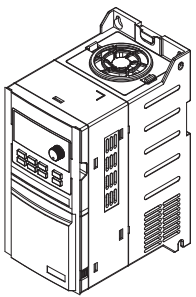
Canroon

CV900N Series High Performance Vector Inverter

Instruction Manual



Please read this manual before use

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1. Safety Information

1.1 Safety Information Signs and Definitions

The safety clauses described in this user manual are very important, which can ensure that you use the inverter safely to prevent yourself or the people around you from being hurt and the property in the working area from being damaged. Please be fully familiar with the following icons and their meanings, and be sure to follow the marked precautions items, then continue reading this user manual.

 Danger	This sign indicates that failure to operate as required may result in death or serious injury.
 Warning	This sign indicates that failure to perform operations as required will cause in moderate personal injury or minor injury or certain material loss.
 Caution	This sign indicates matters needing attention during operation or use.
 Prompt	This sign prompts some useful information to the user.

The following two icons are supplementary instructions to the above signs:

 Forbid	Indicates something absolutely not to be done.
 Enforce	Indicates something that must be done.

1.2 Scope of Use

 Caution	This inverter is suitable for general industrial three-phase AC asynchronous motors.

 Warning	▲ Do not use this inverter in equipment that may threaten life or harm the human body due to inverter failure or work error (nuclear power control equipment, aerospace equipment, vehicle equipment, life support systems, safety equipment, weapon systems, etc.). For special purposes, please consult our company in advance. ▲ This product is manufactured under the supervision of strict quality management system, but when used for important equipment, there must be safety protection measures to prevent the inverter failure to expand the scope of the accident.

1.3 Installation Environment

▲ Installed indoors, in a well–ventilated place, generally should be installed vertically to ensure the best cooling effect. For horizontal installations, additional ventilation may be required.
▲ The ambient temperature is required to be within the range of –10 to 40˚C. If the temperature exceeds 40˚C, please remove the upper cover. If the temperature exceeds 50˚C, external heat dissipation or derating is required. It is recommended that users Do not use the inverter in such a high temperature environment, because it will greatly reduce the service life of the inverter.
▲ The ambient humidity is lower than 90%, and no condensation occurs.
▲ Install in a place with vibration less than 0.5G to prevent falling damage. The inverter is not allowed to suffer from sudden impact.
▲ Install in an environment far away from electromagnetic fields and without flammable and explosive substances.

1.4 Installation Safety Precautions

Danger

▲ Do not work with wet hands.
▲ Do not wiring when the power supply is not completely disconnected。
▲ Do not open the cover or perform wiring work when the inverter is powered on, otherwise there is a risk of electric shock.
▲ When carrying out wiring, inspection and other operations, it must be carried out after turning off the power for 10 minutes, otherwise there is a risk of electric shock.

Warning

▲ Do not install inverters with damaged or missing components to prevent personal accidents and property losses.
▲ The main circuit terminal and the cable must be firmly connected, otherwise the inverter may be damaged due to poor contact.
▲ For the purpose of safety, the ground terminal of the inverter must be reliably grounded. In order to avoid the influence of grounding common impedance interference, multiple inverters should be grounded at one point, as shown in Figure 1–1.

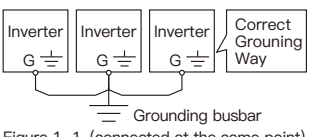
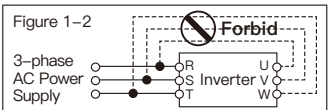


Figure 1–1 (connected at the same point)

Forbid

It is strictly forbidden to connect AC power to the output terminals U, V, W of the inverter, otherwise it will cause damage to the inverter, as shown in Figure 1–2.

Figure 1–2



Enforce	On the input power side of the inverter, be sure to configure a no-fuse circuit breaker for circuit protection to prevent the expansion of the accident caused by the failure of the inverter.

Caution	It is not suitable to install an electromagnetic contactor on the output side of the inverter, because the contactor is switched on and off when the motor is running, which will generate operating overvoltage and cause damage to the inverter. However, it is still necessary for the following three situations: The inverter used for energy-saving control, the system often works at the rated speed, in order to achieve economical operation, when the inverter needs to be removed. Participate in important technological processes,can not be out of service for a long time, need to switch between various control systems to improve system reliability. When one inverter controls multiple motors, the user should pay attention that the contactor must not operate when the inverter has output!

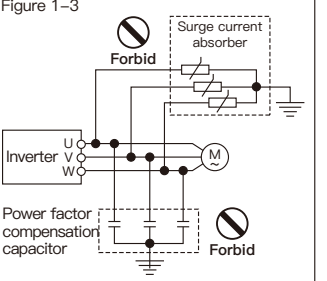
1.5 Operation Safety Precautions

Danger	▲ Do not operate with wet hands. ▲ For inverters that have been stored for more than 1 year, the voltage should be gradually increased to the rated value with a voltage regulator when powering on, otherwise there is a risk of electric shock and explosion. ▲ Do not touch the inside of the inverter after power on, let alone put rods or other objects into the inverter, otherwise it will cause electric shock or the inverter cannot work normally. ▲ When the inverter is powered on, please do not open the cover, otherwise there is a risk of electric shock. ▲ Use the power failure restart function with caution, otherwise it may cause personal injury or death.

Warning

▲ If the operation exceeds 50Hz, the speed range of the motor bearing and mechanical device must be ensured.
▲ Mechanical devices that require lubrication, such as gearboxes and gears, should not be operated at low speed for a long time, otherwise their service life will be reduced or even the equipment will be damaged.
▲ When the ordinary motor is running at low frequency, it must be used with derating due to the poor cooling effect. If it is a constant torque load, it must adopt the forced cooling method of the motor or use a special variable frequency motor.
▲ If the inverter is not used for a long time, please be sure to cut off the input power supply to avoid damage to the inverter or even fire caused by foreign matter entering or other reasons.
▲ Since the output voltage of the inverter is a PWM pulse wave, please do not install capacitors or surge current absorbers (such as varistors) at the output end, otherwise it will cause fault tripping of the inverter or even damage to power components. If it is already installed, be sure to remove it. See Figure 1–3.

Figure 1–3



Caution

▲ Before the motor is used for the first time or reused after being placed for a long time, the insulation of the motor should be checked, and the measured insulation resistance should not be less than 5MΩ.
▲ If the inverter needs to be used outside the allowable operating voltage range, a step–up or step–down device is required for voltage transformation.
▲ In areas where the altitude exceeds 1000 meters, due to the thin air, the heat dissipation effect of the inverter will be deteriorated, so derating is required. Generally, about 10% derating is required for every 1000m increase.

2. Technical Index and Specification

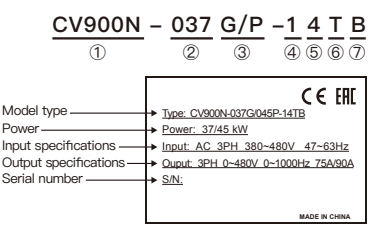
2.1 Technical Specification

Input	Rated voltage, frequency	3–phase (4T) AC380V；47～63Hz 1–phase (2S) AC220V；47～63Hz	
	Allowed voltage range	3–phase (4T) AC320V～480V 1–phase (2S) AC160V～260V	
Output	Voltage	4T；0～480V 2S；0～260V	
	Frequency	Vector control：0～500Hz V/F control：0～1000Hz	
	Overload capacity	150% rated current 60s；180% rated current 5s；195% rated current 0.5s	
Control Mode		V/F Control、Speed Sensorless Vector Control (SVC)	
Control Character	Frequency setting resolution	Analog input	Max. Frequency × 0.025%
		Digital setting	0.01Hz
	V/F control	V/F curve	Three ways: linear type; multi–point type; Nth power type V/F curve (1.2 power, 1.4 power, 1.6 power, 1.8 power, 2 power)
		V/F separation	2 types: full separation and half separation
		Torque boost	Manual setting: 0.0～30% of rated output. Automatic boost: automatically determine the boost torque according to the output current and combined with the motor parameters.
		Automatic current–limiting and voltage–limiting	During acceleration, deceleration or steady running, detect automatically the current and voltage of motor stator, and control it within bound sbased on unique algorithm, minimize fault–trip chance.
	Senseless vector control	Voltage frequency character	Adjust pressure/frequency ratio according to motor parameter and unique algorithm.

Control Character	Senseless vector control	Torque character	Starting torque: 0.1Hz 150% rated torque (V/F control) 0.25Hz 150% rated torque (SVC) Operating speed precision in steady state: ⩽±0.2% rated synchronous speed speed fluctuation: ⩽±0.5% rated synchronous speed Torque response: ⩽20ms (SVC)
		Motor parameter self-measurement	Without any restrictions, the automatic detection of parameters can be completed under the static and dynamic conditions of the motor to obtain the best control effect.
		Current and voltage restrain	Current closed-loop control, free from current impact, perfect restrain function of overcurrent and overvoltage.
	Undervoltage restrain during running	Specially for users with a low or unsteady voltage power grid: even lower than the allowable voltage range, the system can maintain the longest possible operating time based on its unique algorithm and residual energy allocation strategy.	
Typical Function	Multi-segment speed and swing frequency operation	16 segments programmable multi-segment speed control, a variety of operating modes are optional. Swing frequency operation: preset frequency, center frequency adjustable, state memory and recovery after power failure.	
	PID control RS485 communication	Built-in PID controller (able to preset frequency). Standard configuration RS485 communication function.	
	Frequency setting	Analog input	DC voltage 0～10V, DC current 0～20mA (upper and lower limit optional)
		Digital input	Operation panel setting, RS485 interface setting, UP/DOWN terminal control, and various combination setting with analog input.
	Output signal	Digital output	2-channel Y terminal open collector output and 2-channel programmable relay output-TA, TB, TC (NPN version)
			1-channel Y terminal open collector output and 2-channel programmable relay output-TA, TB, TC (NPN+PNP version)
		Analog output	2-channel of analog signal output, the output range can be flexibly set between 0～20mA or 0～10V, which can realize the output of physical quantities such as set frequency and output frequency.
	Automatic steady voltage operation	Dynamic steady state, static steady state, and unsteady voltage for choices to obtain the steadiest operation.	

Typical Function	Acceleration and deceleration time setting	0.0s～65000.0s min continuous setting, S type and linear type mode for choice.	
	Braking	Dynamic braking	Dynamic braking initial voltage, backlash voltage and dynamic braking continuous adjustable.
		DC braking	Halt DC braking initial frequency：0.00～【F00.10】Max.frequency Braking time：0.0～100.0s；Braking current：0%～100% of rated current.
	Low noise running	Carrier frequency 1.0kHz~16.0kHz continuous adjustable, minimize motor noise.	
	Speed tracking and restart function	Smooth restart during operation, instantaneous stop and restart.	
	Counter	A built-in counter, facilitate system integration	
	Operation function	Upper limit and lower limit frequency setting, frequency hopping operation, reversal running restraint, slip frequency compensation, RS485 communication, frequency control of progressive increase and decrease, failure recovery automatically, etc.	
Display	Operation panel display	Running state	Output frequency, output current, output voltage, motor speed, set frequency, module temperature, PID setting, feedback, analog input and output, etc.
		Alarm	There are 8 operating parameter records including output frequency, output current, bus voltage, input terminal status, output terminal status, inverter status, power-on time, and running time when three faults trip.
Protective Function		Overcurrent, overvoltage, undervoltage, module fault, electric thermal relay, overheat, short circuit, default phase of input and output, motor parameter adjustment abnormality, internal memory fault, etc.	
Environment	Ambient temperature	－10℃～＋40℃ (please run the VFD in derated capacity when ambient temperature is 40℃~50℃).	
	Ambient humidity	5%～95%RH, without condensing drops	
	Surroundings	Indoors (without direct sunlight, corrosive or flammable gas, oil fog and dust)	
	Altitude	Running in derated capacity above 1000m, derate 10% for every 1000m rise.	
Structure	Protection level	IP20	
	Cooling method	Air cooling	
Installation Method		Wall-hanging type, cabinet type	

2.2 Nameplate Introduction



①	Product Series	CV900N general vector series		
②	Model Power	00A: 0.4KW ～ 1500: 1500KW		
③	Load Type	G: constant torque	P: variable torque	
④	Output	1: 3–phase	2: 1–phase	
⑤	Voltage Grade	1：110V	2：220V	4：380V
⑥	Input	S: 1–phase	T: 3–phase	
⑦	Cooling Method	B: air cooling with built–in braking unit		
		F: air cooling, without built–in braking unit		

2.3 VFD Series Type

Voltage Classes	Model No.	Rated Power (KW)	Rated Output Current (A)
220V 1–phase	CV900N–00AG/00BP–12SB	0.4/0.75	2.4/4.5
220V 1–phase	CV900N–00BG/001P–12SB	0.75/1.5	4.5/7
220V 1–phase	CV900N–001G/002P–12SB	1.5/2.2	7/10
220V 1–phase	CV900N–002G/004P–12SB	2.2/4	10/16
220V 1–phase	CV900N–004G/005P–12SB	4/5.5	16/20
220V 1–phase	CV900N–005G/007P–12SB	5.5/7.5	20/30
220V 1–phase	CV900N–007G/011P–12SB	7.5/11	30/42
220V 1–phase	CV900N–011G/015P–12SB	11/15	42/60
380V 3–phase	CV900N–00BG/001P–14TB	0.75/1.5	2.5/3.7
380V 3–phase	CV900N–001G/002P–14TB	1.5/2.2	3.7/5

Voltage Classes	Model No.	Rated Power (KW)	Rated Output Current (A)
380V 3-phase	CV900N-002G/004P-14TB	2.2/4	5/9
380V 3-phase	CV900N-004G/005P-14TB	4/5.5	9/13
380V 3-phase	CV900N-005G/007P-14TB	5.5/7.5	13/17
380V 3-phase	CV900N-007G/011P-14TB	7.5/11	17/25
380V 3-phase	CV900N-011G/015P-14TB	11/15	25/32
380V 3-phase	CV900N-015G/018P-14TB	15/18.5	32/37
380V 3-phase	CV900N-018G/022P-14TB	18.5/22	37/45
380V 3-phase	CV900N-022G/030P-14TB	22/30	45/60
380V 3-phase	CV900N-030G/037P-14TB	30/37	60/75
380V 3-phase	CV900N-037G/045P-14TB	37/45	75/90
380V 3-phase	CV900N-045G/055P-14TF	45/55	90/110
380V 3-phase	CV900N-055G/075P-14TF	55/75	110/150
380V 3-phase	CV900N-075G/090P-14TF	75/90	150/176
380V 3-phase	CV900N-090G/110P-14TF	90/110	176/210
380V 3-phase	CV900N-110G/132P-14TF	110/132	210/253
380V 3-phase	CV900N-132G/160P-14TF	132/160	253/300
380V 3-phase	CV900N-160G/185P-14TF	160/185	300/340
380V 3-phase	CV900N-185G/200P-14TF	185/200	340/380
380V 3-phase	CV900N-200G/220P-14TF	200/220	380/420
380V 3-phase	CV900N-220G-14TF	220	420
380V 3-phase	CV900N-250G-14TF	250	470

Voltage Classes	Model No.	Rated Power (KW)	Rated Output Current (A)
380V 3–phase	CV900N–280G–14TF	280	520
380V 3–phase	CV900N–315G–14TF	315	600
380V 3–phase	CV900N–355G–14TF	355	640
380V 3–phase	CV900N–400G–14TF	400	750
380V 3–phase	CV900N–450G–14TF	450	830
380V 3–phase	CV900N–500G–14TF	500	930
380V 3–phase	CV900N–630G–14TF	630	1150
380V 3–phase	CV900N–750G–14TF	750	1360
380V 3–phase	CV900N–800G–14TF	800	1500
380V 3–phase	CV900N–1000G–14TF	1000	2000
380V 3–phase	CV900N–1200G–14TF	1200	2400
380V 3–phase	CV900N–1500G–14TF	1500	2850

2.4 Braking Resistor Selection Table

Voltage Class (V)	Rated Power (KW)	Braking Resistor (Ω*PCS)	Power of Resistor (KW*PCS)	Voltage Class (V)	Rated Power (KW)	Braking Resistor (Ω*PCS)	Power of Resistor (KW*PCS)	Voltage Class (V)	Rated Power (KW)	Braking Resistor (Ω*PCS)	Power of Resistor (KW*PCS)
220	0.4	≥200*1	0.04*1	220	7.5	≥15*1	0.5*1	380	5.5	≥90*1	0.4*1
220	0.75	≥120*1	0.08*1	220	11	≥10*1	0.8*1	380	7.5	≥65*1	0.5*1
220	1.5	≥75*1	0.15*1	380	0.75	≥400*1	0.08*1	380	11	≥43*1	0.8*1
220	2.2	≥50*1	0.2*1	380	1.5	≥200*1	0.15*1	380	15	≥32*1	1*1
220	4	≥30*1	0.3*1	380	2.2	≥150*1	0.2*1	380	18.5	≥25*1	1.3*1
220	5.5	≥20*1	0.4*1	380	4	≥110*1	0.3*1	380	22	≥22*1	1.5*1

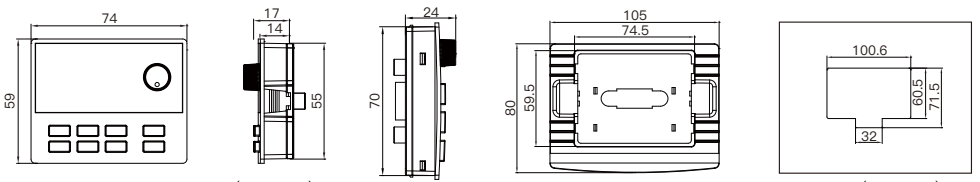
Voltage Class (V)	Rated Power (KW)	Braking Resistor (Ω*PCS)	Power of Resistor (KW*PCS)
380	30	≥16*1	2.5*1
380	37	≥16*1	4*1
380	45	≥16*1	4.5*1
380	55	≥8*1	5.5*1
380	75	≥16*2	4*2
380	90	≥10*2	5*2
380	110	≥10*2	6*2
380	132	≥15*3	5*3
380	160	≥10*3	6*3

Voltage Class (V)	Rated Power (KW)	Braking Resistor (Ω*PCS)	Power of Resistor (KW*PCS)
380	185	≥10*4	6*4
380	200	≥10*4	6*4
380	220	≥10*4	6*4
380	250	≥10*5	6*5
380	280	≥10*5	6*5
380	315	≥10*6	6*6
380	355	≥10*6	6*6
380	400	≥10*7	6*7
380	450	≥10*8	6*8

Voltage Class (V)	Rated Power (KW)	Braking Resistor (Ω*PCS)	Power of Resistor (KW*PCS)
380	500	≥10*9	6*9
380	630	≥5*6	10*6
380	750	≥5*7	10*7
380	800	≥5*7	10*7
380	1000	≥5*9	10*9
380	1200	≥5*10	10*10
380	1500	≥6*12	10*12
——	——	——	——
——	——	——	——

Note: ▲ Please select the resistance value specified by our company.
▲ If the braking resistor not provided by our company is used, resulting in damage to the inverter or other equipment, our company will not bear any responsibility.
▲ The installation of the braking resistor must consider the safety of the environment, and its flammability, and the distance from the inverter should be at least 100mm.
▲ The parameters in the table are for reference only, not as a standard.

