Contents

Preface

Thank you for purchasing the T5000 series AC drive developed by Wuxi Tideway Technology Co., Ltd.!

T5000 considers customers' needs and combines general-purpose function and industrial-oriented functions. T5000 satisfies high performance requirements by using a unique control method to achieve high torque, high accuracy and wide speed-adjusting range. Its anti-tripping function and capabilities of adapting to severe power network, temperature, humidity and dusty environment exceed those of similar product made by other companies, which improves the product's reliability noticeably, and below the 22KW can be built-in input filter (optional).

T5000 possess the power range from 0.4kw to 450kw, self-owned 485 communication ports, It increases the user programmable function, background monitoring software and communication bus function, It features PI control, simpe PLC, flexible I/O terminals and pluse frequency setting, You can select whether to save the parameters upon poweroff or stop, bind frequency setting channel with command channel, main and auxiliary frequency setting, traverse operation, length control, etc, It is used to drive various automation production equipment involving textile, paper-making, wiredrawing, machine tool, packing, food, fan and pump.

This manual describes the correct use of the T5000 series AC drive, including selection,parameter setting, commissioning, maintenance & inspection.

Please read the safety precautions in this manual , in the premise of ensuring the safety of person and equipment before use.

Notices
■ The drawings in the manual are sometimes shown without covers or protective guards.Remember to install the covers or protective guards as specified first, and then performoperations in accordance with the instructions. ■ The drawings in the manual are shown for description only and may not match the product you purchased. ■ The instructions are subject to change, without notice, due to product upgrade, specification modification as well as efforts to increase the accuracy and convenience of the manual ■ Contact our agents or customer service center if you have problems during the use.

Designation Rules and Nameplate of the T5000

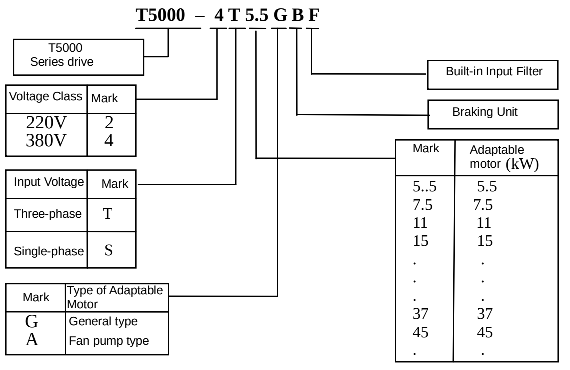


Figure A－1　Designation rules and nameplate of the T5000

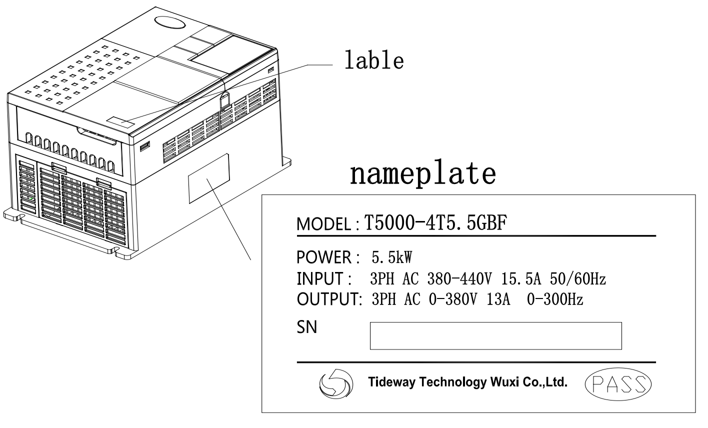


Figure A－2 Designation rules and nameplate

Upon unpacking, check

• Whether the nameplate model and AC drive ratings are consistent with your order. The box contains the AC drive, certificate of conformity, user manual and warranty card.

• Whether the AC drive is damaged during transportation. If you find any omission or damage, contact Tideway or your supplier immediately.

CE

Meeting the Relevant International Product Standards

General requirements–Rating specifications for low voltage adjustable frequency a.c. power drive systems

IEC61800−3 EMC product standard including specific test methods

IEC61000−6 Electromagnetic compatibility (EMC) –Part6: Generic standards

IEC61800−5−1 Safety requirements –Electrical, thermal and energy

Chapter 1 Safety Information and Precautions

1.1 Safety Information

DANGER indicates that failure to comply with the notice will result in severe personal injury or even death。

WARNING indicates that failure to comply with the notice will result in personal injury or property damage.

Read this manual carefully so that you have a thorough understanding. Installation, commissioning or maintenance may be performed in conjunction with this chapter. Tideway will assume no liability or responsibility for any injury or loss caused by improper operation.

1.2 Safety Information

Use Stage	Safety Grade	Precautions
Before installation	DANGER	• Do not install the equipment if you find water seepage, component missing or damage upon unpacking. • Do not install the equipment if the packing list does not conform to the product you received.
	WARNING	• Handle the equipment with care during transportation to prevent damage to the equipment. • Do not use the equipment if any component is damaged or missing.Failure to comply will result in personal injury. • Do not touch the components with your hands. Failure to comply will result in static electricity damage.
During installation	DANGER	• Install the equipment on incombustible objects such as metal,and keep it away from combustible materials. Failure to comply may result in a fire. • Do not loosen the fixed screws of the components, especially the screws with red mark.
	WARNING	• Do not drop wire end or screw into the AC drive. Failure to comply will result in damage to the AC drive. • Install the AC drive in places free of vibration and direct sunlight. • When two AC drives are laid in the same cabinet, arrange the installation positions properly to ensure the cooling effect.
At wiring	DANGER	• Wiring must be performed only by qualified personnel under instructions described in this manual. Failure to comply may result in unexpected accidents. • A circuit breaker must be used to isolate the power supply and the AC drive. Failure to comply may result in a fire. • Ensure that the power supply is cut off before wiring. Failure to comply may result in electric shock. • Tie the AC drive to ground properly by standard. Failure to comply may result in electric shock.

	WARNING	• Never connect the power cables to the output terminals (U, V, W) of the AC drive. Pay attention to the marks of the wiring terminals and ensure correct wiring. Failure to comply will result in damage to the AC drive. • Never connect the braking resistor between the DC bus terminals (+) and (-). Failure to comply may result in a fire. • Use wire sizes recommended in the manual. Failure to comply may result in accidents. • Use a shielded cable for the encoder, and ensure that the shielding layer is reliably grounded.
Before power-on	DANGER	• Check that the following requirements are met: – The voltage class of the power supply is consistent with the rated voltage class of the AC drive. – The input terminals (R, S, T) and output terminals (U, V, W) are properly connected. – No short-circuit exists in the peripheral circuit. – The wiring is secured. Failure to comply will result in damage to the AC drive • Do not perform the voltage resistance test on any part of the AC drive because such test has been done in the factory. Failure to comply will result in accidents.
	WARNING	• Cover the AC drive properly before power-on to prevent electric shock. • All peripheral devices must be connected properly under the instructions described in this manual. Failure to comply will result in accidents
After power-on	DANGER	• Do not open the AC drive's cover after power-on. Failure to comply may result in electric shock. • Do not touch any I/O terminal of the AC drive. Failure to comply may result in electric shock.
	WARNING	• Do not touch the rotating part of the motor during the motor auto-tuning or running. Failure to comply will result in accidents. • Do not change the default settings of the AC drive. Failure to comply will result in damage to the AC drive.
During operation	DANGER	• Do not touch the fan or the discharging resistor to check the temperature. Failure to comply will result in personal burnt. • Signal detection must be performed only by qualified personnel during operation. Failure to comply will result in personal injury or damage to the AC drive.
	WARNING	• Avoid objects falling into the AC drive when it is running. Failure to comply will result in damage to the AC drive. • Do not start/stop the AC drive by turning the contactor ON/OFF.Failure to comply will result in damage to the AC drive.

During maintenance	DANGER	• Repair or maintenance of the AC drive may be performed only by qualified personnel. Failure to comply will result in personal injury or damage to the AC drive. • Do not repair or maintain the AC drive at power-on. Failure to comply will result in electric shock. • Repair or maintain the AC drive only ten minutes after the AC drive is powered off. This allows for the residual voltage in the capacitor to discharge to a safe value. Failure to comply will result in personal injury. • Ensure that the AC drive is disconnected from all power supplies before starting repair or maintenance on the AC drive. • Set and check the parameters again after the AC drive is replaced. • All the pluggable components must be plugged or removed only after power-off.
	WARNING	• The rotating motor generally feeds back power to the AC drive.As a result, the AC drive is still charged even if the motor stops, and the power supply is cut off. Thus ensure that the ACdrive is disconnected from the motor before starting repair or maintenance on the AC drive.

1.3 General Precautions

Please pay attention to the following points before the use of T5000 series drives：

1.3.1 About Motor and Load

Compared to working at mains frequency,there will be some increase in temperature, noise and vibration in the motor. The T5000 Series are voltage source inverters. Its output voltage is in PWM wave. Being non-sinusoidal, there will be some harmonics.

Low Speed Rotation with Constant Torque

When a standard motor is driven at low speed for a long time, there will be insufficient cooling for a self-ventilated motor. Overheating can result in insulation damaged. Special variable frequency motor is recommended for constant torque operation at low speed.

Motor’s over-temperature protecting threshold

The drive can protect the motor from over-temperature. If the power rating of the drive is greater than the motor, be sure to adjust the protection parameters to ensure the motor is properly protected.

Operate above 50Hz

When running the motor above 50Hz, there will be increase in vibration and noise. The rate at which the torque is available from the motor is inversely proportionally to its increase in running speed. Ensure that the motor can still provide sufficient torque to the load.

Lubrication of mechanical devices

Over time, the lubricants in mechanical devices, such as gear box, geared motor, etc. when running at low speed, will deteriorate. Frequent maintenance is recommended.

Regenerative Energy

When lifting load, regenerative energy is produced, the drive will trip on overvoltage when it cannot absorb the regenerative energy of the load. Therefore, a proper braking unit is required

Mechanical resonance point of load

The drive system may encounter mechanical resonance with the load when operating within certain band of output frequency. Skip frequencies have to be set to avoid it.

Frequent start and stop

The drive should be started and stopped via its control terminals. It is prohibited to start and stop the drive directly through contactors at the input side, which may damage the drive.

Motor insulation test

Perform the insulation test when the motor is used for the first time, or when it is reused after being stored for a long time, or in a regular check-up, in order to prevent the poor insulation of motor windings from damaging the AC drive. The motor must be disconnected from the AC drive during the insulation test. A 500-V mega-Ohm meter is recommended for the test. The insulation resistance must not be less than 5 MΩ.

Adaptable Motor

- The standard adaptable motor is adaptable four-pole squirrel-cage asynchronous induction motor. For other types of motor, select a proper AC drive according to the rated motor current.
- The cooling fan and rotor shaft of non-variable-frequency motor are coaxial, which results in reduced cooling effect when the rotational speed declines. If variable speed is required, add a more powerful fan or replace it with variable-frequency motor in applications where the motor overheats easily.
- The standard parameters of the adaptable motor have been configured inside the AC drive. It is still necessary to perform motor auto-tuning or modify the default values based on actual conditions. Otherwise, the running result and protection performance will be affected.
- The AC drive may alarm or even be damaged when short-circuit exists on cables or inside the motor. Therefore, perform insulation short-circuit test when the motor and cables are newly installed or during routine maintenance. During the test, make sure that the AC drive is disconnected from the tested parts.

1.3.2 About Drivers

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

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

Contactor at the I/O terminal of the AC drive

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

When external voltage is out of rated voltage range

The AC drive must not be used outside the allowable voltage range specified in this manual. Otherwise, the AC drive's components may be damaged. If required, use a corresponding voltage step-up or step-down device.

Prohibition of three-phase input changed into two-phase input

Do not change the three-phase input of the AC drive into two-phase input. Otherwise, a fault will result or the AC drive will be damaged.

Protection against lightning strike
There are transient surge suppressors inside the Drive which protects it against lighting strike.

Altitude and de-rating

In places where the altitude is above 1000 m and the cooling effect reduces due to thin air, it is necessary to de-rate the AC drive. Contact Tideway for technical support.。

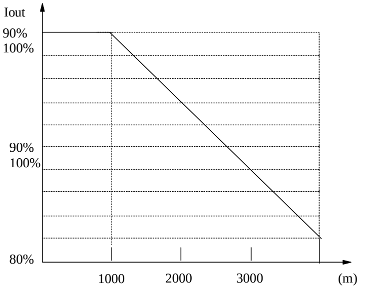


Figure1—1　the relationship between the altitude and rated current of the Drive.

1.4 Disposal

The electrolytic capacitors on the main circuits and PCB may explode when they are burnt. Poisonous gas is generated when the plastic parts are burnt. Treat them as ordinary industrial waste.

Chapter 2 Product Information

2.1 Echnical Specifications

Table 2-1 Technical specifications of the T5000

Item		Specifications
Input	Input Source	Three-phase，380V～440V；50Hz/60Hz
Output	Rated voltage	380V
	Frequency range	0Hz～300Hz
	Overload capacity	G type：60s for 150% of the rated current, 3s for 180% of the rated current
		A type：60s for 120% of the rated current, 3s for 150% of the rated current
	Speed range	1：100（SVC）
	Startup torque	0.50/ 180％（SVC）
	Speed stability accuracy	≤±0.5％（SVC）
	Input frequency resolution	Digital setting:0.01Hz;Analog setting: maximum frequency x 0.025%
	Torque boost	Fixed boost， Customized boost 0.1%–30.0%
	V/F curve	Straight-line V/F curve, Multi-point V/F curve, Square V/F curve
	V/F separation	Two types: complete separation; half separation
	Ramp mode	Straight-line ramp, S-curve ramp, Four groups of acceleration/deceleration time with the range of 0.0–6500.0s
	DC braking	DC braking frequency: 0.00 Hz to maximum frequency
		Braking time: 0.0–36.0s
		Braking action current value: 0.0%–100.0%
	JOG control	JOG frequency range: 0.00–50.00 Hz
		JOG acceleration/deceleration time: 0.0–6500.0s
	Onboard multiple preset speeds	It implements up to 16 speeds via the simple PLC function or combination of DI terminal states.
	Onboard PID	It realizes process-controlled closed loop control system easily.
	Auto voltage regulation (AVR)	It can keep constant output voltage automatically when the mains voltage changes.
	Rapid current limit	It can limit the torque automatically and prevent frequent over current tripping during the running process.
	Overvoltage/ Overcurrent stall control	The current and voltage are limited automatically during the running process so as to avoid frequent tripping due to overvoltage/overcurrent.

Item		Specifications
Customized functions	Swing frequency	the output frequency of the AC drive swings up and down with the set frequency as the center.
	Fixed length control	When reaching set length, the drive will stop
	Droop control	When many drives control single load
	Power dip ride through	The load feedback energy compensates the voltage reduction so that the AC drive can continue to run for a short time.
	Channel binding	Command channel can bind with frequency setting channel and switched synchronizingly
Operating function	Running command source	Operation panel,control terminals,serial communication port You can perform switchover between these sources in various ways.
	Frequency source	Digital setting, analog voltage setting, analog current setting, pulse setting and serial communication port setting. You can perform switchover between these sources in various ways.
	Auxiliary frequency source	It can implement fine tuning of auxiliary frequency and frequency synthesis.
	Pulse output	0~50kHz pulse signal output. Signals can be reference frequency and output frequency
	Analog output	3 analog output (AO) terminals, one of which only supports 0–10 V voltage output and the other supports 0–10 V voltage output or 4–20 mA current output
Others	LED display	It displays the parameters.
	Protection mode	Motor short-circuit detection at power-on, input/output phase loss protection, overcurrent protection, overvoltage protection, undervoltage protection, overheat protection and overload protection
	Optional parts	Braking unit, I/O extension card, different communication card.
Environment	Installation location	Indoor, free from direct sunlight, dust, corrosive gas, combustible gas, oil smoke, vapour, drip or salt.
	Altitude	Lower than 1000 m
	Ambient temperature	-10°C to +40°C (de-rated if the ambient temperature is between 40°C and 50°C)
	Humidity	Less than 95%RH, without condensing
	Vibration	Less than 5.9 m/s2 (0.6 g)
	Storage temperature	-20°C to +60°C
Enclosure	IP level	IP20
	Pollution degree	cooling
Mounting mode		Mounted in a cabinet

2.2 Product series

2.2.1 Electrical Specifications of the T5000

Table2—2 Models and technical data of the T5000

Model	Power apacity kVA	Input Current A	OutputCurrent A	Adaptable Motor kW/HP	
Single-phase 220 V, 50/60 Hz					
T5000-2S0.4GB	1.0	5.4	2.5	0.4	0.5
T5000-2S0.75GB	1.5	8.2	4.0	0.75	1
T5000-2S1.5GB	3.0	14.0	7.0	1.5	2
T5000-2S2.2GB	4.0	23.0	9.6	2.2	3
Three-phase 220 V, 50/60 Hz					
T5000-2T0.4GB	1.5	3.4	2.5	0.4	0.5
T5000-2T0.75GB	3.0	5.0	4.0	0.75	1
T5000-2T1.5GB	4.0	8.0	7.0	1.5	2
T5000-2T2.2GB	5.9	10.5	9.6	2.2	3
Three-phase 380 V, 50/60 Hz					
T5000-4T0.75GB T5000-4T0.75GBF	1.5	3.4	2.0	0.75	1
T5000-4T1.5GB T5000-4T1.5GBF	3.0	5.0	4.0	1.5	2
T5000-4T2.2GB T5000-4T2.2GBF	4.0	5.8	5.0	2.2	3
T5000-4T4.0GB T5000-4T4.0GBF	5.9	10.5	9.0	4.0	5
T5000-4T5.5GB T5000-4T5.5GBF T5000-4T5.5AB	8.9	14.6	13.0	5.5	7.5
T5000-4T7.5GB T5000-4T7.5GBF T5000-4T7.5AB	11.0	20.5	17.0	7.5	10
T5000-4T11GB T5000-4T11GBF T5000-4T11AB	17.0	26.0	25.0	11.0	15
T5000-4T15GB T5000-4T15GBF	21.0	35.0	32.0	15.0	20

Model	Power apacity kVA	Input Current A	OutputCurrent A	Adaptable Motor kW/HP	
T5000-4T15AB					
T5000-4T18.5GB T5000-4T18.5GBF T5000-4T18.5AB	24.0	38.5	37.0	18.5	25
T5000-4T22GB T5000-4T22GBF T5000-4T22AB	30.0	46.5	45.0	22	30
T5000-4T30GB T5000-4T30AB	40.0	62.0	60.0	30	40
T5000-4T37GB T5000-4T37AB	57	76	75	37	50
T5000-4T45GB T5000-4T45AB	69	92	91	45	60
T5000-4T55GB T5000-4T55AB	85	113	112	55	75
T5000-4T75GB T5000-4T75AB	114	157	150	75	100
T5000-4T90GB T5000-4T90AB	134	180	176	90	125

2.2.2 Components of the T5000 series AC drive (plastic housing)

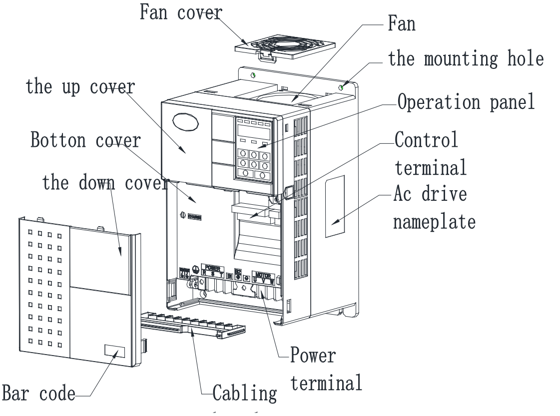


Figure2—1 Components of the T5000 series AC drive

2.2.3 Physical Appearance and Overall Dimensions

1．Physical appearance and overall dimensions

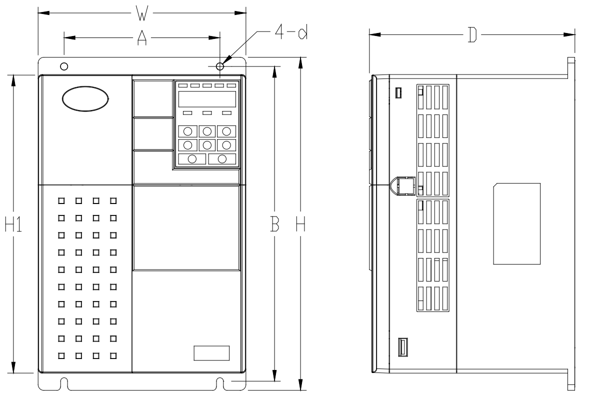


Figure2—2 Physical appearance and overall dimensions

2．Mechanical parameters

Table 2—3 Overall dimensions and mounting hole dimensions

voltage class	Model	Overall Dimensions（mm）				Mounting Hole（mm）			Weight（kg）
		W	H	D	H1	A	B	d	
Single-phase 220 V	T5000-2S0.4GB	103	198	156	176	88	187	M4用	
	T5000-2S0.75GB								
	T5000-2S1.5GB								
	T5000-2S2.2GB								
Three-phase 220 V	T5000-2T0.4GB	103	198	156	176	88	187	M4用	
	T5000-2T0.75GB								
	T5000-2T1.5GB								
	T5000-2T2.2GB								
Three-phase 380 V	T5000-4T0.75GB	103	198	156	176	88	187	M4用	
	T5000-4T0.75GBF								
	T5000-4T1.5GB								

	T5000-4T1.5GBF								
	T5000-4T2.2GB								
	T5000-4T2.2GBF								
	T5000-4T4.0GB	180	290	178	260	135	274	M5用	4.3
	T5000-4T4.0GBF								
	T5000-4T5.5AB								4.5
	T5000-4T5.5GB								
	T5000-4T5.5GBF								
	T5000-4T7.5AB								
	T5000-4T7.5GB								
	T5000-4T7.5GBF								
	T5000-4T11AB								4.7
	T5000-4T11GB								
	T5000-4T11GBF								
	T5000-4T15AB								
	T5000-4T15GB	210	355	184	325	160	338	M5用	6.6
	T5000-4T15GBF								
	T5000-4T18.5AB								
	T5000-4T18.5GB								6.9
	T5000-4T18.5GBF								
	T5000-4T22AB								
	T5000-4T22GB								
	T5000-4T22GBF								
	T5000-4T30AB								

2.3 Description of Optional Parts

The optional parts include braking unit, extension cards of different functions and external operation panel, etc. If any optional part is required, specify it in your order.

Table2-4 Optional Parts of the T5000

Name	Model	Function	Remark
I/O extension card	T5IO1	It can extend 3 DIs, 1 AI (AI4 is used for separation analog input and can be connected to PT100,PT1000), 1 relay output, 1 DO and 1 AO, RS485 and CANlink communication terminal	It applies to all models
CANlink communication card	T5CAN1	It is the CANlink communication card.	It applies to all models
CANopen Communication card	T5CAN2	It is the CANopen communication card.	It applies to all models
Extension cable	T5CAB	It is a standard 8-core cable and can be connected to MDKE,	The standard length is 3 meters.

2.4 Braking Component Selection Guideline

Table 2-5 below provides data for reference. You can select different resistance and power based on actual needs. However, the resistance must not be lower than the recommended value.

The power may be higher than the recommended value.The braking resistor model is dependent on the generation power of the motor in the actual system and is also related to the system inertia, deceleration time and potential energy load.

For systems with high inertia, and/or rapid deceleration times, or frequent braking sequences, the braking resistor with higher power and lower resistance value should be

2.4.1 Calculating the Resistance

The motor and load's regenerative energy is almost consumed on the braking resistor when braking.

According to the formula：U*U/R=Pb

U refers to the braking voltage at system stable braking.

The value of U varies with different systems. For 380V AC systems, U is generally assigned a value of 700V.

Pb refers to the braking power.

2.4.2 Calculating the Power of Braking Resistor

In theory, the power of the braking resistor is consistent with the braking power. Considering de-rating use to 70%, you can calculate the power of the braking resistor according to the formula 0.7 x Pr = Pb x D.

Pr refers to the power of resistor.

D refers to the braking frequency (percentage of the regenerative process to the whole working process)

Elevator-----20% ~30%
Winding and unwinding----20 ~30%
Centrifuge-------50%~60%
Occasional braking load----5%

General Application10%

Table2—5　Recommended values of braking resistor

Model	Recommended Power	Recommended Resistance	Braking Unit	Remarks
Single-phase 220 V				
T5000-2S0.4GB	80W	≥200Ω	Built-in (standard)	无
T5000-2S0.75GB	80W	≥150Ω		
T5000-2S1.5GB	100W	≥100Ω		
T5000-2S2.2GB	300W	≥65Ω		
Three-phase 220 V				
T5000-2T0.4B	150W	≥150Ω	Built-in (standard)	无
T5000-2T0.75B	150W	≥110Ω		
T5000-2T1.5B	250W	≥100Ω		
T5000-2T2.2B	300W	≥65Ω		
Three-phase 380V				
T5000-4T0.4GB T5000-4T0.4GBF	150W	≥300Ω	Built-in (standard)	–
T5000-4T0.75GB T5000-4T0.75GBF	150W	≥300Ω		
T5000-4T1.5GB T5000-4T1.5GB	150W	≥220Ω		
T5000-4T2.2GB T5000-4T2.2GBF	250W	≥200Ω		
T5000-4T4.0GB T5000-4T4.0GBF	300W	≥130Ω	Built-in (standard)	–
T5000-4T5.5GB T5000-4T5.5GBF	400W	≥90Ω		
T5000-4T7.5GB T5000-4T7.5GBF	500W	≥65Ω		
T5000-4T11GB T5000-4T11GBF	800W	≥43Ω		
T5000-4T15GB T5000-4T15GBF	1000W	≥32Ω	Built-in (standard)	–
T5000-4T18.5GB T5000-4T18.5GBF	1300W	≥25Ω		
T5000-4T22GB T5000-4T22GBF	1500W	≥22Ω		

Chapter 3 Mechanical and Electrical Installation

3.1 Installation Environment Requirements

Item	Requirements
Ambient temperature	-10°C to +50°C
Heat dissipation	Install the AC drive on the surface of an incombustible object, and ensure that there is sufficient space around for heat dissipation. Install the AC drive vertically on the support using screws.
Mounting location	Free from direct sunlight, high humidity and condensation
	Free from corrosive, explosive and combustible gas
	Free from oil dirt, dust and metal powder
Vibration	Less than 0.6 g Far away from the punching machine or the like

The clearance that needs to be reserved varies with the power class of the T5000, as shown in the figure 3-1
For application installing multiple AC drives, if one row of AC drives need to be installed above another row, install an insulation guide plate to prevent AC drives in the lower row from heating those in the upper row and causing faults,as shown in the figure 3-2

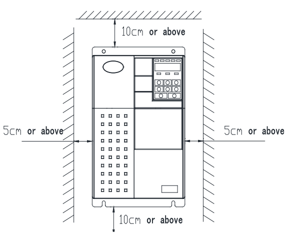


Figure3-1 Clearance for installation

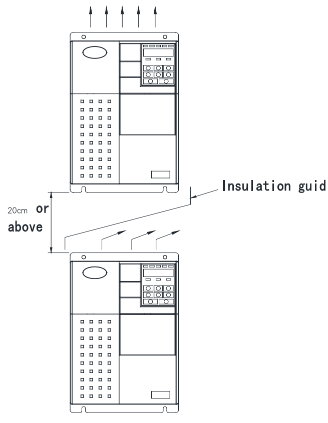


Figure3-2 Insulation guide plate for Installation

3.2 Removal and Installation of the Lower Cover of the T5000

The front cover board of the T5000 series driver contain the above cover and the below cover， you need to remove the below cover and before wiring the main circuit and control circuit.

1）Removal of the below cover of the T5000 (plastic housing)
①Press inward symmetrically to disconnect the hook from the hook slot.;
②Catch the edge of the cover and lift it.。

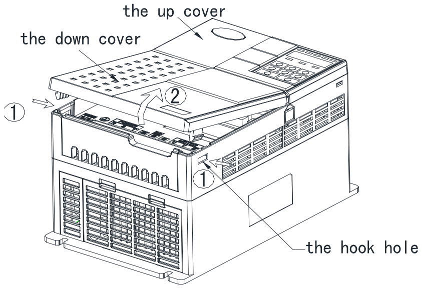
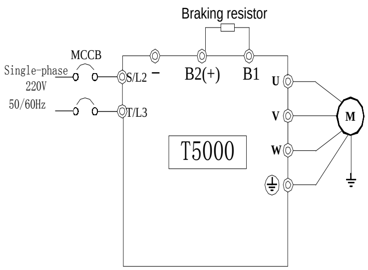


Figure 3-3 Removal of the below cover of the T5000

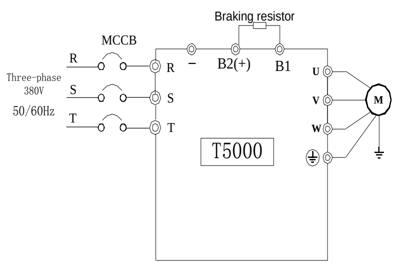
3.3 Wiring of Inverter

Before the wiring of inverter，Please carefully read the first chapter and operate strictly according to the standard.

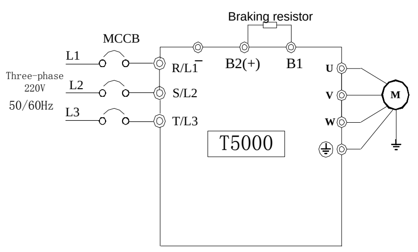
试运行时可采用图3－4的配线图：



Single-phase 220V wiring of the AC drive



Three-phase 380V wiring of the AC drive



Three-phase 220V wiring of the AC drive

Figure3-4 Wiring of AC Drive Main Circuit

3.3.1 Terminal Layout of AC Drive Main Circuit:

1．Peripheral Electrical Devices and System Configuration

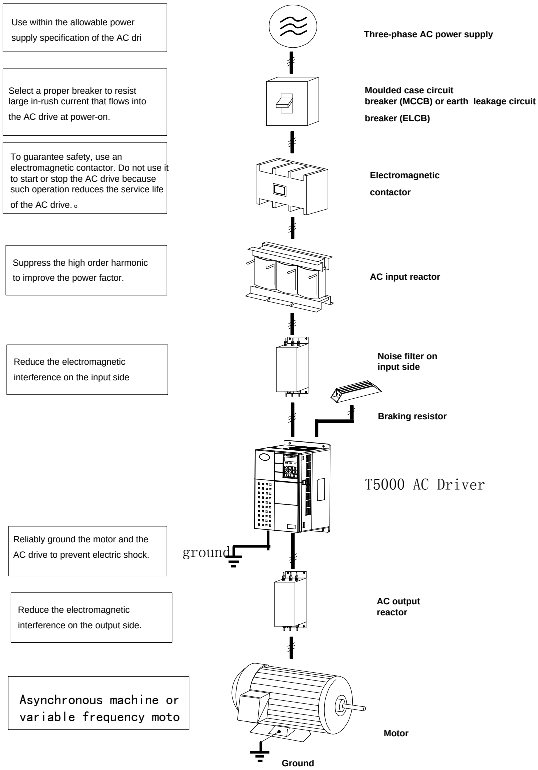


图3—5 Connection diagram of the inverter and peripheral devices

1）MCCB must be installed at the input side of each drive in the cabinet.。

2）Refer the cable section area and MCCB capacity to Table 3-1

Table 3-1 Selection of peripheral electrical devices of the T5000

AC Drive Model	（MCCB） A	Contactor A	Cable of Input,output Side Main Circuit mm2	Cable of Control Circuit mm2
Single-phase 220V				
T5000-2S0.4GB	16	10	2.5	1
T5000-2S0.75GB	16	10	2.5	1
T5000-2S1.5GB	20	16	2.5	1
T5000-2S2.2GB	32	20	4	1

AC Drive Model	（MCCB） A	Contactor A	Cable of Input,output Side Main Circuit mm2	Cable of Control Circuit mm2
Three-phase 220V				
T5000-2T0.4GB	10	10	1.5	1
T5000-2T0.75GB	16	10	1.5	1
T5000-2T1.5GB	16	10	2.5	1
T5000-2T2.2GB	25	16	2.5	1
Three-phase 380V				
T5000-4T0.4GB T5000-4T0.4GBF	10	10	1.5	1
T5000-4T0.75GB T5000-4T0.75GBF	10	10	1.5	1
T5000-4T1.5GB T5000-4T1.5GBF	16	10	1.5	1
T5000-4T2.2GB T5000-4T2.2GBF	16	10	2.5	1
T5000-4T4.0GB T5000-4T4.0GBF	25	16	2.5	1
T5000-4T5.5AB			4	
T5000T5.5GB T5000T5.5GBF T5000T7.5AB	32	25	4	1
T5000-4T7.5GB T5000-4T7.5GBF	40	32	4	1
T5000-4T11AB			6	
T5000-4T11GB T5000-4T11GBF	63	40	6	1
T5000-4T15AB			10	
T5000-4T15GB T5000-4T15GBF T5000-4T18.5AB	63	40	10	1
T5000-4T18.5GB T5000-4T18.5GBF T5000-4T22AB	100	63	16	1.5
T5000-4T22GB T5000-4T22GBF T5000-4T30AB	100	63	16	1.5

Notes： the parameters in zhe table are suggested .

3）Contactor for power supply control, do not use contactors to control the inverter power on and off。

4）DC reactor

The T5000 series AC drives of over 30 kW power are configured with an external DC reactor as standard。

When the above situations occur, install the AC reactor at the inverter input side or DC reactor to the DC reactor terminal.

①If there is switch type reactive–load compensation capacitor or load with silicon control at the same power node, there will be high peak current flowing into input power circuit,which damages the rectifier components.

②When the voltage imbalance of the three–phase power supply of the inverter exceeds 3%, the rectifier component will be damaged.

③ It is required that the input power factor of the inverter shall be higher than93%.When the above situations occur, install the AC reactor at the inverter input side or DC reactor to the DC reactor terminal.

