of HDI pulses sampled per second/PB-07	1.000	☆	F747
P7-72	Cumulative power consumption (kWh)	0～65535	Measured value	●	F748
P7-73	Performance software version	Performance software version number	#.#	●	F749
P7-74	Functional software version	Function software version number	#.#	●	F74A
P7-75	Enhanced function parameter display selection	0: Hide enhanced function parameter group: A0～A3, B0～B5 1: Display enhanced function parameter group: A0～A3, B0～B5	0	☆	F74B
P7-76	Motor speed display correction factor	0.001～3.000	1.000	☆	F74C
Group P8: Communication parameters					
P8-00	Baud rate setting	0：300BPS 1：600BPS 2：1200BPS 3：2400BPS	5	☆	F800

Function code	Name	Description (setting range)	Factory Default	Change	Communication Address
P8-00	Baud rate setting	4: 4800BPS 5: 9600BPS 6: 19200BPS 7: 38400BPS	5	☆	F800
P8-01	Data Format	0: No parity <8,N,2> 1: Even parity <8,E,1> 2: odd parity <8,O,1> 3: No parity 1<8,N,1>	0	☆	F801
P8-02	Mailing address	0～247 (0 is the broadcast address)	1	☆	F802
P8-03	Response time	0ms～30ms	2ms	☆	F803
P8-04	Communication timeout	0ms～30ms	0.0s	☆	F804
P8-05	Communication format selection	0: Standard Modbus RTU protocol 1: Non-standard ModBus RTU protocol	0	☆	F805
P8-06	Background software monitoring function	0: Disable, default 485 communication function 1: On, the background software monitoring function, the 485 communication function cannot be used at this time	0	☆	F806
Group P9: Fault and Protection					
P9-00	Motor overload protection selection	0: Disable 1: Allow	1	☆	F900
P9-01	Motor overload protection gain	0.10～10.00	1.00	☆	F901
P9-02	Motor overload warning coefficient (%)	50%～100%	80%	☆	F902
P9-03	Overvoltage Stall Protection Gain	000～100	030	☆	F903
P9-04	Overvoltage stall protection voltage	200.0～1200.0V	760.0V	★	F904
P9-05	VF Overcurrent Stall Protection Gain	0～100	20	☆	F905
P9-06	VF Overcurrent Stall Protection Current	50%～200%	150%	★	F906

Function code	Name	Description (setting range)	Factory Default	Change	Communication Address
P9-07	VF field weakening area current stall protection factor	50%～200%	100%	★	F907
P9-08	Overvoltage stall allowable rise limit value	0.0%～50.0%	10.0%	☆	F908
P9-11	Fault automatic reset times	0～20	0	☆	F90B
P9-12	Fault relay action selection during automatic fault reset	0: no action 1: Action	0	☆	F90C
P9-13	Fault automatic reset interval time	0.1s～100.0s	1.0s	☆	F90D
P9-14	Input phase loss enable selection	0: invalid 1: Valid	1	☆	F90E
P9-15	Output phase loss enable selection	0: invalid 1: Valid	1	☆	F90F
P9-16	Power-on to ground short-circuit protection	0: invalid 1: Valid	1	☆	F910
P9-17	Undervoltage fault automatic reset selection	0: Manual reset is required after undervoltage fault 1: After the undervoltage fault, the fault will be reset by itself according to the bus voltage	0	☆	F911
P9-18	Overvoltage suppression mode selection	0: invalid 1: Overvoltage suppression mode 1 2: Overvoltage suppression mode 2	1	★	F912
P9-19	Overexcitation active state selection	0: invalid 1: Only the deceleration process is valid 2: The constant speed and deceleration process is valid during running	2	★	F913
P9-20	Overvoltage suppression mode 2 limit value	1.0%～150.0%	100%	★	F914

Function code	Name	Description (setting range)	Factory Default	Change	Communication Address
P9-22	Fault protection action 1	0～22202; Units place: Motor overload - Err14 0: Free parking 1: stop according to the stop mode 2: keep running Ten: reserved Hundreds place: input phase loss-Err23 Thousands place: output phase loss-Err24 Ten thousand: parameter read and write exception - Err25	00000	☆	F916
P9-23	Fault protection action 2	0～22222; Ones place: Communication failure - Err27 0: Free parking 1: stop according to the stop mode 2: keep running Tens place: External fault - Err28 Hundreds place: excessive speed deviation fault - Err29 Thousands: User-defined fault 1-Err30 Ten thousand: user-defined fault 2-Err31	00000	☆	F917
P9-24	Fault protection action 3	0～22222; Ones place: PID feedback lost during runtime - Err32 0: Free parking 1: stop according to the stop mode 2: keep running Tens place: load loss fault - Err34 Hundreds place: software overcurrent - Err16 Thousands place: The current continuous running time reaches -Err39 Ten thousand: the running time reaches - Err40	00000	☆	F918
P9-26	Continue to run frequency selection in case of failure	0: run at the current operating frequency 1: run at the set frequency 2: run at the upper limit frequency 3: Run at the lower frequency limit 4: Run at the standby frequency setting value P9-27	1	☆	F91A