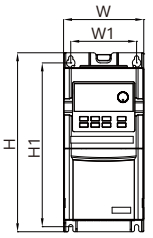
2.5 Appearance and Dimension of Keypad

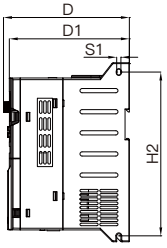


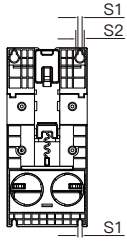
Keyboard (Unit: mm)

Keyboard base and Installation dimension (Unit: mm)

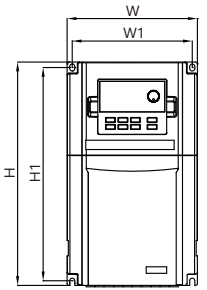
2.6 Product Overall Dimension and Installation Dimension

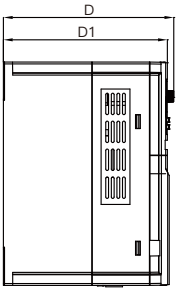


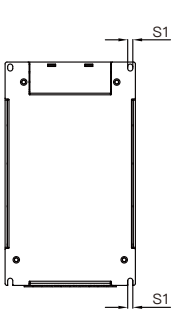




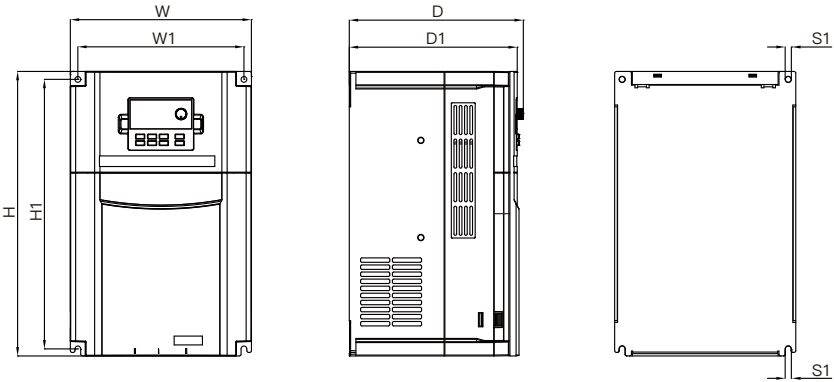
Model No.	W (mm)	H (mm)	D (mm)	W1 (mm)	H1 (mm)	H2 (mm)	D1 (mm)	S1 (mm)	S2 (mm)
CV900N-00AG/00BP-12SB	95	212	149	78	194	194	142	Ø5	Ø10
CV900N-00BG/001P-12SB	95	212	149	78	194	194	142	Ø5	Ø10
CV900N-001G/002P-12SB	95	212	149	78	194	194	142	Ø5	Ø10
CV900N-002G/00BP-12SB	95	212	149	78	194	194	142	Ø5	Ø10
CV900N-00BG/001P-14TB	95	212	149	78	194	194	142	Ø5	Ø10
CV900N-001G/002P-14TB	95	212	149	78	194	194	142	Ø5	Ø10
CV900N-002G/004P-14TB	95	212	149	78	194	194	142	Ø5	Ø10
CV900N-004G/005P-14TB	95	212	149	78	194	194	142	Ø5	Ø10
CV900N-005G/007P-14TB	95	212	149	78	194	194	142	Ø5	Ø10



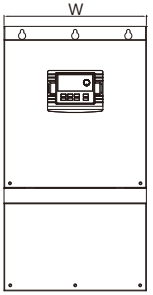


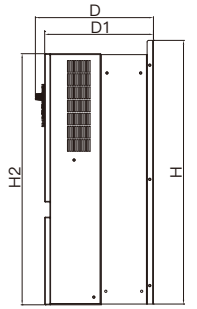


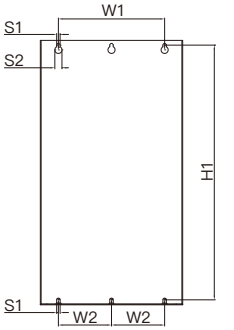
Model No.	W (mm)	H (mm)	D (mm)	W1 (mm)	H1 (mm)	D1 (mm)	S1 (mm)
CV900N–004G/005P–12SB	140	240	183	129	229	176	Ø5.5
CV900N–005G/007P–12SB	140	240	183	129	229	176	Ø5.5
CV900N–007G/011P–14TB	140	240	183	129	229	176	Ø5.5
CV900N–011G/015P–14TB	140	240	183	129	229	176	Ø5.5



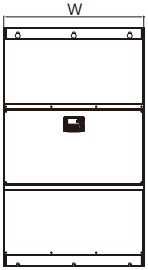
Model No.	W (mm)	H (mm)	D (mm)	W1 (mm)	H1 (mm)	D1 (mm)	S1 (mm)
CV900N-007G/011P-12SB	205	322	197	188	305	190	Ø6.5
CV900N-011G/015P-12SB	205	322	197	188	305	190	Ø6.5
CV900N-015G/018P-14TB	205	322	197	188	305	190	Ø6.5
CV900N-018G/022P-14TB	205	322	197	188	305	190	Ø6.5
CV900N-022G/030P-14TB	205	322	197	188	305	190	Ø6.5

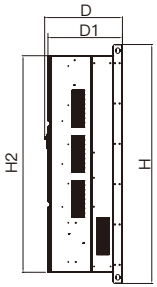


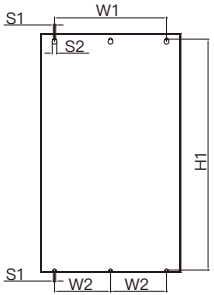




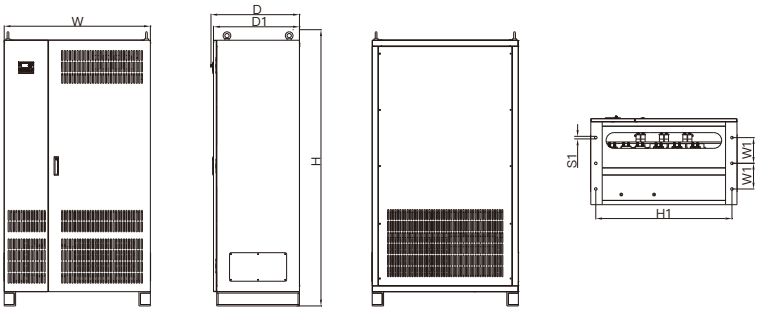
Model No.	W (mm)	H (mm)	D (mm)	W1 (mm)	W2 (mm)	H1 (mm)	H2 (mm)	D1 (mm)	S1 (mm)	S2 (mm)
CV900N-030G/037P-14TB	270	463	223.9	201.5		444.5	437.7	206.3	Ø6.5	Ø13.5
CV900N-037G/045P-14TB	270	463	223.9	201.5		444.5	437.7	206.3	Ø6.5	Ø13.5
CV900N-045G/055P-14TF	320	522	257.6	200	100	499	489	240	Ø9	Ø16.5
CV900N-055G/075P-14TF	320	522	257.6	200	100	499	489	240	Ø9	Ø16.5
CV900N-075G/090P-14TF	340	720	305.6	260	130	700.5	663	288	Ø9	Ø16.5
CV900N-090G/110P-14TF	340	720	305.6	260	130	700.5	663	288	Ø9	Ø16.5
CV900N-110G/132P-14TF	340	720	305.6	260	130	700.5	663	288	Ø9	Ø16.5
CV900N-132G/160P-14TF	380	720	305.6	260	130	700.5	663	288	Ø9	Ø16.5
CV900N-160G/185P-14TF	380	720	305.6	260	130	700.5	663	288	Ø9	Ø16.5







Model No.	W (mm)	H (mm)	D (mm)	W1 (mm)	W2 (mm)	H1 (mm)	H2 (mm)	D1 (mm)	S1 (mm)	S2 (mm)
CV900N-185G/200P-14TF	470	830	347.1	343	171.5	791	743	329.5	Ø11	Ø24
CV900N-200G/220P-14TF	470	830	347.1	343	171.5	791	743	329.5	Ø11	Ø24
CV900N-220G-14TF	470	830	347.1	343	171.5	791	743	329.5	Ø11	Ø24
CV900N-250G-14TF	540	1060	416.6	420	210	1031.5	970	399	Ø13	Ø26
CV900N-280G-14TF	540	1060	416.6	420	210	1031.5	970	399	Ø13	Ø26
CV900N-315G-14TF	540	1060	416.6	420	210	1031.5	970	399	Ø13	Ø26
CV900N-355G-14TF	650	1090	416.6	420	210	1061.5	1000	399	Ø13	Ø26
CV900N-400G-14TF	650	1090	416.6	420	210	1061.5	1000	399	Ø13	Ø26
CV900N-450G-14TF	750	1280	416.6	600	300	1237	1160	399	Ø13	Ø26
CV900N-500G-14TF	750	1280	416.6	600	300	1237	1160	399	Ø13	Ø26



Model No.	W (mm)	H (mm)	D (mm)	W1 (mm)	H1 (mm)	D1 (mm)	S1 (mm)
CV900N–630G–14TF	1024.5	1906	620	180	954.5	602.5	Ø18
CV900N–750G–14TF	1024.5	1906	620	180	954.5	602.5	Ø18
CV900N–800G–14TF	1332	1909.5	720	225	1262	702.5	Ø18
CV900N–1000G–14TF	1332	1909.5	720	225	1262	702.5	Ø18
CV900N–1200G–14TF	1732	1909.5	770	250	1662	752.5	Ø18
CV900N–1500G–14TF	1732	1909.5	770	250	1662	752.5	Ø18

3. Storage and Installation

3.1 Storage

This product must be placed in the packing box before installation. If it is not used temporarily, please pay attention to the following points when storing:

▲ Must be placed in a dust–free, dry place;
▲ The storage environment temperature ranges from –20°C to +65°C;
▲ The relative humidity of the storage environment is in the range of 0% to 95%, and there is no condensation;
▲ The storage environment does not contain corrosive gas and liquid;
▲ It is best placed on a shelf and packaged to store the inverter. It is best not to store for a long time, which will lead to the deterioration of electrolytic capacitors. If long–term storage is needed, it must be ensured that the power is on once in half a year, and the power–on time is at least 5 hours or more. The voltage must be slowly increased to the rated voltage value with the voltage regulator when input.

3.2 Installation Place and Environment

Note: The environmental conditions of the installation site will affect the service life of the inverter. Please install the inverter in the following places:

▲ Ambient temperature: –5~40 ℃ and good ventilation;
▲ Places without dripping water and low temperature;
▲ Places without sunlight, high temperature and severe dust fall;
▲ Places without corrosive gases and liquids;
▲ Places with less dust, oil gas and metal powder;
▲ Places without vibration, easy maintenance and inspection;
▲ Places without electromagnetic noise interference;

3.3 Installation Space and Direction

▲ For the convenience of maintenance, enough space should be left around the inverter. as the picture shows.
▲ In order to ensure good cooling effect, the inverter must be installed vertically and ensure smooth air circulation.
▲ If the installation is not firm, place a flat plate under the base of the inverter before installing. Installed on a loose plane, the stress may cause damage to the main circuit parts, thus damaging the inverter;
▲ The wall surface of the installation should be made of non–combustible materials such as iron plate.
▲ Multiple inverters are installed in the same cabinet. When the up–down installation is adopted, pay attention to the spacing, add a diversion plate in the middle or install them in a up–down dislocation.

4. Wiring

4.1 Main Circuit Wiring Diagram



Power supply: Please pay attention to whether the voltage level is consistent, so as not to damage the inverter.



Electromagnetic contactor
Note: Please do not use the electromagnetic contactor as the power switch of the inverter.



Inverter:
Be sure to correctly connect the main circuit line and control signal line of the inverter.
Be sure to set the inverter parameters correctly.



No–fuse switch: Please refer to the corresponding table.
Leakage switch: Please use a leakage switch with anti–high harmonics.



AC reactor: When the output capacity is greater than 1000KVA, it is recommended to install an AC reactor to improve the power factor.



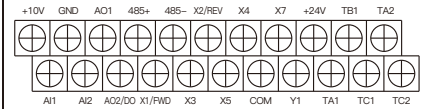
4.2 Wiring Terminals Diagram

4.2.1 The Main Circuit Terminal Functions Described as Follows

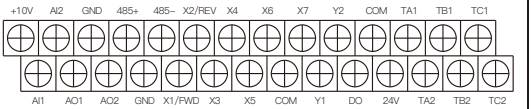
Terminal	Name	Function Description
R、S、T	AC input	3PH 380/220V AC input terminals, connected to the grid
L1、L2	AC input	1PH 220V AC input terminals, connected to the grid
(+)、(–)	DC bus terminals	Common DC bus input point, connection point of external braking unit
(+)、PB	Braking resistor connection	Braking resistor connection point
U、V、W	Inverter output	3PH AC output terminals, connected to motor.
⏚	Safety grounding	Safety grounding terminal. Each inverter must be grounded properly. Note: It is at the bottom of the chassis.

4.2.2 Control Loop Terminal Diagram

(1) NPN version



CV900N-00AG/00BP-12SB～CV900N-022G/030P-14TB



CV900N-030G-14TB～CV900N-1500G-14TF

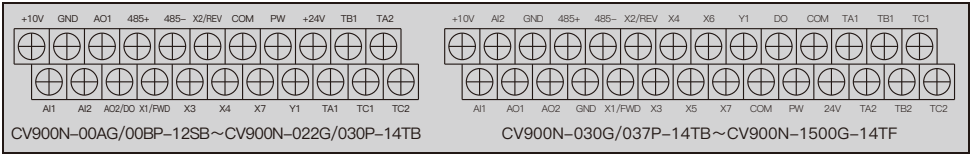
Control loop terminals function description:

Type	Terminal Number	Function Description	Specification
Multi-functional Digital Input Terminal	X1	Effective when short circuit between (X1、X2、X3、X4、X5、X6、X7) ～COM, and the functions are set by parameters F07.00～F07.06 (common port: COM)	INPUT, 0～24V level signal, low level effective, 5mA.
	X2		
	X3		
	X4		
	X5		
	X6		
	X7	X7 can work as one of the multi-functional terminals, also as high-speed pulse input terminal with programming, see F07.06.	
Digital Output Terminal	Y1	Multi-functional programmable collector open circuit output channel 2, can be programmed as DO terminal of various functions (Common port: COM)	OUTPUT, maximum load current ⩽ 50mA.
	Y2		
	DO	Programmable defined as a multiple functions of pulse signal output, switching output, analog output terminals. See F08 group parameters for details.	

Type	Terminal Number	Function Description	Specification
Analog Input / Output Terminal	AI1	AI1 receives voltage/current input. Jumper JP3 (for jumper terminal AI1) can select voltage or current input mode, and voltage input is the default one. For current input, just short the middle and another pin with the jumper cap. AI 2 only receives voltage input. For details on measuring range setting, please refer to function code F07 group parameters. (Reference ground: GND)	INPUT, input voltage range: 0～10V (input impedance: 100KΩ), input current range 0～20mA (input impedance: 500Ω).
	AI2		
Analog Input / Output Terminal	AO1	AO1/AO2 is able to output analog voltage/current (total 13 kinds of signals). Jumper JP4/JP8 (for jumper terminal AO1/AO2) can select voltage or current output mode, and voltage output is the default one. For current output, just short the middle and another pin with the jumper cap. Please refer to the parameter group F08 of the function code for details. (Reference ground: GND)	OUTPUT, 0～10V DC voltage. Output voltage of AO1, AO2 came from PMW waveform of CPU. Output voltage is in direct proportion to the width of PWM waveform.
	AO2		
Relay Output Terminal	TA1/TA2	Two programmable relay output terminals, TA1/TA2, TB1/TB2, TC1/TC2, up to 45 types. For details, please refer to the relays function introduction of F08.02 and F08.03 (Common port: COM)	TA–TB: normal close; TA–TC: normal open. Contact compacity: 250VAC/2A (COSΦ=1); 250VAC/1A (COSΦ=0.4), 30VDC/1A.
	TB1/TB2		
	TC1/TC2		
Power Port	+24V	24V is the common power for circuits of all digital signal input terminals (COM is the ground).	Maximum output current 200mA

▲ Control terminal AI1 can input both voltage and current signal, while AI2 can only input voltage signal; users can conduct corresponding jumper on master control board according to signal type.
▲ Connecting week analog signal is easily affected by external disturbance. So wiring should be as short as possible. The external control line should be set with isolating device or shielding line, and should be grounded.
▲ Input order signal line and frequency meter should be wired separately with shielding, and away from major loop wiring.
▲ Control loop wiring should be over 0.75 mm^2, and STP (shielded twisted pair) is recommended. The connecting part of control loop terminals should be enameled with tin, or process metal joint with cold pressing.
▲ While connecting analog signal output devices, malfunction may occur because of interference from VFD, which can be solved by fixing with capacitor or ferrite bead to the analog signal output device.

(2) NPN+PNP version



CV900N-00AG/00BP-12SB～CV900N-022G/030P-14TB

CV900N-030G/037P-14TB～CV900N-1500G-14TF

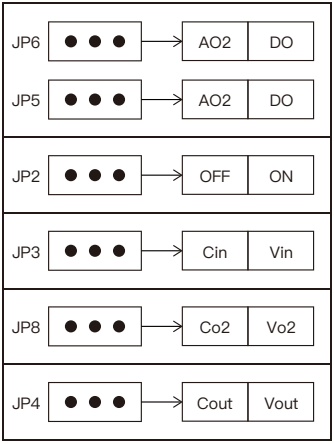
Control loop terminals function description:

Type	Terminal Number	Function Description	Specification
Multi-functional digital input terminal	PW	1. PW connect to terminal 24V, valid when X (X1, X2, X3, X4, X5, X6, X7)～COM is short-circuited. (Common terminal: COM) 2. PW connect to terminal COM, valid when X (X1, X2, X3, X4, X5, X6, X7)～24V is short-circuited. (Common terminal: 24V) 3. External independent power supply 24V is connected to PW, X (X1, X2, X3, X4, X5, X6, X7) valid when is connected to external power supply 24V ground respectively. (Common terminal: external power supply 24V ground) 4. External independent power supply 24V ground is connected to PW, X (X1, X2, X3, X4, X5, X6, X7) valid when is connected to external power supply 24V respectively. Note: the functions are set by parameters F07.00～F07.06 respectively.	
	X1		
	X2		
	X3		
	X4		
	X5		
	X6		
	X7	X7 can work as one of the multi-functional terminals, also as high-speed pulse input terminal with programming, see F07.06.	
Digital output terminal	Y1	Multi-function programmable open collector output, programmable and defined as a switch output terminal with multiple functions. (Common terminal: COM)	OUTPUT, maximum load current ≤ 50mA.

Type	Terminal Number	Function Description	Specification
Digital output terminal	DO	Programmable defined as a multiple functions of pulse signal output, switching output, analog output terminals. See F08 group parameters for details.	
Analog input / output terminal	AI1	AI1 receives voltage/current input. Jumper JP3 (for jumper terminal AI1) can select voltage or current input mode, and voltage input is the default one. For current input, just short the middle and another pin with the jumper cap. AI2 only receives voltage input. For details on measuring range setting, please refer to function code F07 group parameters. (Reference ground: GND)	INPUT, input voltage range: 0～10V (input impedance: 100KΩ), input current range 0～20mA (input impedance: 500Ω).
	AI2		
Analog input / output terminal	AO1	AO1/AO2 is able to output analog voltage/current (total 13 kinds of signals). Jumper JP4/JP8 (for jumper terminal AO1/AO2) can select voltage or current output mode, and voltage output is the default one. For current output, just short the middle and another pin with the jumper cap. Please refer to the parameter group F08 of the function code for details. (Reference ground: GND)	OUTPUT, 0～10V DC voltage. Output voltage of AO1, AO2 came from PMW waveform of CPU. Output voltage is in direct proportion to the width of PWM waveform.
	AO2		
Relay output terminal	TA1/TA2	Two programmable relay output terminals, TA1/TA2, TB1/TB2, TC1/TC2, up to 45 types. For details, please refer to the relays function introduction of F08.02 and F08.03 (Common port: COM)	TA–TB: normal close; TA–TC: normal open. Contact compacity: 250VAC/2A (COSΦ=1); 250VAC/1A (COSΦ=0.4), 30VDC/1A.
	TB1/TB2		
	TC1/TC2		
Power port	+24V	24V is the common power for circuits of all digital signal input terminals (COM is the ground).	Maximum output current 200mA

▲ Control terminal AI1 can input both voltage and current signal, while AI2 can only input voltage signal; users can conduct corresponding jumper on master control board according to signal type.
▲ Connecting week analog signal is easily affected by external disturbance. So wiring should be as short as possible. The external control line should be set with isolating device or shielding line, and should be grounded.
▲ Input order signal line and frequency meter should be wired separately with shielding, and away from major loop wiring.
▲ Control loop wiring should be over 0.75 mm^2, and STP (shielded twisted pair) is recommended. The connecting part of control loop terminals should be enameled with tin, or process metal joint with cold pressing.
▲ While connecting analog signal output devices, malfunction may occur because of interference from VFD, which can be solved by fixing with capacitor or ferrite bead to the analog signal output device.

4.2.3 Jumpers and Corresponding Relationships



JP5 & JP6	
AO2	AO2 of AO2/DO is effective, output voltage signal
DO	DO of AO2/DO is effective, output pulse signal
JP2	
OFF	Non-connecting for matched resistance of 485 communication
ON	Connecting for matched resistance of 485 communication
JP3	
Cin	AI1 input current signal
Vin	AI1 input voltage signal
JP8	
VO2	AO2 output voltage signal
CO2	AO2 output current signal
JP4	
Vout	AO1 output voltage signal
Cout	AO1 output current signal

4.2.4 Wiring Notices

▲ Cut off the input power of VFD while dismantling and changing the motor.
▲ Switching of motor or work frequency power supply should only be conducted when the VFD stops output.
▲ To reduce the effect of EMI (electromagnetic interference), add a surge absorber when electromagnetic connector and relay are close to VFD.
▲ Do not connect AC input power to output terminal U, V, W of VFD.
▲ Add an isolating device to the external control line or use shield line.
▲ Input order signal line should be wired separately with shielding, and away from major loop wiring.

▲ When carrier frequency is less than 4kHz, keep the distance between VFD and motor within 50m; when carrier frequency exceeds 4kHz, make an appropriate reduction of the distance, and better lay the wire in
metal tube.
▲ When adding peripherals (filters, reactors, etc.) to the VFD, check the ground resistance with 1000V tramegger and ensure thevalue is above 4 MΩ.
▲ Do not add phase advance capacitor or RC snubber to the U, V, W terminal of VFD.
▲ If the VFD starts frequently, do not cut off the power, use the COM/RUN of control terminal to conduct start and stop so as not to damage the rectifier bridge.
▲ The earth terminal must be grounded reliably (grounding impedance should be under 10 Ω) to avoid accidents, or there might be electric leakage.
▲ Choose the wire diameter according to national electrical code while conducting major loop wiring.

4.2.5 Spare Circuit

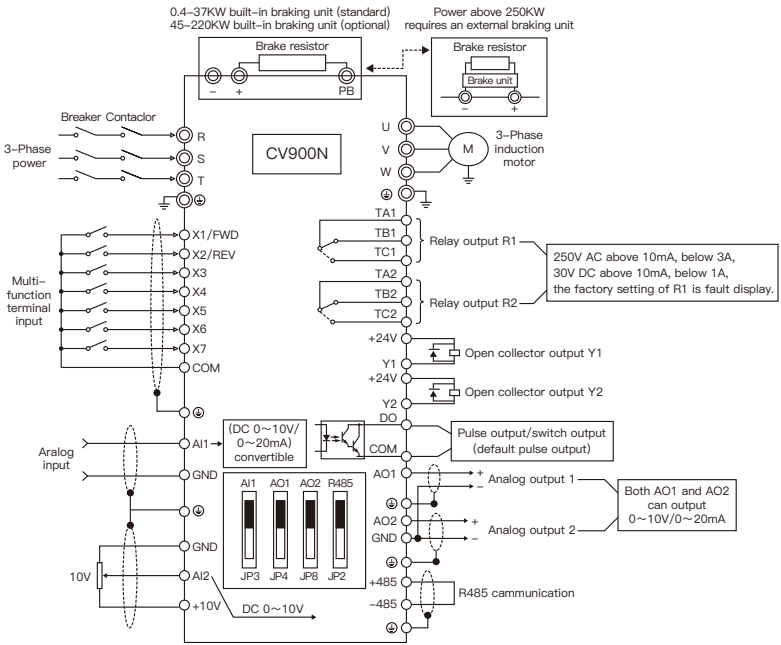
It may cause big downtime loss or other accidental failure during VFD failure or tripping. Adding spare circuit is recommended under this circumstance to ensure safety.

Note: confirm and test the operation characteristic of thespare circuit in advance to ensure the working frequency and the phase sequence of converted frequency are agreed.