④The inverter power supply capacity is more than 550kVA or 10 times of the inverter capacity.

5）AC input reactor

①Eliminate the higher harmonics of the input side effectively and prevent other devices from beingdamaged due to distortion of the voltage waveform.

②Eliminate the input current unbalance due to unbalance between the power phases.

③Improve the power factor of the input side.

6）AC output reactor

The output side of the AC drive generally has much higher harmonics. When the motor is far from the AC drive, there is much distributed capacitance in the circuit and certain harmonics may cause resonance in the circuit, bringing about the following two impacts:

①Degrade the motor insulation performance and damage the motor in the long run.

②Generate large leakage current and cause frequent AC drive protection trips.

If the distance between the AC drive and the motor is greater than 100 m, install an AC output reactor.

7）EMC Input filter

①Reduce the external conduction and radiation interference of the AC drive.

②Decrease the conduction interference flowing from the power end to the AC drive and improve the antiinterference capacity of the AC drive.

8）Output EMI filter

When the output of the inverter is connected with EMI filter, the conduction and radiation interference can be reduced. filter

9）Terminal PE

This terminal must be reliably connected to the main earthing conductor. Otherwise, it may cause electric shock, mal-function or even damage to the AC drive.T5000 User Manual Mechanical and Electrical Installation

①Do not connect the earthing terminal ⏚ to the neutral conductor of the power supply.

②The impedance of the PE conductor must be able to withstand the large shortcircuit current that may arise when a fault occurs.

③You must use a yellow/green cable as the PE conductor.

Select the size of the PE conductor according to the following table。

Table 3－2 Protective Conductor Cross-sectional Area

Cross-sectional Area of a Phase Conductor S （mm^2）	Min. Cross-sectional Area of Protective Conductor Sp（mm^2）
S≤16	S
16＜S≤35	16
35＜S	S/2

2. Wiring of AC Drive Control Circuit

Adaptable Model :T5000-4T30G/37A and below

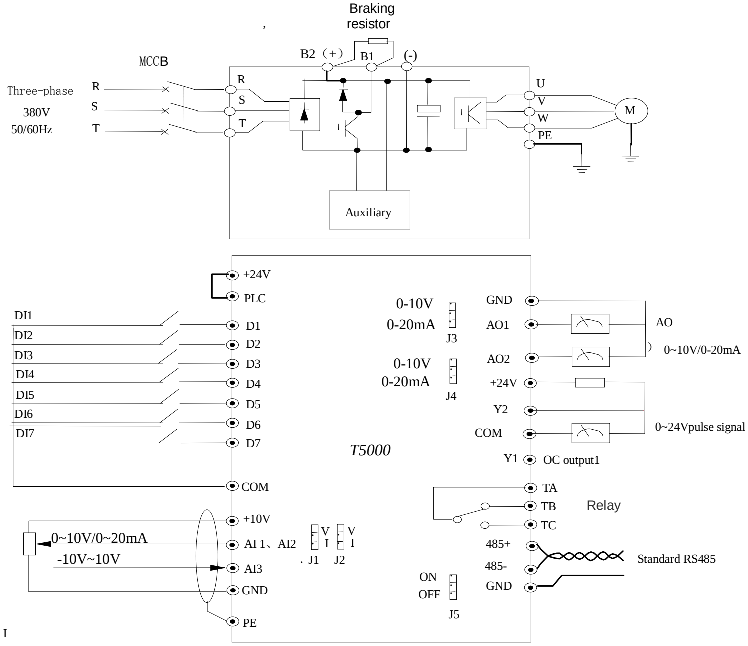


Figure3—6 Systematic Wiring Diagram

📖 Notice:

1. Built-in braking kit is installed and a braking resistor is required to be connected between B2/(+) and B1.

2. In the above Figure., "O" is the terminal in power circuit, and "⊙" is the control terminal.

3 Description of main circuit terminals

Figure 3-3 Description of main circuit terminals of single-phase AC drive

Terminal	Name	Description
S/L2、T/L3	Single-phase power supply input terminals	Connect to the single-phase 220 VAC power supply.
B2/(+)、(-)	Positive and negative terminals of DC bus	Common DC bus input point.
B2/(+)、B1	Connecting terminals of braking resistor	Connect to a braking resistor
U、V、W	AC drive output terminals	Connect to a three-phase motor
⏚	Grounding terminal	Must be grounded.
EMC	EMC Grounding Jumper	EMC grounded.

Table3-4 Description of main circuit terminals of three-phase AC drive

Terminal	Name	Description
R/L1、S/L2、T/L3	Three-phase power supply input terminals	Connect to the three-phase AC power supply
B2/(+)、(-)	Positive and negative terminals of DC bus	Common DC bus input point
B2/(+)、B1	Connecting terminals of braking resistor	Connect to the braking resistor for the AC drive of 15 kW and below (220 V) and 30 kW and below (other voltage classes).
U、V、W	AC drive output terminals	Connect to a three-phase motor.
⏚	Grounding terminal	Must be grounded.
VAR	Surge Grounding Jumper	Surge grounded.
EMC	EMC Grounding Jumper	EMC grounded.

Attention:

Power input terminalsL1、L2、L3 or R、S、T ：
The cable connection on the input side of the AC drive has no phase sequence requirement.

DC bus terminalsB2/(+)、(—) ：
Terminals B2/(+)、 (—) of DC bus have residual voltage after the AC drive is switched off. After indicator CHARGE goes off, wait at least 10 minutes before touching the equipment Otherwise, you may get electric shock.

The cable length of the braking unit shall be no longer than 10 m. Use twisted pair wire or pair wires for parallel connection.。
Do not connect the braking resistor directly to the DC bus. Otherwise, it may damage the AC drive and even cause fire.

Braking resistor connecting terminals B1、B2/(+)：
The cable length of the braking resistor shall be less than 5 m. Otherwise, it may damage the AC drive.

AC drive output terminalsU、V、W ：
The capacitor or surge absorber cannot be connected to the output side of the AC drive. Otherwise, it may cause frequent AC drive fault or even damage the AC drive.
If the motor cable is too long, electrical resonance will be generated due to the impact of distributed capacitance. This will damage the motor insulation or generate higher leakage current, causing the AC drive to trip in overcurrent protection. If the motor cable is greater than 100 m long, an AC output reactor must be installed close to the AC drive.

Terminal⏚PE ：
This terminal must be reliably connected to the main earthing conductor. Otherwise, it may cause electric shock, mal-function or even damage to the AC drive. The resistance of the grounding cable must be less than 0.1 Ω.
Do not connect the earthing terminal to the neutral conductor of the power supply.

Surge Grounding Jumper VAR：

Surge Grounding protect，This jumper were not allow to pull or disconnect.

Grounding Jumper EMC：

Assuming the inverter by a non grounded power system power (IT power) or a high impedance grounding power system, it must be pulled out or cut off this jumper. Under this condition, internal RFI capacitor PE and intermediatebetween circuits (filter capacitor) will be cut off, to avoid damage to the intermediate circuit and (according to IEC61800-3 regulations) to reduce theleakage current to ground. The need to pay particular attention to: can not bepulled out or cut off the EMC jumper in the energized state.

4 Recommended Cable Diameter and Installation Dimensions of Power Terminals

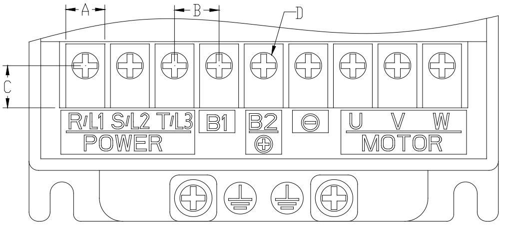
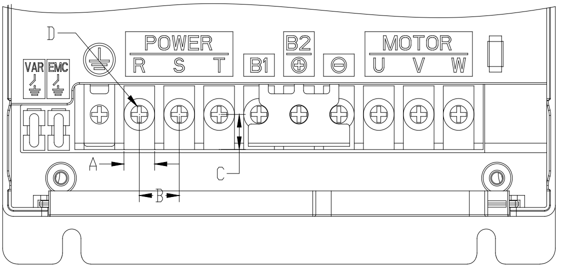


Figure3—7 Dimensions of power terminals

Table3—5 Recommended cable diameter and cable lug model

AC Drive Model	Rated Input Current A	Recommended Output Power Cable Diameter mm2	A	B	C	D	Torque of Torque Driver N. M
Single-phase 220V							
T5000-2S0.4GB	5.4	2.5	8.3	9.5	9.1	M4	1.5
T5000-2S0.75GB	8.2	2.5	8.3	9.5	9.1	M4	1.5
T5000-2S1.5GB	14	2.5	8.3	9.5	9.1	M4	1.5
T5000-2S2.2GB	23	4	8.3	9.5	9.1	M4	1.5
Three-phase 220V							
T5000-2T0.4GB	3.4	1.5	8.3	9.5	9.1	M4	1.5
T5000-2T0.75GB	5	1.5	8.3	9.5	9.1	M4	1.5
T5000-2T1.5GB	8	2.5	8.3	9.5	9.1	M4	1.5
T5000-2T2.2GB	10.5	2.5	8.3	9.5	9.1	M4	1.5
Three-phase 380V							

T5000-4T0.4GB	3.4	1.5	8.3	9.5	9.1	M4	1.5
T5000-4T0.75GB	5	1.5	8.3	9.5	9.1	M4	1.5
T5000-4T1.5GB	5.8	1.5	8.3	9.5	9.1	M4	1.5
T5000-4T2.2GB	10.5	2.5	8.3	9.5	9.1	M4	1.5



Figuer3－8 Dimensions of power terminals

Table3－6 Recommended cable diameter and cable lug model

AC Drive Model	Rated Input Current A	Recommended Output Power Cable Diameter mm2	A	B	C	D	Torque of Torque Driver N.M
T5000-4T4.0GB T5000-4T4.0GBF	10.5	2.5	11	13	11	M5	2.5
T5000-4T5.5GB T5000-4T5.5GBF T5000-4T5.5AB	14.6	4	11	13	11	M5	2.5
T5000-4T7.5GB T5000-4T7.5GBF T5000-4T7.5AB	20.5	4	11	13	11	M5	2.5
T5000-4T11GB T5000-4T11GBF T5000-4T11AB	26	6	11	13	11	M5	2.5
T5000-4T15GB T5000-4T15GBF T5000-4T15AB	35	10	15	17	15	M6	4
T5000-4T18.5GB T5000-4T18.5GBF T5000-4T18.5AB	38.5	16	15	17	15	M6	4

T5000-4T22GB T5000-4T22GBF T5000-4T22AB	46.5	16	15	17	15	M6	4
T5000-4T30AB	62	16	15	17	15	M6	4

Notice：

The recommended data and models are for reference only. The cable diameter you select cannot be larger than the size in the following figures.
The prerequisite of cable selection is as follows: Under ambient temperature of 40°C in steady state, for the recommended diameters of the insulation copper conductor or cable, see section 12.4 of the IEC 60204-1-2005

3.3.2 Description and wiring of control circuit terminals

1. Terminal Arrangement and Description of Control Circuit：

Refer the layout to Fig. 3-9. control terminal function is listed in Table 3-7; Jumper's function in Table 3-8. Be sure to set the jumper and wire the terminals properly. It is recommended to use cable of section area bigger than 1mm2.

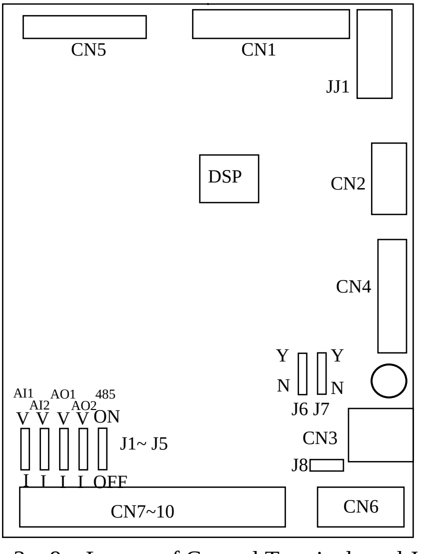


Figure3－9　Layout of Control Terminals and Jumpers

Table3－7　Function of Control Terminals

Serial number	Function Description
CN7~10	Analog input /output、Digital input、Terminal RS485
CN6	Relay output
CN3	External operation panel interface

Table3－8 Jumpers’ Function

Serial number	Function Description and setting	Defalt
J1	AI1 Input:Voltage or current input is decided by jumper J1. Input voltage range: 0–10 V Input current range: 0/4–20 mA	0～10V
J2	AI2 Input:Voltage or current input is decided by jumper J2. Input voltage range: 0–10 V Input current range: 0/4–20 mA	0～10V
J3	AO1 output:Voltage or current output is decided by jumper J3. output voltage range: 0–10 V output current range: 0/4–20 mA	0～10V
J4	AO2 output:Voltage or current output is decided by jumper J4. output voltage range: 0–10 V output current range: 0/4–20 mA	0～10V
J5	RS485 terminal resistor selection ON： there is terminal resistor OFF： there is no terminal resistor	OFF
J6	GND grounding PE selection Y : GND connect PE via resistance-capacitance N : GND not connect PE	N
J7	COM grounding PE selection Y : COM connect PE via resistance-capacitance N : COM not connect PE	N
J8	CME connect COM by jumper J8 Jumper ON: CME connect COM， Jumper OFF: CME disconnect COM	connect

2. Description of Control Circuit Terminals

1）Control Circuit Terminals CN7~10，CN6

CN7~10 terminals arrangement

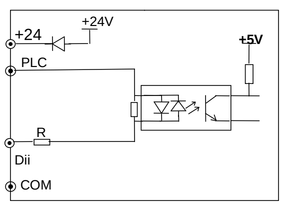
+10V	AI1	AI2	AI3	GND	AO1	AO2	GND	485+	485-
D1	D2	D3	D4	D5	D6	D7/H	+24V	PLC	COM

CN6 terminals arrangement：

TA	TB	TC
Y1	Y2/H	CME

Description of Control Circuit Terminals。

Table3－9 Description of control circuit terminals

Type	Terminal	Name	**Technical specification**
Terminal RS485	RS485＋	Positive end of RS485 differential signal	Rate: 4800/9600/19200/38400/57600bps Up to 32 sets of equipment can be paralleled*. Relay shall be used if the number exceeds 32.Maximum distance: 500m (adopt standard twisted shielded cable)
	RS485－	Negative end of RS485 differential signal	
Analog input	AI1	Analog input 1	Input current range:0/4~20mA: Input impedance 500Ω, Input voltage range:0~10V: Input impedance 22kΩ,
	AI2	Analog input 2	Input current range:0/4~20mA: Input impedance 500Ω, Input voltage range:0~10V: Input impedance 22kΩ,
	AI3	Analog input 3	Input voltage range:0~10V: Input impedance 22kΩ,
Analog output	AO1	Analog output 1	Output voltage range: 0~10 V Output current range: 0/4~20 mA
	AO2	Analog output 2	
Power supply	+10V	External +10 V power supply	Maximum output current: 10 mA
	GND	External +10 V grounding	Internal isolated with COM
Digital input	D1	Digital input1	Optical coupling isolation,compatible with dual polarity input Impedance: 2.4 kΩ Voltage range for level input: 9~30V 
	D2	Digital input2	
	D3	Digital input3	
	D4	Digital input4	
	D5	Digital input5	
	D6	Digital input 6	
	D7	Digital input 7	Optical coupling isolation,compatible with dual polarity input Impedance: 1.5 kΩ Voltage range for level input: 15~30V

Type	Terminal	Name	**Technical specification**
Digital output	Y1	Digital output1	Optical coupling isolation, dual polarity open collector output Output voltage range: 9~30 V Output current range: 0~50 mA
	Y2/H	High-speed pulse output	It is limited byH8.06 (FM terminal output mode selection). As high-speed pulse output, the maximum frequency hits 50 kHz. As open-collector output, its specification is the same as that of Y1
Relay output	TA	Relay output	TA-TB：NC terminal TA-TC：NO terminal Contact driving capacity:： AC250V/2A（COSF =1） AC250V/1A（COSF =0.4） DC30V/1A
	TB		
	TC		
Power supply	+24	External +24 V power supplyApplying	Output current range：0~200mA
	PLC	Common end of multi-functional input terminal	Short circuited with +24V upon delivery
	COM	＋24Vgrounding	Internal isolated with GND

Wiring mode of the analog input input terminals:

AI1、AI2 terminals

Input range: 0–10 VDC/4–20 mA, decided by jumper on the control board

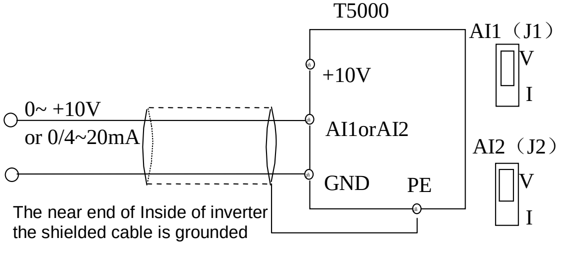


Figure3—10 AI1、AI2 terminals wiring

AI3 terminals：

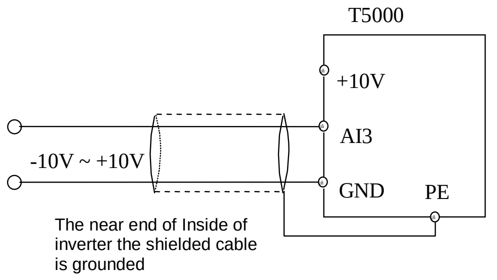


Figure3—11 AI3 terminals wiring

Wiring mode of the analog output terminals:

AO1、AO2 terminals

Output range: 0–10 VDC/4–20 mA, decided by jumper on the control board

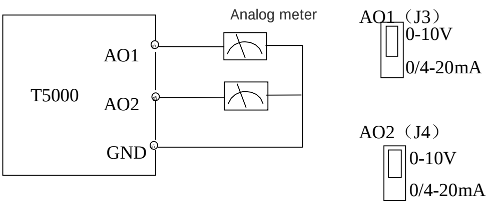


Figure3—12 Analog output terminals wiring

Notice:

1）In applications where the analog signal suffers severe interference, install filter capacitor or ferrite magnetic core at the analog signal source.

2）Weak analog voltage signals are easy to suffer external interference, and therefore the shielded cable must be used and the cable length must be less than 20 m

Serial Communication Port Connection

Using above wiring method, you can build a "single-master single slave" system or a "single-master multi-slaves" system. The drives in the network can be monitored, and be controlled remotely and automatically in real time by using a PC or PLC controller. Thus more complicated operation control can be realized.

The drive can be connected to the host with RS485 port：

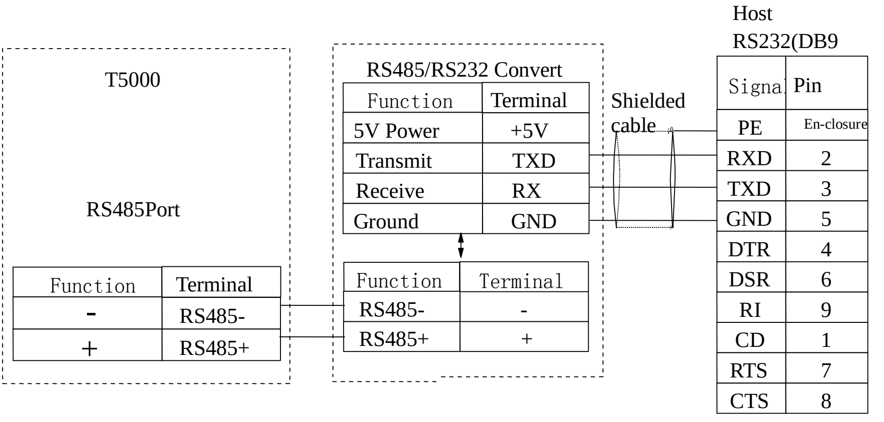


Figure3－13 RS485-（RS485/RS232）-RS232communication wiring

Sevral drive hanging in th same rs485 system, communicationinterference increases, the wiring is very important, users are recommended in the following way (drive motor wiring, all good grounding)

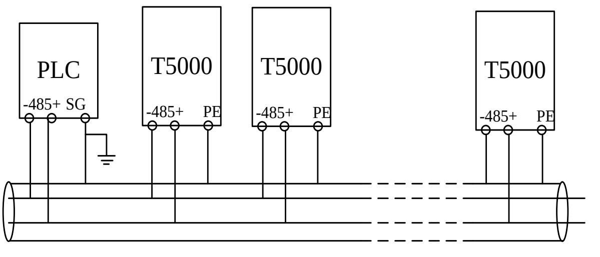


Figure3－14 Wiring of dirve connect to host PLC

if the above standard wiring methods cannot meet the requirements, you can take the actions below:

1. Use isolated RS485 communication module;

2 If the noise is transmitted through the GND line to the drive or other devices, which results in malfunction of them, you may disconnect the GND.

Wiring mode of the multi−functional input terminals:

Generally, select shielded cable no longer than 20 m. When active driving is adopted, necessary filtering measures shall be taken to prevent the interference to the power supply. It is recommended to use the contact control mode. PLC is the public terminal of D1 ~ D7, current flows through the PLC terminal can be pulling current or sink current

1）Dry contact

① The internal +24V power supply is used

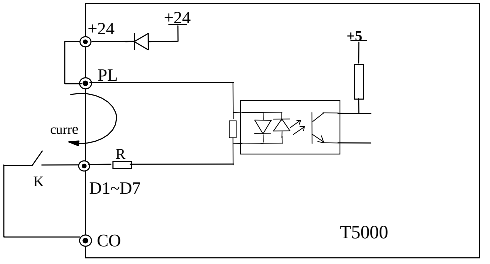


Figure 3－15 wiring of the internal +24V power supply is used

② The external power supply is used, The short circuit bar between terminal +24V and terminal PLC must be removed

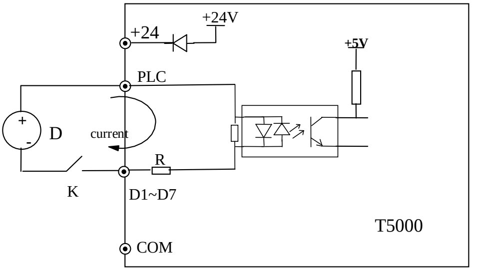


Figure3－16 wiring of the internal external power supply is used

2）SOURCE/（Sink）

① When the internal +24V power supply of the inverter is used, the external controller adopts NPN sink current wiring mode.

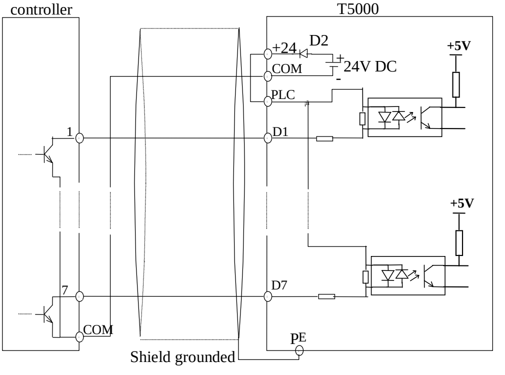


Figure3－17 wiring of the internal +24V power supply is used

② When the internal +24V power supply of the inverter is used, the external controller adopts PNP draw−off current wiring mode. The short circuit bar between terminal +24V and terminal PLC must be removed

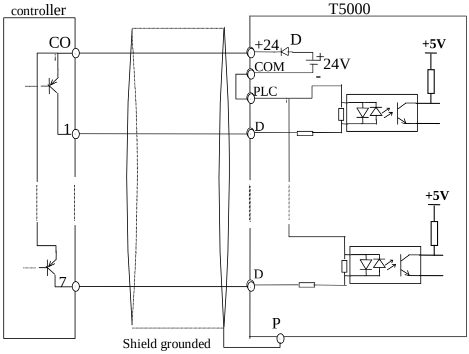


Figure3－18　wiring of the internal +24V power supply is used

③　When the external power supply is used, the external controller adopts NPN sink current wiring mode. The short circuit bar between terminal +24V and terminal PLC must be removed

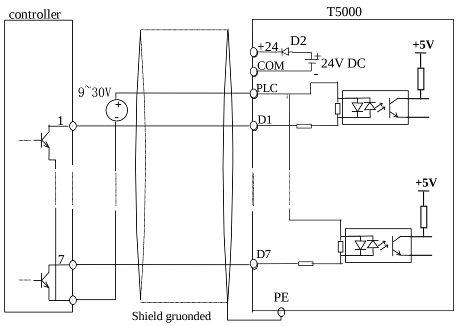


Figure33－19　wiring of the internal external　power supply is used

①　When the external power supply is used, the external controller adopts PNP draw−off current wiring mode. The short circuit bar between terminal +24V and terminal PLC must be removed

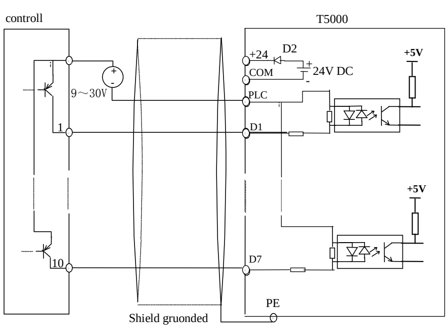


Figure3－20　wiring of the internal external　power supply is used

Wiring mode of the multi−functional output terminals:

① multi−functional output terminals Y1、Y2 , When the internal +24V power supply of the inverter is used

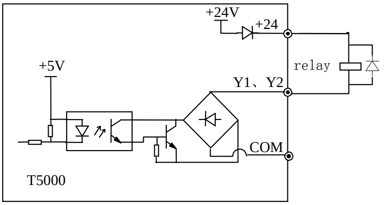


Figure3－21 Wiring mode of the multi−functional output terminals 1

📖 Notice:

When the digital output terminal needs to drive the relay, an absorption diode shall be installed between two sides of the relay coil. Otherwise, it may cause damage to the 24VDC power supply. The driving capacity is not more than 50 mA.。

② multi−functional output terminals Y1、 Y2 , When the external power supply of the inverter is used

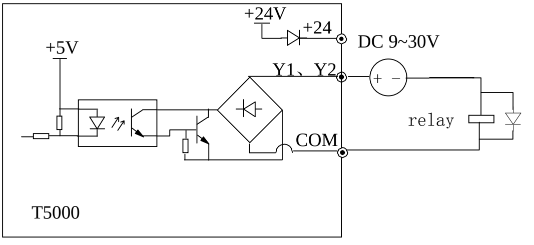


Figure3－22 Wiring mode of the multi−functional output terminals 2

③ Digital pulse output terminals Y2, When the internal +24V power supply of the inverter is used

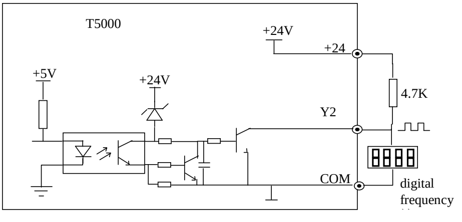


Figure 3－23 Wiring mode of output terminals 1

④ Digital pulse output terminals Y2, When the external power supply of the inverter is used

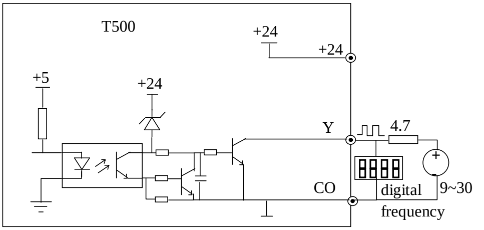


Figure 3—24 Wiring mode of output terminals Y2

Wiring of relay output terminals TA、TB、TC:

When the inverter is connected to the inductive load equipment (e.g. electromagnetic contactor, relay and solenoid valve), surge suppressor must be installed on the load equipment coil

Notice:

1. Please use the shielded multiconductor cable or twisted wire (above 1mm) to connected with the control terminal。
2. When analog voltage and current signals are adopted for remote frequency setting, twisted pair shielded cable shall be used. The shielded layer shall be connected to the PE terminal of the inverter, and the signal cable shall be no longer than 50m.
3. The wires of the main circuit terminals and the wires of the control circuit terminals shall be laid separately or in a square−crossing mode, otherwise, the control signal may be interfered.

3.4 Installation Methods Compliant With EMC Requirements

3.4.1 Definition and Standard of EMC

EMC：

Electromagnetic compatibility (EMC) describes the ability of electronic and electrical devices or systems to work properly in the electromagnetic environment and not to generate electromagnetic interference that influences other local devices or systems.

3.4.2 Correct installation Methods forEMC

In a traction system composed of the drive and a motor, if the drive, controllers and transducer are installed in one cabinet, the disturbance they generate should be depressed at the connection points, therefore, a noise filter and inrush reactor should be installed in the cabinet, so that EMC requirement is met inside it

In system design phase, to reduce EMI, insulating the noise source and using noise snubber are best choice. But the cost is considerable. If there are a few sensitive devices on site, just install power line filter beside them is enough. Notice that the drive and contactor are noise source, and the automatic devices, encoder and transducer are sensible to them.

Divide the system into several EMC areas, refer to Figure 3-25.。

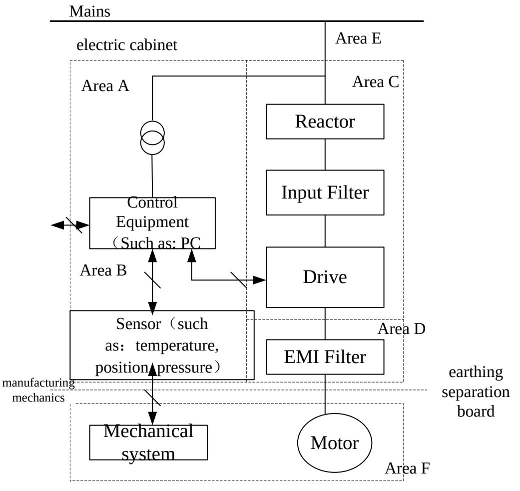


Figure3－25　Recommended System Layout

Area A:should be used to install transformers for control power supply, control system and sensor.

Area B: should be used for interface of signal and control cables with good immunity level.

Area C: should be used to install noise generating devices such as input reactor, drive, brake unit and contactor.

Area D: should be used to install output noise filter.

Area E: should be used to install power source and cables connecting the RFI filter.

Area F: should be used to install the motor and motor cables.

Notice：

Areas should be isolated in space, so that electro-magnetic decoupling effect can be achieved

The shortest distance between areas should be 20cm

Earthing bars should be used for decoupling among areas, the cables from different area should be placed in different tubes.

The filter should be installed at the interfaces between different areas if necessary

Bus cable(such as RS485) and signal cable must be shielded

Installation of the drive

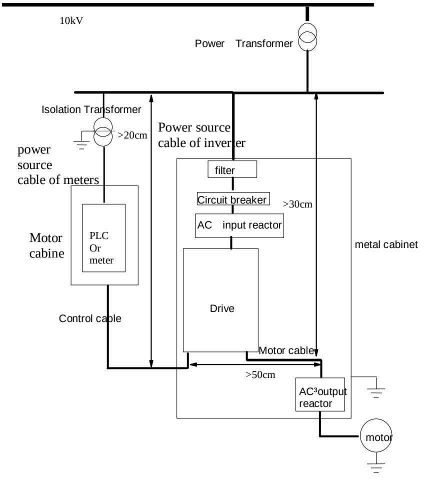


Figure3－26 Installation of the drive

3.4.3 Onsite Wiring Requirements

To avoid mutual EMI disturbance, the control cables, power cable and motor cable should be installed as apart as possible, especially when they are routed in parallel for rather long distance. If the signal cable must cross the power cable or motor cable, keep them at right angle to each other.

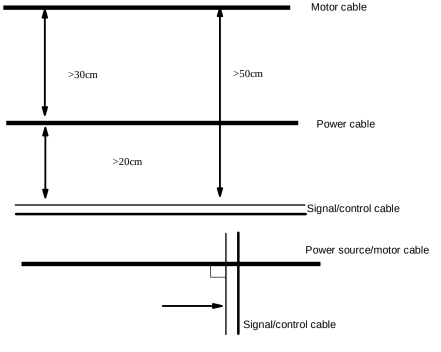
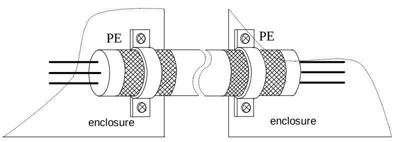


Figure3－27 Cable Routing Schematic Diagram

If the section area of the motor cable is too big, the motor should derate. Refer the drive's cable specs in Table 3-1. Since the larger the section area of cables, the greater their capacitance to the ground, therefore, the output current should derate 5% with increasing every category of cable section area.

Shielded/armored cable: high-frequency low-impedance shielded cable should be used, such as woven copper mesh, aluminum mesh or metal mesh.

The control cable should be shielded, and the clamps at both ends of the metal mesh should be connected to the earth terminal of the drive enclosure.



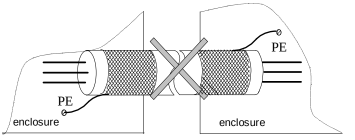
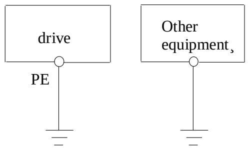


Figure 3－28 Correct Shied Layer Grounding Figure 3－29 Incorrect Shied Layer Grounding

3.4.4 Grounding



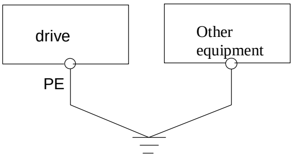


Figure3-30 Independent earthing pole（Recommended） Figure3-31 Share earthing pole（Accept）

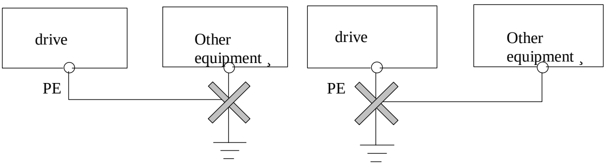


Figure3－32 Shared earthing lines（not allowed）

Besides, pay attention to the following points:

In order to reduce the earthing resistance, flat cable should be used because the high frequency impedance of flat cable is smaller than that of round cable with the same CSA.