Function code	Name	Description (setting range)	Factory Default	Change	Communication Address
P9-27	Abnormal standby frequency set value	0.0%～100.0%	100%	☆	F91B
P9-28	Drop load protection option	0: invalid 1: Valid	0	☆	F91C
P9-29	Drop load detection level	0.0%～80.0%	20.0%	★	F91D
P9-30	Load drop detection time	0.0s～100.0s	5.0s	☆	F91E
P9-31	Excessive speed deviation detection value	0.0%～100.0%	20.0%	☆	F91F
P9-32	Excessive speed deviation detection time	0.0s～100.0s	0.0s	☆	F920
P9-33	Overspeed detection value	0.0%～100.0%	20.0%	☆	F921
P9-34	Overspeed detection time	0.0s～100.0s	2.0s	☆	F922
P9-35	Motor overload protection current coefficient	100%～200%	100%	☆	F923
P9-36	Motor overheating pre-alarm threshold	0-200℃	80℃	☆	F924
P9-37	Motor overheat protection value	0-200℃	100℃	☆	F925
P9-38	Temperature sensor type selection	0：No temperature sensor 1：PT100 2：PT1000	0	☆	F926
Group PA: PID function					
PA-00	PID setting source	0: Keypad (F10.01) 1: Analog AI1 2: Analog AI2 3: Analog AI3 4: Pulse setting (HDI) 5: Rs485 communication setting 6: Multi-speed command	0	☆	FA00
PA-01	PID digital setting	0.0～100.0%	50.0%	☆	FA01
PA-02	PID given change time	0.00s～650.00s	0.00s	☆	FA02

PA-03	PID feedback source	0: AI1 1: AI2 2: AI1-AI2 3: Communication given 4: PULSE given 5: AI1+AI2 6: MAX(|AI1|, |AI2|) 7: MIN(|AI1|, |AI2|)	0	☆	FA03
PA-04	PID action direction	0: Forward action 1: Reverse action	0	☆	FA04

Function code	Name	Description (setting range)	Factory Default	Change	Communication Address
PA-05	PID setting feedback range	0～65535	1000	☆	FA05
PA-06	Proportional gain P	0.0～100.0	20.0	☆	FA06
PA-07	Integral time I	0.01s～10.00s	2.00s	☆	FA07
PA-08	Differential time D	0.000s～10.000s	0.000s	☆	FA08
PA-09	PID reverse cutoff frequency	0.00～Maximum frequency (P0-14)	0.00Hz	☆	FA09
PA-10	Deviation limit	0.0%～100.0%	0.0%	☆	FA0A
PA-11	Differential clipping	0.00%～100.00%	0.0%	☆	FA0B
PA-12	PID feedback filter time	0.00～60.00s	0.00s	☆	FA0C
PA-13	PID feedback loss detection value	0.00～60.00s	0.00s	☆	FA0D
PA-14	PID feedback loss detection time	0.0s～3600.0s	0s	☆	FA0E
PA-18	Proportional gain P2	0.0～100.0	20.0	☆	FA12
PA-19	Integration time I2	0.01s～10.00s	2.00s	☆	FA13
PA-20	Differential time D2	0.000s～10.000s	0.000s	☆	FA14
PA-21	PID parameter switching conditions	0: do not switch 1: DI terminal 2: Automatically switch according to the deviation	0	☆	FA15
PA-22	PID parameter switching deviation 1	0.0%～PA-23	20.0%	☆	FA16
PA-23	PID parameter switching deviation 2	PA-22～100.0%	80.0%	☆	FA17

PA-24	PID initial value	0.0%～100.0%	0.0%	☆	FA18
PA-25	PID initial value hold time	0.00s～650.00s	0.00s	☆	FA19
PA-26	Twice output deviation positive maximum value	0.00%～100.00%	1.00%	☆	FA1A
PA-27	Twice output deviation reverse maximum value	0.00%～100.00%	1.00%	☆	FA1B
PA-28	PID integral properties	Units: Integral separation 0: invalid; 1: Valid	00	☆	FA1C

Function code	Name	Description (setting range)	Factory Defaul	Change	Communication Address
PA-28	PID integral properties	Tens place: output to the limit value, whether to stop integration 0: Continue points; 1: Stop integration	00	☆	FA1C
PA-29	PID shutdown operation	0: stop and do not operate 1: Compute at stop	0	☆	FA1D
Group Pb: Swing Frequency, Fixed Length and Count					
Pb-00	Swing setting method	0: Relative to the central frequency 1: Relative to the maximum frequency	0	☆	FB00
Pb-01	Swing frequency amplitude	0.0%～100.0%	0.0%	☆	FB01
Pb-02	Jump frequency amplitude	0.0%～50.0%	0.0%	☆	FB02
Pb-03	Swing frequency cycle	0.1s～3000.0s	10.0s	☆	FB03
Pb-04	Triangular wave rising time coefficient	0.1%～100.0%	50.0%	☆	FB04
Pb-05	Set length	0m～65535m	1000m	☆	FB05
Pb-06	Actual length	0m～65535m	0m	☆	FB06
Pb-07	Number of pulses per meter	0.1～6553.5	100.0	☆	FB07
Pb-08	Set count value	1～65535	1000	☆	FB08
Pb-09	Designated count value	1～65535	1000	☆	FB09
Group PC: Multi-segment instruction and simple PLC function					
PC-00	Multi-speed 0	-100.0%～100.0%	0.0%	☆	FC00