4.3 Basic Running Wiring

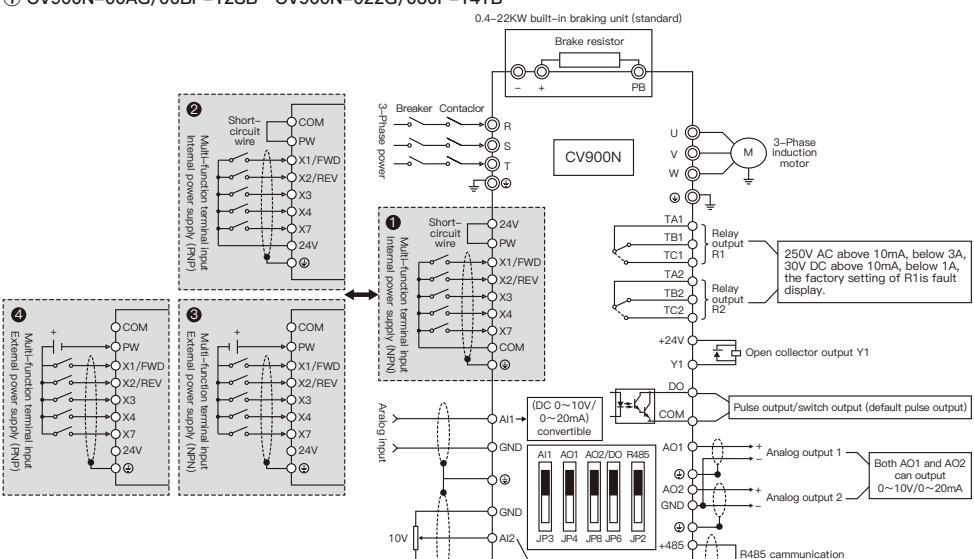
The wiring parts of VFD include major loop and control loop. Open the cover of I/O terminals, users can see the major loop terminal and control loop terminal, and the users must clearly select the model and connect accurately according to the wiring circuit diagrams of different models listed below.

(1) NPN version

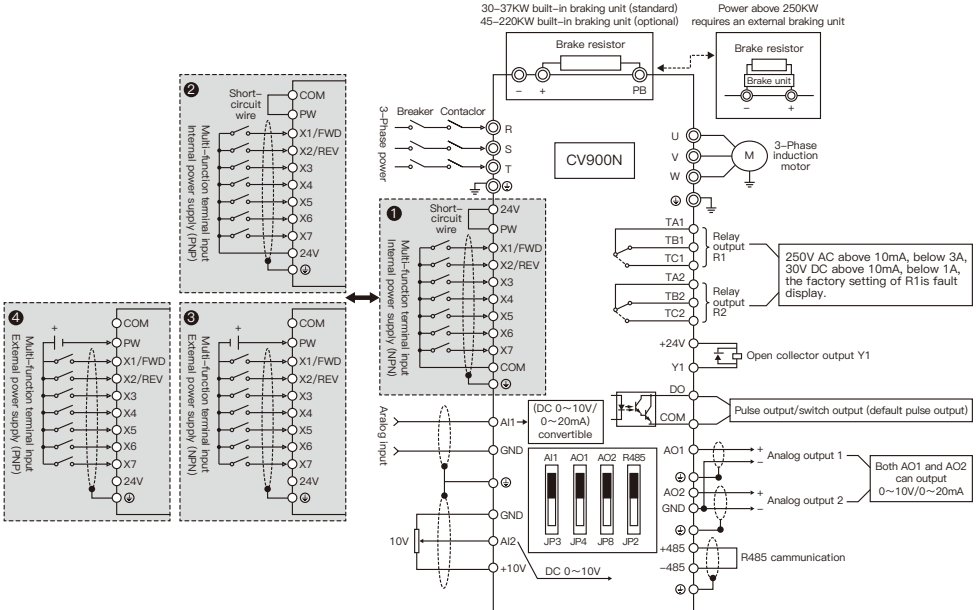


(2) NPN+PNP version

① CV900N-00AG/00BP-12SB～CV900N-022G/030P-14TB



② CV900N-030G/037P-14TB～CV900N-1500G-14TF



4.4 Wiring Precautions

4.4.1 Main Circuit Wiring

When wiring, the selection of wiring diameter specifications, please implement wiring in accordance with the provisions of electrical regulations to ensure safety.

▲ It is best to use isolated wires or wire tubes for power wiring, and ground the isolation layer or both ends of the wire tubes;

▲ Be sure to install an air circuit breaker NPB between the power supply and the input terminals (R, S, T).(If using an earth leakage breaker, please use a breaker with high frequency countermeasures).

▲ Power wires and control wires should be arranged separately and not in the same slot.

▲ Do not connect the AC power supply to the inverter output terminals (U, V, W);

▲ The output wiring should not touch the metal part of the inverter casing, otherwise it may cause a grounding short circuit.

▲ Phase-shifting capacitors, LC, RC noise filters and other components cannot be used at the output terminals of the inverter.

▲ The main circuit wiring of the inverter must be far away from other control equipment.

▲ When the wiring between the inverter and the motor exceeds 50 meters (220V series), (380V series 100 meters), a high dv/dt will be generated inside the motor coil, which will damage the interlayer insulation of the motor , please use a dedicated AC motor for the inverter or install a reactor on the inverter side.

▲ When the distance between the inverter and the motor is long, please reduce the carrier frequency, because the larger the carrier, the greater the leakage current of high harmonic wave on the cable, and the leakage current will have adverse effects on the inverter and other equipment.

4.4.2 Control Loop Wiring (Signal Wire)

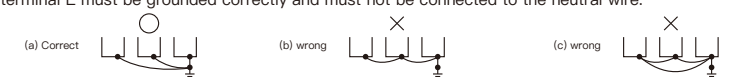
The signal wire and the main circuit wiring cannot be placed in the same wire slot, otherwise interference may occur. Please use shielded wires for signal wires and ground them at one end with a wire diameter of 0.5–2mm^2. It is recommended to use 1 shielded wires for control wires. Use the control terminals on the control panel correctly as required.

4.4.3 Grounding Wire

Please use the third grounding method (below 100Ω) for grounding wire terminal E; use the grounding wire according to the basic length and size of electrical equipment technology; absolutely avoid sharing the grounding electrode with welding machines, power machinery and other large power equipment, and the grounding wires should be as far away as possible from the power wires of large power equipment; for the grounding wiring method of multiple inverters, please use the method (a) in the following figure to avoid the loop of (b) or (c).

▲ The ground wire must be as short as possible.

▲ The ground terminal E must be grounded correctly and must not be connected to the neutral wire.

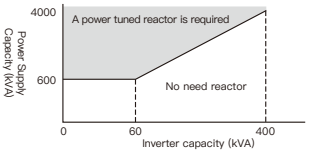


4.5 Specific Application Precautions

4.5.1 Model Selection

(1) Reactor installation

When the converter is connected to a large capacity power transformer (above 600kVA) or when the phase capacitor is switched, the power input loop will generate excessive peak current, which may damage the components of the converter. To prevent this from happening, install a DC or AC reactor. This also helps to improve the power factor on the power side. In addition, when the same power supply system is connected to a thyristor converter such as a DC driver, a DC or AC reactor must be set up regardless of the power supply condition.



Reactor Installation Conditions

(2) Inverter Capacity

When running a special motor, ensure that the rated current of the motor is not higher than the rated output current of the inverter. In addition, when multiple induction motors are run in parallel with one frequency inverter, the capacity of the inverter should be 1.1 times of the total rated current of the motor and less than the rated output current of the inverter.

(3) Starting torque

The starting and accelerating characteristics of the motor driven by the inverter are limited by the overload rated current of the combined inverter. Compared with the starting of general commercial power supply, the torque characteristics are smaller. If large starting torque is required, please increase the capacity of the inverter by one level or increase the capacity of the motor and the inverter at the same time.

(4) Emergency stop

Although the protection function will operate and the output will stop when the inverter fails, the motor cannot be stopped suddenly at this time. Therefore, install a mechanical stop and hold structure on machinery that requires an emergency stop.

(5) Special option

Terminals PB(+) and P1(+) are terminals for connecting dedicated options. Do not connect devices other than dedicated options.

(6) Precautions related to reciprocating loads

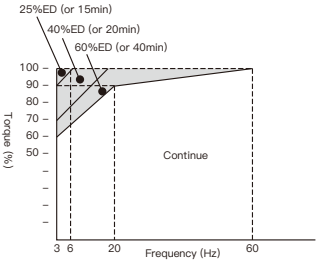
When the inverter is used for reciprocating loads (cranes, elevators, presses, washing machines, etc.), if a current of 150% or more flows repeatedly, the life of the IGBT inside the inverter will be shortened due to thermal fatigue. As a rough standard, when the carrier frequency is 4kHz and the peak current is 150%, the number of starts/stops is about 8 million times.

Especially if low noise is not required, please lower the carrier frequency. In addition, please reduce the peak reciprocating current to less than 150% by reducing the load, extending the acceleration and deceleration time, or increasing the inverter capacity by 1 level, etc. (When conducting test runs for these purposes, please be sure to confirm the peak reciprocating current and adjust it as necessary). In addition, when used for cranes, due to the faster start/stop action during fretting, it is recommended to make the following choices to ensure the motor torque and reduce the current of the inverter.The capacity of the inverter should ensure that its peak current is less than 150%. The capacity of the inverter should be more than 1 level larger than that of the motor.

4.5.2 Precautions for Motor Use

(1) For existing standard motors low speed range

Using an inverter to drive a standard motor will result in a number of increased losses compared to using a commercial power source to drive.
In the low–speed range, the cooling effect will be deteriorated, and the tempera–ture of the motor will increase. Therefore, in the low speed range, please reduce the load torque of the motor. The allowable load characteristics of our standard motors are shown in the figure. In addition, when 100% continuous torque is required in the low–speed range, please consider whether to use an inverter–spe–cific motor.



Allowable load characteristics of our standard motors

(2) Precautions when use for special motors

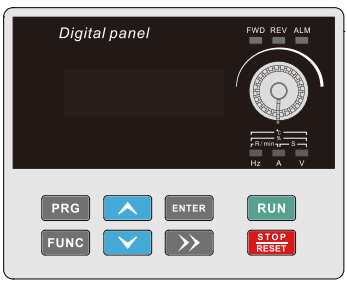
The rated current of the pole–changing motor is different from that of the standard motor. Please confirm the maximum current of the motor and select the corresponding inverter. Be sure to switch the number of poles after the motor stops. If switching is performed during rotation, the regenerative overvoltage or overcurrent protection loop will operate, and the motor will stop running freely.
Motor with brake
When using an inverter to drive a motor with a brake, if the brake loop is directly connected to the output side of the inverter, the brake cannot be opened due to the low voltage at startup.Use a motor with a brake that has a separate brake power supply, and connect the brake power supply to the power supply side of the inverter. In general, when using a motor with a brake, the noise may become louder in the low speed range.

(3) Power transmission structure (reducer, belt, chain, etc.)

When using oil–lubricated gearboxes, transmissions, and reducers in the power transmission system, please note that the oil lubrication effect will deteriorate if the operation is continued only in the low–speed range. In addition, when performing high–speed operation above 60Hz, there will be problems in terms of noise, life, and strength due to centrifugal force of the power transmission structure, so please pay sufficient attention.

5. Operation Panel and Operation Method

5.1 Operation Panel Keys Description



Key	Name	Function Description
PRG	programming /escape key	Enter or escape from programming
∧	Increase key	Data or function code increase (speed up the increasing rate by keeping pressing the key)
∨	Decrease key	Data or function code decrease (speed up the decreasing rate by keeping pressing the key)
ENTER	Enter key	Enter into sub-menu items or confirm data.
RUN	Run key	Enter into run mode under keypad model.
FUNC	Function key	According to the setting of function parameter FE.01, jog or reverse run, and frequency clearance is available when pressing this key under keypad mode.
>>	shift / monitor key	Choose the bit of the data which is to be set and modified when the VFD is in edit status; switch monitor parameter to be shown when the VFD is in other modes.
STOP RESET	stop / reset key	In common run status the VFD will be stopped according to set mode after press this key if run command channel is set as keyboard stop effective mode. The VFD will be reset and resume normal stop status after pressing this key when the VFD is in malfunction status.
	Analog potentiometer knob	Used for frequency given.

5.2 LED and Indicator Light Description

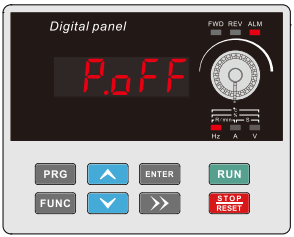
Item			Function Description
Display Function	Digital Display		Display current run status parameter and set parameter.
	LED Indicator	Hz、A、V	Displayed physical quantity unit (current A, voltage V, frequency Hz)
		ALM	Alarm indicator light, indicate that the VFD is in over current or over voltage suppressing status or failure alarm status currently.
		FWD	This indicator light turns green when the VFD is in forward running status.
		REV	This indicator light turns red when the VFD is in reverse running status.

5.3 Unit Indicator Light Description

Item			Function Description
Unit Indicator	LED Indicator	A	Current displayed parameter is current with unit of A, LED indicator light A is on
		V	Current displayed parameter is voltage with unit of V, LED indicator light V is on
		Hz	Current displayed parameter is frequency with unit of Hz, LED indicator light Hz is on
		%	Current displayed parameter is percentage, LED indicator light Hz and V are on
		r/min	Current displayed parameter is rotational speed, LED indicator light Hz and A are on
		m/s	Current displayed parameter is linear velocity, LED indicator light V and A are on
		℃	Current displayed parameter is temperature, LED indicator light V, A and Hz are on

5.4 Monitoring Parameter Display

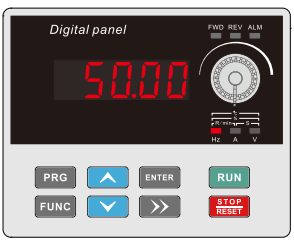
Keypad display status is classified as power–on initialization display, functioncode and monitoring parameters display, malfunction alarm status display, run status parameters display. After power–on, LED will display “P.OFF”, As shown in the right figure, then enter setting frequency display status.



Power–on parameter display
(Initialization display “P.OFF”)

When the VFD is stopped, the keypad displays stopped state monitoring parameters, factory setting is digital setting frequency. As shown in the right figure, unit indicator light reminds that the unit of current displayed parameter is Hz.

Press the >> key to cycle through different shutdown status monitoring parameters (the default settings are four monitoring parameters: main setting frequency, bus voltage, AI1 analog, and AI2 analog). For other monitoring parameters, the display function can be set by function code F14.04.

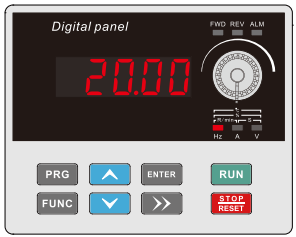


Stop status parameter display
(Display set frequency “50.00”)

5.5 Run Status Parameter Display

The VFD enters into run status when receiving effective run command and run status monitoring parameters normally output frequency is displayed on the keypad. As shown in the right figure, unit is displayed as Hz.

Press the [>>] key to cycle through the operating status monitoring parameters (the default settings are five monitoring parameters: operating frequency, set frequency, bus voltage, output voltage, and output current). For other monitoring parameters, the display function can be set by function code F14.02.



Run status parameter display
(Display current output frequency “20.00”)

5.6 Malfunction Alarm Display

The VFD enters into malfunction alarm display status upon detecting failure signal and display failure code (as shown in the right figuer); Press [>>] to check relative parameters of stopped inverter; to check failure information, press [PRG] and enter into program mode to check F12 group parameter. After troubleshooting, conduct fault resetting by [STOP RESET] key on the keypad, by control terminal or communication command. Keep displaying fault code if fault exist continuously.

Warning: For some serious fault, such as inverse module protect, over current, over voltage, etc., do not conduct fault reset forcibly to make the inverter run again without fault elimination confirmed, or might cause damage to the inverter.



Fault alarm display of
over current during accelerating

5.7 Function Code Editing Display

Under stop, run or fault alarm status, press PRG key to enter editing status which is displayed as two classes menu (input the password first if it is preset, see password unlock instruction). Press ENTER key to enter items one class by one class. Under function parameter display status, press ENTER to conduct storage operation, press PRG key to return to the upper class menu without storing modified parameter.

5.8 Monitoring Parameter

Example 1: status parameter display switching

Under monitoring status, press >> key, the display will switch automatically to according value of monitoring parameter according to F14.02 and F14.04 group status monitoring parameter setting, and meanwhile the corresponding unit indicator light will be on. For example, press >> to switch to output frequency d00.00, and the indicator light of unit "Hz" is on.



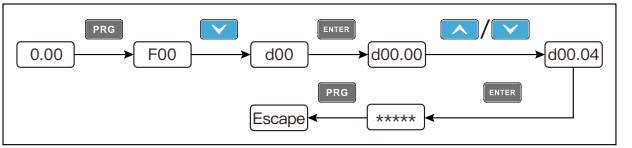
Example 2: check monitoring parameter item d00.04 (output current)

Method 1:

① Press the PRG key to enter the programming state, and the digital tube displays the function parameter F00. Press the ∨ key once, and the digital tube displays the function parameter d00. Then press the ENTER key, the digital tube displays d00.00. The flashing digit stays at the Units position. Adjust the ∧ key or ∨ key until the monitoring code item displays d00.04.

② Press ENTER key, the according value of d00.04 displays and the indicator light of unit "A" is on.

③ Press PRG key, escape from monitoring status.



5.9 Function Code Setting

The function parameter system of this inverter includes function codes F00~FFF and monitoring code group D. Each function group includes several function codes. Function codes are identified by the function code group number + function code number. For example, “F05.08” represents the 8th function code of the 5th group of functions.

Function code setting example:

Example 1: Change the start command to external terminal start, that is, change F00.02 from the default 0 to 1:

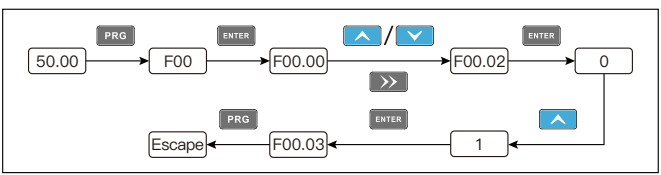
① Press PRG key to enter the programming state, the LED digital tube displays the function parameter F00. Press the ENTER key, the digital tube displays F00.00, and the flashing digit stays at the units digit.

② Press ∧ key or ∨ key to change the corresponding digit. The LED digital tube displays F00.02.

③ Press ENTER key and will see the F00.02 corresponding data (0). Press the ∧ key once to change 0 to 1.

④ Press ENTER key to save the value of F00.02 and automatically display the next function code (F00.03).

⑤ Press PRG key to exit programming state.



5.10 User Password Setting and Function Code Edit

The user password setting function is used to prohibit unauthorized personnel from accessing and modifying function parameters. The factory default is no user password, that is, F15.00 is “00000”.

When setting the user password, enter five digits and press the ENTER key to confirm. The password will automatically take effect after 3 minutes or directly after power off. After the password takes effect, if the password is not verified correctly, the keyboard will display “–Err–”. At this time, viewing other function codes will display “–––––”, and the user cannot set function code parameters. After the password verification is successful, the keyboard displays “–En––” before you can view and modify the function code.

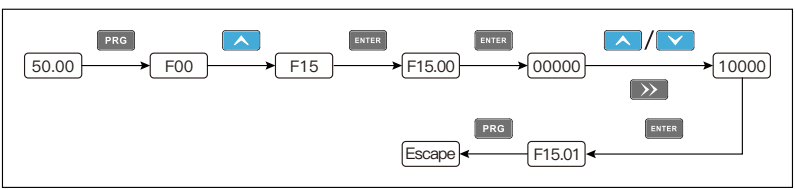
When you need to change the password, select the F15.00 function code and press the ENTER key to enter the password verification state. After the password verification is successful, enter the modification state, enter the new password, and press the ENTER key to confirm. The password is changed successfully. After 3 minutes or directly power off, the password take effect automatically.

For example: set the user password to “10000”:

① Press PRG key to enter the programming state, the LED digital tube displays the function parameter F00, and the flashing digit stays at the units digit. Press the ∧ key to change the digital tube display to F15.

② Press ENTER key, and the digital tube displays F15.00. Press the ENTER key, and the digital tube displays “00000”. Press >> and ∧ to change the digital tube display to “10000”.

③ Press ENTER key to save. At this time, the user password has been set to “10000”.

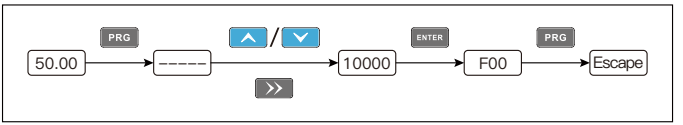


※ If the user password is not verified, the digital tube will display “-----” after pressing the PRG key.

Verify user password:

Press the PRG key to enter the programming state, press the >> key to change the digital tube flash digit to the 10,000 digit, then press the ^ key to change the digital display to “10000”, and press the ENTER key to verify the password successfully. Other parameters can be modified at this time.

Set F15.00 to “00000” to cancel the user password.



6. Function Parameters Table

F15.00 is set to a non–0 value, that is, the parameter protection password is set. In the function parameter mode and user change parameter mode, the parameter menu can only be entered after the correct password is entered. To cancel the password, F15.00 needs to be set to 0. The parameter menu in user–defined parameter mode is not password protected.

The symbols in the function table are explained as follows:

"☆": Indicates that the setting value of this parameter can be changed when the inverter is in stop or running state;

"★": Indicates that the setting value of this parameter cannot be changed when the inverter is running;

"●": Indicates that the value of this parameter is the actual detection record value and cannot be changed;

"✶": Indicates that the parameter is "Manufacturer Parameter", which can be set only by manufacturer and cannot be operated by users.