For 4-core motor cable, the end of one cable should be connected to the PE of the drive, and the other end should be connected to the motor’s enclosure. If the motor and the drive each has its own earthing pole, then the earthing effect is better.

If the earthing poles of different equipment in one system are connected together, then the leakage current will be a noise source that may disturb the whole system. Therefore, the drive’s earthing pole should be separated with the earthing pole of other equipment such as audio equipment, sensors and PC, etc.

In order to reduce the high frequency impedance, the bolts used for fixing the equipment can be used as the high frequency terminal. The paints on the bolt should be cleaned.

The earthing cable should be as short as possible, that is, the earthing point should be as close as possible to the drive.

Earthing cables should be located as far away as possible from the I/O cables of the equipment that is sensitive to noise, and lead should also be as short as possible.

3.4.5 Leakage current

Leakage current may flow through the drive’s input and output capacitors and the motor’s capacitor. The leakage current value is dependent on the distributed capacitance and carrier wave frequency. The leakage current includes ground leakage current and the leakage current between lines.

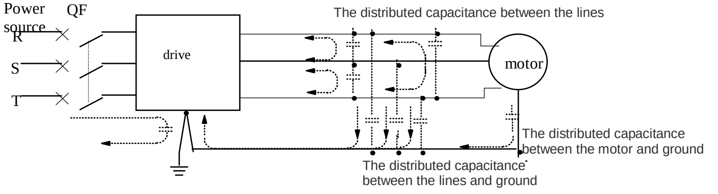


Figure3－33 Leakage current

Ground leakage current

The ground leakage current not only flows into the drive system, but also into other equipment via earthing cables. It may cause leakage current circuit breaker and relays to be falsely activated. The higher the drive's carrier wave frequency, the higher the leakage current, and also, the longer the motor cable, the greater is the leakage current. Suppressing methods:

Reduce the carrier wave frequency, but the motor noise may be higher.

Motor cables should be as short as possible

The drive and other equipment should use leakage current circuit breaker designed for protecting the product against high-order harmonics/surge leakage current.

Leakage current between lines

The line leakage current flowing outside through the distributed capacitors of the drive may false trigger the thermal relay, especially for the drive of which power rating is less than 7.5kW. When the cable is longer than 50m, the ratio of leakage current to motor rated current may increase to a level that can cause the external thermal relay to trigger unexpectedly.

Suppression methods:

Reduce the carrier wave frequency, but the motor audible noise is higher.

Install reactor at the output side of the drive.

In order to protect the motor reliably, it is recommended to use a temperature sensor to detect the motor's temperature, and use the drive's over-load protection device (electronic thermal relay) instead of an external thermal relay.

3.4.6 Installation of EMC Input Filter on Power Input Side

An EMC filter installed between the AC drive and the power supply can not only restrict the interference of electromagnetic noise in the surrounding environment on the AC drive, but also prevents the interference from the AC drive on the surrounding equipment.

The T5000 series AC drive satisfies the requirements of category C2 only with an EMC filter installed on the power input side.

The installation precautions are as follows:

• Strictly comply with the ratings when using the EMC filter. The EMC filter is category I electric apparatus, and therefore, the metal housing ground of the filter should be in good contact with the metal ground of the installation cabinet on a large area, and requires good conductive continuity. Otherwise, it will result in electric shock or poor EMC effect.

• The ground of the EMC filter and the PE conductor of the AC drive must be tied to the same common ground. Otherwise, the EMC effect will be affected seriously.

• The EMC filter should be installed as closely as possible to the power input side of the AC drive.

3.4.7 EMI

The drive is usually installed in a metal cabinet. The instruments outside the metal cabinet is shielded and may be disturbed lightly. The cables are the main EMI source, if you connect the cables according to the manual, the EMI can be suppressed effectively.

Chapter 4 Operation Procedures

4.1 Definitions of Terms

In the follow-up sections, you may encounter the terms describing the control, running and status of drive many times. Please read this section carefully. It will help you to understand and use the functions to be discussed correctly.

4.1.1 The Drive's Control Modes

It defines the methods by which drive receives operating commands like RUN, STOP, FWD, REV, JOG and others.

Keypad control: The drive is controlled by RUN, STOP and JOG keys on the LED keypad;

Terminal control: The drive is controlled by terminals FWD, REV and COM (two-wire mode), Di (3-wire mode);.

Host control: The operations such as START and STOP is controlled by host PC. The control modes can be selected by parameter H0.03, multi-function input terminals (function No. 24, 38 of H6.00～H6.09).

4.1.2 Frequency Setting Methods

There are 8 methods to set frequency, they are：

▲、▼key on the keypad；

AI1（0V~10V/0mA~20mA）；

AI2（0V~10V/0mA~20mA）；

AI3（-10V~10V/0mA~20mA）；

D7/HDI（PULSE）Setting；

PID Setting；

PLC Setting；

Serial communication port Setting；

Communication Setting；

4.1.3 Drive's Operating Status

There are 3 operating status: stop, operating and motor parameter tuning.

Stop: After the drive is switched on and initialized, if no operating command is received or the stop command is executed, then the drive enters stop status. Operating: after receiving run command, the drive begins to operate.

Motor parameter tuning: If H3.14 is set at 1 or 2, after giving RUN command, the drive will enter motor parameter tuning status,the display will be -ALP-， and then it will stay in stop status.

4.1.4 Operating Mode

The drive has 5 kinds of operating modes which can be arranged in the sequence of "Jog>PID>PLC>MS>Simple operation" according to the priority.

Jog: When the drive is in stop status, it will operate according to Jog frequency after it receives the Jog operation command (See HC.00).

PID: If the close-loop operating function is enabled (H0.04=5), the drive will select the close-loop operation mode, meaning that it will perform PI regulation according to the reference and eedback values (See explanations of Parameter LA). Close-loop operating function can be disabled by multi-function terminal, and the drive will then select other operating mode of lower priority level.

PLC running: PLC function is enabled (H0.04=6) The drive will run according to the preset mode,(see LB function group).

MS Running: Select multi-frequency 0～15（LB.00～LB.15）by the combination of multi-function terminal (function No. 12, 13, 14, which is not zero.

Simple Running: open-loop operation.

The above 5 operating modes determine 5 frequency setting sources. Except Jog, the other four frequency setting can be adjusted or combined with auxiliary frequency. The frequency of PLC, MS and simple running can also be adjusted by swing frequency.

4.2 Operation Guide

4.2.1 Operation of LED Keypad

LED keypad display unit is to receive command and display parameters.。

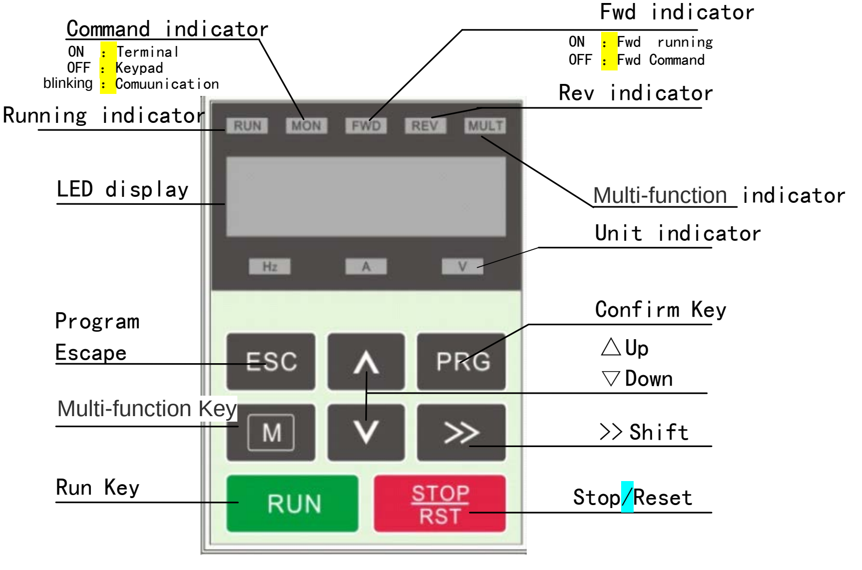


Figure4—1 LED Keypad Display Unit

4.2.2 Keypad Function Explanation

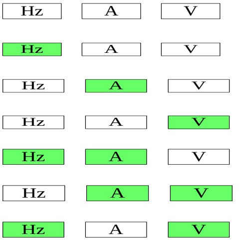
There are 8 keys on the LED keypad display unit, refer the function of each key in Table 4-1.。

Table 4—1 Key's Function

Key	Name	Function
ESC	Program/Escape	Enter or exit Level I menu.
PRG	Confirm Key	Enter the menu interfaces level by level, and confirm the parameter setting.
▲	Up	Increase data or function code.
▼	Down	Decrease data or function code.
>>	Shift	Select the displayed parameters in turn in the stop or running state, and select the digit to be modified when modifying parameters.
M	Multi-function	Perform function switchover (such as quick switchover ofcommand source or direction) according to the setting of HC-00
RUN	Rnn	Start the AC drive in the operation panel control mode
STOP/RST	Stop/Reset	Stop the AC drive when it is in the running state and perform the reset operation when it is in the fault state

4.2.3 Description of Indicators

Implication of the combination of indicators: :ON :OFF



Uint：None

Uint：Hz

Uint：A

Uint：V

Uint：r/min

Uint：%

Uint：m/s

Figure4—2 Unit Indicators and Status

Table4—2 Description of Indicators

Indicators	Status	Display	Description
RUN	Running Status Indicators	OFF	stop state
		ON	running state
MON	Command Indicators	ON	Keypad control
		OFF	Terminal control
		Blinking	Communication control
FWD	Forward Rotation Indicators	OFF	Rev command,Stop state
		ON	Forward Running
		Blinking	Rev command，Fwd Deceleration
REV	Reverse Rotation Indicators	OFF	Fwd command,Stop state
		ON	Reverse Running
		Blinking	Fwd command，Rev Deceleration
MULT	Multi-function Indicators	OFF	None
		ON	Torque control mode or auto-tuning state
		Blinking	The fault state

4.2.4 Parameters display on operation panel

1. Parameters display at stop state

The driver's parameters display at stop state like table 4-3(b), the indicator on the right side shows the unit of the parameters .

You can select the displayed parameters in turn when you press the key '>>'。

2. Parameters display at operating state

The driver's parameters display at operating state like table 4-3(c), the indicator on the right side shows the unit of the parameters .

You can select the displayed parameters in turn when you press the key '>>'。

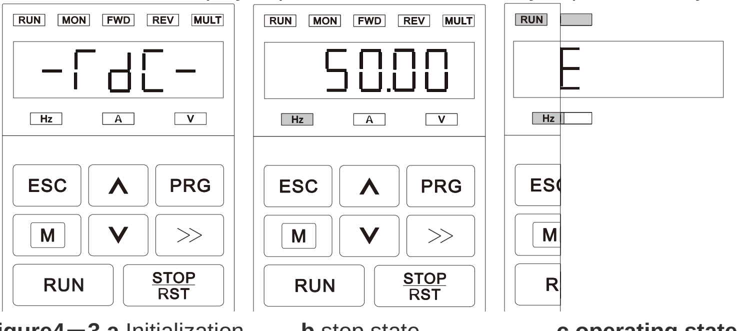


Figure4—3 a Initialization **b** stop state **c operating state**

3．Parameters display at fault state

The driver will be at fault state when it detected the fault signal.

You can select the displayed parameters in turn when you press the key ‘>>’。

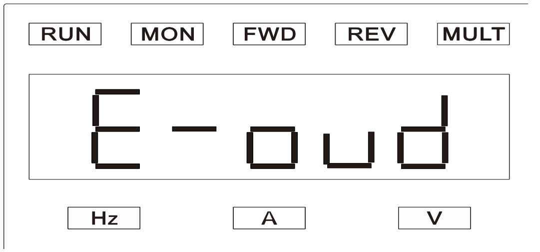


Figure4－4　Parameters display at fault state

4. Function code editing

The operation panel of the T5000 adopts three-level menu.

The three-level menu consists of function code group (Level I), function code (Level II), and function code setting value (level III), as shown in the following figure.

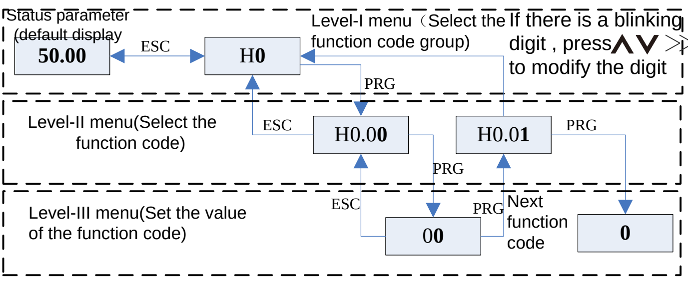


Figure4－5　Operation procedure on the operation panel

4.2.5　Operation procedure on the operation panel

Through the operation panel ,you can carry out various operations on the drive, for example as follows:

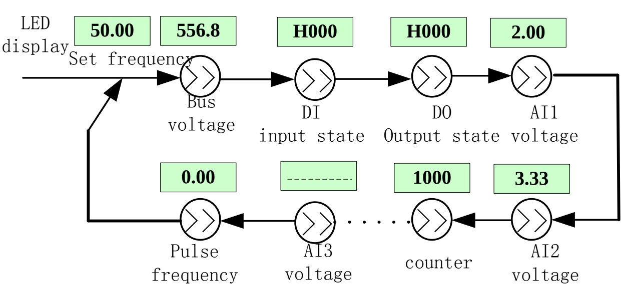


Figure4－6　Example of changing the parameter value

In Level III menu, if the parameter has no blinking digit, it means that the parameter cannot be modified. This may be because:

- Such a function code is only readable, such as, AC drive model, actually detected parameter and running record parameter.
- Such a function code cannot be modified in the running state and can only be changed at stop.
- The parameters to be protected by function code H0.21

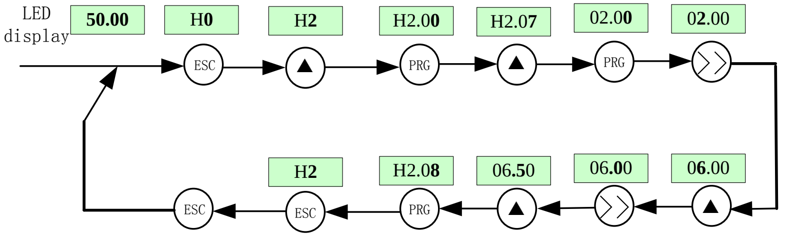


Figure4—7 Parameter editing operation

4.2.6 Quick View of Function Codes

The T5000 provides two quick modes of viewing the required function codes.

1) You can define a maximum of 22 function codes into group HD

2) The T5000 automatically list the modified function codes.

For details, see the description of function code HC.19 and HC.00.

4.3 Power-on for the First Time

4.3.1 Checking before power-on

Please carry out the wiring in accordance with the requirements provided in this Manual Section 3.3 "drive wiring" technology connection, see figure 3-4.

4.3.2 Running for the First Time

Close the air switch after confirmation of wiring and power check,the driver will be power-on,and the operation panel will fast display "-Tdc-", when the digital tube display characters into frequency setting, which shows the driver has been initialized.

The initial power-on operation process is as follows：

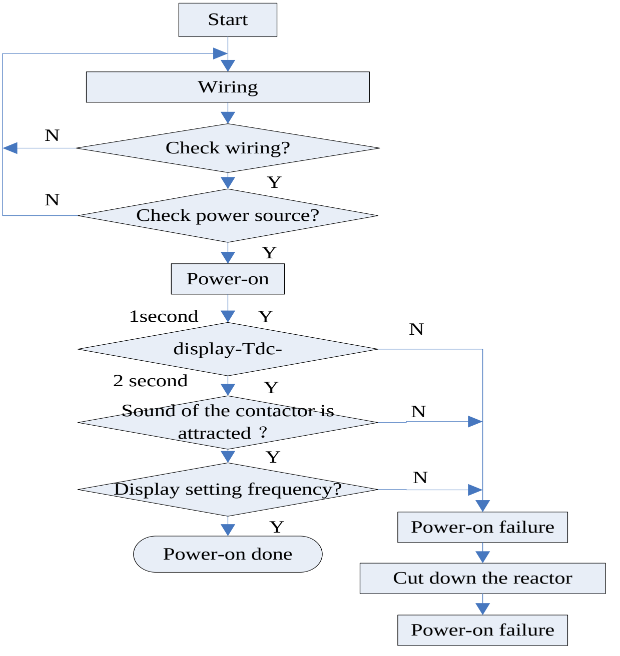


Figure4－8　The initial power-on operation process

Chapter 5 Description of Function Codes

Explaination:

The parameters in shaded boxes “【】” are default value .

5.1 Basic and system Parameters（Group H0）

H0.00 Motor control mode	Setting Range：00～11 【00】

- Units：Motor 1 control mode

0：Motor 1 Voltage/Frequency (V/F) control
It is applicable to applications with low load requirements or applications where one ACdrive operates multiple motors, such as fan and pump.

1：Sensorless flux vector control(SVC)
It indicates open-loop vector control, and is applicable to high-performance control applications such as machine tool, centrifuge, wire drawing machine and injection moulding machine. One AC drive can operate only one motor.

- Tens：Motor 2 control mode

0：Motor 1 Voltage/Frequency (V/F) control
It is applicable to applications with low load requirements or applications where one ACdrive operates multiple motors, such as fan and pump.

1：Sensorless flux vector control(SVC)
It indicates open-loop vector control, and is applicable to high-performance control applications such as machine tool, centrifuge, wire drawing machine and injection moulding machine. One AC drive can operate only one motor.

Notice:

If vector control is used, motor auto-tuning must be performed because the advantages of vector control can only be utilized after correct motor parameters are obtained. Better performance can be achieved by adjusting speed regulator parameters in group.

H0.01 Main frequency source selection	Setting Range：0～8 【0】

0：Digital setting (retentive at power failure)
The initial value of the set frequency is the value of H0.02 (Preset frequency).
You can change the set frequency by pressing keys▲、▼on the operation panel (or using the UP/DOWN function of input terminals).
When the AC drive is powered on again after power failure, the set frequency is the value memorized at the moment of the last power failure

1： AI1

2： AI2
The frequency is set by analog input.

AI1，AI2：0~10 V voltage input or 0~20 mA current input, determined by jumper J1,J2

3：AI3

The frequency is set by analog input.

AI3：-10V~10 V voltage input

The T5000 provides three curves indicating the mapping relationship between the input voltage of AI1, AI2 and AI3 and the target frequency, which are linear (point-point) correspondence, You can set the curves by using function codes H7.00～H7.14

📖 Notice:

When AI is used as the frequency setting source, the corresponding value 100% of the voltage/current input corresponds to the value of H0.06 (Maximum frequency).

4：D7/HDI Pulse setting

The frequency is set by D7(high-speed pulse). The signal specification of pulse setting is 9～30 V (voltage range) and 0～100 kHz (frequency range). The corresponding value 100% of pulse setting corresponds to the value of H0.06 (Maximum frequency).

5：PID

The output of PID control is used as the running frequency. PID control is generally used in on-site closed-loop control, such as constant pressure closed-loop control and constant tension closed-loop control.

When applying PID as the frequency source, you need to set parameters of PID function in group LA.

6：PLC

When the simple programmable logic controller (PLC) mode is used as the frequency source, the running frequency of the AC drive can be switched over among the 16 frequency references.

You can set the holding time and acceleration/deceleration time of the 16 frequency references. For details, refer to the descriptions of Group LB.

7：Multi-reference

In multi-reference mode, combinations of different DI terminal states correspond to different set frequencies. The T5000 supports a maximum of 16 speeds implemented by 16 state combinations of four DI terminals (allocated with functions 12 to 15) in Group LB. The multiple references indicate percentages of the value of H0.06 (Maximum frequency).

If a DI terminal is used for the multi-reference function, you need to perform related setting in group H6.

8：Communication setting

Data is given by the host computer through the communication address 0x5000. The data format is -100.00% to 100.00%. 100.00% corresponds to the value of H0.06 (Maximum frequency).

H0.02 Preset frequency	Setting Range： 0.00Hz ～ maximum frequency 【50.00Hz】

If the frequency source is digital setting(H0.01=0) ,the value of this parameter is the initial frequency of the AC drive (digital setting).

H0.03 Command source selection	Setting Range：0、1、2 【0】

You can input the commands in the following three channels:

0：Operation panel control

Commands are given by pressing keys RUN、STOP、and M on the operation panel .

1：Terminal control

Commands are given by means of multifunctional input terminals with functions such asFWD、REV、FJOG、and RJOG。

2：Communication control

Commands are given from host computer。

Notice:

Notice that during operating process, the control modes can be changed by changing the setting of H0.03. Be careful if you want to do so.

H0.04 Binding command source to frequency source	Setting Rang: 000~888 【000】

Unit's digit：Binding operation panel command to frequency source；

Ten's digit：Binding terminal command to frequency source；

Hundred's digit：Binding communication command to frequency source；

It is used to bind the three running command sources with the nine frequency sources,facilitating to implement synchronous switchover。

For details on the frequency sources, see the description of H0.01 (Main frequency source selection. Different running command sources can be bound to the same frequency source

If a command source has a bound frequency source, the frequency source set in H0.01, H2.01,H2.00 no longer takes effect when the command source is effective

H0.05 Rotation direction	Setting Rang：0、1 【0】

0：Same direction;

1：Reverse direction;

You can change the rotation direction of the motor just by modifying this parameter without changing the motor wiring. Modifying this parameter is equivalent to exchanging any two of the motor's U, V, W wires

Notice:

The motor will resume running in the original direction after parameter initialization. Do not use this function in applications where changing the rotating direction of the motor is prohibited after system commissioning is complete

H0.06 Maximum frequency	Setting Rang: 50.00～300.00Hz 【50.00Hz】

When the frequency source is AI, pulse setting (D7), or multi-reference, 100% of the input corresponds to the value of this parameter.

H0.07 Source of frequency upper limit	Setting Rang：0～5 【0】
H0.08 Frequency upper limit	Setting Rang： Frequency lower limit H0.09 ~ maximum frequency H0.07 【50.00】
H0.09 Frequency lower limit	Setting Rang: 0.00Hz ~ frequency upper limit H0.08 【0.00】

It is used to set the source of the frequency upper limit。including digital setting (H0.08), AI,pulse setting or communication setting. If the frequency upper limit is set by means of AI1,AI2, AI3, D7 or communication, the setting is similar to that of the main frequency source .

For details, see the description of H0.01.

H0.08 and H0.09 the frequency upper ,lower limit for the digital setting.

H0.10 Acceleration time 1	Setting Range：0.0～3600.0s 【10.0s/20.0s】
H0.11 Deceleration time 1	Setting Range：0.0～3600.0s 【10.0s/20.0s】

Acceleration time indicates the time required by the AC drive to accelerate from 0 Hz to "Acceleration/Deceleration Maximum frequency" (H0.06), that is, t1 in Figure 5-1.

Deceleration time indicates the time required by the AC drive to decelerate from "Acceleration/Deceleration Maximum frequency" (H0.06) to 0 Hz, that is, t2 in Figure 5-1.

The T5000 provides totally four groups of acceleration/deceleration time for selection. You can perform switchover by using a DI terminal.

Group 1：H0.10~ H0.11；Group 2：H2.18~ H2.19；Group 3：H2.20~ H2.21；Group 4：H2.22~ H2.23。

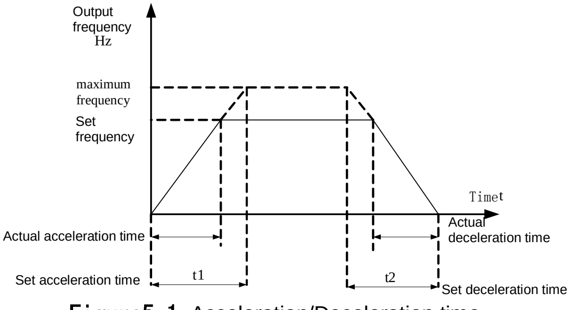


Figure5-1 Acceleration/Deceleration time

H0.12 Carrier frequency	Setting Range：0.5k～16.0k 【6.0k/4.0k/2.0k】

It is used to adjust the carrier frequency of the AC drive, helping to reduce the motor noise, avoiding the resonance of the mechanical system, and reducing the leakage current to the earth and interference generated by the AC drive.

If the carrier frequency is low, output current has high harmonics, and the power loss and temperature rise of the motor increase.

If the carrier frequency is high, power loss and temperature rise of the motor declines.

However, the AC drive has an increase in power loss, temperature rise and interference.

The factory setting of carrier frequency varies with the AC drive power：

power	factory setting
≤11kW	6k
15kW～45kW	4k
45kW above	2k

Influences of carrier frequency adjustment

Carrier frequency	Low	High
Motor noise	Large	Small
Output current waveform	Bad	Good
Motor temperature rise	High	Low
AC drive temperature rise	Low	High
Leakage current	Small	Large
External radiation interference	Small	Large

H0.13 Carrier frequency adjustment	Setting Range：0～1 【0】

0：No；1：Yes。

It is used to set whether the carrier frequency is adjusted based on the temperature. The AC drive automatically reduces the carrier frequency when detecting that the heatsink temperature is high. The AC drive resumes the carrier frequency to the set value when the heatsink temperature becomes normal. This function reduces the overheat alarms.

H0.14 Random PWM depth	Setting Range：0～10 【0】

The setting of random PWM depth can make the shrill motor noise softer and reduce the electromagnetic interference. If this parameter is set to 0, random PWM is invalid.。

H0.15 Serial communication protocol	Setting Range：0～3 【0】

The T5000 supports four serial communication protocol 0：MODBUS；1：Canlink；2：Profibus-DP； 3：ethernet. Select a proper protocol based on the actual requirements.

H0.16 Motor parameter group selection	Setting Range：0～1 【0】

The T5000 can drive two motors at different time. You can set the motor nameplate parameters respectively, independent motor auto-tuning, different control modes, and parameters related to running performance respectively for the two motors.

Motor parameter group 1 corresponds to groups H3~H5. Motor parameter groups 2 correspond to groups Eb~Ec.

You can select the current motor parameter group by using H0.16 or perform switchover between the motor parameter groups by means of a DI terminal. If motor parameters selected by means of H0.16 conflict with those selected by means of DI terminal, the selection by DI is preferre.

H0.16 Setting	DI terminal（terminal function number :40）	Motor selection
0	OFF	Motor 1
0	ON	Motor 2
1	OFF	Motor 2
1	ON	Motor 1

H0.17 User password	Setting Range：00000～55555 【00000】

If it is set to any non-zero number, the password protection function is enabled. After a password has been set and taken effect, you must enter the correct password in order to enter the menu. If the entered password is incorrect you cannot view or modify parameters. The AC drive provides the user password protection function. When FP-00 is set to a nonzero value, the value is the user password. The password takes effect after you after exit the function code editing state. When you press PRG again, "------" will be displayed, and you must enter the correct user password to enter the menu.

To cancel the password protection function, enter with password and set H0.17 to 0.

H0.18 parameter display property	Setting Range：0111～0000【0101】

This function number is used to display the parameter or not.Such an Fig 5-2.

H0.19 Reserved	Reserved

Reserved

H0.20 Parameter modification property	Setting Range：0～1【0】

It is used to set whether the parameters are modifiable to avoid mal-function. If it is set to 0, all parameters are modifiable. If it is set to 1, all parameters can only be viewed.

H0.21 Restore default settings	Setting Range：0～3【0】

0：No operation

1：Restore default settings except motor parameters

2：Clear fault records

3：Restore default settings of all the function number.

5.2 Start/Stop Control（Group H1）

H1.00 Start mode	Setting Range: 0～2【0】

0：Direct start

If the DC braking time is set to 0, the AC drive starts to run at the startup frequency.

If the DC braking time is not 0, the AC drive performs DC braking first and then starts to run at the startup frequency. It is applicable to small-inertia load application where the motor is likely to rotate at startup.

1：Pre-excited start

It is valid only for asynchronous motor and used for building the magnetic field before the motor runs。For pre-excited current and pre-excited time, see parameters of H1.03 and H1.04

If the pre-excited time is 0, the AC drive cancels pre-excitation and starts to run at startup frequency.。

2： Rotational speed tracking restart

The AC drive judges the rotational speed and direction of the motor first and then starts at the tracked frequency. Such smooth start has no impact on the rotating motor. It is applicable to the restart upon instantaneous power failure of large-inertia load. To ensure the performance of rotational speed tracking restart, set the motor parameters in group H1 correctly.

H1.01 Startup frequency	Setting Range: 0.00Hz～10.00Hz【0.00】
H1.02 Startup frequency holding time	Setting Range :0. 0Hz～100.0s 【0.0】

To ensure the motor torque at AC drive startup, set a proper startup frequency. In addition, to build excitation when the motor starts up, the startup frequency must be held for a certain period.

🕮 Notice:

The startup frequency (H1.00) is not restricted by the frequency lower limit. If the set target frequency is lower than the startup frequency, the AC drive will not start and stays in the standby state.
During switchover between forward rotation and reverse rotation, the startup frequency holding time is disabled. The holding time is not included in the acceleration time but in the running time of simple PLC

H1.03 Startup DC braking current/Pre-excited current	Setting Range :0%～100% 【0】
H1.04 Startup DC braking time/Pre-excited time	Setting Range :0.0s～100.0s 【0.0】

Startup DC braking is generally used during restart of the AC drive after the rotating motor stops. Pre-excitation is used to make the AC drive build magnetic field for the asynchronous motor before startup to improve the responsiveness.
Startup DC braking is valid only for direct start (H1.00 = 0). In this case, the AC drive performs DC braking at the set startup DC braking current. After the startup DC braking time, the AC drive starts to run. If the startup DC braking time is 0, the AC drive starts directly without DC braking. The larger the startup DC braking current is, the larger the braking force is.
If the startup mode is pre-excited start (H1.00 = 3), the AC drive builds magnetic field based on the set pre-excited current. After the pre-excited time, the AC drive starts to run. If the pre-excited time is 0, the AC drive starts directly without pre-excitation.

🕮 Notice:

The startup DC braking current or pre-excited current is a percentage relative to the base

H1.05 Rotational speed tracking mode	Setting Range :0～3 【0】

To complete the rotational speed tracking process within the shortest time, select the proper mode in which the AC drive tracks the motor rotational speed.

0： From frequency at stop

It is the commonly selected mode.。

1： From zero frequency

It is applicable to restart after a long time of power failure.。

2: From the maximum frequency

It is applicable to the power-generating load.。

H1.06 Rotational speed tracking speed	Setting Range :1～100 【0】

In the rotational speed tracking restart mode, select the rotational speed tracking speed. The larger the value is, the faster the tracking is. However, too large value may cause unreliable tracking.

H1.07 Stop mode	Setting Range :0～1 【0】

0: Decelerate to stop

After the stop command is enabled, the AC drive decreases the output frequency according to the deceleration time and stops when the frequency decreases to zero.

1: Coast to stop

After the stop command is enabled, the AC drive immediately stops the output. The motor will coast to stop based on the mechanical inertia。

H1.08 Initial frequency of stop DC braking	Setting Range: 0.00Hz～maximum frequency 【0.00】
H1.09 Waiting time of stop DC braking	Setting Range: 0.0s～100.0s 【0.0】
H1.10 Stop DC braking current	Setting Range: 0%～100% 【0】
H1.11 Stop DC braking time	Setting Range :0.0s～100.0s 【0.0】

H1.08: During the process of decelerating to stop, the AC drive starts DC braking when the running frequency is lower than the value set in H1.08。

H1.09: When the running frequency decreases to the initial frequency of stop DC braking, the AC drive stops output for a certain period and then starts DC braking. This prevents faults such as overcurrent caused due to DC braking at high speed.

H1.10: This parameter specifies the output current at DC braking and is a percentage relative to the base value.

H1.11: This parameter specifies the holding time of DC braking. If it is set to 0, DC braking is cancelled.。

The stop DC braking process is shown in the following figure.。

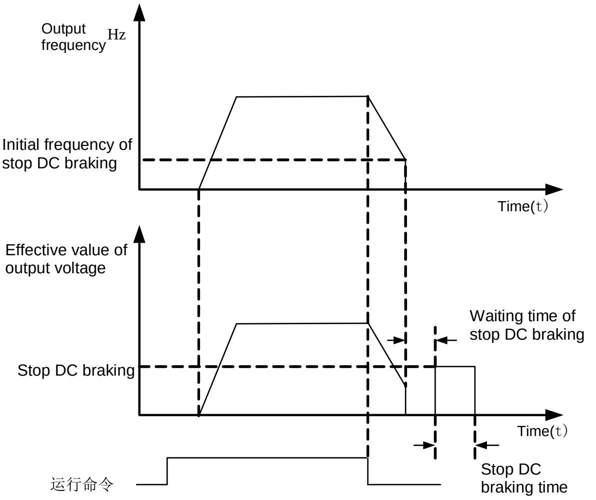


Figure5-3 Stop DC braking process

H1.12 Brake use ratio	Setting Range :0%～100% 【100】

It is valid only for the AC drive with internal braking unit and used to adjust the duty ratio of the braking unit. The larger the value of this parameter is, the better the braking result will be. However, too larger value causes great fluctuation of the AC drive bus voltage during the braking process.。

H1.13 Action selection at instantaneous power failure	Setting Range: 0～2 【0】
H1.14 Action pause judging voltage at instantaneous power failure	Setting Range: 80%～100% 【90】
H1.15 Voltage rally judging time at instantaneous power failure	Setting Range: 0.00s～100.00s 【100】
H1.16 Action judging voltage at instantaneous power failure	Setting Range :60%～100% 【80】

Upon instantaneous power failure or sudden voltage dip, the DC bus voltage of the AC drive reduces. This function enables the AC drive to compensate the DC bus voltage reduction with the load feedback energy by reducing the output frequency so as to keep the AC drive running continuously.。

If H1.13 = 1, upon instantaneous power failure or sudden voltage dip, the AC drive decelerates. Once the bus voltage resumes to normal, the AC drive accelerates to the set frequency. If the bus voltage remains normal for the time exceeding the value set in H1.15, it is considered that the bus voltage resumes to normal.