PC-01	Multi-speed 1	-100.0%～100.0%	0.0%	☆	FC01
PC-02	Multi-speed 2	-100.0%～100.0%	0.0%	☆	FC02
PC-03	Multi-speed 3	-100.0%～100.0%	0.0%	☆	FC03
PC-04	Multi-speed 4	-100.0%～100.0%	0.0%	☆	FC04
PC-05	Multi-speed 5	-100.0%～100.0%	0.0%	☆	FC05
PC-06	Multi-speed 6	-100.0%～100.0%	0.0%	☆	FC06
PC-07	Multi-speed 7	-100.0%～100.0%	0.0%	☆	FC07

Function code	Name	Description (setting range)	Factory Default	Change	Communication Address
PC-08	Multi-speed 8	-100.0%～100.0%	0.0%	☆	FC08
PC-09	Multi-speed 9	-100.0%～100.0%	0.0%	☆	FC09
PC-10	Multi-speed 10	-100.0%～100.0%	0.0%	☆	FC0A
PC-11	Multi-speed 11	-100.0%～100.0%	0.0%	☆	FC0B
PC-12	Multi-speed 12	-100.0%～100.0%	0.0%	☆	FC0C
PC-13	Multi-speed 13	-100.0%～100.0%	0.0%	☆	FC0D
PC-14	Multi-speed 14	-100.0%～100.0%	0.0%	☆	FC0E
PC-15	Multi-speed 15	-100.0%～100.0%	0.0%	☆	FC0F
PC-16	PLC operation mode	0: Stop at the end of a single operation 1: Hold the final value for a single run 2: keep looping	0	☆	FC10
PC-17	PLC power-down memory selection	0: No memory when power off and no memory when stopped 1: Memory when power off and no memory when stopped 2: No memory when power off and memory when shut down 3: Power-down memory and shutdown memory	0	☆	FC11
PC-18	Running time of simple PLC multi-speed 0	0.0s(h)～6500.0s(h)	0.0s(h)	☆	FC12

PC-19	Acceleration/deceleration time of simple PLC multi-speed 0	0～3	0	☆	FC13
PC-20	Running time of simple PLC multi-speed 1	0.0s(h)～6500.0s(h)	0.0s(h)	☆	FC14
PC-21	Acceleration/deceleration time of simple PLC multi-speed 1	0～3	0	☆	FC15
PC-22	Running time of simple PLC multi-speed 2	0.0s(h)～6500.0s(h)	0.0s(h)	☆	FC16

Function code	Name	Description (setting range)	Factory Defaul	Change	Communication Address
PC-23	Acceleration/deceleration time of simple PLC multi-speed 2	0～3	0	☆	FC17
PC-24	Running time of simple PLC multi-speed 3	0.0s(h)～6500.0s(h)	0.0s(h)	☆	FC18
PC-25	Acceleration/deceleration time of simple PLC multi-speed 3	0～3	0	☆	FC19
PC-26	Running time of simple PLC multi-speed 4	0.0s(h)～6500.0s(h)	0.0s(h)	☆	FC1A
PC-27	Acceleration/deceleration time of simple PLC multi-speed 4	0～3	0	☆	FC1B
PC-28	Running time of simple PLC multi-speed 5	0.0s(h)～6500.0s(h)	0.0s(h)	☆	FC1C
PC-29	Acceleration/deceleration time of simple PLC multi-speed 5	0～3	0	☆	FC1D
PC-30	Running time of simple PLC multi-speed 6	0.0s(h)～6500.0s(h)	0.0s(h)	☆	FC1E
PC-31	Acceleration/deceleration time of simple PLC multi-speed 6	0～3	0	☆	FC1F
PC-32	Running time of simple PLC multi-speed 7	0.0s(h)～6500.0s(h)	0.0s(h)	☆	FC20
PC-33	Acceleration/deceleration time of simple PLC multi-speed 7	0～3	0	☆	FC21

PC-34	Running time of simple PLC multi-speed 8	0.0s(h)～6500.0s(h)	0.0s(h)	☆	FC22
PC-35	Acceleration/deceleration time of simple PLC multi-speed 8	0～3	0	☆	FC23
PC-36	Running time of simple PLC multi-speed 9	0.0s(h)～6500.0s(h)	0.0s(h)	☆	FC24