F00 Group – Basic Functions					
Function Code	Name	Set Range	Factory Default	Modbus Address	Modifi–cation
F00.00	Macro function definition	0: common mode 1: 1 variable 2 power (1 variable frequency pump + 2 power frequency pumps) water supply mode 1 2: Three–pump circulation soft start (3 variable frequency pumps) water supply mode 3: 1 variable 3 power (1 variable frequency pump + 3 power frequency pumps) water supply mode 4: 1 variable 2 power (1 variable frequency pump + 2 power frequency pumps) water supply mode 2 5: 1 variable 1 power (1 variable frequency pump + 1 power frequency pump) water supply mode 6: Single pump (1 variable frequency pump) water supply mode 7: Photovoltaic water supply voltage tracking mode 8: Photovoltaic water supply power tracking VF mode 9: Photovoltaic water supply power tracking SVC mode 10～100: Reserved Note: Initialize parameters before setting macro function.	0	4000H	★
F00.01	Motor control mode	0: V/F control 1: Speed Sensorless Vector Control (SVC)	0	4001H	★

Function Code	Name	Set Range	Factory Default	Modbus Address	Modifi-cation
F00.02	Command source selection	0: Operation panel command channel 1: Terminal command channel 2: Communication command channel	0	4002H	☆
F00.03	Main frequency source A selection	0: Digital setting (preset frequency F00.08, UP/DOWN can be modified, no memory when power off) 1: Digital setting (preset frequency F00.08, UP/DOWN can be modified, power-off with memory) 2: AI1 (0～10V/20mA) 3: AI2 (0～10V) 4: Panel potentiometer 5: PULSE Pulse setting (X7) 6: Multi-segment command 7: Simple PLC 8: PID 9: Communication given 10: Multi pump command 11: MPPT given (photovoltaic water supply)	4	4003H	★
F00.04	Auxiliary frequency source B selection	Same as F00.03 (main frequency source A selection)	0	4004H	★
F00.05	Auxiliary frequency source B range selection during superposition	0: Relative to the maximum frequency 1: Relative to frequency source A	0	4005H	☆
F00.06	Auxiliary frequency source B range during superposition	0%～150%	100%	4006H	☆
F00.07	Frequency source B superposition selection	Units: frequency source selection 0: Main frequency source A 1: Main and auxiliary calculation results (the operation relationship is determined by the tens digit) 2: Switch between main frequency source A and auxiliary frequency source B 3: Switch between main frequency source A and main and auxiliary calculation results	00	4007H	☆

Function Code	Name	Set Range	Factory Default	Modbus Address	Modification
F00.07	Frequency source B superposition selection	4: Switch between auxiliary frequency source B and main and auxiliary calculation results Tens digit: frequency source main and auxiliary calculation relationship 0: Main + auxiliary 1: Main – auxiliary 2: Maximum value of both 3: Minimum value of both	00	4007H	☆
F00.08	Preset frequency	0.00Hz～maximum frequency (F00.10)	50.00Hz	4008H	☆
F00.09	Running direction	0: Same direction 1: Opposite direction	0	4009H	☆
F00.10	Maximum frequency	50.00Hz～500.00Hz	50.00Hz	400AH	★
F00.11	Upper limit frequency source	0: F00.12 setting 1: AI1 2: AI2 3: Panel potentiometer 4: PULSE pulse setting 5: Communication given	0	400BH	★
F00.12	Upper limit frequency	Lower limit frequency F00.14～maximum frequency F00.10	50.00Hz	400CH	☆
F00.13	Upper limit frequency bias	0.00Hz～maximum frequency F00.10	0.00Hz	400DH	☆
F00.14	Lower limit frequency	0.00Hz～upper limit frequency F00.12	0.00Hz	400EH	☆
F00.15	Carrier frequency	0.5kHz～16.0kHz	Depending on model	401FH	☆
F00.16	Carrier frequency adjusted with temperature	0: No 1: Yes	1	4010H	☆
F00.17	Acceleration time 1	0.00s～650.00s (F00.19=2) 0.0s～6500.0s (F00.19=1) 0s～65000s (F00.19=0)	Depending on model	4011H	☆

Function Code	Name	Set Range	Factory Default	Modbus Address	Modification
F00.18	Deceleration time 1	0.00s～650.00s (F00.19=2) 0.0s～6500.0s (F00.19=1) 0s～65000s (F00.19=0)	Depending on model	4012H	☆
F00.19	Acceleration and deceleration time unit	0: 1s 1: 0.1s 2: 0.01s	1	4013H	★
F00.21	Auxiliary frequency source bias frequency during superposition	0.00Hz～maximum frequency F00.10	0.00Hz	4015H	☆
F00.22	Frequency command resolution	1: 0.1Hz 2: 0.01Hz	2	4016H	★
F00.23	Digital setting frequency stop memory selection	0: No memory 1: Memory	0	4017H	☆
F00.24	Reserved	——	0	4018H	★
F00.25	Acceleration and deceleration time reference frequency	0: Maximum frequency (F00.10) 1: Set frequency 2: 100Hz	0	4019H	★
F00.26	Frequency command UP/DOWN reference during running	0: Running frequency 1: Set frequency	0	401AH	★
F00.27	Command source bundled frequency source	Units: operation panel command binding frequency source selection 0: no binding 1: Digital setting frequency 2: AI1 3: AI2 4: Panel potentiometer 5: PULSE pulse setting (X7) 6: Multi-segment speed 7: Simple PLC 8: PIDs 9: Communication given	0000	401BH	☆

Function Code	Name	Set Range	Factory Default	Modbus Address	Modification
F00.27	Command source bundled frequency source	Tens digit: terminal command binding frequency source selection Hundreds place: communication command binding frequency source selection Thousands place: auto run binding frequency source selection	0000	401BH	☆
F00.28	Serial communication protocol selection	0: Modbus protocol 1: Reserved	0	401CH	☆
F00.29	GP type display	1: G type (constant torque load model) 2: P type (fan and water pump load model)	Depending on model	401DH	●
F01 Group – Start-Stop Control Parameters					
F01.00	Start mode	0: Direct start 1: Speed tracking restart 2: Pre-excitation start (AC asynchronous machine) 3: Super fast start (valid in vector mode)	0	4100H	☆
F01.01	Speed tracking mode	0: Start from stop frequency 1: Start from zero speed 2: Start from the maximum frequency	0	4101H	★
F01.02	Speed tracking speed	1～100	20	4102H	☆
F01.03	Start frequency	0.00Hz～10.00Hz	0.00Hz	4103H	☆
F01.04	Start frequency hold time	0.0s～100.0s	0.0s	4104H	★
F01.05	DC braking current at startup/ Pre-excitation current	0%～100%	50%	4105H	★
F01.06	DC braking time at startup/ Pre-excitation time	0.0s～100.0s	0.0s	4106H	★

Function Code	Name	Set Range	Factory Default	Modbus Address	Modification
F01.07	Accelerating and decelerating mode	0: Linear Acc/Dec mode 1: S curve Acc/Dec mode A 2: S curve Acc/Dec mode B	0	4107H	★
F01.08	Time ratio of Initial segment in S curve	0.0%～(100.0%–F01.09)	30.0%	4108H	★
F01.09	Time ratio of ending segment in S curve	0.0%～(100.0%–F01.08)	30.0%	4109H	★
F01.10	Stop mode	0: Decelerate to stop 1: Coast to stop	0	410AH	☆
F01.11	Start frequency of DC braking at stop	0.00Hz～maximum frequency	0.00Hz	410BH	☆
F01.12	DC braking waiting time at stop	0.0s～100.0s	0.0s	410CH	☆
F01.13	DC braking current at stop	0%～100%	50%	F01.13	☆
F01.14	DC braking time at stop	0.0s～100.0s	0.0s	410DH	☆
F01.15	Brake utilization rate	0%～100%	100%	410EH	☆
F01.16 ～ F01.20	Reserved	——	0	410FH ～ 4114H	☆
F01.21	Speed tracking delay	0.00～5.00s	0.50s	4115H	☆
F02 Group – Auxiliary Functions					
F02.00	Jog running frequency	0.00Hz～maximum frequency	2.00Hz	4200H	☆
F02.01	Jog acc time	0.0s～6500.0s	20.0s	4201H	☆
F02.02	Jog dec time	0.0s～6500.0s	20.0s	4202H	☆

Function Code	Name	Set Range	Factory Default	Modbus Address	Modification
F02.03	Acc time 2	0.0s～6500.0s	Depending on model	4203H	☆
F02.04	Dec time 2	0.0s～6500.0s	Depending on model	4204H	☆
F02.05	Acc time 3	0.0s～6500.0s	Depending on model	4205H	☆
F02.06	Dec time 3	0.0s～6500.0s	Depending on model	4206H	☆
F02.07	Acc time 4	0.0s～6500.0s	Depending on model	4207H	☆
F02.08	Dec time 4	0.0s～6500.0s	Depending on model	4208H	☆
F02.09	Jump frequency 1	0.00Hz～maximum frequency	0.00Hz	4209H	☆
F02.10	Jump frequency 2	0.00Hz～maximum frequency	0.00Hz	420AH	☆
F02.11	Jump frequency amplitude	0.00Hz～maximum frequency	0.01Hz	420BH	☆
F02.12	Forward and reverse deadband time	0.0s～3000.0s	0.0s	420CH	☆
F02.13	Reverse control prohibition	0: Invalid 1: Valid	0	420DH	☆
F02.14	Set frequency lower than the lower limit frequency running mode	0: Run at the lower limit frequency 1: Stop 2: Run at zero speed	0	420EH	☆
F02.15	Droop control	0.00Hz～10.00Hz	0.00Hz	420FH	☆
F02.16	Set the cumulative power-on arrival time	0h～65000h	0h	4210H	☆

Function Code	Name	Set Range	Factory Default	Modbus Address	Modifi-cation
F02.17	Set the cumulative running arrival time	0h～65000h	0h	4211H	☆
F02.18	Boot Protection Selection	0: No protection 1: Protect Note: When F02.18=0, the terminal power-on detection running command is valid; when F02.18=1, the terminal power-on detection running command is invalid.	0	4212H	☆
F02.19	Frequency detection value (FDT1)	0.00Hz～maximum frequency	50.00Hz	4213H	☆
F02.20	Frequency detection hysteresis value (FDT1)	0.0%～100.0% (FDT1 Electrical Level)	5.0%	4214H	☆
F02.21	Frequency arrival (FAR) detection width	0.0%～100.0% (maximum frequency)	0.0%	4215H	☆
F02.22	Whether the jump frequency is valid during acceleration and deceleration	0: Invalid 1: Valid	0	4216H	☆
F02.23	Acceleration time 1 and acceleration time 2 switching frequency points	0.00Hz～maximum frequency	0.00Hz	4217H	☆
F02.24	Deceleration time 1 and deceleration time 2 switching frequency points	0.00Hz～maximum frequency	0.00Hz	4218H	☆
F02.25	Terminal jog priority	0: Invalid 1: Valid	0	4219H	☆
F02.26	Frequency detection value (FDT2)	0.00Hz～maximum frequency	50.00Hz	421AH	☆
F02.27	Frequency detection hysteresis value (FDT2)	0.0%～100.0% (FDT2 Electrical Level)	5.0%	421BH	☆

Function Code	Name	Set Range	Factory Default	Modbus Address	Modification
F02.28	Arbitrary arrival frequency detection value 1	0.00Hz～maximum frequency	50.00Hz	421CH	☆
F02.29	Arbitrary arrival frequency detection width 1	0.0%～100.0% (maximum frequency)	0.0%	421DH	☆
F02.30	Arbitrary arrival frequency detection value 2	0.00Hz～maximum frequency	50.00Hz	421EH	☆
F02.31	Arbitrary arrival frequency detection width 2	0.0%～100.0% (maximum frequency)	0	421FH	☆
F02.32	Zero current detection level	0.0%～300.0% 100.0% Corresponding motor rated current	5.0%	4220H	☆
F02.33	Zero current detection delay time	0.01s～600.00s	0.10s	4221H	☆
F02.34	Output current over-limit value	0.0% (No detection) 0.1%～300.0% (motor rated current)	200.0%	4222H	☆
F02.35	Output current over-limit detection delay time	0.00s～600.00s	0.00s	4223H	☆
F02.36	Arbitrary arrival current 1	0.0%～300.0% (motor rated current)	100.0%	4224H	☆
F02.37	Arbitrary arrival current 1 width	0.0%～300.0% (motor rated current)	0.0%	4225H	☆
F02.38	Arbitrary arrival current 2	0.0%～300.0% (motor rated current)	100.0%	4226H	☆
F02.39	Arbitrary arrival current 2 width	0.0%～300.0% (motor rated current)	0.0%	4227H	☆
F02.40	Timing function selection	0: Invalid 1: Valid	0	4228H	☆

Function Code	Name	Set Range	Factory Default	Modbus Address	Modification
F02.41	Timing running time selection	0: F02.42 setting 1: AI1 2: AI2 3: panel potentiometer Note: Analog input range corresponds to F02.42	0	4229H	☆
F02.42	Timing running time	0.0Min～6500.0Min	0.0Min	422AH	☆
F02.43	AI1 input voltage protection value lower limit	0.00V～F02.44	3.10V	422BH	☆
F02.44	AI1 input voltage protection upper limit	F02.43～11.00V	6.80V	422CH	☆
F02.45	Module temperature arrival	0℃～100℃	75℃	422DH	☆
F02.46	Cooling fan control	0: The fan runs during operation 1: The fan runs all the time	0	422EH	☆
F02.47	Wakeup frequency	Sleep frequency (F02.49)～maximum frequency (F00.10)	0.00Hz	422FH	☆
F02.48	Wake up delay time	0.0s～6500.0s	0.0s	4230H	☆
F02.49	Sleep frequency	0.00Hz～wakeup frequency (F02.47)	0.00Hz	4231H	☆
F02.50	Sleep delay time	0.0s～6500.0s	0.0s	4232H	☆
F02.51	Arrival time setting for this run	0.0～6500.0Min	0.0Min	4233H	☆
F02.52	Output power correction factor	0.00%～200.0%	100.0%	4234H	☆
F03 Group – Motor Parameters					
F03.00	Motor type	0: Ordinary asynchronous motor 1: Variable frequency asynchronous motor	0	4300H	★
F03.01	Motor rated power	0.1kW～1000.0kW	Depending on model	4301H	★

Function Code	Name	Set Range	Factory Default	Modbus Address	Modification
F03.02	Motor rated voltage	1V～2000V	Depending on model	4302H	★
F03.03	Motor rated current	0.01A～655.35A (VFD power <=55kW) 0.1A～6553.5A (VFD power>55kW)	Depending on model	4303H	★
F03.04	Motor rated frequency	0.01Hz～maximum frequency	Depending on model	4304H	★
F03.05	Motor rated speed	1rpm～65535rpm	Depending on model	4305H	★
F03.06	Asynchronous motor stator resistance	0.001Ω～65.535Ω (VFD power<=55kW) 0.0001Ω～6.5535Ω (VFD power>55kW)	Tuning parameter	4306H	★
F03.07	Asynchronous motor rotor resistance	0.001Ω～65.535Ω (VFD power<=55kW) 0.0001Ω～6.5535Ω (VFD power>55kW)	Tuning parameter	4307H	★
F03.08	Asynchronous motor leakage inductance reactance	0.01mH～655.35mH (VFD power<=55kW) 0.001mH～65.535mH (VFD power>55kW)	Tuning parameter	4308H	★
F03.09	Asynchronous motor mutual inductance reactance	0.1mH～6553.5mH (VFD power<=55kW) 0.01mH～655.35mH (VFD power>55kW)	Tuning parameter	4309H	★
F03.10	Asynchronous motor no-load current	0.01A～F03.03 (VFD power<=55kW) 0.1A～F03.03 (VFD power>55kW)	Tuning parameter	430AH	★
F03.11 ～ F03.26	Reserved	——	0	430BH ～ 431AH	★
F03.27	Tuning selection	0: No operation 1: Asynchronous motor static tuning 2: Asynchronous motor complete tuning 3: Static complete parameter identification	0	431BH	★
F04 Group – Motor Vector Control Parameters					
F04.00	Speed loop proportional gain 1	1～100	30	4400H	☆

Function Code	Name	Set Range	Factory Default	Modbus Address	Modification
F04.01	Speed loop integration time 1	0.01s～10.00s	0.50s	4401H	☆
F04.02	Switching frequency 1	0.00～F04.05	5.00Hz	4402H	☆
F04.03	Speed loop proportional gain 2	1～100	20	4403H	☆
F04.04	Speed loop integration time 2	0.01s～10.00s	1.00s	4404H	☆
F04.05	Switching frequency 2	F04.02～maximum frequency	10.00Hz	4405H	☆
F04.06	Vector control slip gain	50%～200%	100%	4406H	☆
F04.07	Speed loop filter time constant	0.000s～0.100s	0.015s	4407H	☆
F04.08	Vector control overexcitation gain	0～200	64	4408H	☆
F04.09	Torque upper limit source under speed control mode	0: Function code F04.10 setting 1: AI1 2: AI2 3: Panel potentiometer 4: PULSE pulse setting 5: Communication given 6: MIN (AI1, AI2) 7: MAX (AI1, AI2) The full range of 1–7 option corresponds to F04.10	0	4409H	☆
F04.10	Torque upper limit digital setting under speed control mode	0.0%～200.0%	160.0%	440AH	☆
F04.13	Excitation regulation proportional gain	0～60000	2000	440DH	☆
F04.14	Excitation regulation integral gain	0～60000	1300	440EH	☆
F04.15	Torque regulation proportional gain	0～60000	2000	440FH	☆

Function Code	Name	Set Range	Factory Default	Modbus Address	Modification
F04.16	Torque regulation integral gain	0～60000	1300	4410H	☆
F04.17	Speed loop integral properties	0: Invalid 1: Valid	0	4411H	☆
F04.18 ～ F04.20	Reserved	——	0	4412H ～ 4414H	☆
F05 Group – Torque Control Parameters					
F05.00	Speed/torque control mode selection	0: Speed control 1: Torque control	0	4500H	★
F05.01	Torque setting source selection under torque control mode	0: Digital setting 1 (F05.03) 1: AI1 2: AI2 3: Panel potentiometer 4: PULSE pulse 5: Communication given 6: MIN(AI1, AI2) 7: MAX(AI1, AI2) (The full range of 1–7 option corresponds to F05.03 digital setting)	0	4501H	★
F05.03	Torque digital setting under torque control mode	–200.0%～200.0%	150.0%	4503H	☆
F05.05	Torque control forward maximum frequency	0.00Hz～maximum frequency	50.00Hz	4505H	☆
F05.06	Torque control reverse maximum frequency	0.00Hz～maximum frequency	50.00Hz	4506H	☆
F05.07	Torque control acceleration time	0.00s～650.00s	0.00s	4507H	☆
F05.08	Torque control deceleration time	0.00s～650.00s	0.00s	4508H	☆
F06 Group – V/F Control Parameters					

Function Code	Name	Set Range	Factory Default	Modbus Address	Modification
F06.00	V/F curve setting	0: Linear V/F 1: Multi-point V/F 2: Square V/F 3: 1.2 power V/F 4: 1.4 power V/F 5: Reserved 6: 1.6 power V/F 7: Reserved 8: 1.8 power V/F 9: Reserved 10: VF complete separation mode 11: VF half-separated mode	0	4600H	★
F06.01	Torque boost	0.0%: (Automatic torque boost) 0.1%~30.0%	Depending on model	4601H	☆
F06.02	Torque boost cut-off frequency	0.00Hz~maximum frequency	50.00Hz	4602H	★
F06.03	Multi-point VF frequency point F1	0.00Hz~F06.05	0.00Hz	4603H	★
F06.04	Multi-point VF voltage point V1	0.0%~100.0%	0.0%	4604H	★
F06.05	Multi-point VF frequency point F2	F06.03~F06.07	0.00Hz	4605H	★
F06.06	Multi-point VF voltage point V2	0.0%~100.0%	0.0%	4606H	★
F06.07	Multi-point VF frequency point F3	F06.05~Motor rated frequency (F03.04)	0.00Hz	4607H	★
F06.08	Multi-point VF voltage point V3	0.0%~100.0%	0.0%	4608H	★
F06.09	VF slip compensation gain	0.0%~200.0%	0.0%	4609H	☆
F06.10	VF overexcitation gain	0~200	64	460AH	☆
F06.11	VF oscillation suppression gain	0~100	Depending on model	460BH	☆

Function Code	Name	Set Range	Factory Default	Modbus Address	Modification
F06.13	VF separation voltage source	0: Digital setting (F06.14) 1: AI1 2: AI2 3: Panel potentiometer 4: PULSE pulse setting (X7) 5: Multi-segment command 6: Simple PLC 7: PIDs 8: Communication given Note: 100.0% corresponds to the motor rated voltage	0	460DH	☆
F06.14	Voltage digital setting of VF separation	0V～Motor rated voltage	0V	460EH	☆
F06.15	Voltage acceleration time of VF separation	0.0s～1000.0s Note: Indicates the time from 0V to the motor rated voltage	0.0s	460FH	☆
F06.16	Voltage deceleration time of VF separation	0.0s～1000.0s Note: Indicates the time from 0V to the motor rated voltage	0.0s	4610H	☆
F06.17	VF separation stop mode selection	0: Frequency/voltage independently reduced to 0 1: After the voltage is reduced to 0, the frequency will be reduced again	0	4611H	☆
F06.18	VF overcurrent stall action current	50～200%	150%	4612H	☆
F06.19	VF overcurrent stall enable	0: Invalid 1: Valid	1	4613H	☆
F06.20	VF overcurrent stall suppression gain	0～100	20	4614H	
F06.21	VF time speed overcurrent stall action current compensation coefficient	50～200%	50%	4615H	☆

Function Code	Name	Set Range	Factory Default	Modbus Address	Modification
F06.22	VF overvoltage stall action voltage	200.0～2000.0	760.0	4616H	☆
F06.23	VF overvoltage stall enable	0: Invalid 1: Valid	1	4617H	☆
F06.24	VF overvoltage stall suppression frequency gain	0～100	30	4618H	☆
F06.25	VF overvoltage stall suppression voltage gain	0～100	30	4619H	☆
F06.26	Overvoltage stall maximum rise limit frequency	0～50Hz	5Hz	461AH	☆
F07 Group – Input Terminals					
F07.00	X1 terminal function selection	0: No function 1: Forward running FWD or running command 2: Reverse running REV or forward and reverse running direction Note: When it is set to 1 or 2, it needs to be used in conjunction with F07.11, see the function code parameter description for details 3: Three-wire running control 4: Forward jog (FJOG) 5: Reverse jog (RJOG) 6: Terminal UP 7: Terminal DOWN 8: Coast to stop 9: Fault reset (RESET) 10: Running 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	1	4700H	★
F07.01	X2 terminal function selection		2	4701H	★
F07.02	X3 terminal function selection		9	4702H	★

Function Code	Name	Set Range	Factory Default	Modbus Address	Modifi-cation
F07.03	X4 terminal function selection	16: Acceleration and deceleration time selection terminal 1 17: Acceleration and deceleration time selection terminal 2 18: Frequency source switching 19: UP/DOWN setting clear (terminal, keypad) 20: Control command switching terminal 1 21: Acceleration and deceleration prohibited 22: PID pause 23: PLC status reset 24: Swing frequency pause 25: Counter input 26: Counter reset 27: Length count input 28: Length reset 29: Torque control prohibited 30: PULSE (pulse) frequency input (only valid for X7) 31: Reserved 32: Immediate DC braking 33: External fault normally closed input 34: Frequency modification prohibited 35: Reverse PID action direction 36: External stop terminal 1 37: Control command switching terminal 2 38: PID integral pause 39: Switch between frequency source A and preset frequency 40: Switch between frequency source B and preset frequency 41: Reserved 42: Reserved 43: PID parameter switching 44: User-defined fault 1 45: User-defined fault 2	12	4703H	★
F07.04	X5 terminal function selection		13	4704H	★
F07.05	X6 terminal function selection		0	4705H	★
F07.06	X7 terminal function selection		30	4706H	★
F07.07	Reserved		0	4707H	★