If H1.13 = 2, upon instantaneous power failure or sudden voltage dip, the AC drive decelerates to stop.

The process is shown in the following figure.5-4。

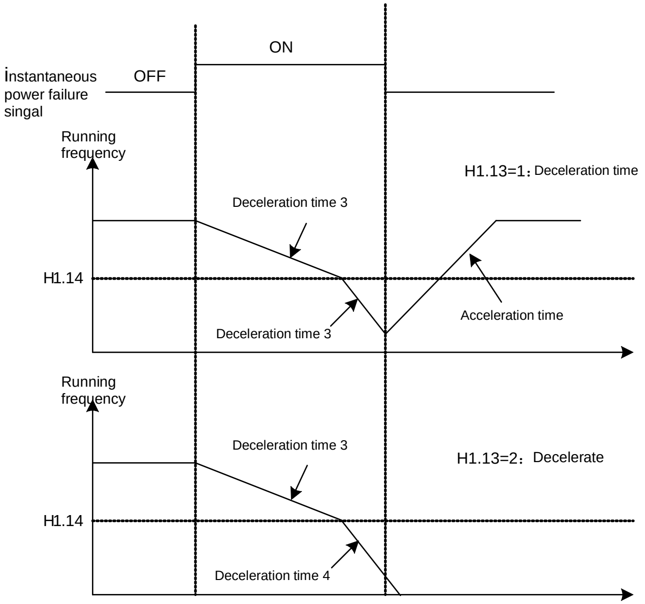


Figure 5-4 AC drive action diagram upon instantaneous power failure

H1.17 Reverse control	Setting Range:0～1 【0】

It is used to set whether the AC drive allows reverse rotation. In the applications where reverse rotation is prohibited, set this parameter to 1.

H1.18 Forward/Reverse rotation dead-zone time	Setting Range:0.0～3600.0 【0.0】

It is used to set the time when the output is 0 Hz at transition of the AC drive forward rotation and reverse rotation, as shown in the following figure.

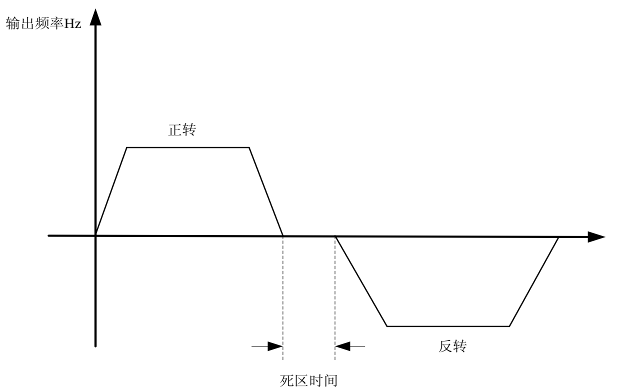


Figure 5-5 Forward/Reverse rotation dead-zone time

5.3 Auxiliary frequency setting and Acceleration/ Deceleration time（Group H2）

H2.00 Main/auxiliary frequency source selection	Setting Range:0～4 【0】

0：Main frequency source

The frequency setting determined by H0.01.

1：Main and auxiliary frequency operation

operation relationship between Main and auxiliary frequency determined by H2.05.

2：Switchover between main and auxiliary frequency

It is used to be control by multi−functional input terminals 20。When the multi-functional input terminal 20 is invalid，the main frequency setting(H1.01) will be the target frequency.

When the multi-functional input terminal 20 is valid，the auxiliary frequency setting(H2.01) will be the target frequency.

3：Switchover between main and the operation results

It is used to be control by multi−functional input terminals 20。When the multi-functional input terminal 20 is invalid，the main frequency setting(H1.01) will be the target frequency.

When the multi-functional input terminal 20 is valid，the operation result (H2.05) will be the target frequency.

4：Switchover between auxiliary and the operation results

It is used to be control by multi−functional input terminals 20。When the multi-functional input terminal 20 is invalid，the main auxiliary setting(H2.01) will be the target frequency.

When the multi-functional input terminal 20 is valid，the operation result (H2.05) will be the target frequency.

H2.01 Auxiliary frequency source selection	Setting Range:0~9 【0】

The auxiliary frequency source is used in the same way as the main frequency source (refer to H0.01).

H2.02 Auxiliary frequency digital setting	Setting Range:0.00Hz～maximum frequency【0.00】

This function code determin auxiliary frequency value when H2.01=0.

H2.03 Base of auxiliary frequency for the operation	Setting Range:0～1 【0】

0：Relative to maximum frequency

1：Relative to main frequency

H2.04 Range of auxiliary frequency	Setting Range:0%～150% 【0】

H2.03 and H2.03 are used to set the adjustment range of the auxiliary frequency source.。

Notice:

If relative to main frequency, the setting range of the auxiliary frequency varies according to the main frequency.

H2.05 Main/auxiliary frequency operation relationship	Setting Range:0～3	【0】

0：Main frequency + auxiliary frequency

1：Main frequency - auxiliary frequency

2：Maximum (Main/auxiliary frequency)

3：Minimum (Main/auxiliary frequency)

H2.06 Running mode when set frequency lower than frequency lower limit	Setting Range:0～2	【0】

0：Run at frequency lower limit；

1：Stop；

2：Run at zero speed

H2.07 JOG running frequency	Setting Range:0.00Hz～maximum frequency	【0.00】

H2.08 Jump frequency 1 lower limit	Setting Range:0.00Hz～maximum frequency	【0.00】
H2.09 Jump frequency 1 upper limit	Setting Range:0.00Hz～maximum frequency	【0.00】
H2.10 Jump frequency 2 lower limit	Setting Range:0.00Hz～maximum frequency	【0.00】
H2.11 Jump frequency 2 lower limit	Setting Range:0.00Hz～maximum frequency	【0.00】

If the set frequency is within the frequency jump range, the actual running frequency is the jump frequency close to the set frequency. Setting the jump frequency helps to avoid the mechanical resonance point of the load.
The T5000 supports two jump frequencies, as shown in the figure 5-6.

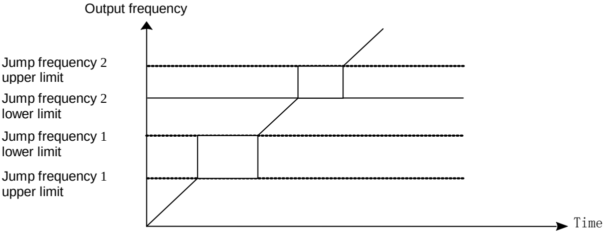


Figure5-6 Principle of the jump frequencies

H2.12 Acceleration/Deceleration time unit	Setting Range:0～2	【0】

0：0.01s；1：0. 1s；2：1s

To satisfy requirements of different applications, the T5000 provides three acceleration/deceleration time units, 1s, 0.1s and 0.01s.

Notice:

Modifying this parameter will make the displayed decimal places change and corresponding acceleration/deceleration time also change.。

H2.13 Acceleration/Deceleration mode	SettingRange:0～1 【0】

0：Linear acceleration/deceleration

The output frequency increases or decreases in linear mode. The T5000 provides four group of acceleration/deceleration time, which can be selected by using H6.16 to H6.17

1：S-curve acceleration/deceleration

The output frequency increases or decreases along the S curve. This mode is generally used in the applications where start and stop processes are relatively smooth, such as elevator and conveyor belt. H2.14 and H2.15 respectively define the time proportions of the start segment and the end segment.

H2.14 S Time proportion of S-curve start segment	Setting Range:0.0%～100.0% 【30.0】
H2.15 S Time proportion of S-curve end segment	Setting Range:0.0%～100.0% 【30.0】

These two parameters respectively define the time proportions of the start segment and the end segment of S-curve acceleration/deceleration. They must satisfy the requirement: H2.14 + H2.15≤ 100.0%.

In Figure 5-7, t1 is the time defined in H2.14, within which the slope of the output frequency change increases gradually. t2 is the time defined in H2.15, within which the slope of the output frequency change gradually decreases to 0. Within the time between t1 and t2,the slope of the output frequency change remains unchanged, that is, linear acceleration/deceleration.

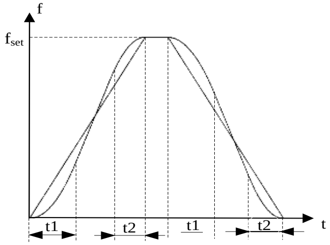


Figure5-7 S-curve acceleration/deceleration

H2.16 Frequency switchover point between acceleration time 1 and acceleration time 2	0.00Hz～maximum frequency 【0.00】
H2.17 Frequency switchover point between deceleration time 1 and deceleration time 2	Setting Range:0.00Hz～maximum frequency 【0.00】

This function is valid when motor 1 is selected and acceleration/deceleration time switchover is not performed by means of DI terminal. It is used to select different groups of acceleration/deceleration time based on the running frequency range rather than DI terminal during the running process of the AC drive.

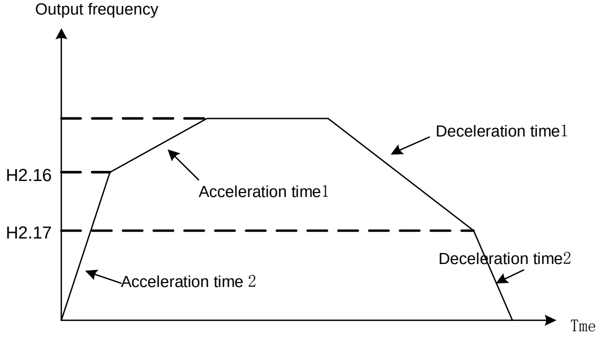


Figure5-8 Acceleration/deceleration time switchover

During acceleration, if the running frequency is smaller than the value of H2.16, acceleration time 2 is selected. If the running frequency is larger than the value of H2.16, acceleration time 1 is selected.

During deceleration, if the running frequency is larger than the value of H2.17, deceleration time 1 is selected. If the running frequency is smaller than the value of H2.17, deceleration time 2 is selected.

H2.18 Acceleration time 2	Setting Range:0.0s～6500.0s 【0.00】
H2.19 Deceleration time 2	Setting Range:0.0s～6500.0s 【0.00】
H2.20 Acceleration time 3	Setting Range:0.0s～6500.0s 【0.00】
H2.21 Deceleration time 3	Setting Range:0.0s～6500.0s 【0.00】
H2.22 Acceleration time 4	Setting Range:0.0s～6500.0s 【0.00】
H2.23 Deceleration time 4	Setting Range:0.0s～6500.0s 【0.00】

The T5000 provides a total of four groups of acceleration/deceleration time, that is, the preceding three groups and the group defined by H0.10 and H0.11. Definitions of four groups are completely the same. You can switch over between the four groups of acceleration/deceleration time through different state combinations of DI terminals. For more details, see the descriptions of group H.

H2.24 JOG acceleration time	Setting Range:0.0s～6500.0s 【0.00】
H2.25 JOG deceleration time	Setting Range:0.0s～6500.0s 【0.00】

These parameters are used to define the set frequency and acceleration/deceleration time of the AC drive when jogging.。

🕮 Notice:

The startup mode is "Direct start" (H1.00 = 0) and the stop mode is "Decelerate to stop" (H1.07 = 0) during jogging.

5.4 Motor 1 Parameters（Group H3）

H3.00 Rated motor power	Setting Range：0.1KW～1000.0KW

H3.01 Rated motor frequency	Setting Range：0.01HZ～maximum frequency
H3.02 Rated motor rotational speed	Setting Range：1rpm～65535rpm
H3.02 Rated motor voltage	Setting Range: 0v～2000v
H3.04 Rated motor current	Setting Range：0.01A～655.35 A

Set the parameters according to the motor nameplate no matter whether V/F control or vector control is adopted.
To achieve better V/F or vector control performance, motor auto-tuning is required. The motor auto-tuning accuracy depends on the correct setting of motor nameplate parameters.

H3.05 Stator resistance	Setting Range：0.001Ω～65.535Ω（Model dependent）
H3.06 Rotor resistance	Setting Range：0.001Ω～65.535Ω（Model dependent）
H3.07 Leakage inductive reactance	Setting Range：0.01mH～655.35mH（Model dependent）
H3.08 Mutual inductive reactance	Setting Range：0.01mH～655.35mH（Model dependent）
H3.09 No-load current	Setting Range：0.01A～655.35 A（Model dependent）

The specific meaning of above motor parameters as shown in the figure 5-9

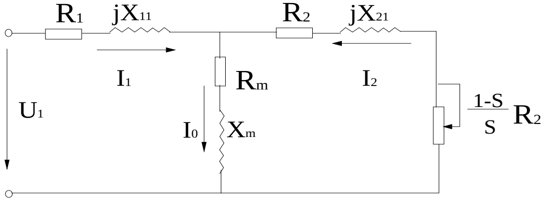


Figure 5-9 The specific meaning of motor parameters

The specific meaning of parameters R_1、X_{1l}、R_2、X_{2l}、X_m、I_0 are：stator resistance、stator leakage inductive reactance、rotor resistance、rotor leakage inductive reactance、mutual inductive reactance、no-load current。
H3.05 to H3.09 are synchronous motor parameters. These parameters are unavailable on the nameplate of most synchronous motors and can be obtained by means of "Synchronous motor no-load auto-tuning".
Each time "Rated motor power" (H3.00) is changed, the AC drive automatically modifies the values of H3.05 to H3.09.

H3.10～H3.13	Reserve

H3.14 Auto-tuning selection	Setting Range：0、1、2

H3.14 can be used to measure and write-in the motor's parameters automatically。

0：Auto-tuning is disabled

1：Motor static auto-tuning

Before starting auto-tuning, values on the motor' s nameplate must be input correctly (H3.00～H3.04)When starting auto-tuning to a standstill motor, the stator's resistance (%R1), rotor's resistance (%R2) and the leakage inductance (%X1) will be measured and the measured values will be written into H3.05, H3.06and H3.07automatically.

2: Rotating auto-tuning

When starting a rotating auto-tuning, at first, the motor is in standstill status, and the stator's resistance (R_1), rotor's resistance (R_2) and the leakage inductance (X_{1l}) will be measured, and then the motor begins to rotate, mutual inductance (X_m), I_0 will be measured and written into H3.05, H3.06, H3.07, H3.08 and H3.09 automatically.

After auto-tuning, H3.14 will be set to 0 automatically.

Auto-tuning procedures:

1) Set the "H3.01 rated frequency" and "H3.03 rated voltage" correctly according to the motor's feature;

2) Set the H3.00, H3.02 and H3.04 correctly;

3) If H3.14 is set to 2, Acc time (H0.10) and Dec time (H0.11) should be set correctly and remove the load from the motor and check the safety;

4) Set H3.14 to 1 or 2, press PRG, and then press RUN to start auto-tuning;

5) When the operating LED turns off, that means the auto-tuning is over.

Notice:

When setting H3.14 to 2, you may increase Acc/Dec time if over-current or over-voltage fault occurs in the auto-tuning process;
When setting H3.14 to 2, the motor's load must be removed before starting rotating auto-tuning;
The motor must be in standstill status before starting the auto-tuning, otherwise the auto-tuning cannot be executed normally;
If it is inconvenient to start auto-tuning (e.g. the motor cannot break away from the load), or you don't require much on motor's control performance, you can use stationary auto-tuning or even disable the function. You may input the values on the motor's nameplate correctly (H3.00 ~ H3.04).
If the auto-tuning function is unavailable and there is motor's parameters on the nameplate, you should input the values correctly (H3.00 ~ H3.04), and then input the calculated values (H3.05 ~ H3.09). Please set the parameters correctly.
If auto-tuning is not successful, the drive alarms and displays fault E-ALP.

5.5 Motor 1 Vector Control Parameters（Group H4）

H4.00 Speed/Torque control selection	Setting Range：0～1【0】

0: Speed control

1: Torque control

It is used to select the AC drive's control mode: speed control or torque control.it is only valid under SVC control model.

The T5000 provides DI terminals with two torque related functions, The two DI terminals need to be used together with H4.00 to implement speed control/torque control switchover.

H4.01 Speed loop proportional gain 1	Setting Range: 0.1–10.0 【3.0】
H4.02 Speed loop integral time 1	Setting Range: 0.010s～10.000s 【0.500】
H4.03 Speed loop proportional gain 2	Setting Range: 0.1–10.0 【2.0】
H4.04 Speed loop integral time 2	Setting Range: 0.010s～10.000s 【1.000】
H4.05 Switchover frequency 1	Setting Range: 0.00Hz～H4.06 【5.00】
H4.06 Switchover frequency 2	Setting Range: H4.05 ～ maximum frequency 【10.00】

Speed loop PI parameters vary with running frequencies of the AC drive.

- If the running frequency is less than or equal to "Switchover frequency 1" (H4.05), the speed loop PI parameters are H4.01 and H4.02.
- If the running frequency is equal to or greater than "Switchover frequency 2" (H4.06), the speed loop PI parameters are H4.03 and H4.04.
- If the running frequency is between H4.05 and H4.06, the speed loop PI parameters are obtained from the linear switchover between the two groups of PI parameters, as shown in Figure 5-10.

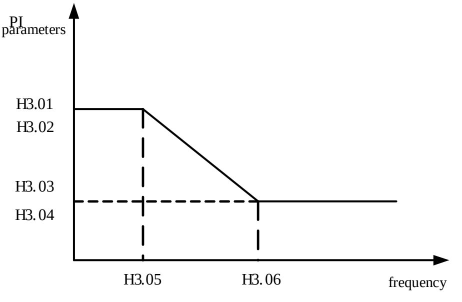


Figure 5-10 Relationship between running frequencies and PI parameters

Notice:

Improper PI parameter setting may cause too large speed overshoot, and overvoltage fault may even occur when the overshoot drops.。

H4.07 Time constant of speed loop filter	Setting Range: 0～100 【80】

In the vector control mode, the output of the speed loop regulator is torque current reference. This parameter is used to filter the torque references. It need not be adjusted generally and can be increased in the case of large speed fluctuation. In the case of motor oscillation, decrease the value of this parameter properly.

If the value of this parameter is small, the output torque of the AC drive may fluctuate greatly, but the response is quick.

H4.08~H4.09	Reserved

H4.10 Vector control slip gain	Setting Range： 50%～200%【100%】

For SVC, it is used to adjust speed stability accuracy of the motor. When the motor with load runs at a very low speed, increase the value of this parameter; when the motor with load runs at a very large speed, decrease the value of this parameter.

H4.11 Torque upper limit source in speed control mode	Setting Range： 0～5 【0】
H4.12 Digital setting of torque upper limit in speed control mode	Setting Range：0.0%～200%【150%】

In the speed control mode, the maximum output torque of the AC drive is restricted by H4.11. If the torque upper limit is analog, pulse or communication setting, 100% of the setting corresponds to the value of H4.12, and 100% of the value of H4.12 corresponds to the AC drive rated torque.
For details on the AI1, AI2 and AI3 setting, see the description of the AI curves in group H7.
For details on the pulse setting, see the description of H7.15 to H7.19.
When the AC drive is in communication with the master, if H4.11 is set to 5 “communication setting”, H4.12 “Digital setting of torque upper limit in speed control mode” can be set via communication from the master.
In other conditions, the host computer writes data -100.00% to 100.00% by the communication address 0x1000, where 100.0% corresponds to the value of H4.12. The communication protocol can be Modbus, CANopen, CANlink or Profibus-DP.

H4.13~H4.18	Reserved

H4.19 Torque setting source in torque mode	Setting Range： 0～5【0】
H4.21 Torque digital setting in torque mode	Setting Range： 0.0%～200%【150%】

H4.19 is used to set the torque setting source in torque mode.
The description of H4.19 is as reference as H4.11.

H4.22 Forward maximum frequency in torque control	Setting Range： 0.00HZ～maximum frequency【50.00】
H4.23 Reverse maximum frequency in torque control	Setting Range： 0.00HZ～maximum frequency【50.00】

Two parameters are used to set the maximum frequency in forward or reverse rotation in torque control mode .In torque control, if the load torque is smaller than the motor output torque, the motor's rotational speed will rise continuously. To avoid runaway of the mechanical system, the motor maximum rotating speed must be limited in torque control.
You can implement continuous change of the maximum frequency in torque control dynamically by controlling the frequency upper limit.

H4.24 Acceleration time in torque control	Setting Range： 0.00s～65000s【0.00】
H4.25 Deceleration time in torque control	Setting Range： 0.00s～65000s【0.00】

In torque control, the difference between the motor output torque and the load torque determines the speed change rate of the motor and load. The motor rotational speed may change quickly and this will result in noise or too large mechanical stress. The setting of acceleration/deceleration time in torque control makes the motor rotational speed change softly.
However, in applications requiring rapid torque response, set the acceleration/deceleration time in torque control to 0.00s. For example, two AC drives are connected to drive the same load. To balance the load allocation, set one AC drive as master in speed control and the other as slave in torque control. The slave receives the master's output torque as the torque command and must follow the master rapidly. In this case, the acceleration/deceleration time of the slave in torque control is set to 0.0s.

H4.26~H4.30	Reserved

5.6 V/F Control Parameters（Group H5）

H5.00 V/F curve setting	Setting Range：0~4【0】

0：Linear V/F

It is applicable to common constant torque load。

1：Multi-point V/F

It is applicable to special load such as dehydrator and centrifuge. Any such V/F curve can be obtained by setting parameters of H5.01~H5.06

2：Square V/F

It is applicable to centrifugal loads such as fan and pump.。

3：V/F complete separation

In this mode, the output frequency and output voltage of the AC drive are independent.
The output frequency is determined by the frequency source, and the output voltage is determined by "Voltage source for V/F separation"(H5.13)

4：V/F half separation

In this mode, V and F are proportional and the proportional relationship can be set in H5.12. The relationship between V and F are also related to the rated motor voltage and rated motor frequency in Group H3.
Assume that the voltage source input is X (0 to 100%), the relationship between V and F is:

V/F = 2 x X x (Rated motor voltage)/(Rated motor frequency)

H5.01 Multi-point V/F frequency F1	Setting Range：0.00HZ～H5.03【0.00Hz】
H5.02 Multi-point V/F voltage V1	Setting Range：0%～100.0％【0.0％】
H5.03 Multi-point V/F frequency F2	Setting Range：H5.01～H5.05【0.00Hz】
H5.04 Multi-point V/F voltage V2	Setting Range：0%～100.0％【0.0％】
H5.05 Multi-point V/F frequency F3	Setting Range：H5.05～rated motor frequency【0.00Hz】
H5.06 Multi-point V/F voltage V3	Setting Range：0%～100.0％【0.0％】

These six parameters are used to define the multi-point V/F curve.
The multi-point V/F curve is set based on the motor's load characteristic. The relationship

between voltages and frequencies is:V1 < V2 < V3, F1 < F2 < F3
At low frequency, higher voltage may cause overheat or even burnt out of the motor and overcurrent stall or overcurrent protection of the AC drive.

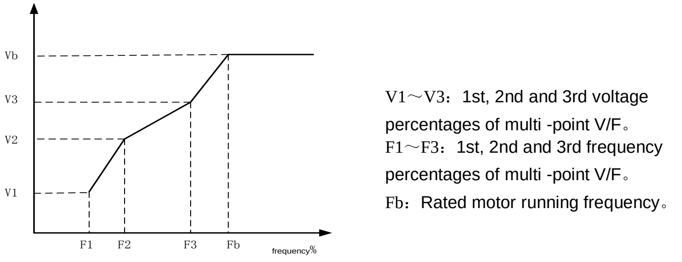


Figure5－11 Setting of multi-point V/F curve

H5.07 V/F Torque boost	Setting Rang：0%~30% 【0%】
H5.08 V/F Cut-off frequency of torque boost	SettingRang: 0.00HZ~ maximum output frequency【50.00】

To compensate the low frequency torque characteristics of V/F control, you can boost the output voltage of the AC drive at low frequency by modifying H5.07.
If the torque boost is set to too large, the motor may overheat, and the AC drive may suffer overcurrent.
If the load is large and the motor startup torque is insufficient, increase the value of H5.07
If the load is small, decrease the value of H5.07. If it is set to 0.0, the AC drive performs automatic torque boost. In this case, the AC drive automatically calculates the torque boost value based on motor parameters including the stator resistance.H5.08 specifies the frequency under which torque boost is valid. Torque boost becomes invalid when this frequency is exceeded, as shown in the following figure.

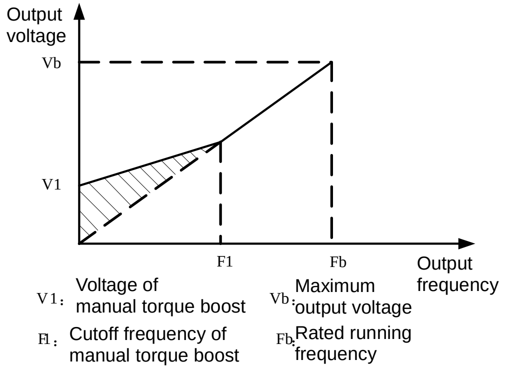


Figure 5-12 V/F Manual torque boost

H5.09 V/F slip compensation gain	Setting Range：0%~200% 【0】

This parameter is valid only for the asynchronous motor.
It can compensate the rotational speed slip of the asynchronous motor when the load of the motor increases, stabilizing the motor speed in case of load change. If this parameter is set to 100%, it indicates that the compensation when the motor bears rated load is the rated motor slip. The rated motor slip is automatically obtained by the AC drive through

calculation based on the rated motor frequency and rated motor rotational speed in group H3.
Generally, if the motor rotational speed is different from the target speed, slightly adjust this parameter。

H5.10 V/F over-excitation gain	Setting Range：0~1 【1】

0：Disable

1：Enable

During deceleration of the AC drive, over-excitation can restrain rise of the bus voltage,preventing the overvoltage fault. The larger the over-excitation is, the better the restraining result is.
Increase the over-excitation gain if the AC drive is liable to overvoltage error during deceleration. However, too large over-excitation gain may lead to an increase in the outputcurrent.

H5.11 V/F oscillation suppression gain	Setting Range：0~100【30】

Set this parameter to a value as small as possible in the prerequisite of efficient oscillation suppression to avoid influence on V/F control.
Set this parameter to 0 if the motor has no oscillation. Increase the value properly only when the motor has obvious oscillation. The larger the value is, the better the oscillation suppression result will be.
When the oscillation suppression function is enabled, the rated motor current and noload current must be correct. Otherwise, the V/F oscillation suppression effect will not be satisfactory.

H5.12 V/F Voltage source for V/F separation	Setting Range：0~8【0】

0：Digital setting (H5.13)

The output voltage is set directly in H5.13。

1：The output voltage is set by AI terminals AI1

2：The output voltage is set by AI terminals AI2

3：The output voltage is set by AI terminals AI3

4、PULSE setting

The output voltage is set by pulses of the terminal D7。

Pulse setting specification: voltage range 9–30 V, frequency range 0–100 kHz。

5、Multi-reference

If the voltage source is multi-reference, parameters in group H5 and LB must be set to determine the corresponding relationship between setting signal and setting voltage. 100.0% of the multi-reference setting in group LB corresponds to the rated motor voltage.

6、Simple PLC

If the voltage source is simple PLC mode, parameters in group LBmust be set to determine the setting output voltage

7、PID

The output voltage is generated based on PID closed loop. For details, see the description of PID in group LA。

8、Communication setting

The output voltage is set by the host computer by means of communication。

The voltage source for V/F separation is set in the same way as the frequency source. For details, see H0.01. 100.0% of the setting in each mode corresponds to the rated motor voltage. If the corresponding value is negative, its absolute value is used.

H5.13 V/F Voltage digital setting for V/F separation	Setting Range: 0V~ rated motor voltage 【0】

The output voltage is set directly in H5.13。

H5.14 V/F Voltage rise time of V/F separation	Setting Range: 0s~1000.0s 【0】

H5.14 indicates the time required for the output voltage to rise from 0 V to the rated motor voltage shown as t1 in the following figure.:

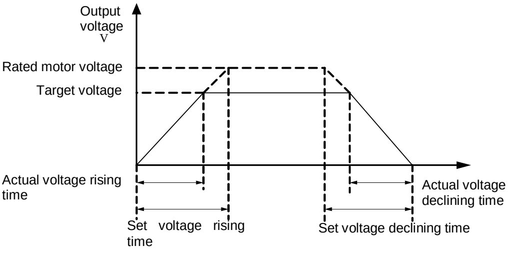


Figure5-13 Voltage of V/F separation

H5.15 V/F Torque boost (motor 2)	Setting Range: 0.1%～30.0% 【0%】
H5.16 V/F Cut-off frequency of torque boost(motor 2)	Setting Range: 0~100 【30】

5.7 Input Terminals（Group H6）

H6.00 D1 function selection	Setting Range:0～50 【1】
H6.01 D2 function selection	Setting Range:0～50 【2】
H6.02 D3 function selection	Setting Range:0～50 【4】
H6.03 D4 function selection	Setting Range:0～50 【7】
H6.04 D5 function selection	Setting Range:0～50 【6】
H6.05 D6 function selection	Setting Range:0～50 【0】
H6.06 D7 function selection	Setting Range:0～50 【0】
H6.07 D8 function selection	Setting Range:0～50 【0】
H6.08 D9 function selection	Setting Range:0～50 【0】
H6.09 D10 function selection	Setting Range:0～50 【0】

The following table lists the functions available for the DI terminals.

Table5－1 Multi-function input selection

Value	Function	Description	Function
0	No function	1	Forward RUN（FWD）

Value	Function	Description	Function
2	Reverse RUN（REV）	3	Three-line control
4	Forward JOG（FJOG）	5	Reverse JOG（RJOG）
6	Coast to stop	7	Fault reset（RESET）
8	Normally open (NO) input of external fault	9	Terminal UP
10	Terminal DOWN	11	UP and DOWN setting clear (terminal, operation panel)
12	Multi-reference terminal 1	13	Multi-reference terminal 2
14	Multi-reference terminal 3	15	Multi-reference terminal 4
16	Terminal 1 for acceleration/ deceleration time selection	17	Terminal 2 for acceleration/ deceleration time selection
18	Normally close (NO) input of external fault	19	External STOP terminal 1
20	Frequency setting switchover	21	Reserved
22	Switchover between main frequency source and preset frequency	23	Switchover between auxiliary frequency source and preset frequency
24	Command source switchover terminal 1	25	PID integral pause
26	Reverse PID action direction	27	PID integral pause
28	PID parameter switchover	29	Counter input
30	Counter reset	31	Length count input
32	Length reset	33	Terminal setting time valid
34	Swing pause	35	Reserved
36	Acceleration/Deceleration prohibited	37	Immediate DC braking
38	Command source switchover terminal 2	39	Frequency modification forbidden
40	Motor selection terminal	41	Speed control/Torque control switchover
42	RUN pause	43	User-defined fault 1
44	User-defined fault 2	45	PLC status reset
46	Torque control prohibited	47	Emergency stop
48	External STOP terminal 2	49	Deceleration DC braking
50	Clear the current running time		

1～2：Forward RUN and Reverse RUN

The terminal is used to control forward or reverse RUN of the AC drive.。

3：Three-line control

The terminal determines three-line control of the AC drive. For details, see the description of H6.21。

4～5：Forward JOG and Reverse JOG

FJOG indicates forward JOG running, while RJOG indicates reverse JOG running. The JOG frequency,acceleration time and deceleration time are described respectively in H2.07、H2.24、H2.25。

6：Coast to stop

The AC drive blocks its output, the motor coasts to rest and is not controlled by the AC drive. It is the same as coast to stop described in H1.07

7：Fault reset（RESET）

The terminal is used for fault reset function, the same as the function of RESET key on the operation panel. Remote fault reset is implemented by this function.

8：Normally open /close input of external fault

If this terminal becomes ON, the AC drive reports “E-DIE” and performs the fault protection action.

As the figure 5-14 showing ，D5 is normally open input ，D6 is normally close input,KM is fault relay。

9～10：Terminal UP / Terminal DOWN

If the frequency is determined by external terminals, the terminals with the two functions are used as increment and decrement commands for frequency modification.

When the frequency source is digital setting, they are used to adjust the frequency.

11：UP and DOWN setting clear

If the frequency source is digital setting, the terminal is used to clear the modification by using the UP/DOWN function or the increment/decrement key on the operation panel, returning the set frequency to the value of H0.02。

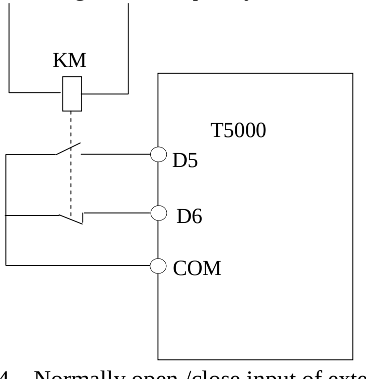


Figure5-14 Normally open /close input of external fault

12～15：Multi-reference terminal

The setting of 16 speeds or 16 other references can be implemented through combinations of 16 states of these four terminals.As below:

K4	K3	K2	K1	Reference Setting	Corresponding Parameter
OFF	OFF	OFF	OFF	Reference 0	Lb.00
OFF	OFF	OFF	ON	Reference 1	Lb.01
OFF	OFF	ON	OFF	Reference 2	Lb.02
OFF	OFF	ON	ON	Reference 3	Lb.03

OFF	ON	OFF	OFF	Reference 4	Lb.04
OFF	ON	OFF	ON	Reference 5	Lb.05
OFF	ON	ON	OFF	Reference 6	Lb.06
OFF	ON	ON	ON	Reference 7	Lb.07
ON	OFF	OFF	OFF	Reference 8	Lb.08
ON	OFF	OFF	ON	Reference 9	Lb.09
ON	OFF	ON	OFF	Reference 10	Lb.10
ON	OFF	ON	ON	Reference 11	Lb.11
ON	ON	OFF	OFF	Reference 12	Lb.12
ON	ON	OFF	ON	Reference 13	Lb.13
ON	ON	ON	OFF	Reference 14	Lb.14
ON	ON	ON	ON	Reference 15	Lb.15

If the frequency source is multi-reference, the value 100% of Lb.00~ Lb.15 corresponds to the value of F0-10 (Maximum frequency).
Besides the multi-speed function, the multi-reference can be also used as the PID setting source or the voltage source for V/F separation, satisfying the requirement on switchover of different setting values.