Function code	Name	Description (setting range)	Factory Default	Change	Communication Address
PC-37	Acceleration/deceleration time of simple PLC multi-speed 9	0～3	0	☆	FC25
PC-38	Running time of simple PLC multi-speed 10	0.0s(h)～6500.0s(h)	0.0s(h)	☆	FC26
PC-39	Acceleration/deceleration time of simple PLC multi-speed 10	0～3	0	☆	FC27
PC-40	Running time of simple PLC multi-speed 11	0.0s(h)～6500.0s(h)	0.0s(h)	☆	FC28
PC-41	Acceleration/deceleration time of simple PLC multi-speed 11	0～3	0	☆	FC29
PC-42	Running time of simple PLC multi-speed 12	0.0s(h)～6500.0s(h)	0.0s(h)	☆	FC2A
PC-43	Acceleration/deceleration time of simple PLC multi-speed 12	0～3	0	☆	FC2B
PC-44	Acceleration/deceleration time of simple PLC multi-speed 13	0～3	0	☆	FC2C
PC-45	Running time of simple PLC multi-speed 14	0.0s(h)～6500.0s(h)	0.0s(h)	☆	FC2D
PC-46	Acceleration/deceleration time of simple PLC multi-speed 14	0～3	0	☆	FC2E

PC-47	Running time of simple PLC multi-speed 15	0.0s(h)～6500.0s(h)	0.0s(h)	☆	FC2F
PC-48	Acceleration/deceleration time of simple PLC multi-speed 15	0～3	0	☆	FC30
PC-49	Running time of simple PLC multi-speed 15	0.0s(h)～6500.0s(h)	0.0s(h)	☆	FC31
PC-50	Time unit of multi-speed	0: s (second) 1:h (hour)	0	☆	FC32

Function code	Name	Description (setting range)	Factory Default	Change	Communication Address
PC-51	Multi-speed priority mode selection	0: Multi-speed does not have priority 1: Multi-speed priority	1	☆	FC33
PC-52	Multi-speed priority acceleration and deceleration time selection	0: Acceleration and deceleration time 1 1: Acceleration and deceleration time 2 2: Acceleration and deceleration time 3 3: Acceleration and deceleration time 4	0	☆	FC34
PC-53	Multi-speed PC-00～PC-15 unit selection	0: % 1: Hz	0	☆	FC35
PC-55	Multi-segment instruction 0 given mode	0: Function code PC-00 given 1: AI1 2: AI2 3: PULSE pulse 4: PID 5: Preset frequency given (P0-11), UP/DOWN can be modified	0	☆	FC37
Group PD: Torque control					

PD-00	Torque command source selection	0: Digital setting (PD-01) 1: AI1 2: AI2 3: Communication given 4: PULSE pulse frequency setting 5: MIN (AI1, AI2) 6: MAX (AI1, AI2) (1-6 option full scale corresponds to PD-01)	0	★	FD00
PD-01	Torque digital given	-200.0%～200.0%	150.0%	☆	FD01
PD-03	Torque control positive direction maximum frequency	0.00Hz～Maximum frequency (P0-14)	50.00Hz	☆	FD03
PD-04	Torque control reverse direction maximum frequency	0.00Hz～Maximum frequency (P0-14)	50.00Hz	☆	FD04

Function code	Name	Description (setting range)	Factory Default	Change	Communication Address
PD-06	Torque command filter time	0.00s～10.00s	0.00s	☆	FD06
PD-07	Torque mode frequency acceleration time	0.0s～1000.0s	10.0s	☆	FD07
PD-08	Torque mode frequency deceleration time	0.0s～1000.0s	10.0s	☆	FD08
PD-10	Speed/torque mode selection	0: Speed mode 1: Torque mode	0	★	FD0A
Group PE: AI multi-point curve setting					
PE-00	Curve 1 minimum input	-10.00V～PE-02	0.00V	☆	FE00
PE-01	Curve 1 minimum input corresponding setting	-100.0%～100.0%	0.0%	☆	FE01
PE-02	Curve 1 Knee 1 Input	PE-00～PE-04	3.00V	☆	FE02
PE-03	Curve 1 inflection point 1 input corresponding setting	-100.0%～100.0%	30.0%	☆	FE03
PE-04	Curve 1 Knee 2 Input	PE-02～PE-06	6.00V	☆	FE04
PE-05	Curve 1 inflection point 2 input corresponding setting	-100.0%～100.0%	60.0%	☆	FE05
PE-06	Curve 1 maximum input	PE-04～10.00	10.00V	☆	FE06

PE-07	Curve 1 maximum input corresponding setting	-100.0%～100.0%	100.0%	☆	FE07
PE-08	Curve 2 minimum input	-10.00～PE-10	0.00V	☆	FE08
PE-09	Curve 2 minimum input corresponding setting	-100.0%～100.0%	0.0%	☆	FE09
PE-10	Curve 2 Knee 1 Input	PE-08～PE-12	3.00V	☆	FE0A
PE-11	Curve 2 inflection point 1 input corresponding setting	-100.0%～100.0%	30.0%	☆	FE0B
PE-12	Curve 2 Knee 2 Input	PE-10～PE-14	6.00V	☆	FE0C
PE-13	Curve 2 inflection point 2 input corresponding setting	-100.0%～100.0%	60.0%	☆	FE0D
PE-14	Curve 2 maximum input	PE-12～10.00V	10.00V	☆	FE0E
PE-15	Curve 2 maximum input corresponding setting	-100.0%～100.0%	100.0%	☆	FE0F
PE-24	AI1 set jump point	-100.0%～100.0%	0.0%	☆	FE18
PE-25	AI1 sets the jump range	0.0%～100.0%	0.5%	☆	FE19