Function Code	Name	Set Range	Factory Default	Modbus Address	Modifi-cation
F07.08	Reserved	46: Speed control/torque control switching 47: Emergency stop 48: External stop terminal 2 49: Deceleration DC braking 50: The current running time is cleared 51: Two-wire/three-wire switching 52: No reverse 53: Start/stop 54: Running Allowed 55: Interlock 1 56: Interlock 2 57: Interlock 3 58: PFC start/stop	0	4708H	★
F07.09	Reserved		0	4709H	★
F07.10	X filter time	0.000s～1.000s	0.010s	470AH	☆
F07.11	Terminal command mode	0: Two-wire type 1 1: Two-wire type 2 2: Three-wire type 1 3: Three-wire type 2	0	470BH	★
F07.12	Terminal UP/DOWN change rate	0.001Hz/s～65.535Hz/s	1.00Hz/s	470CH	☆
F07.13	AI curve 1 minimum input	0.00V～F07.15	0.00V	470DH	☆
F07.14	AI curve 1 minimum input corresponding setting	-100.0%～+100.0%	0.0%	470EH	☆
F07.15	AI curve 1 maximum input	F07.13～+10.00V	10.00V	470FH	☆
F07.16	AI curve 1 maximum input corresponding setting	-100.0%～+150.0%	100.0%	4710H	☆
F07.17	AI1 filter time	0.00s～10.00s	0.10s	4711H	☆
F07.18	AI curve 2 minimum input	0.00V～F07.20	0.00V	4712H	☆

Function Code	Name	Set Range	Factory Default	Modbus Address	Modifi-cation
F07.19	AI curve 2 minimum input corresponding setting	-100.0%～+100.0%	0.0%	4713H	☆
F07.20	AI curve 2 maximum input	F07.18～+10.00V	10.00V	4714H	☆
F07.21	AI curve 2 maximum input corresponding setting	-100.0%～+150.0%	100.0%	4715H	☆
F07.22	AI2 filter time	0.00s～10.00s	0.10s	4716H	☆
F07.23	Panel potentiometer minimum input	-10.00V～F07.25	-9.50V	4717H	☆
F07.24	Panel potentiometer minimum input corresponding setting	-100.0%～+100.0%	0.0%	4718H	☆
F07.25	Panel potentiometer maximum input	F07.23～+10.00V	9.50V	4719H	☆
F07.26	Panel potentiometer maximum input corresponding setting	-100.0% ～+150.0%	100.0%	471AH	☆
F07.27	Panel potentiometer filter time	0.00s～10.00s	0.10s	471BH	☆
F07.28	PULSE minimum input	0.00kHz～F07.30	0.00kHz	471CH	☆
F07.29	PULSE minimum input corresponding setting	-100.0%～100.0%	0.0%	471DH	☆
F07.30	PULSE maximum input	F07.28～100.00kHz	50.00kHz	471EH	☆
F07.31	PULSE maximum input corresponding setting	-100.0%～100.0%	100.0%	471FH	☆
F07.32	PULSE filter time	0.00s～10.00s	0.10s	4720H	☆

Function Code	Name	Set Range	Factory Default	Modbus Address	Modifi-cation
F07.33	AI curve selection	Units: AI1 curve selection 1: Curve 1 (2 points, see F07.13～F07.16) 2: Curve 2 (2 points, see F07.18～ F07.21) 3: Reserved 4: Curve 4 (4 points, see F18.00～F18.07) 5: Curve 5 (4 points, see F18.08～F18.15) Tens digit: AI2 curve selection, same as above Hundreds place: Reserved	321	4721H	☆
F07.34	AI below minimum input setting selection	Units: AI1 below the minimum input setting selection 0: Corresponds to the minimum input setting 1: 0.0% Tens: AI2 below the minimum input setting selection, same as above Hundreds place: Panel potentiometer below the minimum input setting selection, same as above	000	4722H	☆
F07.35	X1 delay time	0.0s～3600.0s	0.0s	4723H	★
F07.36	X2 delay time	0.0s～3600.0s	0.0s	4724H	★
F07.37	X3 delay time	0.0s～3600.0s	0.0s	4725H	★
F07.38	X terminal valid state selection 1	0: Low electrical level valid 1: High electrical level valid Units: X1 Tens: X2 Hundreds: X3 Thousands: X4 Ten thousand digits: X5	00000	4726H	★
F07.39	X terminal valid state selection 2	0: Low electrical level valid 1: High electrical level valid Units: X6 Tens: X7 Hundreds: Reserved Thousands: Reserved Ten thousands: Reserved	00000	4727H	★

Function Code	Name	Set Range	Factory Default	Modbus Address	Modification
F07.40	Reserved	——	0	4728H	☆
F08 Group – Output Terminal					
F08.00	DO/AO2 terminal output mode selection	0: Pulse output (DOP) 1: Switch output (DOR) 2: Analog output (AO2) Note: Both DOP and DOR are output through the main control board terminal DO, and DO and AO2 can be selected through the main control board jumper.	2	4800H	☆
F08.01	DOR output function selection	0: No output 1: The inverter is running 2: Fault output (free stop fault) 3: Frequency level detection FDT1 output 4: Frequency arrival signal (FAR) 5: Running at zero speed (no output when stopped) 6: Motor overload pre-alarm 7: Inverter overload pre-alarm 8: The set count value arrives 9: The specified count value arrives 10: Length arrives 11: PLC cycle completed 12: Accumulated running time arrives 13: Frequency limiting 14: Torque limiting 15: Ready to run 16: AI1>AI2 17: Upper limit frequency arrives 18: Lower limit frequency arrives (related to running) 19: Undervoltage status output 20: Communication setting 21: Reserved 22: Reserved 23: Running at zero speed 2 (output even when stopped) 24: Accumulated power-on time arrives 25: Frequency level detection FDT2 output 26: Frequency 1 arrival output	0	4801H	☆
F08.02	Control board relay R1 function selection		2	4802H	☆
F08.03	Control board relay R2 output function selection		0	4803H	☆

Function Code	Name	Set Range	Factory Default	Modbus Address	Modifi-cation
F08.04	Open collector Y1 output function selection	27: Frequency 2 arrival output 28: Current 1 arrival output 29: Current 2 arrival output 30: Timing arrival output 31: AI1 input over limit 32: Drop Loading 33: Reverse running 34: Zero current state 35: Module temperature arrives 36: The output current exceeds the limit 37: The lower limit frequency arrives (output even when stopped) 38: Alarm output (all faults) 39: Motor over-temperature pre-alarm 40: The running time arrives 41: Fault output (free stop fault and undervoltage no output) 42: Interlock 1 output 43: Interlock 2 output 44: Interlock 3 output	1	4804H	☆
F08.05	Open collector Y2 output function selection (NPN version)		0	4805H	☆
	Reserved (NPN+PNP version)				
F08.06	DOP output function selection	0: Running frequency 1: Set frequency 2: Output current (2 times the motor rated current) 3: Output torque (2 times the motor rated torque) 4: Output power (2 times rated power) 5: Output voltage (1.2 times the inverter rated voltage) 6: PULSE input (100.0% corresponds to 100.0kHz) 7: AI1 8: AI2 9: Reserved 10: Length 11: Count value 12: Communication setting 13: Motor speed 14: Output current (100.0% corresponds to 1000.0A) 15: Output voltage (100.0% corresponds to 1000.0V) 16: Output torque (torque actual value)	0	4806H	☆
F08.07	AO1 output function selection		0	4807H	☆
F08.08	AO2 output function selection		1	4808H	☆

Function Code	Name	Set Range	Factory Default	Modbus Address	Modification
F08.09	DOP output maximum frequency	0.01KHz～100.00KHz	50.00Hz	4809H	☆
F08.10	AO1 zero bias coefficient	−100.0%～+100.0%	0.0%	480AH	☆
F08.11	AO1 gain	−10.00～+10.00	1.00	480BH	☆
F08.12	AO2 zero bias coefficient	−100.0%～+100.0%	0.0%	480CH	☆
F08.13	AO2 gain	−10.00～+10.00	1.00	480DH	☆
F08.14 ～ F08.16	Reserved	——	0	480EH ～ 4810H	☆
F08.17	DOR output delay time	0.0s～3600.0s	0.0s	4811H	☆
F08.18	R1 output delay time	0.0s～3600.0s	0.0s	4812H	☆
F08.19	R2 output delay time	0.0s～3600.0s	0.0s	4813H	☆
F08.20	Y1 output delay time	0.0s～3600.0s	0.0s	4814H	☆
F08.21	Y2 output delay time (NPN version)	0.0s～3600.0s	0.0s	4815H	☆
	Reserved (NPN+PNP version)	——	0		
F08.22	Switch output terminal valid state selection	0: Positive logic 1: Reverse logic Units: Reserved Tens: R1 Hundreds: R2 Thousands: Y1 Ten thousands: Y2 (NPN version) Reserved (NPN+PNP version)	0000	4816H	☆
F08.23	Reserved	——	0	4817H	☆
F09 Group – PID Functions					

Function Code	Name	Set Range	Factory Default	Modbus Address	Modifi-cation
F09.00	PID given source	0: F09.01 setting 1: AI1 2: AI2 3: Panel potentiometer 4: PULSE pulse setting (X7) 5: Communication given 6: Multi-segment command given 7: Pressure given (MPa、Kg)	0	4900H	☆
F09.01	PID value given	0.0%～100.0%	50.0%	4901H	☆
F09.02	PID feedback source	0: AI1 1: AI2 2: Reserved 3: AI1-AI2 4: PULSE pulse setting (X7) 5: Communication given 6: AI1+AI2 7: MAX (|AI1|, |AI2|) 8: MIN (|AI1|, |AI2|)	0	4902H	☆
F09.03	PID action direction	0: Forward action 1: Reverse action	0	4903H	☆
F09.04	PID given feedback range	0～65535	1000	4904H	☆
F09.05	Proportional gain Kp1	0.0～999.9	20.0	4905H	☆
F09.06	Integral time Ti1	0.01s～10.00s	2.00s	4906H	☆
F09.07	Differential time Td1	0.000s～10.000s	0.000s	4907H	☆
F09.08	PID reverse cut-off frequency	0.00～maximum frequency	2.00Hz	4908H	☆
F09.09	PID deviation limit	0.0%～100.0%	0.0%	4909H	☆
F09.10	PID differential limit range	0.00%～100.00%	0.50%	490AH	☆

Function Code	Name	Set Range	Factory Default	Modbus Address	Modification
F09.11	PID given change time	0.00～650.00s	0.00s	490BH	☆
F09.12	PID feedback filter time	0.00～60.00s	0.00s	490CH	☆
F09.13	PID output filter time	0.00～60.00s	100.0s	490DH	☆
F09.14	Reserved	——	——	490EH	☆
F09.15	Proportional gain Kp2	0.0～999.9	20.0	490FH	☆
F09.16	Integral time Ti2	0.01s～10.00s	2.00s	4910H	☆
F09.17	Differential time Td2	0.000s～10.000s	0.000s	4911H	☆
F09.18	PID parameter switching condition	0: Do not switch 1: Switch via X terminal 2: Automatic switching according to the deviation 3～8: Reserved	0	4912H	☆
F09.19	PID parameter switching deviation 1	0.0%～F09.20	20.0%	4913H	☆
F09.20	PID parameter switching deviation 2	F09.19～100.0%	80.0%	4914H	☆
F09.21	PID initial value	0.0%～100.0%	0.0%	4915H	☆
F09.22	PID initial value hold time	0.00～650.00s	0.00s	4916H	☆
F09.23	Reserved	——	0	4917H	☆
F09.24	Reserved	——	0	4918H	☆
F09.25	PID feedback upper limit loss detection value	Does not judge feedback loss 0.1%～100.0%	0.0%	4919H	☆
F09.26	PID feedback lower limit loss detection value		0.0%	491AH	☆

Function Code	Name	Set Range	Factory Default	Modbus Address	Modifi-cation
F09.27	PID feedback loss detection time	0.0s～20.0s	0.0s	491BH	☆
F09.28	PID stop operation	0: No operation when stopped 1: Operation during stop	0	491CH	☆
F10 Group – Multi-Segment Command, Simple PLC					
F10.00	Multi-segment command 0	-100.0%～100.0%	0.0%	4A00H	☆
F10.01	Multi-segment command 1	-100.0%～100.0%	0.0%	4A01H	☆
F10.02	Multi-segment command 2	-100.0%～100.0%	0.0%	4A02H	☆
F10.03	Multi-segment command 3	-100.0%～100.0%	0.0%	4A03H	☆
F10.04	Multi-segment command 4	-100.0%～100.0%	0.0%	4A04H	☆
F10.05	Multi-segment command 5	-100.0%～100.0%	0.0%	4A05H	☆
F10.06	Multi-segment command 6	-100.0%～100.0%	0.0%	4A06H	☆
F10.07	Multi-segment command 7	-100.0%～100.0%	0.0%	4A07H	☆
F10.08	Multi-segment command 8	-100.0%～100.0%	0.0%	4A08H	☆
F10.09	Multi-segment command 9	-100.0%～100.0%	0.0%	4A09H	☆
F10.10	Multi-segment command 10	-100.0%～100.0%	0.0%	4A0AH	☆
F10.11	Multi-segment command 11	-100.0%～100.0%	0.0%	4A0BH	☆
F10.12	Multi-segment command 12	-100.0%～100.0%	0.0%	4A0CH	☆
F10.13	Multi-segment command 13	-100.0%～100.0%	0.0%	4A0DH	☆
F10.14	Multi-segment command 14	-100.0%～100.0%	0.0%	4A0EH	☆
F10.15	Multi-segment command 15	-100.0%～100.0%	0.0%	4A0FH	☆

Function Code	Name	Set Range	Factory Default	Modbus Address	Modifi-cation
F10.16	Simple PLC running mode	0: Stop at the end of a single run 1: Keep the final value at the end of a single run 2: Continuous cycle	0	4A10H	☆
F10.17	Simple PLC power-off memory selection	Units: Power-off memory selection 0: No memory when power off 1: Power-off memory Tens: Inverter stop memory selection 0: Stop without memory 1: Stop with memory	00	4A11H	☆
F10.18	Simple PLC 0-segment running time	0.0s (h)～6500.0s (h)	0.0s (h)	4A12H	☆
F10.19	Simple PLC 0-segment Acc/Dec time selection	0～3	0	4A13H	☆
F10.20	Simple PLC 1-segment running time	0.0s (h)～6500.0s (h)	0.0s (h)	4A14H	☆
F10.21	Simple PLC 1-segment Acc/Dec time selection	0～3	0	4A15H	☆
F10.22	Simple PLC 2-segment running time	0.0s (h)～6500.0s (h)	0.0s (h)	4A16H	☆
F10.23	Simple PLC 2-segment Acc/Dec time selection	0～3	0	4A17H	☆
F10.24	Simple PLC 3-segment running time	0.0s (h)～6500.0s (h)	0.0s (h)	4A18H	☆
F10.25	Simple PLC 3-segment Acc/Dec time selection	0～3	0	4A19H	☆
F10.26	Simple PLC 4-segment running time	0.0s (h)～6500.0s (h)	0.0s (h)	4A1AH	☆

Function Code	Name	Set Range	Factory Default	Modbus Address	Modifi-cation
F10.27	Simple PLC 4–segment Acc/Dec time selection	0～3	0	4A1BH	☆
F10.28	Simple PLC 5–segment running time	0.0s (h)～6500.0s (h)	0.0s (h)	4A1CH	☆
F10.29	Simple PLC 5–segment Acc/Dec time selection	0～3	0	4A1DH	☆
F10.30	Simple PLC 6–segment running time	0.0s (h)～6500.0s (h)	0.0s (h)	4A1EH	☆
F10.31	Simple PLC 6–segment Acc/Dec time selection	0～3	0	4A1FH	☆
F10.32	Simple PLC 7–segment running time	0.0s (h)～6500.0s (h)	0.0s (h)	4A20H	☆
F10.33	Simple PLC 7–segment Acc/Dec time selection	0～3	0	4A21H	☆
F10.34	Simple PLC 8–segment running time	0.0s (h)～6500.0s (h)	0.0s (h)	4A22H	☆
F10.35	Simple PLC 8–segment Acc/Dec time selection	0～3	0	4A23H	☆
F10.36	Simple PLC 9–segment running time	0.0s (h)～6500.0s (h)	0.0s (h)	4A24H	☆
F10.37	Simple PLC 9–segment Acc/Dec time selection	0～3	0	4A25H	☆
F10.38	Simple PLC 10–segment running time	0.0s (h)～6500.0s (h)	0.0s (h)	4A26H	☆
F10.39	Simple PLC 10–segment Acc/Dec time selection	0～3	0	4A27H	☆

Function Code	Name	Set Range	Factory Default	Modbus Address	Modifi-cation
F10.40	Simple PLC 11-segment running time	0.0s (h)～6500.0s (h)	0.0s (h)	4A28H	☆
F10.41	Simple PLC 11-segment Acc/Dec time selection	0～3	0	4A29H	☆
F10.42	Simple PLC 12-segment running time	0.0s (h)～6500.0s (h)	0.0s (h)	4A2AH	☆
F10.43	Simple PLC 12-segment Acc/Dec time selection	0～3	0	4A2BH	☆
F10.44	Simple PLC 13-segment running time	0.0s (h)～6500.0s (h)	0.0s (h)	4A2CH	☆
F10.45	Simple PLC 13-segment Acc/Dec time selection	0～3	0	4A2DH	☆
F10.46	Simple PLC 14-segment running time	0.0s (h)～6500.0s (h)	0.0s (h)	4A2EH	☆
F10.47	Simple PLC 14-segment Acc/Dec time selection	0～3	0	4A2FH	☆
F10.48	Simple PLC 15-segment running time	0.0s (h)～6500.0s (h)	0.0s (h)	4A30H	☆
F10.49	Simple PLC 15-segment Acc/Dec time selection	0～3	0	4A31H	☆
F10.50	Simple PLC running time unit	0: s (second) 1: h (hour)	0	4A32H	☆

Function Code	Name	Set Range	Factory Default	Modbus Address	Modifi-cation
F10.51	Multi-segment command 0 given mode	0: Function code F10.00 given 1: AI1 2: AI2 3: Panel potentiometer 4: PULSE pulse 5: PIDs 6: Preset frequency (F00.08) given, UP/DOWN can be modified	0	4A33H	☆
F11 Group – Swing Frequency, Fixed Length and Count					
F11.00	Swing frequency setting mode	0: Relative to the center frequency 1: Relative to the maximum frequency	0	4B00H	☆
F11.01	Swing Frequency Amplitude	0.0%～100.0%	0.0%	4B01H	☆
F11.02	Jump Frequency Amplitude	0.0%～50.0%	0.0%	4B02H	☆
F11.03	Swing frequency cycle	0.1s～3000.0s	10.0s	4B03H	☆
F11.04	Swing frequency triangular wave rise time	0.1%～100.0%	50.0%	4B04H	☆
F11.05	Set length	0m～65535m	1000m	4B05H	
F11.06	Actual length	0m～65535m	0m	4B06H	☆
F11.07	Pulses per meter	0.1～6553.5	100.0	4B07H	☆
F11.08	Set count value	1～65535	1000	4B08H	☆
F11.09	Specify count value	1～65535	1000	4B09H	☆
F11.10 ～ F11.14	Reserved	——	0	4B0AH ～ 4B0EH	☆
F12 Group – Fault and Protection					

Function Code	Name	Set Range	Factory Default	Modbus Address	Modifi-cation
F12.00	Motor overload protection selection	0: Prohibited 1: Allowed	1	4C00H	☆
F12.01	Motor overload protection gain	0.20～10.00	1.00	4C01H	☆
F12.02	Motor overload pre-alarm coefficient	50%～100%	80%	4C02H	☆
F12.03	Overvoltage stall gain	0～100	0	4C03H	☆
F12.04	Overvoltage stall protection voltage	200.0～2000.0	760.0	4C04H	☆
F12.05	Overcurrent stall gain	0～100	20	4C05H	☆
F12.06	Overcurrent stall protection current	100%～200%	150%	4C06H	☆
F12.07	Reserved	——	0	4C07H	☆
F12.08	Braking initial voltage	200.0～2000.0V	690.0V	4C08H	☆
F12.09	Fault automatic reset times	0～200	0	4C09H	☆
F12.10	Fault digital output terminal action selection during fault automatic reset	0: No action 1: Action	1	4C0AH	☆
F12.11	Fault automatic reset interval time	0.1s～100.0s	6.0s	4C0BH	☆
F12.12	Input phase loss protection selection	0: Prohibited (inverter power <=11kW) 1: Allowed (inverter power >11kW)	Depending on model	4C0CH	☆
F12.13	Output phase loss protection selection	0: Prohibited 1: Allowed	1	4C0DH	☆

Function Code	Name	Set Range	Factory Default	Modbus Address	Modifi-cation
F12.14	1st fault type	0: No fault 1: Reserved 2: Acceleration overcurrent 3: Deceleration overcurrent 4: Constant speed overcurrent 5: Acceleration overvoltage 6: Deceleration overvoltage 7: Constant speed overvoltage 8: Buffer resistance overload 9: Undervoltage 10: Inverter overload 11: Motor overload 12: Input phase loss 13: Output phase loss 14: Module overheating 15: External fault 16: Abnormal communication 17: Reserved 18: Abnormal current detection 19: Abnormal motor tuning 20: Reserved 21: Abnormal parameters read and write 22: Abnormal Inverter hardware 23: Reserved 24: Reserved 25: Reserved 26: Run time arrives 27: Reserved 28: Reserved 29: The power-on time is arrives 30: Offload	——	4C0EH	●
F12.15	2nd fault type		——	4C0FH	●