16～17：Terminals for acceleration/deceleration time selection

Table5-2 State combinations of two terminals for acceleration/deceleration time selection

Terminal 2	Terminal 1	Acceleration/Deceleration Time Selection
OFF	OFF	Acceleration/Deceleration time 1
OFF	ON	Acceleration/Deceleration time 2
ON	OFF	Acceleration/Deceleration time 3
ON	ON	Acceleration/Deceleration time 4

Two terminals for acceleration/deceleration time selection have four state combinations, as listed in the following table.。

19：External STOP terminal 1
In operation panel mode, this terminal can be used to stop the AC drive, equivalent to the function of the STOP key on the operation panel.。

20：Frequency source switchover
The terminal is used to perform switchover between two frequency sources according to the setting in H2.00。

21：Reserved

22：Switchover between main frequency source and preset frequency
After this terminal becomes ON, the frequency source is replaced by the preset frequency set in H0.02

23：Switchover between auxiliary frequency source and preset frequency
After this terminal is enabled, the frequency source Y isreplaced by the preset frequency set H2.02。

24：Command source switchover terminal
If the command source is set to terminal control (H0.03=1), this terminal is

used to perform switchover between terminal control and operation panel control.

If the command source is set to communication control (H0.03=1), this terminal is used to perform switchover between communication control and operation panel control.

25：PID pause

PID is invalid temporarily. The AC drive maintains the current frequency output without supporting PID adjustment of frequency source.。

26：Reverse PID action direction

After this terminal becomes ON, the PID action direction is reversed to the direction set in LA.23.

27：PID integral pause

After this terminal becomes ON, the integral adjustment function pauses. However, the proportional and differentiation adjustment functions are still valid.

28：PID parameter switchover

If the PID parameters switchover performed by means of DI terminal (LA.07=1), the PID parameters are LA.04～LA.06 when the terminal becomes OFF; the PID parameters are LA.10～LA.12when this terminal becomes ON.

29：Counter input

This terminal is used to count pulses.

30：Counter reset

This terminal is used to clear the counter status。

31：Length count input

This terminal is used to count the length

32：Length reset

This terminal is used to clear the length.

33：Terminal setting time valid

If the terminal is valid,setting time begin,when the time reached(HC.40 setting),the drive stop.

34：Swing pause

The AC drive outputs the central frequency, and the swing frequency function pauses.

35：Reserved

36：Acceleration/Deceleration prohibited

It enables the AC drive to maintain the current frequency output without being affected by external signals (except the STOP command).。

37：Immediate DC braking

After this terminal becomes ON, the AC drive directly switches over to the DC braking state.

38：Command source switchover terminal 2

It is used to perform switchover between terminal control and communication control. If the command source is terminal control, the system will switch over to communication control after this terminal becomes ON.

39：Frequency modification forbidden

After this terminal becomes ON, the AC drive does not respond to any frequency modification.

40：Motor selection terminal

Switchover among the two groups of motor parameters can be implemented through the four state combinations two terminals.

41：Speed control/Torque control switchover

This terminal enables the AC drive to switch over between speed control and torque control. When this terminal becomes OFF, the AC drive runs in the mode set in H4.00。When this terminal becomes ON, the AC drive switches over to the other control mode.

42：RUN pause

The AC drive decelerates to stop, but the running parameters are all memorized, such as PLC, swing frequency and PID parameters. After this function is disabled, the AC drive resumes its status before stop.

43～44：User-defined fault 1、2

If these two terminals become ON, the AC drive reports E-ud1and E-ud2，and performs fault protection actions based on the setting in HA.19。

45：PLC status reset

The terminal is used to restore the original status of PLC control for the AC drive when PLC control is started again after a pause.

46：Torque control prohibited

The AC drive is prohibited from torque control and enters the speed control mode.

47：Emergency stop

When this terminal becomes ON, the AC drive stops within the shortest time. During the stop process, the current remains at the set current upper limit. This function is used to satisfy the requirement of stopping the AC drive in emergency state.

48：External STOP terminal 2

In any control mode (operation panel, terminal or communication), it can be used to make the AC drive decelerate to stop. In this case, the deceleration time is deceleration time 4.

49：Deceleration DC braking

When this terminal becomes ON, the AC drive decelerates to the initial frequency of stop DC braking and then switches over to DC braking state.

50：Clear the current running time

When this terminal becomes ON, the AC drive's current running time is cleared. This function must be supported by HC.38 and HC.41.

H6.10	Function selection for AI1 used as DI	Setting Range:0～50【0】
H6.11	Function selection for AI2 used as DI	Setting Range:0～50【0】
H6.12	Function selection for AI3 used as DI	Setting Range:0～50【0】

The functions of these parameters are to use AI as DI. When AI is used as DI, the AI state is high level if the AI input voltage is 7 V or higher and is low level if the AI input voltage is 3V or lower. The AI state is hysteresis if the AI input voltage is between 3 V and 7 V. A1-10 is used to determine whether high level valid or low level valid when AI is used as DI.

The setting of AIs (used as DI) function is the same as that of DIs. For details, see the descriptions of group H6

The following figure takes AI input voltage as an example to describe the relationship between AI input voltage and corresponding DI state.

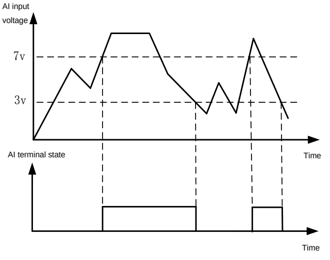


Figure5-15 Relationship of AI input voltage and corresponding DI status

H6.13	DI filter time	Setting Range: 0.000s～1.000s【0.010】

It is used to set the software filter time of DI terminal status. If DI terminals are liable to interference and may cause malfunction, increase the value of this parameter to enhance the anti-interference capability. However, increase of DI filter time will reduce the response of DI terminals.

H6.14	DI1 delay time	Setting Range: 0.0s～3600.0s 【0】
H6.15	DI2 delay time	Setting Range: 0.0s～3600.0s 【0】
H6.16	DI3 delay time	Setting Range: 0.0s～3600.0s 【0】

These parameters are used to set the delay time of the AC drive when the status of DI terminals changes.

Currently, only DI1, DI2 and DI3 support the delay time function.

H6.17	DI valid mode selection 1	Setting Range:00000～11111【00000】
H6.18	DI valid mode selection 2	Setting Range: 00000～11111【00000】
H6.19	Function selection for AI used as DI	Setting Range: 0000～111 【000】

These parameters are used to set the valid mode of DI terminals.

0: High level valid ,1: Low level valid

The DI terminal is valid when being connected with COM, and invalid when being disconnected from COM.

The DI terminal is invalid when being connected with COM, and invalid when being disconnected from COM.

H6.17:

Unit's digit (DI1 valid mode) , Ten's digit (DI2 valid mode), Hundred's digit (DI3 valid mode) Thousand's digit (DI4 valid mode), Ten thousand's digit (DI5 valid mode)

H6.18：

Unit's digit (DI6 valid mode) , Ten's digit (DI7 valid mode), Hundred's digit (DI8 valid mode)

Thousand's digit (DI9 valid mode), Ten thousand's digit (DI10 valid mode)

H6.19：

Unit's digit (AI1 valid mode) , Ten's digit (AI2 valid mode), Hundred's digit (AI3 valid mode)

H6.20 Terminal UP/DOWN rate	Setting Range: 0.001Hz～65.535 【1.000】

It is used to adjust the rate of change of frequency when the frequency is adjusted by means of terminal UP/DOWN.

H6.21 Terminal command mode	Setting Range：0～3【0】

This parameter is used to set the mode in which the AC drive is controlled by external terminals。

0：Two-line mode 1

K_2	K_1	RUN command
0	0	Stop
1	0	Reverse Run
0	1	Forward Run
1	1	Stop

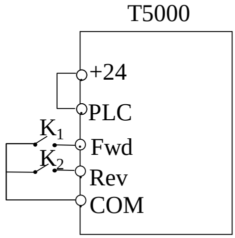


Figure5-16 Setting of two-line mode 1

1：Two-line mode 2

K_2	K_1	RUN command
0	0	Stop
1	0	Stop
0	1	Forward Run
1	1	Reverse Run

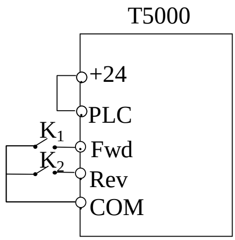


Figure5-17 Setting of two-line mode 2

2：Three-line mode 1

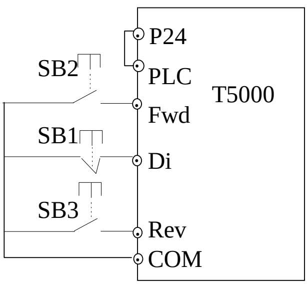


Figure5-18 Setting of three-line mode 1

As shown in the preceding figure：

SB1： stop button

SB2： forward rotation button

SB3：reverse rotation button

3： Three-line mode 2

As shown in the preceding figure：

SB1： stop button

SB2： run button

K	Running direction
0	Forward
1	Reverse

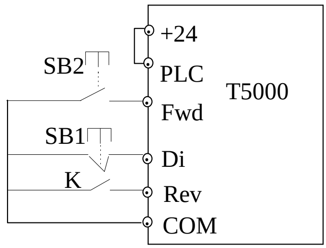


Figure5-19 Setting of three-line mode 2

5.8 Input Terminals（GroupH7）

H7.00 AI curve 1 minimum input	Setting Range：0.01v～H7.02 【0.00】
H7.01 Corresponding setting of AI curve 1 minimum input	Setting Range： -100.0%～+100.0% 【0】
H7.02 AI curve 1 maximum input	Setting Range：H7.00～+10.00V 【10.00v】
H7.03 Corresponding setting of AI curve 1 maximum input	Setting Range：-100.0%～+100.0% 【100.0】
H7.04 AI1 filter time	Setting Range： 0.00s～10.00s 【0.10】

These parameters are used to define the relationship between the analog input voltage and the corresponding setting. When the analog input voltage exceeds the maximum value (H7.02), the maximum value is used. When the analog input voltage is less than the minimum value (H7.00), the value set in H7.21 (Setting for AI less than minimum input) is used.

When the analog input is current input, 1 mA current corresponds to 0.5 V voltage.

AI1 filter time is used to set the software filter time of AI1. If the analog input is liable to interference, increase the value of this parameter to stabilize the detected analog input. However, increase of the AI filter time will slow the response of analog detection. Set this parameter properly based on actual conditions.

In different applications, 100% of analog input corresponds to different nominal values. For details, refer to the description of different applications.

Two typical setting examples are shown in the following figure.

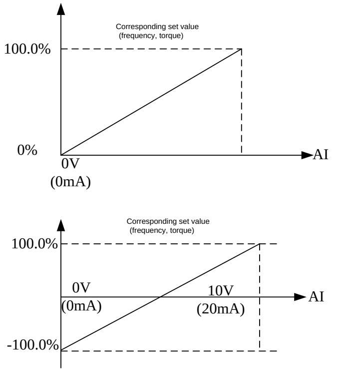


Figure5-20 Corresponding relationship between analog input and set values

H7.05 AI curve 2 minimum input	Setting Range: 0.01v～H7.07 【0.00】
H7.06 Corresponding setting of AI curve 2 minimum input	Setting Range: -100.0%～+100.0% 【0】
H7.07 AI curve 2 maximum input	Setting Range: H7.05～+10.00V 【10.00v】
H7.08 Corresponding setting of AI curve 2 maximum input	Setting Range: -100.0%～+100.0% 【100.0】
H7.09 AI2 filter time	Setting Range: 0.00s～10.00s 【0.10】

H7.10 AI curve 3 minimum input	Setting Range: -10.00v～H7.13 【0.00】
H7.11 Corresponding setting of AI curve 3 minimum input	Setting Range: -100.0%～+100.0% 【0】
H7.12 AI curve 3 maximum input	Setting Range: H7.10～+10.00V 【10.00v】
H7.13 Corresponding setting of AI curve 3 maximum input	Setting Range: -100.0%～+100.0% 【100.0】
H7.14 AI3 filter time	Setting Range: 0.00s～10.00s 【0.10】

The method of setting AI2 and AI3 functions is similar to that of setting AI1 function.。

H7.15 Pulse minimum input	Setting Range: 0.00kHz～H7.17 【0.00】
H7.16 Corresponding setting of pulse minimum input	Setting Range: -100.0%～100.0% 【000.0】
H7.17 Pulse maximum input	Setting Range: H7.15～100.00kHz 【50.00kHz】
H7.18 Corresponding setting of pulse maximum input	Setting Range: -100.0%～+100.0% 【100.0%】
H7.19 Pulse filter time	Setting Range: 0.00s～10.00s 【0.10s】

These parameters are used to set the relationship between D7/HDI pulse input and corresponding settings. The pulses can only be input by D7/HDI. The method of setting this function is similar to that of setting AI1 function.

H7.20 AI curve selection	Setting Range: 333～000 【321】

The unit's digit, ten's digit and hundred's digit of this parameter are respectively used to select the corresponding curve of AI1, AI2 and AI3. Any of the five curves can be selected for AI1, AI2 and AI3.

Curve 1, curve 2 and curve 3 are all 2-point curves, set in group H7.

H7.21 Setting for AI less than minimum input	Setting Range：333～000 【321】

This parameter is used to determine the corresponding setting when the analog input voltage is less than the minimum value.

The unit's digit, ten's digit and hundred's digit of this parameter respectively correspond to the setting for AI2, AI2 and AI3.

If the value of a certain digit is 0, when analog input voltage is less than the minimum input, the corresponding setting of the minimum input (H7.01、H7.06、H7.10) is used.

If the value of a certain digit is 1, when analog input voltage is less than the minimum input, the corresponding value of this analog input is 0.0%.

5.9 Output Terminals（Group H8）

H8.00 Y2 terminal output mode	Setting Range：0～1 【0】

0：Pulse output (Y2-HDO)

1：Switch signal output (Y2)

The FM terminal is programmable multiplexing terminal. It can be used for high-speed pulse output, with maximum frequency of 50 kHz. Refer to H8.01 for relevant functions of Y2. It can also be used as open collector switch signal output (FMR).

H8.01 Y2 function selection	Setting Range：0～39 【0】
H8.02 Relay 1 function	Setting Range：0～39 【3】
H8.03 Relay 2 function	Setting Range：0～39 【0】
H8.04 Y1 function selection	Setting Range：0～39 【1】
H8.05 Y3 function selection	Setting Range：0～39 【4】

These five parameters are used to select the functions of the five digital output terminals. T/A-T/B-T/C and P/A-P/B-P/C are respectively the relays on the control board and the extension card.

The functions of the output terminals are described in the following table:

Table5—3 Functions of output terminals

Value	Function	Value	Function
0	No output	1	AC drive running
2	Frequency reached	3	Fault output (stop)
4	Frequency-level detection FDT1 output	5	Frequency level detection FDT2 output
6	Zero-speed running (no output at stop)	7	Zero-speed running 2 (having output at stop)
8	Frequency upper limit reached	9	Frequency lower limit reached (no output at stop)

Value	Function	Value	Function
10	Frequency 1 reached	11	Frequency 2 reached
12	Accumulative poweron time reached	13	Accumulative running time reached
14	Timing reached	15	Set count value reached
16	Designated count value reached	17	Length reached
18	Undervoltage state output	19	Motor overload pre-warning
20	AC drive overload prewarning	21	Frequency limited
22	Torque limited	23	Ready for RUN
24	AI1 larger than AI2	25	AI1 input limit exceeded
26	Frequency lower limit reached (having output at stop)	27	Current running time reached
28	Alarm output	29	Fault output
30	Current 1 reached	31	Current 2 reached
32	Load becoming 0	33	Zero current state
34	Module temperature reached	35	Software current limit exceeded
36	Reverse running	37	Motor overheat warning
38	PLC cycle complete	39	Communication setting

0：No output

The terminal has no function

1：AC drive running

When the AC drive is running and has output frequency (can be zero), the terminal becomes ON.

2：Frequency reached

Refer to the descriptions of HC.14。

3：Fault output (stop)

When the AC drive stops due to a fault, the terminal becomes ON.

4：Frequency-leveldetection FDT1 output.

Refer to the descriptions of HC.12、HC.13。

5：Frequency-leveldetection FDT1 output

Refer to the descriptions of HC.15、HC.16。

6：Zero-speed running(no output at stop)

If the AC drive runs with the output frequency of 0, the terminal becomes ON. If the AC drive is in the stop state, the terminal becomes OFF.

7：Zero-speed running 2 (having output at stop)

If the output frequency of the AC drive is 0, the terminal becomes ON. In the state of stop, the signal is still ON.

8：Frequency upper limit reached

If the running frequency reaches the upper limit, the terminal becomes ON.

9：Frequency lower limit reached (having output at stop)

If the running frequency reaches the lower limit, the terminal becomes ON. In the stop state, the signal is still ON.

10：Frequency 1 reached

Refer to the descriptions of HC.17、HC.18.

11：Frequency 2 reached

Refer to the descriptions of HC.19、HC.20.

12：Accumulative poweron time reached

If the AC drive accumulative power-on time exceeds the value set in HC.36, the terminal becomes ON.

13：Accumulative running time reached

If the accumulative running time of the AC drive exceeds the time set in HC.37, the terminal becomes ON

14：Timing reached

If the timing function (HC.38) is valid, the terminal becomes ON after the current running time of the AC drive reaches the set time(HC.41).

15：Set count value reached

The terminal becomes ON when the count value reaches the value set in LC.08.

16：Designated count value reached

The terminal becomes ON when the count value reaches the value set in LC.09

17：Length reached

The terminal becomes ON when the detected actual length exceeds the value set in LC.05。

18：Undervoltage state output

If the AC drive is in undervoltage state, the terminal becomes ON.

19：Motor overload pre-warning

The AC drive judges whether the motor load exceeds the overload pre-warning threshold before performing the protection action. If the pre-warning threshold is exceeded, the terminal becomes ON. For motor overload parameters, see the descriptions of HA.00~HA.02..

20：AC drive overload prewarning

The terminal becomes ON 10s before the AC drive overload protection action is performed.

21：Frequency limited

If the set frequency exceeds the frequency upper limit or lower limit and the output frequency of the AC drive reaches the upper limit or lower limit, the terminal becomes ON.

22：Torque limited

In speed control mode, if the output torque reaches the torque limit, the AC drive enters the stall protection state and meanwhile the terminal becomes ON.。

23：Ready for RUN

If the AC drive main circuit and control circuit become stable, and the AC drive detects no fault and is ready for RUN, the terminal becomes ON.

24：AI1 larger than AI2

When the input of AI1 is larger than the input of AI2, the terminal becomes ON.

25：AI1 input limit exceeded

If AI1 input is larger than the value of HC.30 (AI1 input voltage upper limit) or lower than the value of HC.31 (AI1 input voltage lower limit), the terminal becomes ON.

26：Frequency lower limit reached (having output at stop)

If the running frequency reaches the lower limit, the terminal becomes ON. In the stop state, the signal is still ON.。

27：Current running time reached

If the current running time of AC drive exceeds the value of HC.41, the terminal becomes ON.

28：Alarm output If a fault occurs on the AC drive and the AC drive continues to run, the terminal outputs the alarm signal.

29：Fault output

When the AC drive stops due to a fault, the terminal becomes ON.

30：Current 1 reached

Refer to the descriptions ofHC.25、HC.26。

31：Current 2 reached

Refer to the descriptions of HC.27、HC.28。

32：Load becoming 0

If the load becomes 0, the terminal becomes ON.

33：Zero current state

Refer to the descriptions of HC.21、HC.22。

34：Module temperature reached

If the heatsink temperature of the inverter module (HC.34) reaches the set module temperature threshold (HC.33), the terminal becomes ON.

35：Software current limit exceeded

Refer to the descriptions of HC.23、HC.24。

36：Reverse running

If the AC drive is in the reverse running state, the terminal becomes ON.

37：Motor overheat warning

If the motor temperature reaches the temperature set in HA.26 (Motor overheat warning threshold), the terminal becomes ON. You can view the motor temperature by using ob.37

38：PLC cycle complete

When simple PLC completes one cycle, the terminal outputs a pulse signal with width of 250 ms.

39：Communication setting

Refer to the communication protocol.

H8.06 Y2 function selection	Setting Range：0～16 【0】
H8.07 AO1 function selection	Setting Range：0～16 【0】

H8.08 AO2 function selection	Setting Range: 0～16 【0】

The output pulse frequency of the Y2/H terminal ranges from 0.01 kHz to "Maximum HDO output frequency" (H8.09). The value of H8.09 is between 0.01 kHz and 100.00 kHz.
The output range of AO1 and AO2 is 0–10 V or 0–20 mA. The relationship between pulse and analog output ranges and corresponding functions is listed in the following table.
Relationship between pulse and analog output ranges and corresponding functions:

Value	Function	Range (Corresponding to Pulse or Analog Output Range 0.0%–100.0%)
0	Running frequency	0～Running frequency
1	Set frequency	0～maximum output frequency
2	Output current	0～2 times of rated motor current
3	Output current	0.0A～1000.0A
4	Output torque (absolute value)	0～2 times of rated motor torque
5	Output torque (actual value)	-2 times of rated motor torque to 2 times of rated motor torque
6	Output voltage	0～1.2 times of rated AC drive voltage
7	Output voltage	0.0V～1000.0V
8	Motor rotational speed	0～rotational speed corresponding to maximum output frequency
9	Output power	0～2 times of rated power
10	AI1	0V～10V
11	AI2	0V～10V（or 0～20mA）
12	AI3	0V～10V
13	PULSE input	0.01kHz～100.00kHz
14	Communication setting	0.0%～100.0%
15	Length	0～maximum set length
16	Count value	0～maximum count value

H8.09 Maximum Y2 output frequency	Setting Range: 0.01kHz～100.00kHz【50.00kHz】

If the Y2/H terminal is used for pulse output, this parameter is used to set the maximum frequency of pulse output.。

H8.10 Y2 output delay time	Setting Range: 0.0s～3600.0s 【0.0s】
H8.11 Relay 1 output delay time	Setting Range: 0.0s～3600.0s 【0.0s】
H8.12 Relay 2 output delay time	Setting Range: 0.0s～3600.0s 【0.0s】
H8.13 Y1 output delay time	Setting Range: 0.0s～3600.0s 【0.0s】
H8.14 Y3 output delay time	Setting Range: 0.0s～3600.0s 【0.0s】

These parameters are used to set the delay time of output terminals Y2, relay 1, relay 2, Y1and Y3 from status change to actual output.

H8.15 DO valid mode selection	Setting Range: 00000～11111 【00000】

0：Positive logic，The output terminal is valid when being connected with COM, and invalid when being disconnected from COM.

1：Negative logic，The output terminal is invalid when being connected with COM, and valid when being disconnected from COM.

Ten thousand's digit： Y3 output valid mode

Thousand's digit： Y1 output valid mode

Hundred's digit： Relay 2 output valid mode

Ten's digit： Relay 1 output valid mode

Unit's digit： Y2 output valid mode

H8.16 AO1 offset coefficient	Setting Range：-100%～100%	【0%】
H8.17 AO1 gain	Setting Range：-10.00～10.00	【0.00】
H8.18 AO2 offset coefficient	Setting Range：-100%～100%	【0%】
H8.19 AO2 gain	Setting Range：-10.00～10.00	【0.00】

These parameters are used to correct the zero drift of analog output and the output amplitude deviation. They can also be used to define the desired AO curve.
If "b" represents zero offset, "k" represents gain, "Y" represents actual output, and "X" represents standard output, the actual output is: $Y = kX + b$.
The zero offset coefficient 100% of AO1 and AO2 corresponds to 10 V (or 20 mA). The standard output refers to the value corresponding to the analog output of 0 to 10 V (or 0 to 20 mA) with no zero offset or gain adjustment.
For example, if the analog output is used as the running frequency, and it is expected that the output is 8 V when the frequency is 0 and 3 V at the maximum frequency, the gain shall be set to -0.50, and the zero offset shall be set to 80%.

H8.20 AO1 output filter time	Setting Range： 0.000s～1.000s	【0.000s】
H8.21 AO2 output filter time	Setting Range： 0.000s～1.000s	【0.000s】
H8.22 Y2 output filter time	Setting Range： 0.000s～1.000s	【0.000s】

5.10 AI/AO Correction and AI curve setting（Group H9）

H9.00 AI1 measured voltage 1	Setting Range：0.500 V～4.000 V	【Factory-corrected】
H9.01 AI1 displayed voltage 1	Setting Range：0.500 V～4.000 V	【Factory-corrected】
H9.02 AI1 measured voltage 2	Setting Range：6.000V～9.999V	【Factory-corrected】
H9.03 AI1 displayed voltage 2	Setting Range：6.000V～9.999V	【Factory-corrected】
H9.04 AI2 measured voltage 1	Setting Range：0.500 V～4.000 V	【Factory-corrected】
H9.05 AI2 displayed voltage 1	Setting Range：0.500 V～4.000 V	【Factory-corrected】
H9.06 AI2 measured voltage 2	Setting Range：6.000V～9.999V	【Factory-corrected】
H9.07 AI2 displayed voltage 2	Setting Range：6.000V～9.999V	【Factory-corrected】
H9.08 AI3 measured voltage 1	Setting Range：-9.999V～10.000V	【Factory-corrected】
H9.09 AI3 displayed voltage 1	Setting Range：-9.999V～10.000V	【Factory-corrected】
H9.10 AI3 measured voltage 2	Setting Range：-9.999V～10.000V	【Factory-corrected】
H9.11 AI3 displayed voltage 2	Setting Range：-9.999V～10.000V	【Factory-corrected】

These parameters are used to correct the AI to eliminate the impact of AI zero offset and gain.
They have been corrected upon delivery. When you resume the factory values, these parameters will be restored to the factory-corrected values. Generally, you need not perform correction in the applications.
Measured voltage indicates the actual output voltage value measured by instruments such as the multimeter. Displayed voltage indicates the voltage display value sampled by the AC drive. For details, refer to ob.12、ob.13、ob.14
During correction, send two voltage values to each AI terminal, and save the measured values and displayed values to the function codes H9.00 to H9.11. Then the AC drive will automatically perform AI zero offset and gain correction.
If the input voltage and the actual voltage sampled by the AC drive are inconsistent, perform correction on site. Take AI1 as an example. The on-site correction is as follows:
1) Send a voltage signal (approximately 2 V) to AI1.
2) Measure the AI1 voltage and save it to H9.00.
3) View the displayed value of U0-21 and save the value to H9.01.
4) Send a voltage signal (approximately 8 V) to AI1.
5) Measure AI1 voltage and save it to H9.02.
6) View the displayed value of U0-21 and save the value to H9.03.
At correction of AI2 and AI3, the actually sampled voltage is respectively queried in ob.13 and ob.14.
For AI1 and AI2, 2 V and 8 V are suggested as the correction voltages. For AI3, -8 V and 8V are suggested.

H9.12 AO1 target voltage1	Setting Range：0.500 V～4.000 V 【Factory-corrected】
H9.13 AO1 measured voltage1	Setting Range：0.500 V～4.000 V 【Factory-corrected】
H9.14 AO1 target voltage2	Setting Range：6.000V～9.999V 【Factory-corrected】
H9.15 AO1 measured voltage2	Setting Range：6.000V～9.999V 【Factory-corrected】
H9.16 AO2 target voltage1	Setting Range：0.500 V～4.000 V 【Factory-corrected】
H9.17 AO2 measured voltage1	Setting Range：0.500 V～4.000 V 【Factory-corrected】
H9.18 AO2 target voltage2	Setting Range：6.000V～9.999V 【Factory-corrected】
H9.19 AO2 measured voltage2	Setting Range：6.000V～9.999V 【Factory-corrected】

These parameters are used to correct the AO.。
They have been corrected upon delivery. When you resume the factory values, these parameters will be restored to the factory-corrected values. You need not perform correction in the applications.
Target voltage indicates the theoretical output voltage of the AC drive. Measured voltage indicates the actual output voltage value measured by instruments such as the multimeter.

H9.21 Jump point of AI1 input corresponding setting	Setting Range： -100.0%～100.0% 【0.0%】
H9.22 Jump amplitude of AI1 input corresponding setting	Setting Range： 0.0%～100.0% 【0.5%】
H9.23 Jump point of AI2 input corresponding setting	Setting Range： -100.0%～100.0% 【0.0%】

H9.24 Jump amplitude of AI2 input corresponding setting	Setting Range：0.0%～100.0% 【0.5%】
H9.25 Jump point of AI3 input corresponding setting	Setting Range：-100.0%～100.0% 【0.0%】
H9.26 Jump amplitude of AI3 input corresponding setting	Setting Range：0.0%～100.0% 【0.5%】

The AI terminals (AI1 to AI3) of the T5000 all support the corresponding setting jump function, which fixes the AI input corresponding setting at the jump point when AI input corresponding setting jumps around the jump range.
For example, AI1 input voltage jumps around 5.00 V and the jump range is 4.90–5.10 V.AI1 minimum input 0.00 V corresponds to 0.0% and maximum input 10.00 V corresponds to 100.0%. The detected AI1 input corresponding setting varies between 49.0% and 51.0%.
If you set H9.21 to 50.0% and H9.22 to 1.0%, then the obtained AI1 input corresponding setting is fixed to 50.0%, eliminating the fluctuation effect.

5.11 Fault and Protection（Group HA）

HA.00 Motor overload protection selection	Setting Range：0~1【1】

0：Disabled
The motor overload protective function is disabled. The motor is exposed to potential damage due to overheating. A thermal relay is suggested to be installed between the AC drive and the motor.

1：Ensabled
The AC drive judges whether the motor is overloaded according to the inverse time-lag curve of the motor overload protection.。

HA.01 Motor overload protection gain	Setting Range：0.20~10.00【1.00】

The inverse time-lag curve of the motor overload protection is:
220% x HA.01 x rated motor current (if the load remains at this value for one minute, the AC drive reports motor overload fault), or 150% x F9-01 x rated motor current (if the load remains at this value for 60 minutes, the AC drive reports motor overload fault)
Set HA.01 properly based on the actual overload capacity. If the value of F9-01 is set too large, damage to the motor may result because the motor overheats but the AC drive does not report the alarm.

HA.02 Motor overload warning coefficient	Setting Range：50%~100%【80%】

This function is used to give a warning signal to the control system via DO before motor overload protection. This parameter is used to determine the percentage, at which prewarning is performed before motor overload. The larger the value is, the less advanced the pre-warning will be.
When the accumulative output current of the AC drive is greater than the value of the overload inverse time-lag curve multiplied by HA.02, the DO terminal on the AC drive allocated with function 6 (Motor overload pre-warning) becomes ON.

HA.03 Overvoltage stall gain	Setting Range：0~100【0】
HA.04 Overvoltage stall protective voltage	Setting Range：120%~150%【130%】

When the DC bus voltage exceeds the value of HA.04 (Overvoltage stall protective voltage) during deceleration of the AC drive, the AC drive stops deceleration and keeps the present running frequency. After the bus voltage declines, the AC drive continues to decelerate.A.H03 (Overvoltage stall gain) is used to adjust the overvoltage suppression capacity of the AC drive. The larger the value is, the greater the overvoltage suppression capacity will be.

In the prerequisite of no overvoltage occurrence, set HA.03 to a small value.

For small-inertia load, the value should be small. Otherwise, the system dynamic response will be slow. For large-inertia load, the value should be large. Otherwise, the suppression result will be poor and an overvoltage fault may occur.

If the overvoltage stall gain is set to 0, the overvoltage stall function is disabled

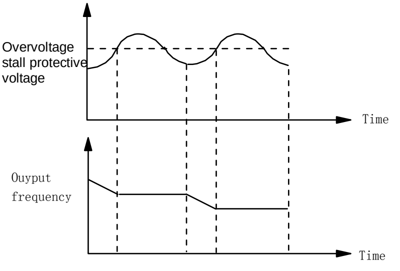


Figure5－21　Overvoltage stall protective

HA.05　Overcurrent stall gain	Setting Range：0~100【20】
HA.06 Overcurrent stall protective current	Setting Range：120%~150%【150%】

When the output current exceeds the overcurrent stall protective current during acceleration/deceleration of the AC drive, the AC drive stops acceleration/deceleration and keeps the present running frequency. After the output current declines, the AC drive continues to accelerate/decelerate.HA.05 (Overcurrent stall gain) is used to adjust the overcurrent suppression capacity of theAC drive. The larger the value is, the greater the overcurrent suppression capacity will be. In the prerequisite of no overcurrent occurrence, set HA.05 to a small value.

For small-inertia load, the value should be small. Otherwise, the system dynamic response will be slow. For large-inertia load, the value should be large. Otherwise, the suppression result will be poor and overcurrent fault may occur.

If the overcurrent stall gain is set to 0, the overcurrent stall function is disabled.

HA.07　Rapid current limit	Setting Range：0~1【1】

0：Disabled；1：Enabled

The rapid current limit function can reduce the AC drive's overcurrent faults at maximum,guaranteeing uninterrupted running of the AC drive.

However, long-time rapid current limit may cause the AC drive to overheat, which is not allowed. In this case, the AC drive will report CBC, indicating the AC drive is overloaded and needs to stop.