Function code	Name	Description (setting range)	Factory Default	Change	Communication Address
PE-26	AI2 set jump point	-100.0%～100.0%	0.0%	☆	FE1A
PE-27	AI2 set jump range	0.0%～100.0%	0.5%	☆	FE1B
Group PF: Manufacturer parameters					
PF.00	Factory password	0～65535	*****	☆	FF00
Group A0: Second motor parameter setting					
A0-00	Motor selection	1: Motor No. 1 2: Motor No. 2	1	★	A000
A0-01	The second motor control mode	1: Open loop vector control (speed sensorless vector) 2: VF Control	2	★	A001
A0-02	Second motor acceleration and deceleration time selection	0: Consistent with the first motor 1: Acceleration and deceleration time 1 2: Acceleration and deceleration time 2 3: Acceleration and deceleration time 3 4: Acceleration and deceleration time 4	0	☆	A002

Group A1: Second Motor Parameters					
A1-00	Motor parameter tuning	0: no function 1: Static tuning 2: Dynamic full tuning	0	★	A100
A1-01	Motor 2 rated power	0.1Kw～1000.0Kw	Model is determined	★	A101
A1-02	Motor 2 rated voltage	1V～1500V	380V	★	A102
A1-03	Motor 2 Number of motor poles	2 to 64	Model is determined	●	A103
A1-04	Motor 2 rated current	0.01A～600.00A(Motor rated power<=30.0KW) 0.1A～6000.0A(Motor rated power>30.0KW)	A1-01 OK	★	A104
A1-05	Motor 2 rated frequency	0.01Hz～Maximum frequency (P0-14)	50.00Hz	★	A105
A1-06	Motor 2 rated speed	1rpm～65535 rpm	A1-01 OK	★	A106

Function code	Name	Description (setting range)	Factory Default	Change	Communication Address
A1-07	Motor 2 no-load current	0.01A～A1-04 (Motor rated power<=30.0KW) 0.1A～A1-04 (Motor rated power>30.0KW)	A1-01 OK	★	A107
A1-08	Motor 2 stator resistance	0.001ohm～65.535ohm	Model is determined	★	A108
A1-09	Motor 2 rotor resistance	0.001ohm～65.535ohm	Model is determined	★	A109
A1-10	Motor 2 mutual inductance	0.1mH～6553.5mH	Model is determined	★	A10A
A1-11	Motor 2 leakage inductance	0.01mH～655.35mH	Model is determined	★	A10B
A1-12	Acceleration at Dynamic Full Tuning	1.0s～6000.0s	10.0s	☆	A10C
A1-13	Deceleration at dynamic full tuning	1.0s～6000.0s	10.0s	☆	A10D
Group A2: Second motor VF parameter setting					
A2-00	Torque boost	0.0%～30.0%	0.0%	☆	A200
A2-01	Oscillation suppression gain	0～100	Model is determined	☆	A202

Group A3: Second motor vector control parameters					
A3-00	Switching frequency P1	0.00Hz～A3-02	5.00Hz	☆	A300
A3-02	Switching frequency P2	A3-00～P0-14	10.00Hz	☆	A302
A3-04	Low frequency speed proportional gain	0.1～10.0	4.0	☆	A304
A3-05	Low frequency speed integration time	0.01s～10.00s	0.50s	☆	A305
A3-06	High frequency speed proportional gain	0.1～10.0	2.0	☆	A306
A3-07	High frequency speed integration time	0.01s～10.00s	1.00s	☆	A307
A3-08	Speed loop integral attribute selection	0: Points take effect 1: Integral separation	0	★	A308
A3-11	Torque current regulator Kp	0～30000	2000	☆	A30B
A3-12	Torque current regulator Ki	0～30000	1300	☆	A30C

Function code	Name	Description (setting range)	Factory Defaul	Change	Communication Address
A3-13	Excitation current regulator Kp	0～30000	2000	☆	A30D
A3-14	Excitation current regulator Ki	0～30000	1300	☆	A30E
A3-15	Flux Brake Gain	100～200	110	☆	A30F
A3-16	Field weakening torque correction factor	50%～200%	100%	☆	A310
A3-17	Slip Compensation Coefficient	50%～200%	100%	☆	A311
A3-18	Speed loop feedback filter time	0.000s～1.000s	0.015s	☆	A312
A3-19	Speed loop output filter time constant	0.000s～1.000s	0.000s	☆	A313
A3-20	Electric torque upper limit source	0: P3-21 2: AI2 1: AI1 (analog range corresponds to P3-21) 3: Communication given 4: PLUSE given	0	☆	A314
A3-21	Electric torque upper limit	0.0%～200.0%	150.0%	☆	A315

A3-22	Braking torque upper limit source	0: P3-23 2: AI2 1: AI1 (analog range corresponds to P3-23) 3: Communication given 4: PLUSE given	0	☆	A316
A3-23	Braking torque upper limit	0.0%～200.0%	150%	☆	A317
Group B0: System parameters					
B0-00	Function code read-only selection	0: invalid 1: read only	0	☆	B000
B0-01	LCD top menu display/LED second line display	0: output current 1: Motor speed 2: Load speed 3: Output voltage 4: PID given 5: PID feedback	0	☆	B001