Function Code	Name	Set Range	Factory Default	Modbus Address	Modifi-cation
F12.16	3rd (latest) fault type	31: Loss of PID feedback while running 40: Fast current limit timeout 41: Switch motors while running 42: Speed deviation too large 43: Motor overspeed 45: Motor over temperature 51: Initial position error	——	4C10H	●
F12.17	Frequency at 3rd (latest) fault	——	——	4C11H	●
F12.18	Current at 3rd (latest) fault	——	——	4C12H	●
F12.19	Bus voltage at 3rd (latest) fault	——	——	4C13H	●
F12.20	Input terminal status at 3rd (latest) fault	——	——	4C14H	●
F12.21	Output terminal status at 3rd (latest) fault	——	——	4C15H	●
F12.22	Inverter status at 3rd (latest) fault	——	——	4C16H	●
F12.23	Power-on time at 3rd (latest) fault	——	——	4C17H	●
F12.24	Run time at 3rd (latest) fault	——	——	4C18H	●
F12.27	Frequency at 2nd fault	——	——	4C1BH	●
F12.28	Current at 2nd fault	——	——	4C1CH	●
F12.29	Bus voltage at 2nd fault	——	——	4C1DH	●
F12.30	Input terminal status at 2nd fault	——	——	4C1EH	●
F12.31	Output terminal status at 2nd fault	——	——	4C1FH	●
F12.32	Inverter status at 2nd fault	——	——	4C20H	●

Function Code	Name	Set Range	Factory Default	Modbus Address	Modifi-cation
F12.33	Power-on time at 2nd fault	——	——	4C21H	●
F12.34	Run time at 2nd fault	——	——	4C22H	●
F12.37	Frequency at 1st fault	——	——	4C25H	●
F12.38	Current at 1st fault	——	——	4C26H	●
F12.39	Bus voltage at 1st fault	——	——	4C27H	●
F12.40	Input terminal status at 1st fault	——	——	4C28H	●
F12.41	Output terminal status at 1st fault	——	——	4C29H	●
F12.42	Inverter status at 1st fault	——	——	4C2AH	●
F12.43	Power-on time at 1st fault	——	——	4C2BH	●
F12.44	Run time at 1st fault	——	——	4C2CH	●
F12.47	Fault protection action selection 1	Units: Motor overload (11) 0: Coast to stop 1: Stop according to the stop mode 2: Keep running Tens: Input phase loss (12) Hundreds: Output phase loss (13) Thousands: External fault (15) Ten thousands: Communication abnormal (16)	00000	4C2FH	☆
F12.48	Fault protection action selection 2	Units: Reserved 0: Coast to stop Tens: Function code read/write abnormal (21) 0: Coast to stop 1: Stop according to the stop mode Hundreds: Reserved Thousands: Motor overheating (25) Ten thousands: Runtime arrives (26)	00000	4C30H	☆

Function Code	Name	Set Range	Factory Default	Modbus Address	Modifi-cation
F12.49	Fault protection action selection 3	Units: User-defined fault 1 (27) 0: Coast to stop 1: Stop according to the stop mode 2: Keep running Tens: User-defined fault 2 (28) 0: Coast to stop 1: Stop according to the stop mode 2: Keep running Hundreds: Power-on time arrival (29) 0: Coast to stop 1: Stop according to the stop mode 2: Keep running Thousands: Drop loading (30) 0: Coast to stop 1: Decelerate to stop 2: Jump directly to 7% of the motor rated frequency and continue to run, when the load is not drop, it will automatically return to the set frequency running Tens thousands: PID feedback loss while running (31) 0: Coast to stop 1: Stop according to the stop mode 2: Keep running	00000	4C31H	☆
F12.50	Fault protection action selection 4	Units: Speed deviation too large (42) 0: Coast to stop 1: Stop according to the stop mode 2: Continue running Tens, hundreds, thousands, ten thousand: Reserved	00000	4C32H	☆
F12.54	Continue to run frequency selection in case of fault	0: Run at the current running frequency 1: Run at the set frequency 2: Run at the upper limit frequency 3: Run at the lower limit frequency 4: Running at abnormal standby frequency	0	4C36H	☆

Function Code	Name	Set Range	Factory Default	Modbus Address	Modification
F12.55	Abnormal standby frequency	0.0%～100.0% (100.0% corresponds to the maximum frequency F00.10)	100.0%	4C37H	☆
F12.56	Motor temperature sensor type	0: No temperature sensor 1: PT100 2: PT1000	0	4C38H	☆
F12.57	Motor overheat protection threshold	0℃～200℃	110℃	4C39H	☆
F12.58	Motor overheat pre-alarm threshold	0℃～200℃	90℃	4C3AH	☆
F12.59	Instantaneous power failure action selection	0: Invalid 1: Deceleration 2: Deceleration to stop	0	4C3BH	☆
F12.60	Instantaneous stop action pauses to judge voltage	80.0%～100.0%	85.0%	4C3CH	☆
F12.61	Instantaneous power failure voltage recovery judgment time	0.00s～100.00s	0.50s	4C3DH	☆
F12.62	Instantaneous power failure action judgment voltage	60.0%～100.0% (Standard bus voltage)	80.0%	4C3EH	☆
F12.63	Off load protection selection	0: Invalid 1: Valid	0	4C3FH	☆
F12.64	Off load detection level	0.0～100.0%	10.0%	4C40H	☆
F12.65	Off load detection time	0.0～60.0s	1.0s	4C41H	☆
F12.66	Reserved	——	——	4C42H	☆
F12.67	Reserved	——	——	4C43H	☆

Function Code	Name	Set Range	Factory Default	Modbus Address	Modifi-cation
F12.68	SVC speed deviation excessive detection value	0.0%～50.0% (maximum frequency)	20.0%	4C44H	☆
F12.69	SVC speed deviation excessive detection time	0.0s: No detection 0.1～60.0s	0.0s	4C45H	☆
F12.70	Instantaneous stop non-stop gain Kp	0～100	40	4C46H	☆
F12.71	Instantaneous stop non-stop integral coefficient Ki	0～100	30	4C47H	☆
F12.72	Instantaneous stop non-stop action deceleration time	0.0～300.0s	20.0s	4C48H	☆
F12.73	Carrier automatic adjustment selection	Units digit: Automatic adjustment of overload carrier 0: Prohibited 1: Valid Tens digit: Carrier automatically adjusted at startup 0: Prohibited 1: Valid Hundreds, thousands, ten thousand: Reserved	11	4C49H	☆
F13 Group – Communication Parameters					
F13.00	MODBUS communication baud rate	0～1: Reserved 2: 1200BPS 3: 2400BPS 4: 4800BPS 5: 9600BPS 6: 19200BPS 7: 38400BPS 8: 57600BPS 9: 115200BPS	6	4D00H	☆

Function Code	Name	Set Range	Factory Default	Modbus Address	Modifi-cation
F13.01	MODBUS data format	0: No parity (8-N-2) 1: Even parity (8-E-1) 2: Odd parity (8-O-1) 3: No parity (8-N-1)	1	4D01H	☆
F13.02	Local address	1～247	1	4D02H	☆
F13.03	MODBUS response delay	0～20ms	2	4D03H	☆
F13.04	RS485 communication overtime time	0.0: Invalid 0.1～60.0s	0.0s	4D04H	☆
F13.05	MODBUS protocol selection	0: Non-standard MODBUS protocol 1: Standard MODBUS protocol	1	4D05H	☆
F13.06	RS485 communication read current resolution	0: 0.01A 1: 0.1A	0	4D06H	☆
F13.07	RS485 communication protocol selection	0: 900N protocol 1: 900G protocol 2～10：Reserved	0	4D07H	☆
F14 Group – Keypad and Display					
F14.00	Key FUNC function selection	0: FUNC key is invalid 1: Switch between operation panel command channel and remote command channel (terminal command channel or communication command channel) 2: Forward and reverse switching 3: Forward jog 4: Reverse jog Note: When F14.00=1, switch to the terminal operation command, the small dots of the auxiliary display ones digital tube flash slowly at intervals of 1s; switch to the communication operation command channel, and the small dots of the auxiliary display ones digital tube flash quickly at intervals of 200ms.	3	4E00H	★

Function Code	Name	Set Range	Factory Default	Modbus Address	Modifi-cation
F14.01	Key STOP/RESET function selection	0: Only in the keypad operation mode, the stop function of the STOP/RES key is valid 1: In any operation mode, the stop function of STOP/RES key is valid	1	4E01H	☆
F14.02	LED running main display parameter 1	0000～FFFF Bit00: Running frequency 1(Hz) Bit01: Set frequency (Hz) Bit02: Bus voltage (V) Bit03: Output voltage (V) Bit04: Output current (A) Bit05: Output power (kW) Bit06: Output torque (%) Bit07: Terminal input status Bit08: Terminal output status Bit09: AI1 voltage (V) Bit10: AI2 voltage (V) Bit11: Pressure feedback (MPa, Kg) Bit12: Count value Bit13: Length value Bit14: Load speed display Bit15: PID setting	1F	4E02H	☆
F14.03	LED running main display parameter 2	0000 ～ FFFF Bit00: PID feedback Bit01: PLC stage Bit02: PULSE input pulse frequency (kHz) Bit03: Running frequency 2 (Hz) Bit04: remaining running time Bit05: AI1 voltage before correction (V) Bit06: AI2 voltage before correction (V) Bit07: Pressure setting (MPa, Kg) Bit08: linear speed Bit09: Current power-on time (Hour) Bit10: current running time (Min)	0	4E03H	☆

Function Code	Name	Set Range	Factory Default	Modbus Address	Modifi-cation
F14.03	LED running main display parameter 2	Bit11: PULSE input pulse frequency (Hz) Bit12: Communication setting value Bit13: reserved Bit14: main frequency A display (Hz) Bit15: Auxiliary frequency B display (Hz)	0	4E03H	☆
F14.04	LED stop main display parameters	0000～FFFF Bit00: Set frequency (Hz) Bit01: Bus voltage (V) Bit02: Terminal input status Bit03: Terminal output status Bit04: AI1 voltage (V) Bit05: AI2 voltage (V) Bit06: Panel potentiometer voltage (V) Bit07: Count value Bit08: Length value Bit09: PLC stage Bit10: Load speed Bit11: PID setting Bit12: PULSE input pulse frequency (kHz) Bit13: Pressure feedback (MPa, Kg) Bit14: Input voltage (V) Bit15: Reserved	33	4E04H	☆
F14.05	LED running auxiliary display parameters	0～80	4	4E05H	☆
F14.06	LED stop auxiliary display parameters	0～80	38	4E06H	☆
F14.07	Load speed display coefficient	0.0001～6.5000	1.0000	4E07H	☆
F14.08	Inverter module heat sink temperature	0.0℃～100.0℃	——	4E08H	●
F14.09	Cumulative running time	0h～65535h	——	4E09H	●

Function Code	Name	Set Range	Factory Default	Modbus Address	Modification
F14.10	Load speed display decimal places	LED units: Load speed (d00.14) display coefficient 0: 0 decimal places 1: 1 decimal place 2: 2 decimal places 3: 3 decimal places LED ten digit: Feedback speed (d00.19) display coefficient 1: 1 ecimal place 2: 2 decimal places	21	4E0AH	☆
F14.11	Cumulative power-on time	0~65535 hour	——	4E0BH	●
F14.12	Cumulative power consumption	0~65535 kWh	——	4E0CH	●
F14.13	Hardware version number	——	——	4E0DH	●
F14.14	Software version number	——	——	4E0EH	●
F14.15	Software batch number	——	3.0410	4E0FH	●
F15 Group – Function Code Management					
F15.00	User password	0~65535	0	4F00H	☆
F15.01	Parameter initialization	0: No operation 1: All user parameters except the motor parameters are restored to factory settings 2: All user parameters are restored to factory settings 3: Clear record information	0	4F01H	★
F15.02	Function code modification attribute	0: Modifiable 1: Unmodifiable	0	4F02H	☆
F15.03	Reserved	——	0	4F03H	●
F15.04	Reserved	——	0	4F04H	●
F16 Group – Water Supply Parameter Group					

Function Code	Name	Set Range	Factory Default	Modbus Address	Modification
F16.00	Terminal access and disconnection delay	0.0～6000.0s	0.1	5000H	☆
F16.01	Polling time	0.0～6000.0h	48.0	5001H	☆
F16.02	Reduce pump lower limit frequency	0.0～upper limit frequency	35.00	5002H	☆
F16.03	Adding pump delay time	0.0～3600.0s	5.0	5003H	☆
F16.04	Reduce pump delay time	0.0～3600.0s	5.0	5004H	☆
F16.05	Pump sleep waiting time	0.0～3600.0s	2.0	5005H	☆
F16.06	Pump wake-up waiting time	0.0～3600.0s	1.0	5006H	☆
F16.07	Pump wake up pressure point	(0.0～100.0%)* (F16.08)	80.0%	5007H	☆
F16.08	Preset pressure	0.00～F16.09 (MPa、Kg)	5.00	5008H	☆
F16.09	Sensor range	0.00～100.00 (MPa、Kg)	10.00	5009H	☆
F16.10	Maximum power node of the battery panel	50.0%～100.0%	81.0	500AH	☆
F16.11	VF speed adjustment coefficient	0.000～2.000	1.000	500BH	☆
F16.12	MPPT high point working voltage	(F16.13)～200.0%	100.0%	500CH	☆
F16.13	MPPT low point working voltage	0.0%～(F16.12)	75.0%	500DH	☆
F16.14	MPPT high point voltage frequency point	0.00Hz～maximum frequency (F00.10)	50.00	500EH	☆
F16.15	MPPT low point voltage frequency point	0.00Hz～maximum frequency (F00.10)	0.00	500FH	☆
F16.16	MPPT low voltage protection point	40.0%～100.0%	45.0%	5010H	☆

Function Code	Name	Set Range	Factory Default	Modbus Address	Modifi-cation
F16.17	Water shortage detection initial frequency	0.00Hz～maximum frequency (F00.10)	10.00	5011H	☆
F16.18	Photovoltaic water pump water shortage detection current corresponds to no-load current ratio	0.0%～300.0%* no-load current (F03.10)	0.0	5012H	☆
F16.19	Photovoltaic water pump water shortage detection time	0～6000.0s	0.0	5013H	☆
F16.20	Photovoltaic undervoltage self-start delay	0.1～6000.0s (0.0 value turn off self-start)	2.0	5014H	☆
F16.21	Photovoltaic water shortage self-start delay	0.1～6000.0s (0.0 value turn off self-start)	15.0	5015H	☆
F16.22	Power search time	0.050～60.000	0.500	5016H	☆
F16.23	Power search gain	10～500	125	5017H	☆
F16.24	Power search speed gain	1～1000	100	5018H	☆
F16.25	Pre-search increase frequency time	0.01～600.00s	15.00	5019H	☆
F16.26	Pre-search decrease frequency time	0.01～600.00s	15.00	501AH	☆
F17 Group – Control Optimization Parameters					
F17.00	DPWM switching upper limit frequency	0.00Hz～maximum frequency (F00.10)	8.00Hz	5100H	☆
F17.01	PWM modulation mode	0: Asynchronous modulation 1: Synchronous modulation	0	5101H	☆

Function Code	Name	Set Range	Factory Default	Modbus Address	Modification
F17.02	Deadband compensation mode selection	0: No compensation 1: Compensation mode	1	5102H	☆
F17.03	Random PWM depth	0: Random PWM invalid 1～10: PWM carrier frequency random depth	0	5103H	☆
F17.04	Pulse-by-wave current limit enable	0: Disable 1: Enable	1	5104H	☆
F17.05	Voltage overmodulation coefficient	100～110	105	5105H	☆
F17.06	Undervoltage point setting	200.0V～2000.0V	350.0V	5106H	☆
F17.07	Reserved	——	0	5107H	☆
F17.08	Overvoltage point setting	200.0V～2200.0V	Depending on model	5108H	★
F17.09	Reserved	——	0	5109H	☆
F17.10	Reserved	——	0	510AH	☆
F18 Group – AI Curve Setting					
F18.00	AI curve 4 minimum input	-10.00V～F18.02	0.00V	5200H	☆
F18.01	AI setting curve 4 minimum input corresponding setting	-100.0%～+100.0%	0.0%	5201H	☆
F18.02	AI curve 4 inflection point 1 input	F18.00～F18.04	3.00V	5202H	☆
F18.03	AI curve 4 inflection point 1 input corresponding setting	-100.0%～+100.0%	30.0%	5203H	☆
F18.04	AI curve 4 inflection point 2 input	F18.02～F18.06	6.00V	5204H	☆

Function Code	Name	Set Range	Factory Default	Modbus Address	Modifi-cation
F18.05	AI curve 4 inflection point 2 input corresponding setting	–100.0%～+100.0%	60.0%	5205H	☆
F18.06	AI Curve 4 Maximum input	F18.06～+10.00V	10.00V	5206H	☆
F18.07	AI curve 4 maximum input corresponding setting	–100.0%～+100.0%	100.0%	5207H	☆
F18.08	AI curve 5 minimum input	–10.00V～F18.10	–10.00V	5208H	☆
F18.09	AI curve 5 minimum input corresponding setting	–100.0%～+100.0%	–100.0%	5209H	☆
F18.10	AI curve 5 inflection point 1 input	F18.08～F18.12	–3.00V	520AH	☆
F18.11	AI curve 5 inflection point 1 input corresponding setting	–100.0%～+100.0%	–30.0%	520BH	☆
F18.12	AI curve 5 inflection point 2 input	F18.10～F18.14	3.00V	520CH	☆
F18.13	AI curve 5 inflection point 2 input corresponding setting	–100.0%～+100.0%	30.0%	520DH	☆
F18.14	AI Curve 5 Maximum input	F18.12～+10.00V	10.00V	520EH	☆
F18.15	AI curve 5 maximum input corresponding setting	–100.0%～+100.0%	100.0%	520FH	☆
F18.16	AI1 set jump point	–100.0%～100.0%	0.0%	5210H	☆
F18.17	AI1 set jump range	0.0%～100.0%	0.1%	5211H	☆
F18.18	AI2 set jump point	–100.0%～100.0%	0.0%	5212H	☆
F18.19	AI2 set jump range	0.0%～100.0%	0.1%	5213H	☆

Function Code	Name	Set Range	Factory Default	Modbus Address	Modifi-cation
F18.20	Panel potentiometer set jump point	-100.0%～100.0%	0.0%	5214H	☆
F18.21	Panel potentiometer set jump range	0.0%～100.0%	0.1%	5215H	☆
FFF Group – Manufacturer Parameters					
FFF.00	Factory password	0～65535	0	5F00H	★

d00 Group – Basic Monitoring Parameters			
Function Code	Name	Factory Value	Modbus Address
d00.00	Running frequency (Hz)	0.01Hz	7000H
d00.01	Set frequency (Hz)	0.01Hz	7001H
d00.02	Bus voltage (V)	0.1V	7002H
d00.03	Output voltage (V)	1V	7003H
d00.04	Output current (A)	0.01A	7004H
d00.05	Output power (kW)	0.1kW	7005H
d00.06	Output torque (%)	0.10%	7006H
d00.07	Terminal input status	1	7007H
d00.08	Terminal output status	1	7008H
d00.09	AI1 voltage (V) / current (mA)	0.01V/0.01mA	7009H
d00.10	AI2 voltage (V)	0.01V	700AH
d00.11	Pressure feedback (MPa、Kg)	0.00	700BH
d00.12	Count value	1	700CH
d00.13	Length value	1	700DH
d00.14	Load speed display	1	700EH
d00.15	PID setting	1	700FH
d00.16	PID feedback	1	7010H
d00.17	PLC stage	1	7011H
d00.18	PULSE input pulse frequency (Hz)	0.01kHz	7012H

Function Code	Name	Factory Value	Modbus Address
d00.19	Feedback speed (Hz)	0.01Hz	7013H
d00.20	Remain run time	0.1Min	7014H
d00.21	Voltage (V) / current (mA) before AI1 correction	0.001V/0.01mA	7015H
d00.22	Voltage before AI2 correction (V)	0.001V	7016H
d00.23	Pressure setting (MPa、Kg)	0.00	7017H
d00.24	Linear speed	1m/Min	7018H
d00.25	Current power-on time	1Min	7019H
d00.26	Current running time	0.1Min	701AH
d00.27	PULSE input pulse frequency	1Hz	701BH
d00.28	Communication set value	0.01%	701CH
d00.29	Reserved	0	701DH
d00.30	Main frequency A display	0.01Hz	701EH
d00.31	Auxiliary frequency B display	0.01Hz	701FH
d00.32	Reserved	——	7020H
d00.33	Reserved	——	7021H
d00.34	Motor temperature value	1℃	7022H
d00.35	Target torque (%)	0.1%	7023H
d00.36	Reserved	——	7024H
d00.37	Power factor angle (Hz)	0.1°	7025H
d00.38	Input voltage (V)	0.0V	7026H

Function Code	Name	Factory Value	Modbus Address
d00.39	VF separation target voltage	1V	7027H
d00.40	VF separation output voltage	1V	7028H
d00.41	Input terminal status visual display	1	7029H
d00.42	Output terminal status visual display	1	702AH
d00.43	Input terminal function status visual display 1 (Function 01– Function 40)	1	702BH
d00.44	Input terminal function status visual display 2 (Function 41– Function 80)	1	702CH
d00.45	Fault information	1	702DH
d00.58	Reserved	0	703AH
d00.59	Set frequency (%)	0.01%	703BH
d00.60	Running frequency (%)	0.01%	703CH
d00.61	Inverter status	1	703DH
d00.62	Current fault code	1	703EH
d00.63	Reserved	——	703FH
d00.64	Reserved	——	7040H
d00.65	Torque upper limit	0.10%	7041H
d00.66 ~ d00.78	Reserved	——	——
d00.79	Set temperature	1℃	7041H

7. EMC (Electromagnetic Compatibility)

7.1 Definition

Electromagnetic compatibility (EMC) refers to the ability of electrical equipment to operate in an electromagnetic interference environment without interfering with the electromagnetic environment and to realize its function stably.

7.2 EMC Standard Introduction

According to the requirements of the national standard GB/T12668.3, the inverter needs to meet the requirements of electromagnetic interference and anti-electromagnetic interference.
Our existing products implement the latest international standards: I E C / E N 6 1 8 0 0 – 3: 2004 (Adjustable speed electrical power drive systems part 3: EMC requirements and specific test methods), which is equivalent to the national standard GB/T12668.3 .
IEC/EN61800-3 mainly inspects the frequency converter from two aspects of electromagnetic interference and anti-electromagnetic interference. Electromagnetic interference mainly tests the radiated interference, conduction interference and harmonic interference of the frequency inverter (this requirement is required for frequency inverters used in civilian use).Anti-electromagnetic interference mainly affects the conduction immunity, radiation immunity, surge immunity, fast mutation pulse group immunity, ESD immunity and low-frequency power supply immunity (specific test items are):
① Immunity test for input voltage sags, interruptions and changes;
② Commutation notch immunity test;
③ Harmonic input immunity test;
④ Input frequency change test;
⑤ Input voltage unbalance test;
⑥ Input voltage fluctuation test) for testing. Tested in accordance with the strict requirements of IEC/EN61800-3 above, our products are installed and used in accordance with the guidance shown in 8.3, and will have good electromagnetic compatibility in general industrial environments.