HA.08　Undervoltage threshold	Setting Range：60%~140%【100%】

It is used to set the undervoltage threshold, The undervoltage threshold 100% of the AC drive of different voltage classes corresponds to different nominal values, Undervoltage nominal values for different voltage

Single- phase /Three-phase 220V：100% corresponds to 200V
Three-phase 380V： 100% corresponds to 350V

HA.09 Overvoltage threshold	Setting Range：200.0v～2500.0v【Model dependent】

It is used to set the overvoltage threshold of the AC drive. The default values of different voltage classes are different。
Single- phase /Three-phase 220V：810V
Three-phase 380V： 400V

HA.11 Fault auto reset times	Setting Range：0~20【0】
HA.12 DO action during fault auto reset	Setting Range：0~1【1】
HA.13 Time interval of fault auto reset	Setting Range：0.1s~100.0s【1.0s】

HA.11 is used to set the times of fault auto resets if this function is used. After the value is exceeded, the AC drive will remain in the fault state.
HA.12 is used to decide whether the DO acts during the fault auto reset if the fault auto reset function is selected.
0：Not act
1：Act
HA.13is used to set the waiting time from the alarm of the AC drive to fault auto reset.

HA.14 Input phase loss protection selection	Setting Range：0~1【1】

It is used to determine whether to perform input phase loss protection.
0：Disabled
1：Ensabled

HA.15 Output phase loss protection selection	Setting Range：0~1【1】

It is used to determine whether to perform output phase loss protection.
0：Disabled
1：Enabled

HA.16 Contactor energizing protection selection	Setting Range：0~1【1】

It is used to determine whether to perform contactor energizing protection.
0：Disabled 1：Enabled

HA.17 Fault protection action selection1	Setting Range：00000~22222【00000】
HA.18 Fault protection action selection2	Setting Range：00000~22222【00000】
HA.19 Fault protection action selection3	Setting Range：00000~22222【00000】
HA.20 Fault protection action selection4	Setting Range：00000~22222【00000】
HA.21 Fault protection action selection5	Reserved

0：Coast to stop
1：Stop according to the stop mode
2：Continue to run
HA.17 Fault protection action selection 1
□ Unit's digit：Power input phase loss

- Ten's digit：Motor overload
- Hundred's digit：External equipment fault
- Thousand's digit：Accumulative running time reached
- Ten thousand's digit：Accumulative power-on time reached

HA.18 Fault protection action selection 2

- Unit's digit：Communication fault
- Ten's digit：Encoder fault
- Hundred's digit：Too large speed deviation
- Thousand's digit：Motor over-speed
- Ten thousand's digit：Reserved

HA.19 Fault protection action selection 3

- Unit's digit：Load becoming 0
- Ten's digit：PID feedback lost during running
- Hundred's digit：User-defined fault 1
- Thousand's digit：User-defined fault 2
- Ten thousand's digit：Reserved

HA.20 Fault protection action selection 4

- Unit's digit：Power input phase loss
- Ten's digit：EEPROM readwrite fault
- Hundred's digit：Reserved
- Thousand's digit：Reserved

HA.21: Reserved

HA.22 Frequency selection for continuing to run upon fault	Setting Range：0~4【0】

If a fault occurs during the running of the AC drive and the handling of fault is set to "Continue to run", the AC drive displays A-*** and continues to run at the frequency set in HA.22

0：Current running frequency

1：Set frequency

2：Frequency upper limit

3：Frequency lower limit

4：Backup frequency upon abnormality

HA.23 Backup frequency upon abnormality	Setting Range：60%~100%【100%】

The setting of HA.23 is a percentage relative to the maximum frequency。

HA.24 Type of motor temperature sensor	Setting Range：0~2【0】
HA.25 Motor overheat protection threshold	Setting Range：0~200℃【110℃】
HA.26 Motor overheat warning threshold	Setting Range：0~200℃【90℃】

The signal of the motor temperature sensor needs to be connected to the optional I/O extension card. AI3 on the extension card can be used for the temperature signal input. The motor temperature sensor is connected to AI3 and PGND of the extension card. The AI3 terminal of the T5000 supports both PT100 and PT1000. Set the sensor type correctly during the use. You can view the motor temperature via ob.37.

If the motor temperature exceeds the value set in HA.25, the AC drive reports an alarm

and acts according to the selected fault protection action.
If the motor temperature exceeds the value set in HA.26, the DO terminal on the AC drive allocated with Motor overheat warning becomes ON.

HA.27 Protection upon load becoming 0	Setting Range：0~1【0】
HA.28 Detection level of load becoming 0	Setting Range：0.0%~100.0%【10%】
HA.29 Detection time of load becoming 0	Setting Range：0.0~60.0s【10.0s】

HA.27 Protection upon load becoming 0：0：Disable；1：Enable
If protection upon load becoming 0 is enabled, when the output current of the AC drive is lower than the detection level (HA.28) and the lasting time exceeds the detection time (HA.29), the output frequency of the AC drive automatically declines to 7% of the rated frequency. During the protection, the AC drive automatically accelerates to the set frequency if the load resumes to normal.

5.12 Communication Parameters （Group Hb）

For details, see the description of the communication protocol.

5.13 Auxiliary Functions/Dispaly （Group HC）

HC.00 M multi-fuction button selection	Setting Range：0 ~5 【0】

0：Disable
1：Switchover between operation panel control and remote command control
You can perform switchover from the current command source to the operation panel control (local operation). If the current command source is operation panel control, this key is invalid
2：Switchover between forward rotation and reverse rotation
You can change the direction of the frequency reference by using the MF.K key. It is valid only when the current command source is operation panel control.
3：Forward JOG
You can perform forward JOG (FJOG) by using the MF.K key.
4：Reverse JOG
You can perform reverse JOG (FJOG) by using the MF.K key.
5: Reserved

HC.01 Reserved	Reserved

HC.02 LED display running parameters 1	Setting Range：0x 0000 ~0x FFFF【0x1F】
HC.03 LED display running parameters 2	Setting Range：0x0000~0xFFFF 【0x00】

These two parameters are used to set the parameters that can be viewed when the AC drive is in the running state.
AI2 voltage (V)

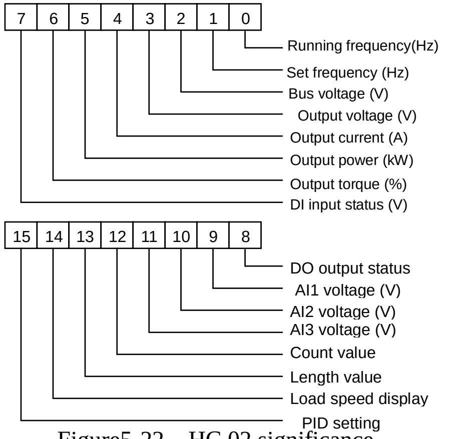


Figure5-22 HC.02 significance

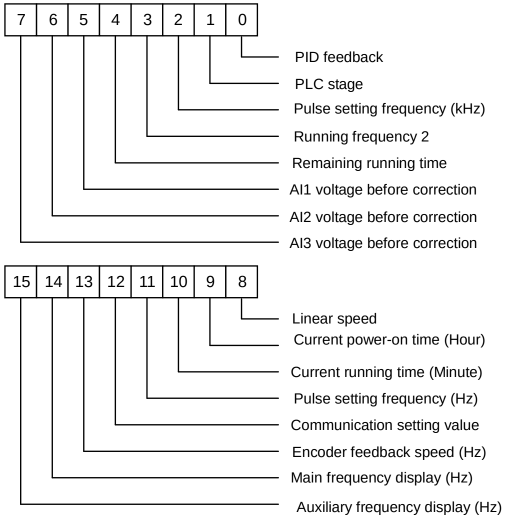


Figure5-23 HC.03 significance

HC.04 LED display stop parameters	Setting Range：0x 1111 ~0x FFFF 【0x 33】

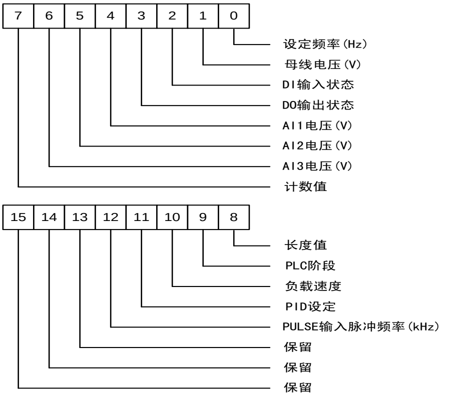


Figure5-24 HC.04 significance

HC.05 STOP/RESET key function	Setting Range: 0 ~1 【0】

0: STOP/RST key enabled only in operation panel control

1: STOP/RST key enabled in any operation mode

HC.06 Droop control	Setting Range: 0.00Hz～10.00Hz 【0.00Hz】

This function is used for balancing the workload allocation when multiple motors are used to drive the same load. The output frequency of the AC drives decreases as the load increases. You can reduce the workload of the motor under load by decreasing the output frequency for this motor, implementing workload balancing between multiple motors.

HC.07 Startup protection	Setting Range: 0～1 【0】

0: No; 1: Yes

This parameter is used to set whether to enable the safety protection. If it is set to 1, the AC drive does not respond to the run command valid upon AC drive power-on (for example, an input terminal is ON before power-on). The AC drive responds only after the run command is cancelled and becomes valid again.

In addition, the AC drive does not respond to the run command valid upon fault reset of the AC drive. The run protection can be disabled only after the run command is cancelled.

In this way, the motor can be protected from responding to run commands upon power-on or fault reset in unexpected conditions.

HC.08 Jump frequency during acceleration/deceleration	Setting Range: 0～1 【0】

0: Disabled 1: Enabled

It is used to set whether the jump frequencies are valid during acceleration/deceleration.When the jump frequencies are valid during acceleration/deceleration, and the running frequency is within the frequency jump range, the actual running frequency will jump over the set frequency jump amplitude (rise directly from the lowest jump frequency to the highest jump frequency). The following figure shows the diagram when the jump frequencies are valid during acceleration/deceleration.

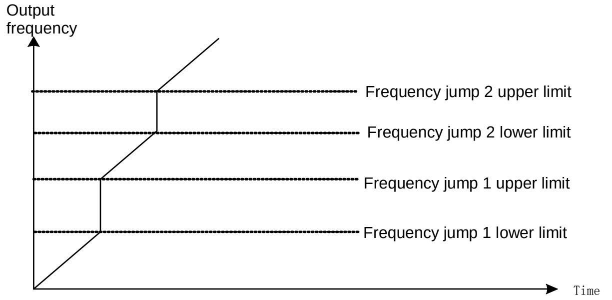


Figure5-25: Diagram when the jump frequencies are valid during acceleration/deceleration。

HC.09 Terminal JOG preferred	Setting Range：0～1 【0】

0：Disable；1:Enable

If terminal JOG is preferred, the AC drive switches to terminal JOG running state when there is a terminal JOG command during the running process of the AC drive.

HC.10 Accumulative running time reached action selection	Setting Range：0～1 【0】
HC.11 Accumulative power-on time reached action selection	Setting Range：0～1 【0】

0：Continue to run；1：Warnning

HC.12 Frequency detection value (FDT1)	Setting Range：0.00Hz～maximum frequency 【50.00Hz】
HC.13 Frequency detection hysteresis (FDT hysteresis 1)	Setting Range：0.0%～100.0%（FDT1 level）【5.0%】

If the running frequency is higher than the value of HC.12, the corresponding DO terminal becomes ON. If the running frequency is lower than value of HC.12, the DO terminal goes OFF

These two parameters are respectively used to set the detection value of output frequency and hysteresis value upon cancellation of the output. The value of HC.13 is a percentage of the hysteresis frequency to the frequency detection value (HC.12).

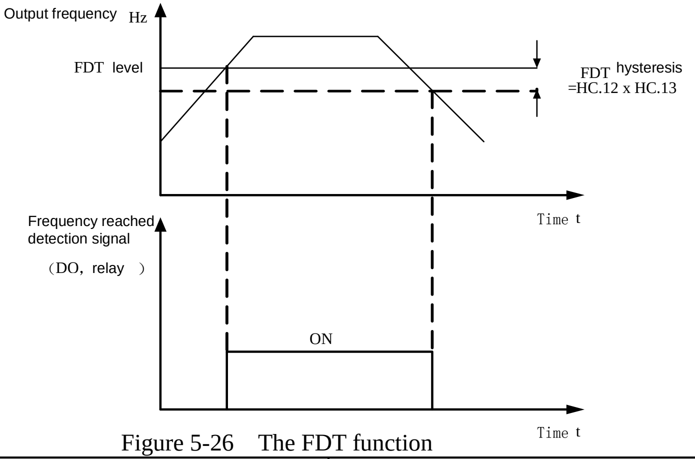


Figure 5-26 The FDT function

HC.14 Detection range of frequency reached	Setting Range：0.00～100%(maximum frequency)【0.0%】

If the AC drive running frequency is within the certain range of the set frequency, the corresponding DO terminal becomes ON.

This parameter is used to set the range within which the output frequency is detected to reach the set frequency. The value of this parameter is a percentage relative to the maximum frequency. The detection range of frequency reached is shown in the following figure 5-27.

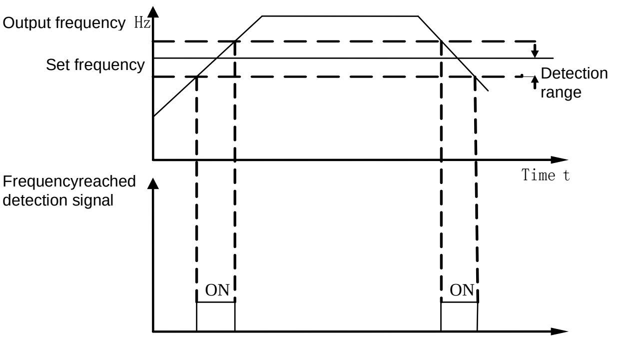


Figure 5-27 The detection range of frequency reached

HC.15 Frequency detection value (FDT2	Setting Range：0.00Hz～maximum frequency【50.00Hz】
HC.16 Frequency detection hysteresis (FDT hysteresis 2)	Setting Range：0.0%～100.0%（FDT2 level）【5.0%】

The frequency detection function is the same as FDT1 function. For details, refer to the descriptions of HC.12、HC.13。

HC.17 Any frequency reaching detection value 1	Setting Range：0.00Hz～maximum frequency【50.00Hz】
HC.18 Any frequency reaching detection amplitude 1	Setting Range：0.0%～100.0% 【0.0%】
HC.19 Any frequency reaching detection value 2	Setting Range：0.00Hz～maximum frequency【50.00Hz】
HC.20 Any frequency reaching detection amplitude 2	Setting Range：0.0%～100.0% 【0.0%】

If the output frequency of the AC drive is within the positive and negative amplitudes of the any frequency reaching detection value, the corresponding DO becomes ON. The T5000 provides two groups of any frequency reaching detection parameters, including frequency detection value and detection amplitude, as shown in the following figure 5-28

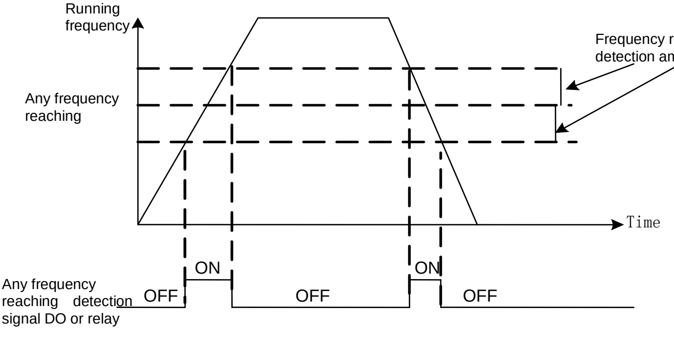


Figure 5-28 Any frequency reaching detection

HC.21 Zero current detection level	Setting Range：0.0%～300.0% 【5.0%】
HC.22 Zero current detection delay time	Setting Range：0.01s～600.00s 【0.10s】

If the output current of the AC drive is equal to or less than the zero current detection level and the duration exceeds the zero current detection delay time, the corresponding DO becomes ON. The zero current detection is shown in the following figure

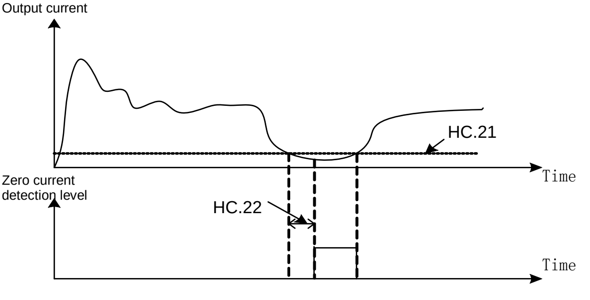


Figure 5-29 The zero current detection

HC.23 Output overcurrent threshold	Setting Range：0.0% ～ 300.0% 【200.0%】
HC.24 Output overcurrent detection delay time	Setting Range：0.00s ～ 600.00s 【0.00s】

If the output current of the AC drive is equal to or higher than the overcurrent threshold and the duration exceeds the detection delay time, the corresponding DO becomes ON.

The output overcurrent detection function is shown in the following figure.

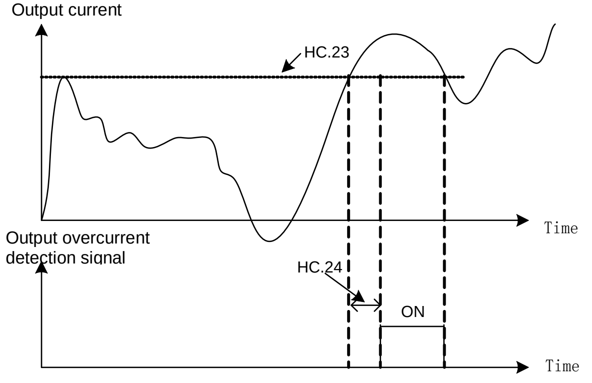


Figure 5-30 The output overcurrent detection function

HC.25 Any current reaching 1	Setting Range：0.0%～300.0%（rated motor current）【100.0%】
HC.26 Any current reaching 1 amplitude	Setting Range：0.0%～300.0%（rated motor current）【0.0%】
HC.27 Any current reaching 2	Setting Range：0.0%～300.0%（rated motor current）【100.0%】
HC.28 Any current reaching 2 amplitude	Setting Range：0.0%～300.0%（rated motor current）【0.0%】

If the output current of the AC drive is within the positive and negative amplitudes of any current reaching detection value, the corresponding DO becomes ON.

The T5000 provides two groups of any current reaching detection parameters, including current detection value and detection amplitudes, as shown in the following figure.

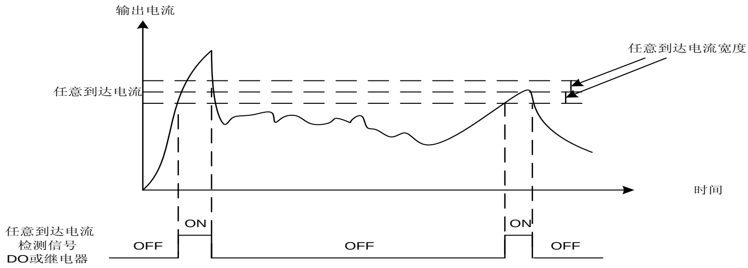


Figure5-31 Any current reaching detection

HC.29 Load speed display coefficient	Setting Range：0.0001～6.5000 【1.0000】

This parameter is used to adjust the relationship between the output frequency of the AC drive and the load speed. For details, see the description of HC.43。

HC.30 AI1 input voltage lower limit	Setting Range：0.00V～HC-31 【3.1V】
HC.31 AI1 input voltage upper limit	Setting Range：HC-30～10.00V 【6.8V】

These two parameters are used to set the limits of the input voltage to provide protection on the AC drive. When the AI1 input is larger than the value of HC.31 or smaller than the value of HC.30, the corresponding DO becomes ON, indicating that AI1 input exceeds the limit.

HC.32 Cooling fan control	Setting Range：0～1 【0】

It is used to set the working mode of the cooling fan. If this parameter is set to 0, the fan works when the AC drive is in running state. When the AC drive stops, the cooling fan works if the heatsink temperature is higher than 40°C, and stops working if the heatsink temperature is lower than 40°C.

If this parameter is set to 1, the cooling fan keeps working after power-on.

HC.33 Module temperature threshold	Setting Range：0℃～100℃ 【75℃】

When the heatsink temperature of the AC drive reaches the value of this parameter, the corresponding DO becomes ON, indicating that the module temperature reaches the threshold.

HC.34 Heatsink temperature of inverter module	Setting Range：0.0℃～100℃ 【0℃】

It is used to display the insulated gate bipolar transistor (IGBT) temperature of the inverter module, and the IGBT overheat protection value of the inverter module depends on the model.

HC.35 Rectifier temperature of module	Setting Range：0.0℃～100℃ 【0℃】

It is used to display the insulated rectifier temperature of the rmodule, and the rectifier overheat protection value of the inverter module depends on the model.

HC.36 Accumulative power-on time threshold	Setting Range：0h～65000h 【0h】

If the accumulative power-on time (HC.44) reaches the value set in this parameter, the corresponding DO terminal becomes ON.

HC.37 Accumulative running time threshold	Setting Range：0h～65000h 【0h】

It is used to set the accumulative running time threshold of the AC drive. If the accumulative running time (HC.42) reaches the value set in this parameter, the corresponding DO terminal becomes ON.

HC.38 Timing function	Setting Range：0～1 【0】
HC.39 Timing duration source	Setting Range：0～3 【0】
HC.40 Timing duration	Setting Range：0.0Min～6500.0Min 【0.0Min】

These parameters are used to implement the AC drive timing function.
If HC.38 is set to 1, the AC drive starts to time at startup. When the set timing duration is reached, the AC drive stops automatically and meanwhile the corresponding DO becomes ON.

The AC drive starts timing from 0 each time it starts up 。

The timing duration is set in HC.39、HC.40, in unit of minute.

HC.39 Timing duration source：

0： HC.40；1：AI1；2：AI2；3：AI3

📖 Notice:

100% of analog input correspondsto the value of HC.40。

HC.41 Current running time reached	Setting Range：0.0Min～6500.0Min 【0.0Min】

If the current running time reaches the value set in this parameter, the corresponding DO becomes ON, indicating that the current running time is reached。

HC.42 Accumulative running time	Setting Range：0h～65535h 【0h】

It is used to display the accumulative running time of the AC drive. After the accumulative running time reaches the value set in HC.37, the terminal with the digital output function 12 becomes ON.

HC.43 Number of decimal places for load speed display	Setting Range：0～3 【0】

0：0 decimal place；1：1 decimal place；2：2 decimal place；3：3 decimal place
HC.43 is used to set the number of decimal places for load speed display. The following gives an example to explain how to calculate the load speed:
Assume that HC.29 (Load speed display coefficient) is 2.000 and HC.43 is 2 (2 decimal places). When the running frequency of the AC drive is 40.00 Hz, the load speed is 40.00 x 2.000 = 80.00 (display of 2 decimal places).
If the AC drive is in the stop state, the load speed is the speed corresponding to the set frequency, namely, "set load speed". If the set frequency is 50.00 Hz, the load speed in the stop state is 50.00 x 2.000 = 100.00 (display of 2 decimal places).

HC.44 Accumulative power-on time	Setting Range：0h～65535h 【0h】

It is used to display the accumulative power-on time of the AC drive since the delivery. If the time reaches the set power-on time (HC. 36), the terminal with the digital output function 12 becomes ON.

HC.45 Accumulative power consumption	Setting Range：0～65535 kWh 【0】

It is used to display the accumulative power consumption of the AC drive until now.

HC.46 Wakeup frequency	Setting Range：Dormant frequency (HC.48) ～ maximum frequency（H0.06） 【0.00Hz】
HC.47 Wakeup delay time	Setting Range：0.0s～6500.0s 【0.0s】

HC.48 Dormant frequency	Setting Range： 0.00Hz ～ Wakeup frequency （HC.46) 【0.00Hz】
HC.49 Dormant delay time	Setting Range：0.0s～6500.0s 【0.0s】

These parameters are used to implement the dormant and wakeup functions in the water supply application.
When the AC drive is in running state, the AC drive enters the dormant state and stops automatically after the dormant delay time (HC.49) if the set frequency is lower than or equal to the dormant frequency (HC.48).
When the AC drive is in dormant state and the current running command is effective, the AC drives starts up after the wakeup delay time (HC.47) if the set frequency is higher than or equal to the wakeup frequency (HC.46).
Generally, set the wakeup frequency equal to or higher than the dormant frequency. If the wakeup frequency and dormant frequency are set to 0, the dormant and wakeup functions are disabled.
When the dormant function is enabled, if the frequency source is PID, whether PID operation is performed in the dormant state is determined by LA.27. In this case, select PID operation enabled in the stop state (LA.27 = 1).

5.14 User-defined Parameters（Group Hd）

Hd.00 User-defined function code0	Setting Range：uH0.00～uoE.xx【H0.01】
Hd.01 User-defined function code1	Setting Range：uH0.00～uoE.xx【H0.02】
Hd.02 User-defined function code 2	Setting Range：uH0.00～uoE.xx【H0.03】
Hd.03 User-defined function code 3	Setting Range：uH0.00～uoE.xx【H0.07】
Hd.04 User-defined function code 4	Setting Range：uH0.00～uoE.xx【H0.08】
Hd.05 User-defined function code 5	Setting Range：uH0.00～uoE.xx【H0.17】
Hd.06 User-defined function code 6	Setting Range：uH0.00～uoE.xx【H0.18】
Hd.07 User-defined function code 7	Setting Range：uH0.00～uoE.xx【H3.00】
Hd.08 User-defined function code 8	Setting Range：uH0.00～uoE.xx【H3.01】
Hd.09 User-defined function code 9	Setting Range：uH0.00～uoE.xx【H4.00】
Hd.10 User-defined function code 10	Setting Range：uH0.00～uoE.xx【H4.01】
Hd.11 User-defined function code 11	Setting Range：uH0.00～uoE.xx【H4.03】
Hd.12 User-defined function code 12	Setting Range：uH0.00～uoE.xx【H5.04】
Hd.13 User-defined function code 13	Setting Range：uH0.00～uoE.xx【H5.07】
Hd.14 User-defined function code 14	Setting Range：uH0.00～uoE.xx【H6.00】
Hd.15 User-defined function code 15	Setting Range：uH0.00～uoE.xx【H6.10】
Hd.16 User-defined function code 16	Setting Range：uH0.00～uoE.xx【H0.00】
Hd.17 User-defined function code 17	Setting Range：uH0.00～uoE.xx【H0.00】
Hd.18 User-defined function code 18	Setting Range：uH0.00～uoE.xx【H0.00】
Hd.19 User-defined function code 19	Setting Range：uH0.00～uoE.xx【H0.00】

Hd.20 User-defined function code 20	Setting Range：uH0.00～uoE.xx【H0.00】
Hd.21 User-defined function code 21	Setting Range：uH0.00～uoE.xx【H0.00】

Hd is user-defined parameter group. You can select the required parameters from all T5000 functions codes and add them into this group, convenient for view and modification. Group FE provides a maximum of 30 user-defined parameters. If " Hd -00" is displayed, it indicates that group Hd is null. After you enter user-defined function code mode, the displayed parameters are defined by Hd -00 to Hd -31 and the sequence is consistent with that in group Hd.

5.15 Motor 2 Parameters（Group Eb）

For more details, see description of group H3,Motor 1 Parameters

5.16 Motor 2 Vector Control Parameters（Group Ec）

For more details, see description of group H4, Motor 2 Vector Control Parameters

5.17 Process Control PID Function（Group LA）

PID control is a general process control method. By performing proportional, integral and differential operations on the difference between the feedback signal and the target signal, it adjusts the output frequency and constitutes a feedback system to stabilize the controlled counter around the target value.
It is applied to process control such as flow control, pressure control and temperature control. The following figure shows the principle block diagram of PID control.

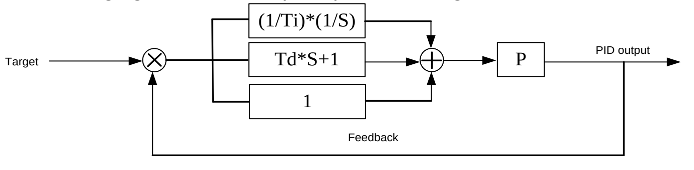


Figure 5-32 Principle block diagram of PID control

LA.00 PID setting source	Setting Range： 0～6 【0】
LA.01 PID digital setting	Setting Range：0.0%～100.0% 【50%】

0： LA.01

1～3：AI1、AI2、AI3

4：PULSE setting（D7/HDI）

5：Communication setting

LA.00 is used to select the channel of target process PID setting. The PID setting is a relative value and ranges from 0.0% to 100.0%. The PID feedback is also a relative value. The purpose of PID control is to make the PID setting and PID feedback equal.

LA.02 PID feedback source	Setting Range： 0～8 【0】

0～2：AI1、AI2、AI3

3：AI1-AI2

4：PULSE setting（D7/H）

5：Communication setting

6：AI1+AI2

7：MAX(|AI1|, |AI2|)

8：MIN(|AI1|, |AI2|)

This parameter is used to select the feedback signal channel of process PID.

The PID feedback is a relative value and ranges from 0.0% to 100.0%.

LA.03 PID setting feedback range	Setting Range：0～65535 【1000】

This parameter is a non-dimensional unit. It is used for PID setting display (ob.15) and PID feedback display (ob.16).

Relative value 100% of PID setting feedback corresponds to the value of LA.03. If LA.03 is set to 2000 and PID setting is 100.0%, the PID setting display (ob.15) is 2000.

LA.04 Proportional gainKp1	Setting Range：0.0～100.0 【20】
LA.05 Integral timeTi1	Setting Range：0.01s～10.00s 【2.00s】
LA.06 Differential timeTd1	Setting Range：0.000s～10.000s 【0.000s】

LA.04：Proportional gainKp1

It decides the regulating intensity of the PID regulator. The higher the Kp1 is, the larger the regulating intensity is. The value 100.0 indicates when the deviation between PID feedback and PID setting is 100.0%, the adjustment amplitude of the PID regulator on the output frequency reference is the maximum frequency.

LA.05：Integral timeTi1

It decides the integral regulating intensity. The shorter the integral time is, the larger the regulating intensity is. When the deviation between PID feedback and PID setting is 100.0%, the integral regulator performs continuous adjustment for the time .Then the adjustment amplitude reaches the maximum frequency.

LA.06：Differential timeTd1

It decides the regulating intensity of the PID regulator on the deviation change. The longer the differential time is, the larger the regulating intensity is. Differential time is the time within which the feedback value change reaches 100.0%, and then the adjustment amplitude reaches the maximum frequency.

LA.07 PID parameter switchover condition	Setting Range：0～2 【0】
LA.08 PID parameter switchover deviation1	Setting Range：0.0%～LA.09 【20.0%】
LA.09 PID parameter switchover deviation2	Setting Range：LA.08～100.0【80.0%】
LA.10 Proportional gainKp2	Setting Range：0.0～100.0 【20.0】
LA.11 Integral timeTi2	Setting Range：0.01s～10.00s 【2.00s】
LA.12 Differential timeTd2	Setting Range：0.00～10.000 【0.000s】

In some applications, PID parameters switchover is required when one group of PID parameters cannot satisfy the requirement of the whole running process.

These parameters are used for switchover between two groups of PID parameters.

Regulator parameters LA.10~ LA.12 are set in the same way as LA.04~ LA.06.

The switchover can be implemented either via a DI terminal or automatically implemented based on the deviation.

If you select switchover via a DI terminal, the DI must be allocated with function 28 "PID parameter switchover". If the DI is OFF, group 1 (LA.04~ LA.06) is selected. If the DI is ON, group 2 (LA.10~ LA.12) is selected.

If you select automatic switchover, when the absolute value of the deviation between PID feedback and PID setting is smaller than the value of LA.08, group 1 is selected. When the absolute value of the deviation between PID feedback and PID setting is higher than the value of LA.09, group 2 is selected. When the deviation is between LA.08, and LA.09, the PID parameters are the linear interpolated value of the two groups of parameter values.

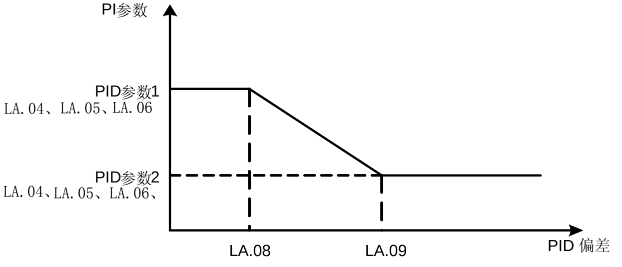


Figure5-33 PID parameters switchover

LA.13 PID initial value	Setting Range：0.0%～100.0% 【0.0%】
LA.14 PID initial value holding time	Setting Range：0.00～650.00s 【0.00s】

When the AC drive starts up, the PID starts closed-loop algorithm only after the PID output is fixed to the PID initial value (LA.13) and lasts the time set in LA.14.

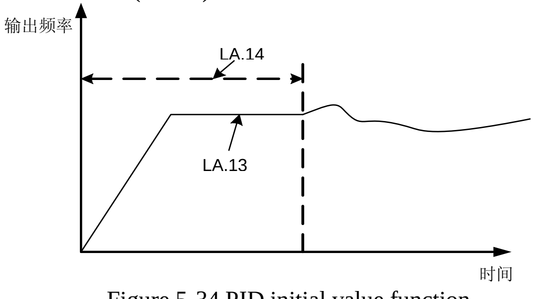


Figure 5-34 PID initial value function

LA.15 Maximum deviation between two PID outputs in forward direction	Setting Range：0.0%～100.0% 【1.00%】
LA.16 Maximum deviation between two PID outputs in reverse direction	Setting Range：0.0%～100.0% 【1.00%】

This function is used to limit the deviation between two PID outputs (2 ms per PID output) to suppress the rapid change of PID output and stabilize the running of the AC drive.
LA.15 and LA.16 respectively correspond to the maximum absolute value of the output deviation in forward direction and in reverse direction.

LA.17 Cut-off frequency of PID reverse rotation	Setting Range：0.00～maximum frequency 【2.00Hz】

In some situations, only when the PID output frequency is a negative value (AC drive reverse rotation), PID setting and PID feedback can be equal. However, too high reverse rotation frequency is prohibited in some applications, and LA.17 is used to determine the reverse rotation frequency upper limit.