Function code	Name	Description (setting range)	Factory Default	Change	Communication Address
B0-02	LCD language selection	0: Chinese 1: English	0	☆	B002
B0-03	LED menu toggle selection	0: Disable 1: enable	0	☆	B003
B0-04	Vector operating frequency display selection	0: real-time frequency 1: set frequency	0	☆	B004
B0-05	Display selection during UP/Down adjustment	0: Display the set value 1: Display the current variable value	0	☆	B005
Group B1: User function code customization					
B1-00	Clear custom function code selection	0: invalid 1: Valid	0	☆	B100
B1-01	Custom function code 1	uP0-00～uU1-xx	uP0-03	☆	B101
B1-02	Custom function code 2	uP0-00～uU1-xx	uP0-04	☆	B102
B1-03	Custom function code 3	uP0-00～uU1-xx	uP0-06	☆	B103
B1-04	Custom function code 4	uP0-00～uU1-xx	uP0-23	☆	B104
B1-05	Custom function code 5	uP0-00～uU1-xx	uP0-24	☆	B105
B1-06	Custom function code 6	uP0-00～uU1-xx	uP4-00	☆	B106

B1-07	Custom function code 7	uP0-00～uU1-xx	uP4-01	☆	B107
B1-08	Custom function code 8	uP0-00～uU1-xx	uP4-02	☆	B108
B1-09	Custom function code 9	uP0-00～uU1-xx	uP4-04	☆	B109
B1-10	Custom function code 10	uP0-00～uU1-xx	uP4-05	☆	B10A
B1-11	Custom function code 11	uP0-00～uU1-xx	uP4-06	☆	B10B
B1-12	Custom function code 12	uP0-00～uU1-xx	uP4-12	☆	B10C
B1-13	Custom function code 13	uP0-00～uU1-xx	uP4-13	☆	B10D
B1-14	Custom function code 14	uP0-00～uU1-xx	uP5-00	☆	B10E
B1-15	Custom function code 15	uP0-00～uU1-xx	uP5-01	☆	B10F
B1-16	Custom function code 16	uP0-00～uU1-xx	uP5-02	☆	B110
B1-17	Custom function code 17	uP0-00～uU1-xx	uP6-00	☆	B111
B1-18	Custom function code 18	uP0-00～uU1-xx	uP6-01	☆	B112

Function code	Name	Description (setting range)	Factory Default	Change	Communication Address
B1-19	Custom function code 19	uP0-00～uU1-xx	uP0-00	☆	B113
B1-20	Custom function code 20	uP0-00～uU1-xx	uP0-00	☆	B114
B1-21	Custom function code 21	uP0-00～uU1-xx	uP0-00	☆	B115
B1-22	Custom function code 22	uP0-00～uU1-xx	uP0-00	☆	B116
B1-23	Custom function code 23	uP0-00～uU1-xx	uP0-00	☆	B117
B1-24	Custom function code 24	uP0-00～uU1-xx	uP0-00	☆	B118
B1-25	Custom function code 25	uP0-00～uU1-xx	uP0-00	☆	B119
B1-26	Custom function code 26	uP0-00～uU1-xx	uP0-00	☆	B11A
B1-27	Custom function code 27	uP0-00～uU1-xx	uP0-00	☆	B11B
B1-28	Custom function code 28	uP0-00～uU1-xx	uP0-00	☆	B11C
B1-29	Custom function code 29	uP0-00～uU1-xx	uP0-00	☆	B11D
B1-30	Custom function code 30	uP0-00～uU1-xx	uP0-00	☆	B11E
B1-31	Custom function code 31	uP0-00～uU1-xx	uP0-00	☆	B11F
Group B2: Optimize control parameters					

B2-00	Dead Time Compensation Enable Selection	0: no compensation 1: Compensation	1	☆	B200
B2-01	PWM method	0: Asynchronous modulation 1: Synchronous	0	☆	B201
B2-02	PWM seven-segment/five-segment selection	0: 7 segments in the whole process 1: Seven-segment/five-segment automatic switching	0	☆	B202
B2-03	CBC current limit enable selection	0: Disable 1: enable	1	☆	B203
B2-04	Braking point	330.0V～1200.0V	360.0V 690.0V	☆	B204
B2-05	Undervoltage point	150.0V～820.0V	200.0V 350.0V	☆	B205
B2-06	Random PWM depth setting	0～6	0	☆	B206

Function code	Name	Description (setting range)	Factory Default	Change	Communication Address
B2-07	0Hz operating mode selection	0: No current output; 1: Normal operation; 2: Output with stop DC braking current P1-16;	0	☆	B207
B2-08	Low frequency carrier limitation mode selection	0: limit mode 0 1: Restricted Mode 1 2: Unlimited (the carrier of all frequency bands is the same)	0	☆	B208
Group B3: AIAO correction parameters					
B3-00	AI1 shows voltage 1	-9.999V～10.000V	3.000V	☆	B300
B3-01	AI1 measured voltage 1	-9.999V～10.000V	3.000V	☆	B301
B3-02	AI1 shows voltage 2	-9.999V～10.000V	8.000V	☆	B302
B3-03	AI1 measured voltage 2	-9.999V～10.000V	8.000V	☆	B303
B3-04	AI2 shows voltage 1	-9.999V～10.000V	3.000V	☆	B304
B3-05	AI2 measured voltage 1	-9.999V～10.000V	3.000V	☆	B305