7.3 EMC Guide

(1) Harmonic Wave Effect

The higher harmonics of the power supply will cause damage to the inverter. Therefore, in some places where the power grid quality is relatively poor, it is recommended to install an AC input reactor.

(2) Electromagnetic Interference And Installation Precautions

There are two kinds of electromagnetic interference, one is the interference of the electromagnetic noise of the surrounding environment on the inverter, and the other is the interference generated by the inverter on the surrounding equipment.

Installation Precautions:
① The grounding wires of inverters and other electrical products should be well grounded;
② The power input and output lines of the inverter and the weak current signal lines (such as: control lines) should not be arranged in parallel as much as possible, but vertically if possible;
③ It is recommended to use shielded cable or steel pipe shielded power line for the output power line of the inverter, and the shielding layer must be reliably grounded. It is recommended to use twisted-pair shielded control lines for the lead wires of the interfered equipment, and the shielding layer must be grounded reliably;
④ For motor cables longer than 100m, it is required to install an output filter or reactor.

(3) Method Of Interference Caused By Peripheral Electromagnetic Equipment To VFD

Generally, the reason for the electromagnetic impact on the frequency inverter is that there are a large number of relays, contactors or electromagnetic brakes installed near the frequency inverter. When the frequency inverter is disturbed and malfunctions, it is recommended to adopt the following solutions:
① Install a surge suppressor on the device that generates interference;
② Install a filter at the input end of the frequency inverter, refer to to point 6 for details;
③ Use shielded cables for the lead wires of inverter control signal lines and detection lines, and ground the shielding layer reliably.

(4) Method Of Dealing With Interference Caused By VFD To Peripheral Equipment

The noise in this part is divided into two types: one is the radiated interference of the frequency inverter, and the other is the conducted interference of the frequency inverter. These two kinds of interference cause the surrounding electrical equipment to be subjected to electromagnetic or electrostatic induction. Thus causing the equipment to malfunction. For several different interference situations, refer to the following solutions:
① The instruments, receivers and sensors used for measurement generally have relatively weak signals. If they are close to the frequency inverter or in the same control cabinet, they are susceptible to interference and malfunction. It is recommended to adopt the following solutions: keep away from Interference source; do not arrange signal lines and power lines in parallel, especially do not bundle them together in parallel; use shielded lines for signal lines and power lines, and have good grounding; add ferrite magnetic rings on the output side of the inverter (select the suppression frequency at 30～1000MHz range), and wind 2～3 turns in the same direction, for bad conditions, you can choose to install an EMC output filter;
② When the disturbed equipment and the inverter use the same power supply, it will cause conduction interference. If the above methods cannot eliminate the interference, an EMC filter should be installed between the inverter and the power supply (refer to point 6 for type selection) ;
③ The peripheral equipment is grounded separately, which can eliminate the interference caused by the leakage current of the ground wire of the inverter when it is common ground.

(5) Leakage Current And Treatment

There are two forms of leakage current when using a frequency inverter: one is leakage current to ground; the other is leakage current between lines.

① Factors affecting ground leakage current and solutions:
There is distributed capacitance between the wire and the ground, the larger the distributed capacitance, the greater the leakage current; effectively reduce the distance between the inverter and the motor to reduce the distributed capacitance. The greater the carrier frequency, the greater the leakage current. The carrier frequency can be lowered to reduce leakage current. However, reducing the carrier frequency will increase the noise of the motor. Please note that adding a reactor is also an effective way to solve the leakage current.
The leakage current will increase with the increase of the loop current, so when the motor power is large, the corresponding leakage current is large.
② Factors and solutions that cause leakage current between lines:
There is distributed capacitance between the output wiring of the inverter, if the current passing through the line contains high-order harmonics, it may cause resonance and generate leakage current. At this time, if a thermal relay is used, it may malfunction.
The solution is to reduce the carrier frequency or install an output reactor. When using a frequency inverter, it is recommended not to install a thermal relay between the frequency inverter and the motor, and use the electronic overcurrent protection function of the frequency inverter.

(6) Precautions for installing an EMC input filter at the power input terminal

① Note: When using the filter, please use it strictly according to the rated value; since the filter belongs to Class I electrical appliances, the metal shell of the filter should be in good contact with the metal ground of the installation cabinet in a large area, and it is required to have good conductive continuity, otherwise there will be a risk of electric shock And seriously affect the EMC effect;
② Through the EMC test, it is found that the ground of the filter must be connected to the same common ground as the PE terminal of the inverter, otherwise the EMC effect will be seriously affected.
③ The filter should be installed as close as possible to the power input end of the inverter.

8. Fault Diagnosis And Solutions

8.1 Fault Alarm and Solution

Any abnormity occurs during operation, the inverter will lock PWM output immediately and enter the fault protection status. Meanwhile,the flashing fault code on the keyboard indicates the current fault information.At the same time, the fault indicator ALM lights up. At this time, you need to check the cause of the fault and the corresponding treatment method according to the methods in this section. If the problem still cannot be solved, please contact our company directly. For the corresponding solutions, see the table below for fault diagnosis and troubleshooting.

Fault Name	Display Code	Possible Reasons	Solutions
Inverter unit protection	E-01	1. Inverter output circuit is short-circuited 2. The wire between the motor and the inverter too long 3. The module overheated 4. Inverter internal wiring is loose 5. Main control board abnormal 6. Driver board abnormal 7. Inverter module abnormal	1. Eliminate peripheral faults 2. Install reactor or output filter 3. Check whether the air duct is blocked, whether the fan is working normally and eliminate the existing problems 4. Plug in well all cables 5. Seek technical support 6. Seek technical support 7. Seek technical support
Overcurrent when accelerating	E-02	1. There is grounding or short circuit in the inverter output circuit 2. The control mode is vector without parameter identification 3. The acceleration time is too short 4. Manual torque boost or V/F curve is inappropriate 5. Low voltage 6. Start the rotating motor 7. Sudden load increase during acceleration 8. The selection of inverter power is small	1. Eliminate peripheral faults 2. Carry out motor parameter identification 3. Increase the acceleration time 4. Adjust manual boost torque or V/F curve 5. Adjust the voltage to the normal range 6. Select speed tracking start or start after the motor stops 7. Cancel sudden load increase 8. Choose a higher power level inverter

Fault Name	Display Code	Possible Reasons	Solutions
Overcurrent when decelerating	E–03	1. There is grounding or short circuit in inverter the output circuit 2. The control mode is vector without parameter identification 3. The deceleration time is too short 4. Low voltage 5. Sudden load increase during deceleration 6. No braking unit and braking resistor installed	1. Eliminate peripheral faults 2. Carry out motor parameter identification 3. Increase the deceleration time 4. Adjust the voltage to the normal range 5. Cancel sudden load increase 6. Install braking unit and resistor
Overcurrent at constant speed	E–04	1. There is grounding or short circuit in the inverter output circuit 2. The control mode is vector without parameter identification 3. Low voltage 4. Whether there is a sudden load increase during running 5.The selection of inverter power is small	1. Eliminate peripheral faults 2. Carry out motor parameter identification 3. Adjust the voltage to the normal range 4. Cancel sudden load increase 5. Choose a higher power level inverter
Overvoltage when accelerating	E–05	1. The input voltage is too high 2. During the acceleration process, there is an external force to drive the motor to run 3. Acceleration time is too short 4. No braking unit and braking resistor installed	1. Adjust the voltage to the normal range 2. Cancel the external force or install braking resistor 3. Increase the acceleration time 4. Install braking unit and resistor
Overvoltage when decelerating	E–06	1. The input voltage is too high 2. During the deceleration process, there is an external force to drive the motor to run 3. The deceleration time is too short 4. No braking unit and braking resistor installed	1. Adjust the voltage to the normal range 2. Cancel the external force or install braking resistor 3. Increase the deceleration time 4. Install braking unit and resistor
Overvoltage at constant speed	E–07	1. The input voltage is too high 2. During the operation, there is an external force to drive the motor to run	1. Adjust the voltage to the normal range 2. Cancel the external force or install braking resistor

Fault Name	Display Code	Possible Reasons	Solutions
Control power supply fault	E–08	1. The input voltage is not within the specified range	1. The input voltage is not within the specified range
Undervoltage fault	E–09	1. Instantaneous power failure 2. The voltage at the inverter input terminal is not within the required range 3. The bus voltage abnormal 4. The rectifier bridge and buffer resistor are abnormal 5. Drive board abnormal 6. Control board abnormal	1. Reset fault 2. Adjust the voltage to the normal range 3. Seek technical support 4. Seek technical support 5. Seek technical support 6. Seek technical support
Inverter overload	E–10	1. Whether the load is too large or the motor is blocked 2. The selection of inverter power is too small	1. Reduce the load and check the motor and mechanical condition 2. Choose a higher power level inverter
Motor overload	E–11	1. Three–phase input power supply abnormal 2. Driver board abnormal 3. lightning protection board abnormal 4. Main control board abnormal	1. Check and eliminate the problems in the peripheral circuit 2. Seek technical support 3. Seek technical support 4. Seek technical support
Input phase loss	E–12	1. Three–phase input power supply abnormal 2. Driver board abnormal 3. Lightning protection board abnormal 4. Main control board abnormal	1. Check and eliminate the problems in the peripheral circuit 2. Seek technical support 3. Seek technical support 4. Seek technical support
Output phase loss	E–13	1. The lead wire from the inverter to the motor is abnormal 2. The three–phase output of the inverter is unbalanced when the motor is running 3. Driver board abnormal 4. Module abnormal	1. Eliminate peripheral faults 2. Check whether the three–phase winding of the motor is normal and troubleshoot 3. Seek technical support 4. Seek technical support

Fault Name	Display Code	Possible Reasons	Solutions
Module overheat	E–14	1. The ambient temperature is too high 2. The air duct is blocked 3. The fan is damaged 4. The module thermistor is damaged 5. The inverter module is damaged	1. Reduce the ambient temperature 2. Clean the air duct 3. Replace the fan 4. Replace the thermistor 5. Replace the inverter module
External device fault	E–15	1. Input external fault signal through multi–function terminal X	1. Reset operation
Communi–cation fault	E–16	1. The upper computer is not working properly 2. The communication cable is abnormal 3. The setting of communication expansion card F00.28 is incorrect 4. The setting of communication parameter F13 group is incorrect	1. Check the wiring of the upper computer 2. Check the communication cable 3. Correctly set the communication expansion card type 4. Correctly set the communication parameters
Current detection fault	E–18	1. Check whether the hall device is abnormal 2. Driver board abnormal	1. Replace the hall device 2. Replace the driver board
Motor tuning fault	E–19	1. The motor parameters are not set according to the nameplate 2. The parameter identification process timed out	1. Correctly set the motor parameters according to the nameplate 2. Check the lead wires from the inverter to the motor
EEPROM read and write fault	E–21	1. EEPROM chip damage	1. Replace the main control board
Inverter hardware fault	E–22	1. Overvoltage 2. Overcurrent	1. Handle according to overvoltage fault 2. Handle according to overcurrent fault
Cumulative running time reached fault	E–26	1. The cumulative running time reaches the set value	1. Use the parameter initialization function to clear the record information

Fault Name	Display Code	Possible Reasons	Solutions
User–defined Fault 1	E–27	1. Input the signal of user–defined fault 1 through the multi–function terminal X	1. Reset operation
User–defined Fault 2	E–28	1. Input the signal of user–defined fault 2 through the multi–function terminal X	1. Reset operation
Cumulative power–on time reached fault	E–29	1. The cumulative running time reaches the set value	1. Use the parameter initialization function to clear the record information
Off load fault	E–30	1. The inverter running current is less than F12–64	1. Confirm whether the load is off or whether the parameter settings of F12–64 and F12–65 conform to the actual operating conditions
Runtime PID feedback loss fault	E–31	1. PID feedback is less than the set value of F09.26	1. Check the PID feedback signal or set F09.26 to an appropriate value
Wave–by–wave current limiting fault	E–40	1. Whether the load is too large or the motor is blocked 2. The selection of inverter power is too small	1. Reduce the load and check the motor and mechanical condition 2. Choose a higher power level inverter
Excessive speed deviation fault	E–42	1. No parameter identification 2. The setting of the detection parameters F12.66～F12.69 for excessive speed deviation is unreasonable	1. Carry out motor parameter identification 2. Reasonably set the detection parameters according to the actual situation
Wrong initial position	E–51	1. The motor parameters and the actual deviation are too large	1. Reconfirm whether the motor parameters are correct, focusing on whether the rated current is set too small
Master–slave control slave fault	E–55	1. The slave machine fails, check the slave machine	1. Start troubleshooting according to the slave fault code

Fault Name	Display Code	Possible Reasons	Solutions
Brake tube protection fault	E-60	1. The braking resistor is short-circuited or the braking module is abnormal	1. Check braking resistor or seek technical support
Photovoltaic water shortage detection fault	E-65	1. Photovoltaic water pump water shortage detection fault	1. See F16.10～F16.26 for details

8.2 Common Faults and Solutions

No.	Fault Phenomenon	Possible Reasons	Solutions
1	No display after power on	The grid voltage is not available or is too low; The switching power supply on the inverter drive board is faulty; The rectifier bridge is damaged; The inverter buffer resistor is damaged; Control board, keypad fault; The connection between the control board, the driver board and the keypad is broken.	Check the input power; Check bus voltage; Seek manufacturer services.
2	Power on display “P.OFF”	Poor connection between the driver board and the control board; Related components on the control board are damaged; There is a short circuit to the ground of the motor or the motor line; Hall fault; Grid voltage is too low	Seek manufacturer services.

No.	Fault Phenomenon	Possible Reasons	Solutions
3	The display is normal when the inverter powered on, display “P.OFF” after running and stop immediately	The fan is damaged or blocked; There is a short circuit in the peripheral control terminal wiring.	Replace the fan; Eliminate external short circuit faults.
4	Frequent report of E–14 (module overheat) fault	The carrier frequency setting is too high; The fan is damaged or the air duct is blocked; The inverter internal components are damaged (thermocouple or others).	Reduce carrier frequency (F00.15); Replace the fan and clean the air duct; Seek manufacturer services.
5	The motor does not rotate after the inverter is running	Motors and motor cables; Inverter parameter setting error (motor parameter); Poor contact between the driver board and the control board; Driver board fault.	Reconfirm the connection between the inverter and the motor; Replace the motor or clear the mechanical fault; Check and reset the motor parameters.
6	X–terminal invalid	Parameter setting error; External signal error; Control board fault.	Check and reset the relevant parameters of Group F07; Reconnect the external signal line; Seek manufacturer services.
7	The inverter frequently reports overcurrent and overvoltage faults	Motor parameter setting is wrong; The acceleration and deceleration time is inappropriate; load fluctuations.	Reset the motor parameters or perform motor tuning; Set the appropriate acceleration and deceleration time; Seek manufacturer services.
8	Power–on digital tubes are all lit	Related components on the control board are damaged.	Replace the control board.

Appendix I: Modbus Communication Protocol

CV900N series inverters provide RS485 communication interface and support Modbus-RTU slave station communication protocol. Users can realize centralized control through a computer or PLC, set inverter running commands through this communication protocol, modify or read function code parameters, and read inverter working status and fault information, etc.

(1) Agreement Content

The serial communication protocol defines the content and format of information transmitted in serial communication. It includes: the polling (or broadcast) format of the master; the encoding method of the master, including: the function code required for action, transmission data and error checking, etc. The response of the slave machine also adopts the same structure, including: action confirmation, return data and error checking, etc. If the slave makes an error when receiving 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.

(2) Application Method

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

(3) Bus Structure

① Hardware Interface

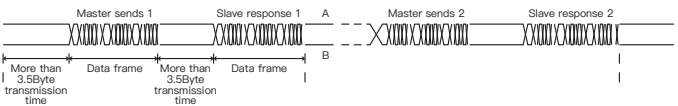
Inverter terminals 485+ and 485- are Modbus communication interfaces.

② Topology

Single-master multi-slave system. Each communication device in the network has a unique slave address, and one of the devices acts as a communication master(usually is PC upper computer, PLC, HMI, etc.), actively initiates communication, and performs parameter read or write operations on the slave. Other devices are communication slaves, responding to inquiries or communication operations from the master to the machine. Only one device can send data at a time, while other devices are receiving. The setting range of the slave address is 1～247, and 0 is the broadcast communication address. The slave address must be unique in the network.

③ Communication transmission method

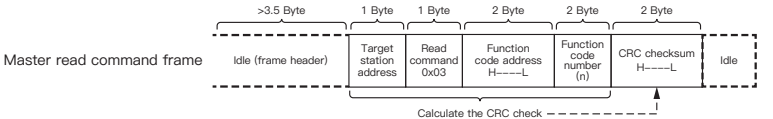
Asynchronous serial, half-duplex transmission mode. In the process of serial asynchronous communication, the data is sent one frame at a time in the form of a message. According to the MODBUS-RTU protocol, when the idle time of no data on the communication data line is greater than 3.5Byte transmission time, it means a new communication frame start.



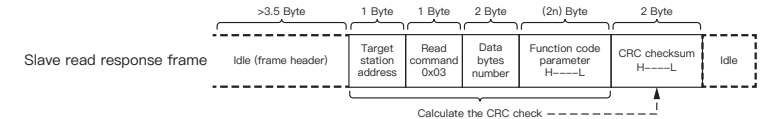
CV900N series inverter built-in communication protocol is the Modbus-RTU slave communication protocol, which can respond to the "query/command" of the master, or make corresponding actions according to the "query/command" of the master, and respond with communication data.
The master can refer to a personal computer (PC), industrial control equipment or programmable logic controller (PLC), etc. The master can not only communicate with a slave, but also issue broadcast information to all lower slaves. For the individual access "query/command" of the master, the accessed slave must return a response frame; for the broadcast information sent by the master, the slave does not need to feedback a response to the master.

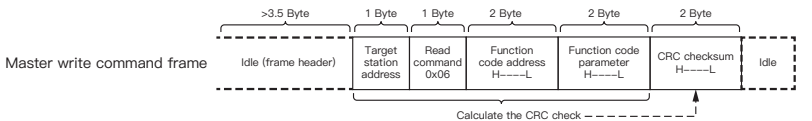
(4) Communication Data Structure

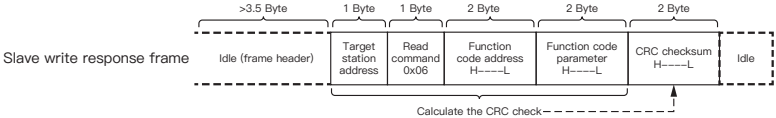
CV900N series inverter Modbus protocol communication data format is as follows. The inverter only supports reading or writing of Word parameters, and the corresponding communication read operation command is 0x03; the write operation command is 0x06, and does not support byte or bit read and write operations:



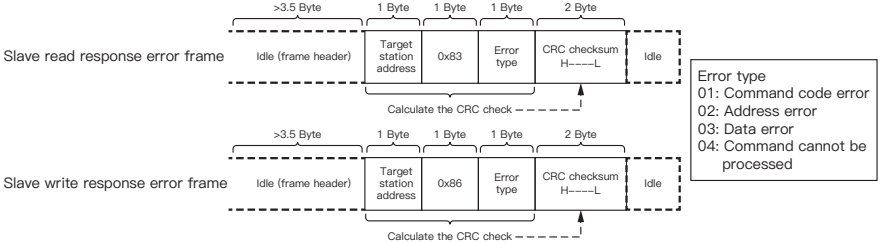
Theoretically, the upper computer can read several consecutive function codes at one time (that is, n can reach a maximum of 12), but be careful not to cross the last function code of this function code group, otherwise it will reply incorrectly.







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



Data Frame Field Description:

Frame Header START	The transmission time is more than 3.5 characters idle
Slave address ADR	Communication address range: 1~247; 0 = broadcast address
Command Code CMD	03: Read slave parameters; 06: Write slave parameters
Function code address H	The inverter internal parameter address is expressed in hexadecimal; it is divided into functional code type and non-functional code type (such as running status parameters, running commands, etc.) parameters, etc., see address definition for details. When transmitting, the high byte comes first and the low byte follows.
Function code address L	

Function codes number H	The number of function codes read in this frame, if it is 1, it means read 1 function code. When transmitting, the high byte comes first and the low byte follows. This protocol can only rewrite one function code at a time, without this field.
Function codes number L	
Data H	The response data, or the data to be written. When transmitting, the high byte comes first and the low byte follows.
Data L	
CRC CHK high bit	Detection value: CRC16 check value. When transmitting, the high byte comes first and the low byte follows. For the calculation method, please refer to the description of CRC check in this section.
CRC CHK low bit	
END	At 3.5 characters

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 checks 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 are not equal, it means that there is an error in the transmission.

CRC is to store 0xFFFF first, and then call a process to process the continuous 8–bit bytes in the message with the value in the current register. Only the 8Bit data in each character is valid for CRC, the start and stop bits and parity bits are invalid. In the process of CRC generation, each 8–bit character is exclusive or (XOR) with the contents of the register, and the result moves to 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 exclusive or different from the preset value. If the LSB is 0, it will not be performed. The whole process is repeated 8 times. After the last bit (bit 8) is complete,the next 8–bit byte separately differs from the current value of the register. The value in the final register is the CRC value after all bytes in the message have been executed.

When the CRC is added to the message, the low byte is added first, followed by the high byte. CRC simple function as follows:

```
unsigned int crc_chk_value  (unsigned char *data_value,unsigned char length)
{
    unsigned int crc_value=0xFFFF;
    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) ;
}
```

(5) Communication Parameters Address Definitions

Read and write function code parameters (some function codes cannot be changed and are only used by manufacturers or monitored):
Use the function code group number and label as the parameter address to express the rule:
High byte: F00～FFF (F Group)、d00 (d Group)
Low byte: 00～FF
For example: if you want to access the function code F00.20, the access address of the function code is expressed as 0xF014;
Note: 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 function code parameters, pay attention to the range, unit and related instructions of the parameters.

Function Code Group No.	Communication Access Address	Communication Modify Function Code Address In RAM
F00～F15 Group	0xA000～0xAFFF	0x4000～0x4FFF
F16 Group～F18 Group	0xB000～0xB2FF	0x5000～0x52FF
FFF Group	0xBF00～0xBFFF	0x5F00～0x5FFF
d00 Group	0x7000～0x70FF	

Note: Since 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, and only need to change the value in RAM.