LA.18 PID deviation limit	Setting Range：0. 0%～100.0% 【0.01%】

If the deviation between PID feedback and PID setting is smaller than the value of LA.18, PID control stops. The small deviation between PID feedback and PID setting will make the output frequency stabilize, effective for some closed-loop control applications.

LA.19 PID differential limit	Setting Range：0. 00%～100.00% 【0.10%】

It is used to set the PID differential output range. In PID control, the differential operation may easily cause system oscillation. Thus, the PID differential regulation is restricted to a small range.。

LA.20 PID setting change time	Setting Range：0.00s～650.00s 【0.00s】

It is used to set the PID differential output range. In PID control, the differential operation may easily cause system oscillation. Thus, the PID differential regulation is restricted to a small range.

LA.21 PID feedback filter time	Setting Range：0.00～60.00s 【0.00s】
LA.22 PID output filter time	Setting Range：0.00～60.00s 【0.00s】

LA.21 is used to filter the PID feedback, helping to reduce interference on the feedback but slowing the response of the process closed-loop system.

LA.22 is used to filter the PID output frequency, helping to weaken sudden change of the AC drive output frequency but slowing the response of the process closed-loop system.

LA.23 PID action direction	Setting Range：0.00～60.00s 【0.00s】

0: Forward action

When the feedback value is smaller than the PID setting, the AC drive's output frequency rises. For example, the winding tension control requires forward PID action.

1: Reverse action

When the feedback value is smaller than the PID setting, the AC drive's output frequency reduces. For example, the unwinding tension control requires reverse PID action.

Notice that this function is influenced by the DI function 26 "Reverse PID action direction".

LA.24 PID integral property	Setting Range：00～11 【00】

Unit's digit (Integral separated)
0: Invalid
1: Valid
Ten's digit (Whether to stop integral operation when the output reaches the limit)
0: Continue integral operation
1: Stop integral operation

Integral separated

If it is set to valid, , the PID integral operation stops when the DI allocated with function 27 "PID integral pause" is ON In this case, only proportional and differential operations take effect.

If it is set to invalid, integral separated remains invalid no matter whether the DI allocated with function 27 "PID integral pause" is ON or not.

Whether to stop integral operation when the output reaches the limit

If "Stop integral operation" is selected, the PID integral operation stops, which may help to reduce the PID overshoot.

LA.25 Detection value of PID feedback loss	Setting Range：0.1%～100.0% 【0.0%】
LA.26 Detection time of PID feedback loss	Setting Range：0.0s～20.0s 【1s】

These parameters are used to judge whether PID feedback is lost.

If the PID feedback is smaller than the value of LA.25 and the lasting time exceeds the value of LA.26, the AC drive reports E-PFLand acts according to the selected fault protection action.

LA.27 PID operation at stop	Setting Range：0～1 【0】

0: No PID operation at stop

1: PID operation at stop

It is used to select whether to continue PID operation in the state of stop. Generally, the PID operation stops when the AC drive stops.

5.18 Multi-Reference and Simple PLC Function（Group Lb）

The T5000 multi-reference has many functions. Besides multi-speed, it can be used as the setting source of the V/F separated voltage source and setting source of process PID. In addition, the multi-reference is relative value.

The simple PLC function is different from the T5000 user programmable function. Simple PLC can only complete simple combination of multi-reference, while the user programmable function is more practical.

Lb.00 Reference 0	Setting Range：-100.0%～100.0%【0.0%】
Lb.01 Reference 1	Setting Range：-100.0%～100.0%【5.0%】
Lb.02 Reference 2	Setting Range：-100.0%～100.0%【10.0%】
Lb.03 Reference 3	Setting Range：-100.0%～100.0%【15.0%】
Lb.04 Reference 4	Setting Range：-100.0%～100.0%【20.0%】
Lb.05 Reference 5	Setting Range：-100.0%～100.0%【25.0%】
Lb.06 Reference 6	Setting Range：-100.0%～100.0%【30.0%】
Lb.07 Reference 7	Setting Range：-100.0%～100.0%【35.0%】
Lb.08 Reference 8	Setting Range：-100.0%～100.0%【40.0%】
Lb.09 Reference 9	Setting Range：-100.0%～100.0%【45.0%】
Lb.10 Reference 10	Setting Range：-100.0%～100.0%【50.0%】
Lb.11 Reference 11	Setting Range：-100.0%～100.0%【55.0%】
Lb.12 Reference 12	Setting Range：-100.0%～100.0%【60.0%】
Lb.13 Reference 13	Setting Range：-100.0%～100.0%【65.0%】
Lb.14 Reference 14	Setting Range：-100.0%～100.0%【70.0%】
Lb.15 Reference 15	Setting Range：-100.0%～100.0%【75.0%】

Multi-reference can be the setting source of frequency, V/F separated voltage and process PID. The multi-reference is relative value and ranges from -100.0% to 100.0%.

As frequency source, it is a percentage relative to the maximum frequency. As V/F separated voltage source, it is a percentage relative to the rated motor voltage. As process PID setting source, it does not require conversion.

Multi-reference can be switched over based on different states of DI terminals. For details, see the descriptions of group H6.

Lb.16 Simple PLC running mode	Setting Range：0～3 【0】

0：Stop after the AC drive runs one cycle

The AC drive stops after running one cycle, and will not start up until receiving another Command。

1： Keep final values after the AC drive runs one cycle

The AC drive keeps the final running frequency and direction after running one cycle.

2： Repeat after the AC drive runs one cycle

The AC drive automatically starts another cycle after running one cycle, and will not stop until receiving the stop command.

Simple PLC can be either the frequency source or V/F separated voltage source.

When simple PLC is used as the frequency source, whether parameter values of Lb.00～Lb.15 are positive or negative determines the running direction. If the parameter values are negative, it indicates that the AC drive runs in reverse direction.

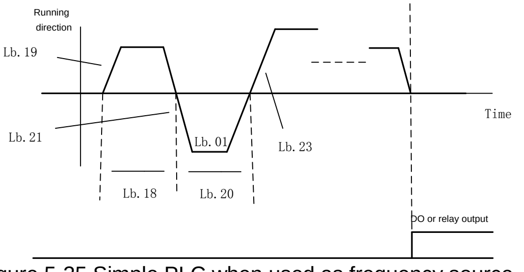


Figure 5-35 Simple PLC when used as frequency source

Lb.17	Simple PLC retentive selection	Setting Range：00～11 【00】

Unit's digit (Retentive upon power failure)

0: No

1: Yes

Ten's digit (Retentive upon stop)

0: No

1: Yes

PLC retentive upon power failure indicates that the AC drive memorizes the PLC running moment and running frequency before power failure and will continue to run from the memorized moment after it is powered on again. If the unit's digit is set to 0, the AC drive restarts the PLC process after it is powered on again.

PLC retentive upon stop indicates that the AC drive records the PLC running moment and running frequency upon stop and will continue to run from the recorded moment after it starts up again. If the ten's digit is set to 0, the AC drive restarts the PLC process after it starts up again.

Lb.18	Running time of simple PLC reference 0	Setting Range： 0.0s(h) ～ 6553.5s(h) 【0.0s(h)】
Lb.19	Acceleration/deceleration time of simple PLC reference 0	Setting Range：0～3 【0】
Lb.20	Running time of simple PLC reference 1	Setting Range： 0.0s(h) ～ 6553.5s(h) 【0.0s(h)】
Lb.21	Acceleration/deceleration time of simple	Setting Range：0～3 【0】

	PLC reference 1	
Lb.22	Running time of simple PLC reference 2	Setting Range：0.0s(h)～6553.5s(h)【0.0s(h)】
Lb.23	Acceleration/deceleration time of simple PLC reference 2	Setting Range：0～3 【0】
Lb.24	Running time of simple PLC reference 3	Setting Range：0.0s(h)～6553.5s(h)【0.0s(h)】
Lb.25	Acceleration/deceleration time of simple PLC reference 3	Setting Range：0～3 【0】
Lb.26	Running time of simple PLC reference 4	Setting Range：0.0s(h)～6553.5s(h)【0.0s(h)】
Lb.27	Acceleration/deceleration time of simple PLC reference 4	Setting Range：0～3 【0】
Lb.28	Running time of simple PLC reference 5	Setting Range：0.0s(h)～6553.5s(h)【0.0s(h)】
Lb.29	Acceleration/deceleration time of simple PLC reference 5	Setting Range：0～3 【0】
Lb.30	Running time of simple PLC reference 6	Setting Range：0.0s(h)～6553.5s(h)【0.0s(h)】
Lb.31	Acceleration/deceleration time of simple PLC reference 6	Setting Range：0～3 【0】
Lb.32	Running time of simple PLC reference 7	Setting Range：0.0s(h)～6553.5s(h)【0.0s(h)】
Lb.33	Acceleration/deceleration time of simple PLC reference 7	Setting Range：0～3 【0】
Lb.34	Running time of simple PLC reference 8	Setting Range：0.0s(h)～6553.5s(h)【0.0s(h)】
Lb.35	Acceleration/deceleration time of simple PLC reference 8	Setting Range：0～3 【0】
Lb.36	Running time of simple PLC reference 9	Setting Range：0.0s(h)～6553.5s(h)【0.0s(h)】
Lb.37	Acceleration/deceleration time of simple PLC reference 9	Setting Range：0～3 【0】
Lb.38	Running time of simple PLC reference 10	Setting Range：0.0s(h)～6553.5s(h)【0.0s(h)】
Lb.39	Acceleration/deceleration time of simple PLC reference 10	Setting Range：0～3 【0】
Lb.40	Running time of simple PLC reference 11	Setting Range：0.0s(h)～6553.5s(h)【0.0s(h)】
Lb.41	Acceleration/deceleration time of simple PLC reference 11	Setting Range：0～3 【0】

Lb.42 Running time of simple PLC reference 12	Setting Range：0.0s(h) ～ 6553.5s(h) 【0.0s(h)】
Lb.43 Acceleration/deceleration time of simple PLC reference 12	Setting Range：0～3 【0】
Lb.44 Running time of simple PLC reference 13	Setting Range：0.0s(h) ～ 6553.5s(h) 【0.0s(h)】
Lb.45 Acceleration/deceleration time of simple PLC reference 13	Setting Range：0～3 【0】
Lb.46 Running time of simple PLC reference 14	Setting Range：0.0s(h) ～ 6553.5s(h) 【0.0s(h)】
Lb.47 Acceleration/deceleration time of simple PLC reference 14	Setting Range：0～3 【0】
Lb.48 Running time of simple PLC reference 15	Setting Range：0.0s(h) ～ 6553.5s(h) 【0.0s(h)】
Lb.49 Acceleration/deceleration time of simple PLC reference 15	Setting Range：0～3 【0】

Lb.50 Time unit of simple PLC running	Setting Range：0～1 【0】

0: s (second)

1: h (hour)

Lb.51 Reference 0 source	Setting Range：0～5 【0】

0： Lb.00

1～3：AI1、AI2、AI3

4：PULSE setting

5：PID

It determines the setting channel of reference 0. You can perform convenient switchover between the setting channels. When multi-reference or simple PLC is used as frequency source, the switchover between two frequency sources can be realized easily.

5.19 Swing Frequency, Fixed Length and Count（Group Lc）

The swing frequency function is applied to the textile and chemical fiber fields and the applications where traversing and winding functions are required.

The swing frequency function indicates that the output frequency of the AC drive swings up and down with the set frequency as the center. The trace of running frequency at the time axis is shown in the following figure.

The swing amplitude is set in LC.00 and LC.01. When LC.01 is set to 0, the swing amplitude is 0 and the swing frequency does not take effect.

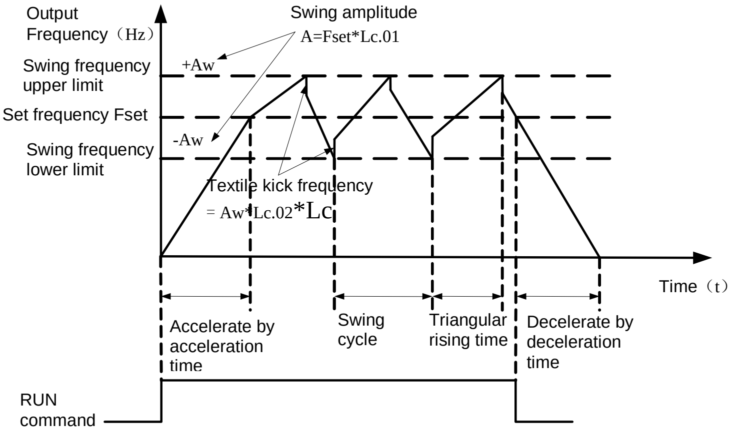


Figure 5-36 Swing frequency control

LC.00 Swing frequency setting mode	Setting Range：0～1 【0】

This parameter is used to select the base value of the swing amplitude.

0: Relative to the central frequency

It is variable swing amplitude system. The swing amplitude varies with the central frequency (set frequency).

1: Relative to the maximum frequency (H0.06 maximum output frequency)

It is fixed swing amplitude system. The swing amplitude is fixed.

LC.01 Swing frequency amplitude	Setting Range：0.0%～100.0% 【0.0%】
LC.02 Jump frequency amplitude	Setting Range：0.0%～50.0% 【0.0%】

This parameter is used to determine the swing amplitude and jump frequency amplitude. The swing frequency is limited by the frequency upper limit and frequency lower limit.
If relative to the central frequency (LC.00 = 0), the actual swing amplitude AW is the calculation result of H2.00 (Frequency source selection) multiplied by LC.01.
If relative to the maximum frequency (LC.00 = 1), the actual swing amplitude AW is the calculation result of H0.06 (Maximum frequency) multiplied by LC.01.
Jump frequency = Swing amplitude AW x LC.02 (Jump frequency amplitude).
If relative to the central frequency (LC.00 = 0), the jump frequency is a variable value.
If relative to the maximum frequency (LC.00 = 1), the jump frequency is a fixed value.
The swing frequency is limited by the frequency upper limit and frequency lower limit.

LC.03 Swing frequency cycle	Setting Range：0.0s～3000.0s 【10.0s】
LC.04 Triangular wave rising time coefficient	Setting Range：0.0%～100.0% 【50.0%】

LC.03 specifies the time of a complete swing frequency cycle.
LC.04 specifies the time percentage of triangular wave rising time to LC.03 (Swing frequency cycle).
Triangular wave rising time = LC.03 (Swing frequency cycle) x LC.04 (Triangular wave rising time coefficient, unit: s)
Triangular wave falling time = LC.03 (Swing frequency cycle) x (1 – LC.04 Triangular wave rising time coefficient ,unit: s)

LC.05 Set length	Setting Range：0m～65535m 【1000m】
LC.06 Actual length	Setting Range：0m～65535m 【0m】

LC.07 Number of pulses per meter	Setting Range：0.1～6553.5 【100.0】

The preceding parameters are used for fixed length control.
The length information is collected by DI terminals. LC.06 (Actual length) is calculated by dividing the number of pulses collected by the DI terminal by LC.07 (Number of pulses each meter).
When the actual length LC.06 exceeds the set length in LC.05, the DO terminal allocated with function 10 (Length reached) becomes ON.
During the fixed length control, the length reset operation can be performed via the DI terminal allocated with function 32. For details.
Allocate corresponding DI terminal with function 31 (Length count input) in applications. If the pulse frequency is high, D7/H must be used.

LC.08 Set count value	Setting Range：1～65535 【1000】
LC.09 Designated count value	Setting Range：1～65535 【1000】

The count value needs to be collected by DI terminal. Allocate the corresponding DI terminal with function 29 (Counter input) in applications. If the pulse frequency is high, D7/H must be used.
When the count value reaches the set count value (LC.08), the DO terminal becomes ON. Then the counter stops counting.
When the counting value reaches the designated counting value (LC.09), the DO terminal (Designated count value reached) becomes ON. Then the counter continues to count until the set count value is reached.
LC.09 should be equal to or smaller than LC.08.

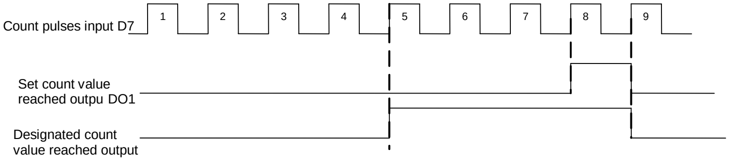


Figure 5-37 Reaching the set count value and designated count value

5.20 Monitoring Parameters - monitor the AC drive's running state （Group ob）

5.21 Monitoring Parameters - monitor the AC drive's fault state （Group oE）

Chapter 6 Faults and Solutions

The T5000 provides a total of 36 pieces of fault information and protective functions. After a fault occurs, the AC drive implements the protection function, and displays the fault code on the operation panel (if the operation panel is available).

Table 6-1 Solutions to the faults of the T5000

Number	Display	Fault Name	Possible Causes	Solutions
1	E-oCA	Overcurrent during acceleration	1: The output circuit is grounded or short circuited. 2: Motor auto-tuning is not performed. 3: The acceleration time is too short. 4: Manual torque boost or V/F curve is not appropriate. 5: The voltage is too low. 6: The startup operation is performed on the rotating motor. 7: A sudden load is added during acceleration. 8: The AC drive model is of too small power class.	1: Eliminate external faults. 2: Perform the motor autotuning. 3: Increase the acceleration time. 4: Adjust the manual torque boost or V/F curve. 5: Adjust the voltage to normal range. 6: Select rotational speed tracking restart or start the motor after it stops. 7: Remove the added load. 8: Select an AC drive of higher power class.
2	E-oCD	Overcurrent during deceleration	1: The output circuit is grounded or short circuited. 2: Motor auto-tuning is not performed. 3: The deceleration time is too short. 4: The voltage is too low. 5: A sudden load is added during deceleration. 6: The braking unit and braking resistor are not installed.	1: Eliminate external faults. 2: Perform the motor autotuning. 3: Increase the deceleration time. 4: Adjust the voltage to normal range. 5: Remove the added load. 6: Install the braking unit and braking resistor

3	E-oCC	Overcurrent at constant speed	1: The output circuit is grounded or short circuited. 2: Motor auto-tuning is not performed. 3: The voltage is too low. 4: A sudden load is added during operation. 5: The AC drive model is of too small power class.	1: Eliminate external faults. 2: Perform the motor autotuning. 3: Adjust the voltage to normal range. 4: Remove the added load. 5: Select an AC drive of higher power class.
4	E-ovA	Overvoltage during acceleration	1: The input voltage is too high. 2: An external force drives the motor during acceleration. 3: The acceleration time is too short. 4: The braking unit and braking resistor are not installed	1: Adjust the voltage to normal range. 2: Cancel the external force or install a braking resistor. 3: Increase the acceleration time. 4: Install the braking unit and braking resistor.
5	E-ovD	Overvoltage during deceleration	1: The input voltage is too high. 2: An external force drives the motor during deceleration. 3: The deceleration time is too short. 4: The braking unit and braking resistor are not installed.	1: Adjust the voltage to normal range. 2: Cancel the external force or install the braking resistor. 3: Increase the deceleration time. 4: Install the braking unit and braking resistor.
6	E-ovC	Overvoltage at constant speed	1: The input voltage is too high. 2: An external force drives the motor during deceleration.	1: Adjust the voltage to normal range. 2: Cancel the external force or install the braking resistor
7	E-BoL	Control power supply fault	The input voltage is not within the allowable range.	Adjust the input voltage to the allowable range.
8	E-LU	Undervoltage	1: Instantaneous power failure occurs on the input power supply. 2: The AC drive's input voltage is not within the allowable range. 3: The bus voltage is abnormal. 4: The rectifier bridge and buffer	1: Reset the fault. 2: Adjust the voltage to normal range. 3: Contact the agent or Tideway.

			resistor are faulty. 5: The drive board is faulty. 6: The main control board is faulty.	
9	E-HrE	AC drive hardware fault	1: Overvoltage exists. 2: Overcurrent exists.	1: Handle based on overvoltage. 2: Handle based on overcurrent.
10	E-IPL	Power input phase loss	1: The three-phase power input is abnormal. 2: The drive board is faulty. 3: The lightening board is faulty. 4: The main control board is faulty.	1: Eliminate external faults. 2: Contact the agent or Tideway.
11	E-oPL	Power output phase loss	1: The cable connecting the AC drive and the motor is faulty. 2: The AC drive's three-phase outputs are unbalanced when the motor is running. 3: The drive board is faulty. 4: The module is faulty.	1: Eliminate external faults. 2: Check whether the motor three-phase winding is normal. 3: Contact the agent or Tideway.
12	E-GF	Short circuit to ground	The motor is short circuited to the ground.	Replace the cable or motor.
13	E-13	Reserved	Reserved	Reserved
14	E-oL1	AC drive overload	1: The load is too heavy or lockedrotor occurs on the motor. 2: The AC drive model is of too small power class.	1: Reduce the load and check the motor and mechanical condition. 2: Select an AC drive of higher power class.
15	E-oL2	Motor overload	1: HA.01 is set improperly. 2: The load is too heavy or locked rotor occurs on the motor. 3: The AC drive model is of too small power class.	1: Set HA.01 correctly. 2: Reduce the load and check the motor and the mechanical condition. 3: Select an AC drive of higher power class.

16	E-oL3	Module overheat	1: The ambient temperature is too high. 2: The air filter is blocked. 3: The fan is damaged. 4: The thermally sensitive resistor of the module is damaged. 5: The inverter module is damaged.	1: Lower the ambient temperature. 2: Clean the air filter. 3: Replace the damaged fan. 4: Replace the damaged thermally sensitive resistor. 5: Replace the inverter module.
17	E-EPr	EEPROM readwrite fault	The EEPROM chip is damaged	Replace the main control board.
18	E-DIE	External equipment fault	External fault signal is input via DI.	Reset the operation.
19	E_rTo	Accumulative running time reached	The accumulative running time reaches the setting value.	Clear the record through the parameter initialization function.
20	E-Pto	Accumulative power-on time reached	The accumulative power-on time reaches the setting value.	Clear the record through the parameter initialization function.
21	E-CCF	Current detection fault	1: The HALL device is faulty. 2:The drive board is faulty.	1: Replace the faulty HALL device. 2: Replace the faulty drive board.
22	E-Eto	Motor overheat	1: The cabling of the temperature sensor becomes loose. 2: The motor temperature is too high.	1: Check the temperature sensor cabling and eliminate the cabling fault. 2: Lower the carrier frequency or adopt other heat radiation measures.
23	E-cEr	Contactor fault	1: The drive board and power supply are faulty. 2: The contactor is faulty.	1: Replace the faulty drive board or power supply board. 2: Replace the faulty contactor.
24	E-PCE	Communication fault	1: The host computer is in abnormal state. 2: The communication cable is faulty. 3: The communication parameters in group HB are set improperly.	1: Check the cabling of host computer. 2: Check the communication cabling. 3: Set the communication parameters properly.

25	E-PGL	Encoder fault	1: The encoder type is incorrect. 2: The cable connection of the encoder is incorrect. 3: The encoder is damaged. 4: The PG card is faulty.	1: Set the encoder type correctly based on the actual situation. 2: Eliminate external faults. 3: Replace the damaged encoder. 4: Replace the faulty PG card.
26	E-ALP	Motor auto-tuning fault	1: The motor parameters are not set according to the nameplate. 2: The motor auto-tuning times out.	1: Set the motor parameters according to the nameplate properly. 2: Check the cable connecting the AC drive and the motor.
27	E-27	Reserved	Reserved	Reserved
28	E-CBC	Pulse-by-puls e Current limit fault	1: The load is too heavy or lockedrotor occurs on the motor. 2: The AC drive model is of too small power class.	1: Reduce the load and check the motor and mechanical condition. 2: Select an AC drive of higher power class.
29	E-SLo	Motor over-speed	1: The encoder parameters are set incorrectly. 2: The motor auto-tuning is not performed. 3: HA.30 and HA.31 are set incorrectly.	1: Set the encoder parameters properly. 2: Perform the motor autotuning. 3: Set HA.30 and HA.31 correctly based on the actual situation.
30	E-SLE	Too large speed deviation	1: The encoder parameters are set incorrectly. 2: The motor auto-tuning is not performed. 3: HA.32 and HA.33 are set incorrectly.	1: Set the encoder parameters properly. 2: Perform the motor autotuning. 3: Set HA.32 and HA.33 correctly based on the actual situation.
31	E-CrP	Motor switchover fault during running	Change the selection of the motor via terminal during running of the AC drive.	Perform motor switchover after the AC drive stops.
32	E-LLE	Load becoming 0	The AC drive running current is lower than HA. 28	Check that the load is disconnected or the setting of HA. 28 and HA. 29 is correct.
33	E-PFL	PID feedback lost during running	The PID feedback is lower than the setting of LA. 25	Check the PID feedback signal or set LA.25 to a proper value.
34	E-34	Reserved	Reserved	Reserved

35	E_uD1	User-defined fault 1	1: The user-defined fault 1 signal is input via DI. 2: User-defined fault 1 signal is input via virtual I/O.	Reset the operation.
36	E_uD2	User-defined fault 2	1: The user-defined fault 2 signal is input via DI. 2: The user-defined fault 2 signal is input via virtual I/O.	Reset the operation.

Table6—2 Common Faults and Solutions

Phenomena	Possible Causes		Solutions
There is no display at power-on.	1: There is no power supply to the AC drive or the power input to the AC drive is too low. 2: The power supply of the switch on the drive board of the AC drive is faulty. 3: The rectifier bridge is damaged. 4: The control board or the operation panel is faulty. 5: The cable connecting the control board and the drive board and the operation panel breaks.		1: Check the power supply. 2: Check the bus voltage. 3: Re-connect the cables. 4: Contact the agent or Tideway for technical support.
Unexpected stops during running	The drive stops automatically without STOP command. The RUN indicator goes out.	Alarm occurs	Find out the reason and reset
		Single cycle of PLC finishes	Check PLC configuration
		Preset length arrives	Clear the actual length value or set LC.05 at 0
		Interruption Of the communication between the drive and host or flush mount faceplate	Check communication cables and HB setting
		Power failure	check the power supply
		Command input method changed	Check the command input method and corresponding parameter
		Positive/negative logic of control terminal changed	Check the corresponding parameter
	The drive stops automatically without STOP command. The RUN indicator is still on, zero-frequency running	Auto reset of fault	Check reason of fault and the auto reset function
		Simple PLC pause	Check PLC pause function (terminal)
		Interrupt signal feedback from external devices	Check the configuration of external interrupt and faulty external devices
		Reference frequency is 0	Check the reference frequency
		Skip frequency	Check skip frequency

		Positive logic, close loop feedback>reference frequency Negative logic, close loop feedback<reference frequency	Check the close loop setting and feedback
		Restart low voltage compensation function enabled, and low supply voltage	Check the configuration of restart and the input voltage
Drive does not run	Press RUN key, the drive does not run and RUN indicator is off.	“ Coast to stop” terminal effective	Check “coast to stop” terminal
		“ Operation prohibition” terminal effective	Check “operation prohibition” terminal
		“ External stop” terminal effective	Check “external stop” terminal
		Preset length arrives	Check length setting or delete actual length value
		In 3-wire control mode, the control terminal not closed.	Close the control terminals
		Alarm due to fault	Clear the fault
The AC drive reports overcurrent and overvoltage frequently.	1: The motor parameters are set improperly. 2: The acceleration/deceleration time is improper. 3: The load fluctuates.		1: Re-set motor parameters or re-perform the motor autotuning. 2: Set proper acceleration/ deceleration time. 3: Contact the agent or Tideway for technical support.

Chapter 7 Maintenance

The influence of the ambient temperature, humidity, dust and vibration will cause the aging of the devices in the AC drive, which may cause potential faults or reduce the service life of the AC drive. Therefore, it is necessary to carry out routine and periodic maintenance.

📖 Notice:

As safety precautions, before carrying out check and maintenance of the drive, please ensure that :
The drive has been switched off;
The charging LED lamp in the drive is off, which can be seen after removing the cover.。

7.1 Routine Maintenance

The drive must be operated in the environment specified in the Section 2.1. Besides, some unexpected accidents may occur during operation. The user should perform the routine maintenance to ensure a good operation environment according to the table below. A good way to prolong the lifetime of the drive is to record the routine operation data, find out and clear faults in the early stage

Table7－1 Daily Checking Items

Object	Item		Criterion
	Item	Method	
Environment	1>Temperature humidity	Thermometer, hygrometer	(1)-10℃～+40℃， Derate if at 40℃～50℃
	2>Dust, water and leakage	observe	(2)No sign of leakage
	3>Gas	Smell	(3)No strange smell
Motor	1>Heat	Touch the casing	(1)Normal air flow
	2>Sound	Listen	(2)No strange sound
Drive	1>Heat	Touch	(1)No overheat
	2>Sound	Listen	(2)No strange sound
	3>Output current	Clamp meter	(2)Within rated range
	4> Output voltage	Voltage meter	(3)No overheat

7.2 Periodic Maintenance

You should check the drive every 3 months or 6 months according to the actual environment.

📖 NOTICE :

1. Only trained personnel can dismantle the drives for repairing or device replacement;
2. Don't leave metal parts like screws or pads in the drive, otherwise the equipment

may be damaged.

General Inspection::

1. Whether screws of control terminals are loose. If so, tighten them with a screwdriver;
2. Whether the main circuit terminals are properly connected; whether the mains cables are over heated;
3. Whether the power cables and control cables are damaged, check especially for any wear on the cable insulation
4. Whether the insulating tapes around the cable lugs are stripped;
5. Clean the dust on PCBs and air ducts with a vacuum cleaner;
6. For drives that have been stored for a long time, it must be powered on every 2 years. When supplying AC power to the drive, use a voltage regulator to raise the input voltage to rated input voltage gradually. The drive should be powered for 5 hours without driving a motor load.
7. Before performing insulation tests, all main circuit input/output terminals should be short-circuited with conductors. Then proceed insulation test to the ground. Insulation test of single main circuit terminal to ground is prohibited, The drive can be damaged by such a test. Please use a 500V Mega-Ohm-Meter.

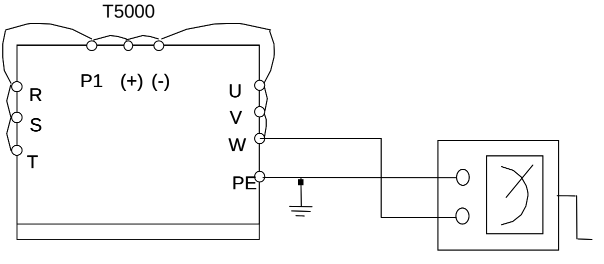


Figure7－1 Performing insulation tests,

8. If performing insulation test to the motor, be sure to disconnect the cables between the drive and it. Otherwise, the drive might be damaged.

📖 Notice:

Dielectric test of the drive has already been done in the factory. It is not necessary for the user to do dielectric test again in order to avoid potential damage of its internal components.

7.3 Replacing of Easily-worn Parts

The easily-worn parts of the drive are cooling fan and electrolytic capacitor, whose life has close relation with the environment and maintenance. Refer to the table below

Part	Life
Fan	30～40 thousand hours
Electrolytic capacitor	40～50 thousand hours
Relay TA/TB/TC	About 100,000 times

You can decide the time when the components should be replaced according to their service time.

1. Cooling fan

Possible cause of damages: wear of the bearing, aging of the fan vanes.

Criteria: After the drive is switched off, check if abnormal conditions such as crack exists on fan vanes and other parts. When the drive is switched on, check if drive running is normal, and check if there is any abnormal vibration.

2. Electrolytic capacitors

Possible cause of damages: high ambient temperature, aging of electrolyte and large pulse current induced by rapid changing loads.

Criteria: Check if frequent over-current or over-voltage failures occur during drive start-up with load. Check if there is any leakage of liquids (electrolytes). Check if the safety valve protrudes. Measure static capacitance and insulation resistance.

3. Relay TA/TB/TC

Possible cause of damages: erosion, frequent operation.

Criteria: ON/OFF malfunction.

7.4 Storage of the Drive

The following points must be followed for the temporary and long-term storage of drive:

1. Store in locations free of high temperature, humidity, dust, metal powder, and with good ventilation.

2. Long-term storage will cause the deterioration of electrolytic capacitors. Therefore, the drive must be switched on for a test within 2 years, for at least 5 hours. The input voltage must be applied gradually with a voltage regulator to the rated value.

Appendix 1 Standard Function Parameters

T5000 Series drive's parameters are organized in groups. Each group has several parameters that are identified by "Group No.+ Parameter SN.". Parameter Hx.yz deNotices that the parameter belongs to group "X" and its SN is "yz". For example, "H2.05" belongs to group 2 and its SN is 5. For the convenience of setting the parameters, the group number corresponds to the menu level, 1, parameter number corresponds to menu level 2 and parameters of parameter correspond to the menu level 3.

Explanation of the columns in Parameter Table:

The "Function Code" in first column refers to the parameter's name displayed by LED; The "Parameter Name" in second column refers to the parameter's complete name, The "setting range" in third column is the valid ranges of parameter settings; The "minimum unit" is the min. value of the parameter; The "factory setting" in fourth column is the default factory settings; The "properties" in fifth row is the properties of modification (that is, whether it is allowed to be modified and conditions for modification):

"○" : deNotices the parameters can be revised when the drive is in operating or stop status;

"▲" : deNotices the parameters can not be revised when the drive is operating;

"●" : deNotices the parameters are actually detected and can not be revised;

"〓" : deNotices the parameters that are set by factory and the user cannot modify it;

(The drive has already set the "auto-checking" function to the modification property of each parameter, so as to avoid wrong modification by the user.)

The drive provides passwords to protect the parameters against unauthorized modifications. After the user's password is set (that is, the settings of H0.17 are not zero), the drive will require you to input the password before the user press the ESC to edit the parameter settings, otherwise you cannot set the parameters. For the parameters set by factory, you can only set the parameters after inputting factory password (you should not change the settings of the parameters set by factory because the drive may operate abnormally or may be damaged if the parameters are not set correctly).