B3-06	AI2 shows voltage 2	-9.999V～10.000V	8.000V	☆	B306
B3-07	AI2 measured voltage 2	-9.999V～10.000V	8.000V	☆	B307
B3-12	AO1 target voltage 1	-9.999V～10.000V	3.000V	☆	B30C
B3-13	AO1 measured voltage 1	-9.999V～10.000V	3.000V	☆	B30D
B3-14	AO1 target voltage 2	-9.999V～10.000V	8.000V	☆	B30E
B3-15	AO1 measured voltage 2	-9.999V～10.000V	8.000V	☆	B30F
B3-16	AO2 target voltage 1	-9.999V～10.000V	3.000V	☆	B310
B3-17	AO2 measured voltage 1	-9.999V～10.000V	3.000V	☆	B311
B3-18	AO2 target voltage 2	-9.999V～10.000V	8.000V	☆	B312
B3-19	AO2 measured voltage 2	-9.999V～10.000V	8.000V	☆	B313
Group B4: Master-slave control parameters					
B4-00	Master-slave control enable selection:	0: Disable 1: Enable	0	★	B400
B4-01	Master-slave selection:	0: Host 1: Slave	0	★	B401

Function code	Name	Description (setting range)	Factory Default	Change	Communication Address
B4-02	Host sending frequency selection:	0: Running frequency 1: Target frequency	0	★	B402
B4-03	Slave follow master command source selection	0: Do not follow 1: Follow	0	★	B403
B4-04	Slave receive frequency coefficient	0.00%～600.00%	100.00%	☆	B404
B4-05	Slave receives torque coefficient	-10.00～10.00	1.00	☆	B405
B4-06	Slave receives torque bias	-50.00%～50.00%	0.00%	☆	B406
B4-07	Frequency deviation threshold	0.20%～10.00%	0.50%	☆	B407
B4-08	Master-slave communication drop detection time	0.00s～10.0s	0.1s	☆	B408
Group B5: Brake function parameters					
B5-00	Brake control enable selection:	0: Disable 1: Enable	0	★	B500
B5-01	brake release frequency	0.00Hz～20.00Hz	2.50Hz	★	B501

B5-02	Brake release frequency maintenance time	0.0s～20.0s	1.0s	★	B502
B5-03	Current limit value during holding brake	50.0%～200.0%	120.0%	★	B503
B5-04	Brake pull-in frequency	0.00Hz～20.00Hz	1.50Hz	★	B504
B5-05	Brake pull-in delay time	0.0s～20.0s	0.0s	★	B505
B5-06	Holding time of brake pull-in frequency	0.0s～20.0s	1.0s	★	B506
Group B6: Sleep wakeup function parameters					
B6-00	Hibernate selection	0: The sleep function is invalid 1: Digital input terminal DI controls sleep function 2: The sleep function is controlled by the PID setting value and feedback value 3: Control the sleep function according to the operating frequency	0	☆	B600

Function code	Name	Description (setting range)	Factory Default	Change	Communication Address
B6-01	Sleep frequency	0.00Hz～P0-14	0.00Hz	☆	B601
B6-02	Sleep delay	0.0s～3600.0s	20.0s	☆	B602
B6-03	Wake-up difference	0.0%～100.0% When B6-00=3, the unit becomes Hz	10.0%	☆	B603
B6-04	Wake up delay	0.0s～3600.0s	0.5s	☆	B604
B6-05	Sleep delay frequency output selection	0: PID automatic adjustment 1: Sleep frequency B6-01	0	☆	B605

Function code	Name	Description (setting range)	Smallest unit	Change	Communication Address
Group U0: Fault logging parameters					

U0-00	Last failure type	00: No fault Err01: Inverter module protection Err04: Overcurrent during acceleration Err05: Overcurrent during deceleration Err06: Overcurrent during constant speed operation Err08: Overvoltage during acceleration Err09: Overvoltage during deceleration Err10: Overvoltage during constant speed operation Err12: Undervoltage fault Err13: Drive overload fault Err14: Motor overload fault Err15: Drive overheated Err17: Current detection failure Err20: Short circuit fault to ground Err23: Input phase loss fault Err24: output phase loss fault Err25: Eeprom operation failure Err27: Communication failure Err28: External fault Err29: The speed deviation is too large Err30: User-defined fault 1 Err31: User-defined fault 2 Err33: Fast current limiting Err34: load drop fault Err32: PID feedback lost during runtime Err35: Input power failure Err37: parameter storage exception Err39: The running time has arrived Err40: Cumulative running time reached Err42: Switch the motor during operation Err46: Master-slave control communication dropped	1	●	7000
U0-01	Last failure type		1	●	7001
U0-02	Types of first and second faults		1	●	7002