(6) Stop/Run Parameters Section:

Parameter Address	Parameter Description	Parameter Address	Parameter Description
1000H	* Communication setting value (decimal) −10000～10000	1010H	PID setting
		1011H	PID feedback
1001H	Running frequency	1012H	PLC steps
1002H	Bus voltage	1013H	PULSE input pulse frequency, unit 0.01kHz
1003H	Output voltage	1014H	Feedback speed, unit 0.1Hz
1004H	Output current	1015H	Remaining run time
1005H	Output power	1016H	AI1 voltage before correction
1006H	Output torque	1017H	AI2 voltage before correction
1007H	Running speed	1018H	Panel potentiometer voltage before correction
1008H	Digital input terminal input sign	1019H	Linear speed
1009H	Digital output terminal output sign	101AH	Current power−on time
100AH	AI1 voltage	101BH	Current running time
100BH	AI2 voltage	101CH	PULSE input pulse frequency, unit 1Hz
100CH	Panel potentiometer voltage	101DH	Communication setting value
100DH	Count value input	101EH	Actual feedback speed
100EH	Length value input	101FH	Main frequency A display
100FH	Load speed	1020H	Auxiliary frequency B display

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

Control command input to the inverter: (write only)

Command Address	Command Function
2000H	0001: Forward running
	0002: Reverse running
	0003: Forward jog
	0004: Reverse jog
	0005: Coast to stop
	0006: Deceleration stop
	0007: Fault reset

Read inverter status: (read only)

Status Address	Status Function
3000H	0001: Forward running
	0002: Reverse running
	0003: Stop

Parameter lock password verification: (if the return is 8888H, it means the password verification is passed)

User Password Address	Content of the Enter Password
AF00H	*****

Parameter initialization:

Command Address	Command Content
AF01H	0～FFFF means 0～65535

Digital output terminal control: (write only)

Command Address	Command Content
2001H	BIT0: Y1 Output control BIT1: Y2 Output control (NPN version) Reserved (NPN+PNP version) BIT2: R1 Output control BIT3: R2 Output control

Analog output AO1 control: (write only)

Command Address	Command Content
2002H	0～7FFF means 0%～100%

Analog output AO2 control: (write only)

Command Address	Command Content
2003H	0～7FFF means 0%～100%

Pulse (PULSE) output control: (write only)

Command Address	Command Content
2004H	0～7FFF means 0%～100%

(7) Inverter Fault Description:

Inverter Fault Address	Inverter Fault Information	
8000H	0000: No fault 0001: Reserved 0002: Overcurrent when accelerating 0003: Overcurrent when decelerating 0004: Overcurrent at constant speed 0005: Overvoltage when accelerating 0006: Overvoltage when decelerating	0007: Overvoltage at constant speed 0008: Buffer resistor overload fault 0009: Undervoltage fault 000A: Inverter overload 000B: Motor overload 000C: Input phase loss 000D: Output phase loss

Inverter Fault Address	Inverter Fault Information	
8000H	000E: Module overheat 000F: External device fault 0010: Communication fault 0011: Reserved 0012: Current detection fault 0013: Motor tuning fault 0014: Reserved 0015: Parameter read and write fault 0016: Inverter hardware fault 0017: Reserved 0018: Reserved	0019: Reserved 001A: Running time arrives 001B: User-Defined Fault 1 001C: User-Defined Fault 2 001D: Power-on time arrives 001E: Off load 001F: Runtime PID Feedback Loss 0028: Fast Current Limit Timeout Fault 002A: Excessive speed deviation 005C: Wrong initial position 0041: Photovoltaic water shortage detection fault

(8) The Meaning Of The Error Code That The Slave Responds To The Abnormal Message:

Error Code Address	Error Code	Description
8001H	01H	Wrong password
	02H	Read and write command error
	03H	CRC verification error
	04H	Invalid address
	05H	Invalid parameter
	06H	Invalid parameter
	07H	System lock
	08H	Saving parameters

Appendix II: Macro Parameter Settings Description

Function Macro Definition	Setting Parameters	Automatically Modify The Parameter List	Debugging Steps
1 Variable 2 power (1 variable frequency pump + 2 power frequency pumps) water supply mode 1	F00.00=1	F00.03=10; F14.02=11; F14.03=80; F14.04=2002; F14.05=11; F14.06=11; F07.00=53; F07.01=54; F07.02=55; F07.03=56; F07.04=57; F07.05=58; F08.02=42; F08.03=43; F08.04=44; F09.00=7。	Step1: Determine the sensor feedback type, AI1, AI2 factory default input voltage feedback signal, you can also select AI1 input current feedback signal through jumper JP3; Step2: Terminal wiring, if the pressure gauge is 0～10V output, connect the signal wire of the pressure gauge to AI1, and connect the other two wires to +10V and GND; if the output is 0～20mA, short connect COM and GND, Connect the pressure gauge signal wire to AI1, and the other wire to 24V. For other terminal wiring details, refer to the appendix III (three-pump circulation soft start water supply parameters instructions) Step3: Parameter initialization (F15.01=2); Step4: Set the sensor range (F16.09); Step5: Function macro selection (F00.01=1 or 2) Step6: Set the target pressure, which can be set by parameter F16.08, or by the up and down keys on the keypad.
Three-pump circulation soft start (3 variable frequency pumps) water supply mode	F00.00=2		
1 variable 3 power (1 variable frequency pump + 3 power frequency pumps) water supply mode	F00.00=3	F00.03=10; F14.02=11; F14.03=80; F14.04=2002; F14.05=11; F14.06=11; F08.02=42; F08.03=43; F08.04=44; F09.00=7。	Step1: Determine the sensor feedback type, AI1, AI2 factory default input voltage feedback signal, you can also select AI1 input current feedback signal through jumper JP3; Step2: Terminal wiring, if the pressure gauge is 0～10V output, connect the signal wire of the pressure gauge to AI1, and connect the other two wires to +10V and GND; if the output is 0～20mA, short connect COM and GND, Connect the pressure gauge signal wire to AI1, and the other wire to 24V. Step3: Parameter initialization (F15.01=2); Step4: Set the sensor range (F16.09); Step5: Function macro selection (F00.00=3、4、5、6) Step6: Set the target pressure, which can be set by parameter F16.08, or by the up and down keys on the keypad Note: When F00.00=3, 4, 5, 6, no need connect the interlock circuit, and the contactor can be controlled through the main control board relay and Y terminal.
1 variable 2 power (1 variable frequency pump + 2 power frequency pumps) water supply mode 2	F00.00=4	F00.03=10; F14.02=11; F14.03=80; F14.04=2002; F14.05=11; F14.06=11; F08.02=42; F08.03=43; F09.00=7。	

Function Macro Definition	Setting Parameters	Automatically Modify The Parameter List	Debugging Steps
1 variable 1 power (1 variable frequency pump + 1 power frequency pump) water supply mode	F00.00=5	F00.03=10；F14.02=11；F14.03=80；F14.04=2002；F14.05=11；F14.06=11；F08.02=42；F09.00=7。	Step1: Determine the sensor feedback type, AI1, AI2 factory default input voltage feedback signal, you can also select AI1 input current feedback signal through jumper JP3; Step2: Terminal wiring, if the pressure gauge is 0～10V output, connect the signal wire of the pressure gauge to AI1, and connect the other two wires to +10V and GND; if the output is 0～20mA, short connect COM and GND, Connect the pressure gauge signal wire to AI1, and the other wire to 24V. Step3: Parameter initialization (F15.01=2); Step4: Set the sensor range (F16.09); Step5: Function macro selection (F00.00=3、4、5、6) Step6: Set the target pressure, which can be set by parameter F16.08, or by the up and down keys on the keypad Note: When F00.00=3, 4, 5, 6, no need connect the interlock circuit, and the contactor can be controlled through the main control board relay and Y terminal.
Single pump (1 variable frequency pump) water supply mode	F00.00=6	F00.03=10；F14.02=11；F14.03=80；F14.04=2002；F14.05=11；F14.06=11；F09.00=7。	
Photovoltaic water supply voltage tracking mode	F00.00=7	F00.03=11.	Step2: Parameter initialization (F15.02=2) ; F00.03=11; Step3: Function macro selection (F00.00=7、8、9) Note: Refer to F16.10～F16.26 for photovoltaic water supply.
Photovoltaic water supply power tracking VF mode	F00.00=8		
Photovoltaic water supply power tracking SVC mode	F00.00=9		

Appendix III: Three-Pump Circulation Soft Start Water Supply Parameter Description

Function Code	Name	Set Range	Factory Default	Modification
F00.00	Function macro definition	0: Common mode 1: 1 variable 2 power (1 variable frequency pump + 2 power frequency pumps) water supply mode 1 2: Three-pump circulation soft start (3 variable frequency pumps) water supply mode	0	×
F00.02	Command source selection	1: Terminal running command channel	0	×
F00.03	Main frequency source selection	10: Multi pump command	0	×
F07.00	Input terminal X1 function	53: Start/stop 54: Running Allowed 55: Interlock 1 56: Interlock 2 57: Interlock 3 58: PFC start/stop	53	×
F07.01	Input terminal X2 function		54	×
F07.02	Input terminal X3 function		55	×
F07.03	Input terminal X4 function		56	×
F07.04	Input terminal X5 function		57	×
F07.05	Input terminal X6 function		58	×
F07.06	Input terminal X7 function		0	×
F08.02	Programmable relay R1 output	42: Interlock 1 output 43: Interlock 2 output 44: Interlock 3 output	42	×
F08.03	Programmable relay R2 output		43	×
F08.04	Open collector Y1 output function selection		44	×
F08.05	Open collector Y2 output function selection (NPN version)		0	×
	Reserved (NPN+PNP version)		0	×

Function Code	Name	Set Range	Factory Default	Modifi-cation
F09.00	PID given source	0: F09.01 setting 1: AI1 2: AI2 3: Panel potentiometer 4: PULSE pulse setting (X7) 5: Communication given 6: Multi-segment command given	0	☆
F09.01	PID value given	0.0%～100.0%	50.0%	☆
F09.02	PID feedback source	0: AI1 1: AI2 2: Reserved 3: AI1-AI2 4: PULSE pulse setting (X7) 5: Communication given 6: AI1+AI2 7: MAX (|AI1|, |AI2|) 8: MIN (|AI1|, |AI2|)	0	☆
F09.03	PID action direction	0: Forward action 1: Reverse action	0	☆
F09.04	PID given feedback range	0～65535	1000	☆
F09.05	Proportional gain Kp1	0.0～100.0	20.0	☆
F09.06	Integral time Ti1	0.01s～10.00s	2.00s	☆
F09.07	Differential time Td1	0.000s～10.000s	0.000s	☆
F09.08	PID reverse cut-off frequency	0.00～maximum frequency	2.00Hz	☆
F09.09	PID deviation limit	0.0%～100.0%	0.0%	☆
F09.10	PID differential limit range	0.00%～100.00%	0.10%	☆
F09.11	PID given change time	0.00～650.00s	0.00s	☆

Function Code	Name	Set Range	Factory Default	Modifi-cation
F09.12	PID feedback filter time	0.00～60.00s	0.00s	☆
F09.13	PID output filter time	0.00～60.00s	0.00s	☆
F09.26	PID feedback loss detection value	0.0%: Not judge feedback loss 0.1%～100.0%	0.0%	☆
F09.27	PID feedback loss detection time	0.0s～20.0s	0.0s	☆
F16.00	Terminal access and disconnection delay	0.0～6000.0s	0.1	☆
F16.01	Polling time	0.0～6000.0h	48.0	☆
F16.02	Reduce pump lower limit frequency	0.0～600.00Hz	35.00	☆
F16.03	Adding pump delay time	0.0～3600.0s	5.0	☆
F16.04	Reduce pump delay time	0.0～3600.0s	5.0	☆
F16.05	Pump sleep waiting time	0.0～3600.0s	2.0	☆
F16.06	Pump wake-up waiting time	0.0～3600.0s	1.0	☆
F16.07	Pump wake up pressure point	(0.0～100.0%)*(F16.08)	80.0%	☆
F16.08	Preset pressure	0.00～F16.09 (MPa、Kg)	5.00	☆
F16.09	Pressure gauge range	0.00～100.00 (MPa、Kg)	10.00	☆

(1) 1 variable 2 power water supply mode 1 and three-pump circulation soft start water supply model use instruction:

① 1 variable 2 power water supply mode means that the inverter only starts the first frequency conversion speed regulation, and the others are directly connected to the power grid.
② The three-pump circulation soft start water supply mode means that the inverter starts each pump, and after the start, it is connect-ed to the power grid with a delay; the first start is connected to the power grid, and the second start is used for speed regulation.

(2) Use of external terminals and description of the working process of the adding and reduce pumps:

① The functions of input terminals X1～X6 have been fixed at the factory.

When F00.01 selects 1 or 2, the input terminals X1～X6 have fixed their water supply functions.
② Corresponding relationship between X terminal, Y terminal and relay.
After X3 is short connect with COM, it corresponds to No. 42 interlock 1 output in F08.02～F08.05,say as No. 1 pump for convenience; after X4 is short connect with COM, it corresponds to No. 43 Interlock 2 outpu in F08.02～F08.05,say as pump No. 2; after X5 is short connect to COM, it corresponds to No. 44 interlock 3 output in F08.02～F08.05, say as No. 3 pump.
③ 3. The difference between X1 and X6
X1 and X6 cannot be switched on at the same time. X1 is manually controlled to start and stop, and only one pump can be turned on at a time. The frequency is given by AI1, without PID adjustment; X6 is controlled to start and stop in multi–pump water supply mode, and PID adjustment is performed.
④ Manually control the start and stop pump working process
After X1 and COM are short–connected, the pump starts in the order of put in first, start first, start the small No. pump if input together. For example, if only X5 is connected, only pump No. 3 turn on; if X4 and X5 are connected at the same time, only pump No. 2 turn on; if X3, X4 and X5 are connected at the same time, only pump No. 1 turn on.
⑤ Multi–pump water supply mode working process
After X6 and COM are short–connected, the order of starting the pumps is that put in first start first, put in together start from the small No. pump, and PID control is performed.
a. When F00.01=1 (1 variable and 2 power water supply mode 1 is valid), if all three water pumps are put into operation, after the system is powered on, first connect the No. 1 pump and start the No. 1 variable frequency pump to work. When the working frequency of the No. 1 variable frequency pump reaches 50Hz, delay the increase pump time (F16.03). If the measured pressure does not reach the system set pressure, the No. 2 power frequency pump will be connected. When the working frequency of the No. 1 variable frequency pump reaches 50Hz again, delay the increase pump time (F16.03). If the measured pressure still does not reach the system set pressure, the No. 3 power frequency pump will be connected.
At this time, the No. 1 pump is in the working state of frequency conversion, No. 2 and No. 3 pumps are in the working state of power frequency. If the measured pressure is greater than or equal to the system set pressure, the working frequency of the No. 1 variable frequency pump drops to the lower limit frequency of pump reduction (F16.02), and after the delay of pump reduction (F16.04), the No. 3 power frequency pump will be disconnected. If the measured pressure is still greater than or equal to the system set pressure, and the working frequency of the No. 1 variable frequency pump is less than or equal to the lower limit frequency of the pump reduction(F16.02), after the delay of the pump reduction (F16.04), the No. 2 power frequency pump will be disconnect–ed. In the end, only No. 1 variable frequency pump was left to work.
b. When F00.01=2 (three–pump circulation soft start water supply model is valid), if all three water pumps are put into operation, after the system is powered on, first connect the No. 1 pump and start the No. 1 pump to work with frequency conversion.When the frequency conversion of No. 1 pump works at 50Hz, if the measured pressure does not reach the system set pressure after the increase pump delay (F16.03), disconnect No. 1 variable frequency pump, connect the No.2 pump and No.1 power frequency pump, at this time, the No. 1 pump is converted from the frequency conversion state to the power frequency state, and the No. 2 pump is in the frequency conversion state.
When the frequency conversion of the No. 2 pump works at 50Hz, after the increase pump delay (F16.03), if the measured pressure still does not reach the system set pressure, disconnect the No. 2 pump, connect the No. 3 variable frequency pump and No. 2

power frequency pump, at this time, the No. 2 pump is converted from the variable frequency pump to the power frequency state working, the No. 3 pump is in the variable frequency working state, and the No. 1 pump is still in the power frequency state. When the working frequency of the No. 3 pump drops to the lower limit frequency of pump reduction (F16.02), after the pump reduction delay (F16.04), if the measured pressure is greater than or equal to the system set pressure,disconnect the No. 1 power frequency pump. When the working frequency of the No. 3 pump is less than or equal to the lower limit frequency of pump reduction (F16.02), after the pump reduction delay (F16.04), if the measured pressure is still greater than or equal to the system set pressure, disconnect the No. 2 power frequency pump; finally only No. 3 variable frequency pump is left to work.

Note: If need one to drive three, all three pumps are put into operation; if need one to drive two, choose any two pumps to put in; if need one to drive one, choose any one pump to put in; The order are all in the rules of put in first, start first, start the small No. pump if put in together.

⑥ Terminal access and disconnection delay
Since there is a delay in the connection and disconnection of the contactor terminal, the signal is not synchronized, and it needs to be adjusted by the terminal input disconnection delay (F16.00).
⑦ X2 terminal description
X2 is the operation permission terminal. This terminal is connected to the normally closed point of the external fault relay. Generally, it is connected to the external water shortage or high voltage signal control. If there is no external fault detection, it needs to be short connect to COM.

(3) STOP/RST key application

① The factory default of F 14.01 is 3, that is, the STOP/RST key is valid when the terminal controls the operation mode. If the keypad is used to stop the machine, it needs to be re-connected to the X2 and X6 terminals or re-powered on to work normally.
② When F14.01=0, the STOP/RST key is invalid under terminal control, and only resets the fault of the inverter. Generally, F14.01 is set to 0 to prevent from keypad stop by misoperation. It is necessary to reconnect the X2, X6 terminals or It can work normally only after power on again.

(4) The working process when there is a fault in water supply

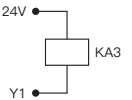
① If the variable frequency pump has an external fault, stop the faulty pump first, and then switch the larger power frequency pump to the variable frequency pump. For example, No. 1, No. 2 and No. 3 pumps are all turned on, No. 2 is the variable frequency pump, No. 1 and No. 3 are power frequency pumps. If there is an inverter fault, stop No. 2 pump first, then switch No. 3 power frequency pump to variable frequency pump, and No. 1 continues to power frequency; if the external fault of No. 3 pump is removed, it can be normal put into use.
② If the variable frequency pump has an internal fault, stop all the pumps, and after the inverter fault is reset with the keypad, it will return to normal working status.

(5) Function Setting

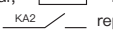
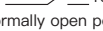
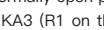
① If you want to turn on the water supply function, you need to set F00.00 to 1 or 2. For details, please refer to the manual.
② If need to start the PID function, you need to set F00.03=10, and then set the required PID parameters in Group F09, see the manual for details.
③ F14.01 is set to 0, that is, the stop key on the keypad is invalid.

(6) Water supply wiring diagram (refer to ABB inverter ACS510 constant pressure water supply wiring diagram)

① Open collector Y1 connect to relay schematic diagram:



② Introduction of symbols on the wiring diagram

In Figure 1 and Figure 2 below, L1 and L2 represent the coil power supply,  represents normally closed terminal,  represents normally open terminal,  represents coil.  represents the normally open point of relay KA1 (controlled by Y1 on the main board) ,  represents the normally open point of relay KA2 (controlled by Y2 on the main board),  represents the normally open point of relay KA3 (R1 on the main board); KM1, KM2 and KM3 are contactors that control No. 1, No. 2 and No. 3 variable frequency pumps, respectively KM11、KM21 and KM31 are contactors that control No. 1, No. 2 and No. 3 power frequency pumps respectively.

(Note: Figures 1 and 2 below are only sketch logic diagrams, if you need fault relays or indicators, add them by yourself.)

③ Interlocking and self-locking of contactor (as shown in Figure 1)

When KM1 is connected, KM11, KM2 and KM3 cannot be connected.

When KM11 is connected, KM1 cannot be connected.

When KM2 is connected, KM21, KM1 and KM3 cannot be connected.

When KM21 is connected, KM2 cannot be connected.

When KM3 is connected, KM31, KM1 and KM2 cannot be connected.

When KM31 is connected, KM3 cannot be connected.

Figure 1:

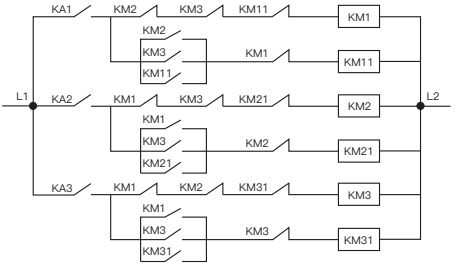
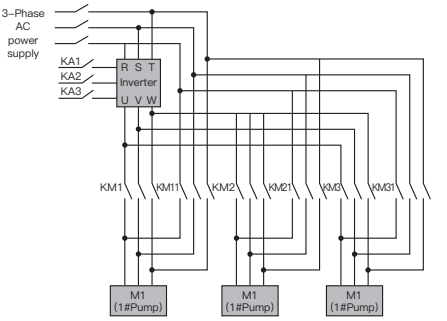


Figure 2:



Warranty Card

Product Information:

Product Name: _____ Customer Name: _____

Model Type: _____ Customer Address: _____

Purchase Date: _____ Contact Number: _____

Warranty Terms:

1. From the date of original shipment, we guarantee warranty of 12 months for free, and paid service for a lifetime;
2. Product failure caused by the following reasons are not included in 12 months warranty guarantee:
   (1) Users didn't conduct right operation according to user's manual;
   (2) Eguipment has been repaired or modified by user's without consent of manufacturer;
   (3) Fault caused by operation outside standard scope of application;
   (4) Abnormal aging or fault result from bad operating environment;
   (5) Damage caused by force majeure lie earthquke, fire, flood, thunderstrike, abnormal voltage, or other naturtal disasters;
   (6) Damage caused by improper delivery or extermal force.
3. Manufacturer preserves the right to refuse warranty service for the following conditon:
   (1) Damage of beyond recognition of brand, trade mark, serial number, nameplate, and other manufacturer marks;
   (2) Payment is not finished according to contrace;
   (3) Intenional concealment to our after-sale service provider of wrong operation during setting, wirting, operation, maintenance or other process.
4. For failing products, our preserve the right to entrust others for warranty issues.

Certificate

Inspector: QC 001

The product is inspected according to the standard.

Shenzhen Canroon Electrical Appliances Co., Ltd

Canroon

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REV：V1.3