U0-03	Frequency of last failure	0.01Hz	●	7003
U0-04	Current at last fault	0.01A	●	7004
U0-05	Bus voltage at last fault	0.1V	●	7005
U0-06	Input terminal status at the last fault	1	●	7006
U0-07	Output terminal status at the last fault	1	●	7007
U0-08	Last fault inverter status	1	●	7008
U0-09	Running time at the last fault (starting time after power-on, minutes)	1min	●	7009
U0-10	Running time at the last failure (time from running time, minutes)	1min	●	700A

U0-13	Frequency at last failure	0.01Hz	●	700D
U0-14	Current at previous fault	0.01A	●	700E
U0-15	Bus voltage at previous fault	0.1V	●	700F
U0-16	Input terminal at the previous fault	1	●	7010
U0-17	Output terminal when the previous fault	1	●	7011
U0-18	Last fault inverter status	1	●	7012
U0-19	The running time of the previous fault (start timing after power-on, minutes)	1min	●	7013
U0-20	Time of last failure (timed from runtime, minutes)	1min	●	7014
U0-21	reserved variable	--	●	7015
U0-22	reserved variable	-	●	7016
U0-23	The frequency of the first and second faults	0.01Hz	●	7017

Function code	Name	Smallest unit	Change	Communication Address
U0-24	Current at the first and second faults	0.01A	●	7018
U0-25	Bus voltage at the first and second faults	0.1V	●	7019
U0-26	Input terminal for the first and second faults	1	●	701A
U0-27	Output terminal when the first and second faults	1	●	701B
U0-28	Inverter status of previous and second faults	1	●	701C
U0-29	The running time of the first and second faults (start timing after power-on, minutes)	1min	●	701D
U0-30	The time of the first and second failures (timed from the running time, minutes)	1min	●	701E
Group U1: Application Monitoring Parameters				
U1-00	Operating frequency (Hz)	0.01Hz	●	7100
U1-01	Set frequency (Hz)	0.01Hz	●	7101
U1-02	Bus voltage (V)	0.1V	●	7102
U1-03	Output voltage (V)	1V	●	7103
U1-04	Output current (A)	0.1A	●	7104
U1-05	Output power (Kw)	0.1kW	●	7105
U1-06	DI input status, hexadecimal number	1	●	7106
U1-07	DO output status, hexadecimal number	1	●	7107

U1-08	Voltage after AI1 correction	0.01V	●	7108
U1-09	Voltage after AI2 correction	0.01V	●	7109
U1-10	PID set value, PID set value (percentage)*PA-05	1	●	710A
U1-11	PID feedback, PID feedback value (percentage)*PA-05	1	●	710B
U1-12	Count value	1	●	710C
U1-13	Length value	1	●	710D
U1-14	Motor speed	rpm	●	710E
U1-15	PLC stage, the current segment during multi-speed operation	1	●	710F
U1-16	PULSE pulse input frequency	0.01kHz	●	7110
U1-17	Feedback speed, the actual operating frequency of the motor	0.1Hz	●	7111

Function code	Name	Smallest unit	Change	Communication Address
U1-18	P7-38 Remaining time of timing time	0.1Min	●	7112
U1-19	AI1 voltage before correction	0.001V	●	7113
U1-20	Voltage before AI2 correction	0.001V	●	7114
U1-21	DI5 high-speed pulse sampling line speed, refer to P7-71 for use	1m/min	●	7115
U1-22	Load speed display (set load speed when stopped), refer to P7-31 for use	customize	●	7116
U1-23	The power-on time	1Min	●	7117
U1-24	This running time	0.1Min	●	7118
U1-25	PULSE pulse input frequency, different from U1-16 only in unit	1Hz	●	7119
U1-26	Communication setting frequency value	0.01%	●	711A
U1-27	Main frequency display	0.01Hz	●	711B
U1-28	Auxiliary frequency display	0.01Hz	●	711C
U1-29	Target torque, take the motor rated torque as 100%	0.1%	●	711D
U1-30	Output torque, take the motor rated torque as 100%	0.1%	●	711E
U1-31	Output torque, with the rated current of the inverter as 100%	0.1%	●	711F
U1-32	Torque upper limit, the rated current of the inverter is 100%	0.1%	●	7120
U1-33	VF separation target voltage	1V	●	7121
U1-34	VF split output voltage	1V	●	7122
U1-35	Reserve	—	●	7123

U1-36	Motor serial number currently in use	1	●	7124
U1-37	AO1 target voltage	0.01V	●	7125
U1-38	AO2 target voltage	0.01V	●	7126
U1-39	Inverter running status, 0: Stop, 1: Forward, 2: Reverse, 3: Fault	1	●	7127
U1-40	Inverter current fault	1	●	7128
U1-41	Agent time remaining	1h	●	7129
U1-42	AC incoming line current	0.1A	●	712A
U1-43	PLC current phase remaining time	0.1	●	712B
U1-47	Cumulative running time 1 (cumulative running time = U1- 47 + U1-48)	1h	●	712F
U1-48	Cumulative running time 2 (cumulative running time = U1- 47 + U1-48)	1min	●	7130
U1-50	Motor temperature	Minimum unit 1℃	●	7132

APPENDIX: VERSION CHANGE LOG

DATE	CHANGED VERSION	CHANGE CONTENT
2022-11	V3.1	None

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