Table1：Standard Function Parameters

Group H0：Basic and system Parameters					
Function Code	Parameter Name	Setting Range	Min unit	Default	Property
H0.00	Motor control mode	Units：Motor 1 control mode 0：Motor 1 Voltage/Frequency (V/F) control 1：Motor 1 Sensorless flux vector control(SVC) Tens：Motor 2 control mode 0: Motor 2 Voltage/Frequency (V/F) control 1: Motor 2 Sensorless flux vector control(SVC)	1	0	▲
H0.01	Main Frequency Source selection	0：Digital setting (H0.02,retentive at power failure) 1：AI1（0-10v） 2：AI2（0-10v） 3：AI3（-10v-10v） 4：X7/DI Pulse setting 5：PID 6：PLC 7：Multi-reference 8：Communication setting	1	0	▲
H0.02	Preset frequency	0.00Hz～maximum frequency H0.06	0.01Hz	50.00Hz	○
H0.03	Command source selection	0：Operation panel control 1：Terminal control 2：Communication control	1	0	○
H0.04	Binding command source to frequency source	Unit's digit：Binding operation panel command to frequency source； 0：No binding 1：AI1（0-10v） 2：AI2（0-10v） 3：AI3（-10v-10v） 4：X7/DI Pulse setting 5：PID 6：PLC 7：Terminal control 8：Communication control Ten's digit：Binding terminal command to frequency source； Hundred's digit：Binding communication command to frequency source；	888	000	○
H0.05	Rotation direction	0：Same direction; 1：Reverse direction;	1	0	○
H0.06	Maximum frequency	50.00Hz～300.00Hz	0.01Hz	50.00Hz	▲

H0.07	Source of frequency upper limit	0：H0.08 1：AI1 2：AI2 3：AI3 4：PULSE pulse setting 5：Communication setting	1	0	▲
H0.08	Frequency upper limit	Frequency lower limit H0.09～maximum frequency H0.07	0.01Hz	50.00Hz	○
H0.09	Frequency lower limit	0.00Hz～Frequency upper limit H0.08	0.01Hz	0.00Hz	○
H0.10	Acceleration time 1	0.0s～6500.0s	0.1s	Model dependent	○
H0.11	Deceleration time 1				○
H0.12	Carrier frequency	0.5kHz～16.0kHz	0.01kHz	Model dependent	○
H0.13	Carrier frequency adjustment	0：No 1：Yes	1	1	○
H0.14	Random PWM depth	0：invalid 1～10：	1		○
H0.15	Serial communication protocol	0：MODBUS 1：Canlink 2：Profibus-DP 3：ethernet	1	0	○
H0.16	Motor parameter group selection	0：Motor 1 1：Motor 2	1	0	▲
H0.17	User password	0～55555	1	00000	○
H0.18	parameter display property	Unit's digit (Group o display selection) 0：Not display 1：Display Ten's digit (Group E display selection)： 0：Not display 1：Display Hundred's digit (Group L display selection)： 0：Not display 1：Display Thousand's digit (Group d display selection)： 0：Not display 1：Display	1	0101	○
H0.19	功能码组别显示选择	0、显示基本组； 1、显示用户功能码组别； 2、显示与初厂值不同的功能码值；	1	0	○
H0.20	Parameter modification property	0：all parameters are modifiable 1：Parameter modification property	1	0	○

Function Code	Parameter Name	Setting Range	Min unit	Default	Property
H0.21	Restore default settings	0：No operation 1：Restore default settings except motor parameters 2：Clear fault records 3：Restore default settings of all the function number.	1	0	▲
Group H1：Start/Stop Control					
Function Code	Parameter Name	Setting Range	Min unit	Default	Property
H1.00	Start mode	0：Direct start 1：Pre-excited start 2：Rotational speed tracking restart	1	0	○
H1.01	Startup frequency	0.00Hz～10.00Hz	0.01Hz	0.00Hz	○
H1.02	Startup frequency holding time	0.0s～100.0s	0.1s	0.0s	▲
H1.03	Startup DC braking current/Pre-excited current	0%～100%	1%	0%	▲
H1.04	Startup DC braking time/Pre-excited time	0.0s～100.0s	0.1s	0.0s	▲
H1.05	Rotational speed tracking mode	0：From frequency at stop 1：From zero frequency 2：From the maximum frequency	1	0	▲
H1.06	Rotational speed tracking speed	1～100	1	20	○
H1.07	Stop mode	0：Decelerate to stop 1：Coast to stop	1	0	○
H1.08	Initial frequency of stop DC braking	0.00Hz～maximum frequency	0.01Hz	0.00Hz	○
H1.09	Waiting time of stop DC braking	0.0s～100.0s	0.1s	0.0s	○
H1.10	Stop DC braking current	0%～100%	1%	0%	○
H1.11	Stop DC braking time	0.0s～100.0s	0.1s	0.0s	○
H1.12	Brake use ratio	0%～100%	1%	100%	○
H1.13	Action selection at instantaneous power failure	0：Invalid 1：Decelerate 2：Decelerate to stop	1	0	○
H1.14	Action pause judging voltage at instantaneous power failure	80.0%～100.0%(standard bus voltage)	0.10%	90%	○
H1.15	Voltage rally judging time at instantaneous power failure	0.00s～100.00s	0.01	0.5s	○

H1.16	Action judging voltage at instantaneous power failure	60.0%～100.0%(standard bus voltage)	0.10%	80.00%	○
H1.17	Reverse control	0：Enabled 1: Disabled	1	0	○
H1.18	Forward/Reverse rotation dead-zone time	0.0s～3600.0s	0.1s	0.0s	○

Group H2 Auxiliary frequency setting and Acceleration/ Deceleration time					
Function Code	Parameter Name	Setting Range	Min unit	Default	Property
H2.00	Main/auxiliary frequency source selection	0：Main frequency source 1：Main and auxiliary frequency operation（operation relationship determined by H2.05） 2：Switchover between main and auxiliary frequency 3：Switchover between main and operation result 4：Switchover between auxiliary and operation result	1	0	○
H2.01	Auxiliary frequency source selection	0：Digital setting (H0.02,retentive at power failure) 1：AI1（0-10v） 2：AI2（0-10v） 3：AI3（-10v-10v） 4：X7/DI Pulse setting 5：PID 6：PLC 7：Multi-reference 8：Communication setting	1	0	▲
H2.02	Auxiliary frequency digital setting	0.00Hz～maximum frequency H0.06	0.01Hz		○
H2.03	Base of auxiliary frequency for the operation	0：Relative to maximum frequency 1：Relative to main frequency	1	0	○
H2.04	Range of auxiliary frequency	0%～100%	0.01	1	○
H2.05	Main/auxiliary frequency operation relationship	0：Main frequency + auxiliary frequency 1：Main frequency - auxiliary frequency 2：Maximum (Main/auxiliary frequency) 3：Minimum (Main/auxiliary frequency)		0	○

H2.06	Running mode when set frequency lower than frequency lower limit	0：Run at frequency lower limit； 1：Stop； 2：Run at zero speed	1	0	○
H2.07	JOG running frequency	0.00Hz ～ maximum frequency	0.01Hz	2.00Hz	○
H2.08	Jump frequency 1 lower limit	0.00Hz ～ maximum frequency	0.01Hz	0.00Hz	○
H2.09	Jump frequency 1 upper limit	0.00Hz ～ maximum frequency	0.01Hz	0.00Hz	○
H2.10	Jump frequency 2 lower limit	0.00Hz ～ maximum frequency	0.01Hz	0.00Hz	○
H2.11	Jump frequency 2 lower limit	0.00Hz ～ maximum frequency	0.01Hz	0.00Hz	○
H2.12	Acceleration/Deceleration time unit	0：0.01s 1：0.1s 2：1s	1	1	▲
H2.13	Acceleration/Deceleration mode	0：Linear acceleration/deceleration 1：S-curve acceleration/deceleration	1	0	▲
H2.14	S Time proportion of S-curve start segment	0.0%～(100.0%-H2.15)	0.10%	30.00%	▲
H2.15	S Time proportion of S-curve end segment	0.0%～(100.0%- H2.14)	0.10%	30.00%	▲
H2.16	Frequency switchover point between acceleration time 1 and acceleration time 2	0.00Hz ～ maximum frequency	0.01Hz	0.00Hz	○
H2.17	Frequency switchover point between deceleration time 1 and deceleration time 2	0.00Hz ～ maximum frequency	0.01Hz	0.00Hz	○
H2.18	Acceleration time 2	0.0s～6500.0s	0.1s	Model dependent	○
H2.19	Deceleration time 2	0.0s～6500.0s	0.1s	Model dependent	○
H2.20	Acceleration time 3	0.0s～6500.0s	0.1s	Model dependent	○
H2.21	Deceleration time 3	0.0s～6500.0s	0.1s	Model dependent	○
H2.22	Acceleration time 4	0.0s～6500.0s	0.1s	Model dependent	○
H2.23	Deceleration time 4	0.0s～6500.0s	0.1s	Model dependent	○

H2.24	JOG acceleration time	0.0s～6500.0s	0.1s	20.0s	○
H2.25	JOG deceleration time	0.0s～6500.0s	0.1s	20.0s	○
Group H3 Motor 1 Parameters					
Function Code	Parameter Name	Setting Range	Min unit	Default	Property
H3.00	Rated motor power	0.1kW～1000.0kW	0.1kW	Model dependent	▲
H3.01	Rated motor frequency	0.00Hz～maximum frequency	0.01Hz	Model dependet	▲
H3.02	Rated motor rotational speed	0rpm～65535rpm	1rpm	Model dependet	▲
H3.03	Rated motor voltage	0V～2000V	1V	Model dependet	▲
H3.04	Rated motor current	0.01A～655.35A(AC drive power <= 55kW) 0.1A～6553.5A(AC drive power > 55kW)	0.01A	Model dependet	▲
H3.05	Stator resistance	0.001Ω～65.535Ω(AC drive power <=55kW) 0.0001Ω ～ 6.5535Ω(AC drive power >55kW)	0.001Ω	Model dependet	▲
H3.06	Rotor resistance	0.001Ω～65.535Ω(AC drive power <=55kW) 0.0001Ω ～ 6.5535Ω(AC drive power >55kW)	0.001Ω	Model dependet	▲
H3.07	Leakage inductive reactance	0.01mH～655.35mH(AC drive power <=55kW) 0.001mH ～ 65.535mH(AC drive power >55kW)	0.01mH	Model dependet	▲
H3.08	Mutual inductive reactance	0.1mH～6553.5mH(AC drive power <=55kW) 0.01mH ～ 655.35mH(AC drive power >55kW)	0.1mH	Model dependet	▲
H3.09	No-load current	0.01A ～ H3.04 (AC drive power <=55kW) 0.1A ～ H3.04 (AC drive power >55kW)	0.01	Model dependet	▲
H3.10~H3.13	Reserved	Reserved	Reserved	Reserved	Reserved
H3.14	Auto-tuning selection	0: No auto-tuning 1: Asynchronous motor static auto-tuning 2: Asynchronous motor complete auto-tuning	1	0	▲
Group H4 Motor 1 Vector Control Parameters					
Function Code	Parameter Name	Setting Range	Min unit	Default	Property

H4.00	Speed/Torque control selection	0：Speed control 1：Torque control	1	0	▲
H4.01	Speed loop proportional gain Kp1	0.1～10.0	0.1	3	○
H4.02	Speed loop integral time Ti1	0.010s～10.000s	0.001s	0.500s	○
H4.03	Speed loop proportional gain Kp2	0.1～10.0	0.1	2.0	○
H4.04	Speed loop integral time Ti2	0.010s～10.000s	0.001s	1.000s	○
H4.05	Switchover frequency 1	0.00～H4.06	0.01Hz	5.00Hz	○
H4.06	Switchover frequency 2	H4.05～maximum frequency H0.06	0.01Hz	10.00Hz	○
H4.07	Time constant of speed loop filter	0～100	1	80	○
H4.08	Reserved	Reserved	Reserved	Reserved	○
H4.09	Vector over-excitation gain	0～200	1	64	○
H4.10	Vector control slip gain	50%～200%	0.01	1	○
H4.11	Torque upper limit source in speed control mode	0：H4.12 1：AI1 2：AI2 3：AI3 4：Pulse setting 5：Communication setting	1	0	○
H4.12	Digital setting of torque upper limit in speed control mode	0.0%～200.0%	0.001	150.00%	○
H4.13	Reserved	Reserved	Reserved	Reserved	○
H4.14	Reserved	Reserved	Reserved	Reserved	○
H4.15~H4.18	Reserved	Reserved	Reserved	Reserved	保留
H4.19	Torque setting source in torque mode	0：H4.21 1：AI1 2：AI2 3：AI3 4：Pulse setting 5：Communication setting	1	0	▲
H4.20	Reserved	Reserved	Reserved	Reserved	○

H4.21	Torque digital setting in torque mode	-200.0%～200.0%	0.001	1.5	○
H4.22	Forward maximum frequency in torque control	0.00Hz～maximum frequency	0.01Hz	50.00Hz	○
H4.23	Reverse maximum frequency in torque control	0.00Hz～maximum frequency	0.01Hz	50.00Hz	○
H4.24	Acceleration time in torque control	0.00s～65000s	0.01s	0.00s	○
H4.25	Deceleration time in torque control	0.00s～65000s	0.01s	0.00s	○

Group H5 V/F Control Parameters					
Function Code	Parameter Name	Setting Range	Min unit	Default	Property
H5.00	V/F curve setting	0：Linear V/F 1：Multi-point V/F 2：Square V/F 3：V/F complete separation 4：V/F half separation	1	0	▲
H5.01	Multi-point V/F frequency F1	0.00Hz～H5.03	0.01Hz	0.00Hz	▲
H5.02	Multi-point V/F voltage V1	0.0%～100.0%	0.001	0	▲
H5.03	Multi-point V/F frequency F2	H5-01～H5.05	0.01Hz	0.00Hz	▲
H5.04	Multi-point V/F voltage V2	0.0%～100.0%	0.001	0	▲
H5.05	Multi-point V/F frequency F3	H5-03 ～ rated motor frequency (H3.01)	0.01Hz	0.00Hz	▲
H5.06	Multi-point V/F voltage V3	0.0%～100.0%	0.001	0	▲
H5.07	V/F Torque boost	0.0%:（fixed torque boost） 0.1%～30.0%	0.001	Model dependent	○
H5.08	V/F Cut-off frequency of torque boost	0.00Hz～maximum frequency	0.01Hz	50.00Hz	▲
H5.09	V/F slip compensation gain	0.0%～200.0%	0.001	0	○
H5.10	VF over-excitation gain	0～1	1	1	○
H5.11	oscillation suppression gain	0～100	1	Model dependent	○

H5.12	Voltage source for V/F separation	0：H2.13 1：AI1（-10v-10v） 2：AI2（0-10v） 3：AI3 4：X7/HDI Pulse setting 5：PID 6：PLC 7：Multi-reference 8：Communication setting 100.0% of the setting in each mode corresponds to the rated motor voltage	1	0	○
H5.13	Voltage digital setting for V/F separation	0V～rated motor voltage	1V	0V	○
H5.14	Voltage rise time of V/F separation	0.0s～1000.0s	0.1s	0.0s	○
H5.15	V/F Torque boost (motor 2)	0.0%:（fixed torque boost） 0.1%～30.0%	0.001	Model dependent	○
H5.16	V/F oscillation suppression gain(motor 2)	0～100	1	Model dependent	○

Group H6 Input Terminals

Function Code	Parameter Name	Setting Range	Min unit	Default	Property
H6.00	D1 function selection	0：No function 1：Forward RUN（FWD） 2：Reverse RUN（REV） 3：Three-line control 4：Forward JOG（FJOG） 5：Reverse JOG（RJOG） 6：Coast to stop 7：Fault reset（RESET） 8：Normally open (NO) input of external fault 9：Terminal UP 10：Terminal DOWN		1	▲
H6.01	D2 function selection	11：UP and DOWN setting clear (terminal, operation panel) 12：Multi-reference terminal 1 13：Multi-reference terminal 2 14：Multi-reference terminal 3 15：Multi-reference terminal 4 16：Terminal 1 for acceleration/ deceleration time selection 1 17：Terminal 2 for acceleration/ deceleration time selection 18：Normally close (NO) input of external fault		2	▲
H6.02	D3 function selection			4	▲
H6.03	D4 function selection			7	▲
H6.04	D5 function selection			6	▲
H6.05	D6 function selection			0	▲
H6.06	D7 function selection			0	▲
H6.07	D8 function selection			0	▲
H6.08	D9 function selection			0	▲

H6.09	D10 function selection	19：External STOP terminal 1 20 ： Frequency setting switchover 21：Reserved 22:Switchover between main frequency source and preset frequency 23 ： Switchover between auxiliary frequency source and preset 24 ： Command source switchover terminal 1 25：PID integral pause 26 ： Reverse PID action direction 27：PID integral pause 28：PID parameter switchover 29：Counter input 30：Counter reset 31：Length count input 32：Length reset 33：Teminal time valid； 34：Swing pause 35：Reserved 36：Acceleration/Deceleration prohibited 37：Immediate DC braking 38 ： Command source switchover terminal 2 39：Frequency modification forbidden 40：Motor selection terminal 41：Speed control/Torque control switchover 42：RUN pause 43：User-defined fault 1 44：User-defined fault 2 45：PLC status reset 46：Torque control prohibited 47：Emergency stop 48: External STOP terminal 2 49：Deceleration DC braking 50：Clear the current running time 51-59:Reserved		0	▲
H6.10	Function selection for AI1 used as DI	0～59	1	1	▲
H6.11	Function selection for AI2 used as DI	0～59	1	1	▲
H6.12	Function selection for AI3 used as DI	0～59	1	1	▲
H6.13	DI filter time	0.000s～1.000s	0.001	0.1	○
H6.14	DI1 delay time	0.0s～3600.0s			▲
H6.15	DI2 delay time	0.0s～3600.0s			▲
H6.16	DI3 delay time	0.0s～3600.0s			▲

H6.17	DI valid mode selection 1	0：High level valid 1：Low level valid Unit's digit：D1 Ten's digit：D2 Hundred's digit：D3 Thousand's digit：D4 Ten thousand's digit：D5			▲
H6.18	DI valid mode selection 2	0：High level valid 1：Low level valid Unit's digit：D6 Ten's digit：D7 Hundred's digit：D8 Thousand's digit：D9 Ten thousand's digit：D10			▲
H6.19	Function selection for AI used as DI	0：High level valid 1：Low level valid Unit's digit：AI1 Ten's digit：AI2 Hundred's digit：AI3	111	111	▲
H6.20	Terminal UP/DOWN rate	0.001Hz～65.535Hz			○
H6.21	Terminal command mode	0：Two-line mode 1 1：Two-line mode 2 2：Three-line mode 1 3：Three-line mode 2			
Group H7 Input Terminals					
Function Code	Parameter Name	Setting Range	Min unit	Default	Property
H7.00	AI curve 1 minimum input	0.00V～H7.02	0.01	0.00V	○
H7.01	Corresponding setting of AI curve 1 minimum input	-100.0%～+100.0%	0.01	0	○
H7.02	AI curve 1 maximum input	H7.00～+10.00V	0.01	10.00V	○
H7.03	Corresponding setting of AI curve 1 maximum input	-100.0%～+100.0%	0.01	1	○
H7.04	AI1 filter time	0.00s～10.00s	0.01	0.10s	○
H7.05	AI curve 2 minimum input	0.00V～H7.07	0.01	0.00V	○
H7.06	Corresponding setting of AI curve 2 minimum input	-100.0%～+100.0%	0.01	0	○

H7.07	AI curve 2 maximum input	H7.05～+10.00V	0.01	10.00V	○
H7.08	Corresponding setting of AI curve 2 maximum input	-100.0%～+100.0%	0.01	1	○
H7.09	AI2 filter time	0.00s～10.00s	0.01	0.10s	○
H7.10	AI curve 3 minimum input	-10.00V～H7.13	0.01	-10.00V	○
H7.11	Corresponding setting of AI curve 3 minimum input	-100.0%～+100.0%	0.01	-1	○
H7.12	AI curve 3 maximum input	H7.10～+10.00V	0.01	10.00V	○
H7.13	Corresponding setting of AI curve 2 maximum input	-100.0%～+100.0%	0.01	1	○
H7.14	AI3 filter time	0.00s～10.00s	0.01	0.10s	○
H7.15	Pulse minimum input	0.00kHz～H7.17	0.01	0.00kHz	○
H7.16	Corresponding setting of pulse minimum input	-100.0%～100.0%	0.01	0	○
H7.17	Pulse maximum input	H7.15～100.00kHz	0.01	50.00kHz	○
H7.18	Corresponding setting of pulse maximum input	-100.0%～100.0%	0.01	1	○
H7.19	Pulse filter time	0.00s～10.00s	0.01	0.10s	○
H7.20	AI curve selection	unit's digit：AI1 curve selection 1：Curve 1（2 points, seeH7.00～H7.03） 2：Curve 2（2 points, see H7.05～H7.08） 3：Curve 3（2 points, see H7.10～H7.13） Ten's digit：(AI2 curve selection)，same as AI1 Hundred's digit (AI3 curve selection),same as AI1)		321	○

H7.21	Setting for AI less than minimum input	Unit's digit (Setting for AI1 less than minimum input) 0: Minimum value 1: 0.0% Ten's digit (Setting for AI2 less than minimum input) 0, 1 (same as AI1) Hundred's digit (Setting for AI3 less than minimum input) 0, 1 (same as AI1)		0	○
Group H8 Output Terminals					
Function Code	Parameter Name	Setting Range	Min unit	Default	Property
H8.00	Y2 terminal output mode	0：Pulse output (Y2-HDO) 1：Switch signal output (Y2)	1	0	○
H8.01	Y2 function selection	0：No output 1：AC drive running 2：Frequency reached 3：Fault output (stop) 4：Frequency-level detection FDT1 output 5：Frequency-level detection FDT2 output 6：Zero-speed running (no output at stop) 7：Zero-speed running 2 (having output at stop) 8：Frequency upper limit reached 9: Frequency lower limit reached (no output at stop) 10：Frequency 1 reached	1	0	○
H8.02	Relay 1 function	11：Frequency 2 reached 12：Accumulative power-on time reached 13：Accumulative running time reached 14：Timing reached 15：Set count value reached 16：Designated count value reached 17：Length reached 18：Undervoltage state output 19：Motor overload pre-warning 20：AC drive overload prewarning	1	3	○

H8.03	Relay 2 function	21：Frequency limited 22：Torque limited 23：Ready for RUN 24：AI1>AI2 25：AI1 input limit exceeded 26：Frequency lower limit reached (having output at stop) 27：Current running time reached 28：Alarm output 29：Fault output 30：Current 1 reached	1	0	○
H8.04	Y1 function selection	31：Current 2 reached 32：Load becoming 0 33：Zero current state 34：Module temperature reached	1	1	○
H8.05	Y3 function selection	35：Software current limit exceeded 36：Reverse running 37：Motor overheat warning 38：PLC cycle complete 39：Communication setting	1	4	○
H8.06	Y2 function selection	0：Running frequency 1：Set frequency 2：Output current 3：Output current 4：Output torque (absolute value)	1	0	○
H8.07	AO1 function selection	5：Output torque (actual value) 6：Output voltage 7：Output voltage 8：Motor rotational speed 9：Output power 10：AI1	1	0	○
H8.08	AO2 function selection	11：AI2 12：AI3 13：PULSE input 14：Communication setting 15：Length 16：Count value	1	1	○
H8.09	Maximum Y2 output frequency	0.01kHz～100.00kHz	0.01kHz	50.00kHz	○
H8.10	Y2 output delay time	0.0s～3600.0s	0.1s	0.0s	○
H8.11	Relay 1 output delay time	0.0s～3600.0s	0.1s	0.0s	○
H8.12	Relay 2 output delay time	0.0s～3600.0s	0.1s	0.0s	○
H8.13	Y1 output delay time	0.0s～3600.0s	0.1s	0.0s	○

H8.14	Y3 output delay time	0.0s～3600.0s	0.1s	0.0s	○
H8.15	DO valid mode selection	0-Positive logic；1- Negative logic Ten thousand's digit： Y3 output valid mode Thousand's digit： Y1 output valid mode Hundred's digit： Relay 2 output valid mode Ten's digit： Relay 1 output valid mode Unit's digit： Y2 output valid mode	11111	0	○
H8.16	AO1 offset coefficient	-100.0%～100.0%	0.001	0	○
H8.17	AO1 gain	-10.00～10.00	0.01	1	○
H8.18	AO2 offset coefficient	-100.0%～100.0%	0.001	0	○
H8.19	AO2 gain	-10.00～10.00	0.01	1	○
H8.20	AO1 output filter time				
H8.21	AO2 output filter time				
H8.22	Y2 output filter time				

Group H9 AI/AO Correction and AI curve setting

Function Code	Parameter Name	Setting Range	Min unit	Default	Property
H9.00	AI1 measured voltage 1	0.500V～4.000V	0.001V	Factory-corrected	○
H9.01	AI1 displayed voltage 1	0.500V～4.000V	0.001V	Factory-corrected	○
H9.02	AI1 measured voltage 2	6.000V～9.999V	0.001V	Factory-corrected	○
H9.03	AI1 displayed voltage 2	6.000V～9.999V	0.001V	Factory-corrected	○
H9.04	AI2 measured voltage 1	0.500V～4.000V	0.001V	Factory-corrected	○
H9.05	AI2 displayed voltage 1	0.500V～4.000V	0.001V	Factory-corrected	○
H9.06	AI2 measured voltage 2	6.000V～9.999V	0.001V	Factory-corrected	○
H9.07	AI2 displayed voltage 2	6.000V～9.999V	0.001V	Factory-corrected	○
H9.08	AI3 measured voltage 1	-9.999V～10.000V	0.001V	Factory-corrected	○

H9.09	AI3 displayed voltage 1	-9.999V～10.000V	0.001V	Factory-corrected	○
H9.10	AI3 measured voltage 2	-9.999V～10.000V	0.001V	Factory-corrected	○
H9.11	AI3 displayed voltage 2	-9.999V～10.000V	0.001V	Factory-corrected	○
H9.12	AO1 target voltage 1	0.500V～4.000V	0.001V	Factory-corrected	○
H9.13	AO1 measured voltage 1	0.500V～4.000V	0.001V	Factory-corrected	○
H9.14	AO1 target voltage 2	6.000V～9.999V	0.001V	Factory-corrected	○
H9.15	AO1 measured voltage 2	6.000V～9.999V	0.001V	Factory-corrected	○
H9.16	AO2 target voltage 1	0.500V～4.000V	0.001V	Factory-corrected	○
H9.17	AO2 measured voltage 1	0.500V～4.000V	0.001V	Factory-corrected	○
H9.18	AO2 target voltage 2	6.000V～9.999V	0.001V	Factory-corrected	○
H9.19	AO2 measured voltage 2	6.000V～9.999V	0.001V	Factory-corrected	○
H9.20	Jump point of AI1 input corresponding setting	-100.0%～100.0%	0.001	Factory-corrected	○
H9.21	Jump amplitude of AI1 input corresponding setting	0.0%～100.0%	0.001	Factory-corrected	○
H9.22	Jump point of AI2 input corresponding setting	-100.0%～100.0%	0.001	Factory-corrected	○
H9.23	Jump amplitude of AI2 input corresponding setting	0.0%～100.0%	0.001	Factory-corrected	○
H9.24	Jump point of AI3 input corresponding setting	-100.0%～100.0%	0.001	Factory-corrected	○
H9.25	Jump amplitude of AI3 input corresponding setting	0.0%～100.0%	0.001	Factory-corrected	○
Group HA Fault and Protection					
Function Code	Parameter Name	Setting Range	Min unit	Default	Property

HA.00	Motor overload protection selection	0：Disabled 1：Ensabled	1	1	○
HA.01	Motor overload protection gain	0.20～10.00	0.01	1.00	○
HA.02	Motor overload warning coefficient	50%～100%	0.01	80	○
HA.03	Overvoltage stall gain	0～100	1	0	○
HA.04	Overvoltage stall protective voltage	120%～150%	0.01	130	○
HA.05	Overcurrent stall gain	0～100	1	20	○
HA.06	Overcurrent stall protective current	100%～200%	0.01	150	○
HA.07	Rapid current limit	0：Disabled 1：Ensabled	1	1	○
HA.08	Undervoltage threshold	60.0%～140.0%	0.001	100%	○
HA.09	Overvoltage threshold	200.0v～2500.0v	0.1v	Model dependent	
HA.10	Short-circuit to ground upon power-on	0: Disabled 1: Enabled	1	1	○
HA.11	Fault auto reset times	0～20	1	0	○
HA.12	DO action during fault auto reset	0：Not act 1：Act	1	0	○
HA.13	Time interval of fault auto reset	0.1s～100.0s	0.1s	1.0	○
HA.14	Input phase loss protection selection	0: Disabled 1: Enabled	1	1	○
HA.15	Output phase loss protection selection	0: Disabled 1: Enabled	1	1	○
HA.16	Contactor energizing protection selection	0: Disabled 1: Enabled	1	1	○
HA.17	Fault protection action selection 1	00000~22222	11111	00000	○
HA.18	Fault protection action selection 2	00000~22222	11111	00000	○

HA.19	Fault protection action selection 3	00000~22222	11111	00000	○
HA.20	Fault protection action selection 4	00000~22222	11111	000000	○
HA.21	Fault protection action selection 5	Reserved	Reserved	Reserved	●
HA.22	Frequency selection for continuing to run upon fault	0：Current running frequency 1：Set frequency 2：Frequency upper limit 3：Frequency lower limit 4: Backup frequency upon abnormality	1	0	○
HA.23	Backup frequency upon abnormality	60.0% ～ 100.0%(maximum frequency H0.06)	0.001	100.0	○
HA.24	Type Of motor temperature sensor	0：NULL 1：PT100 2：PT1000	1	0	○
HA.25	Motor overheat protection threshold	0℃～200℃	1℃	110	○
HA.26	Motor overheat warning threshold	0℃～200℃	1℃	90	○
HA.27	Protection upon load becoming 0	0：Disable；1：Enable	1	0	○
HA.28	Detection level of load becoming	0.0～100.0%	0.001	10.0	○
HA.29	Detection time of load becoming	0.0～60.0s	0.1s	1.0	○
Group Hb Communication Parameters					
Function Code	Parameter Name	Setting Range	Min unit	Default	Property
Hb.00	Baud rate	0：300BPS 1：600BPS 2：1200BPS 3：2400BPS 4：4800BPS 5：9600BPS 6：19200BPS 7：38400BPS 8：57600BPS 9：115200BPS	1	6	○

Hb.01	Data format	0: No check, data format <8,N,2> 1: Even parity check, data format <8,E,1> 2: Odd Parity check, data format <8,O,1> 3: No check, data format <8,N,1> Valid for Modbus	1	0	○
Hb.02	Local address	1～247，0Broadcast address	1	1	○
Hb.03	Response delay	0ms～20ms	1ms	2	○
Hb.04	Communication timeout	0.0（invalid），0.1s～60.0s	0.1s	0	○
Group HC Auxiliary Functions/Dispaly					
Function Code	Parameter Name	Setting Range	Min unit	Default	Property
HC.00	M multi-fuction button selection	0：Disable 1：Switchover between operation panel control and remote command control 2：Switchover between forward rotation and reverse rotation 3：Forward JOG 4：Reverse JOG 5：Reserved	1	0	▲
HC.01	Reserved	Reserved	1	0	○
HC.02	LED display running parameters 1	0000～FFFF Bit00: Running frequency (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: DI input status Bit08: DO output status Bit09: AI1 voltage (V) Bit10: AI2 voltage (V) Bit11: AI3 voltage (V) Bit12: Count value Bit13: Length value Bit14: Load speed display Bit15: PID setting	1111	0x1F	○

HC.03	LED display running parameters 2	0000～FFFF Bit00：PID feedback Bit01：PLC stage Bit02：Pulse setting frequency Bit03：Running frequency Bit04：Remaining running tim Bit05：AI1 voltage before correction Bit06：AI2 voltage before correction Bit07：AI3 voltage before correction Bit08：Linear speed Bit09：Current power-on time Bit10：Current running time Bit11：Pulse setting frequency Bit12：Communication setting value Bit13：Encoder feedback speed Bit14：Main frequency display Bit15：Auxiliary frequency display	1111	0x0	○
HC.04	LED display stop parameters	0000～FFFF Bit00: Set frequency (Hz) Bit01: Bus voltage (Hz) Bit02: DI input status (V) Bit03: DO output status (V) Bit04: AI1 voltage (V) Bit05: AI2 voltage (V) Bit06: AI3 voltage (V) Bit07: Count value Bit08: Length value Bit09: PLC stage Bit10: Load speed display Bit11: PID setting Bit12: PLUSE setting	1111	0x33	○
HC.05	STOP/RESET key function	0：STOP/RST key enabled only in operation panel control 1：STOP/RST key enabled in any operation mode	1	1	○
HC.06	Droop control	0.00Hz～10.00Hz	0.01Hz	0	○
HC.07	Startup protection	0：Disable；1:Enable	1	0	○
HC.08	Jump frequency during acceleration/deceleration	0：Disable；1:Enable	1	0	○
HC.09	Terminal JOG preferred	0：Disable；1:Enable	1	0	○
HC.10	Accumulative running time reached action selection	0：Continue to run；1：Warnning	1	0	▲
HC.11	Accumulative power-on time reached action selection	0：Continue to run；1：Warnning	1	0	▲
HC.12	Frequency detection value (FDT1)	0.00Hz～maximum frequency	0.01Hz	50.00Hz	○
HC.13	Frequency detection hysteresis (FDT1)	0.0%～100.0%（FDT1 level）	0.001	5.0	○
HC.14	Detection range of frequency reached	0.0% ～ 100.0% （ maximum frequency）	0.001	0	○
HC.15	Frequency detection value (FDT2)	0.00Hz～maximum frequency	0.01Hz	50.00Hz	○

HC.16	Frequency detection hysteresis (FDT2)	0.0%～100.0%（FDT2 level）	0.001	5.0	○
HC.17	Any frequency reaching detection value 1	0.00Hz～maximum frequency	0.01Hz	50.00Hz	○
HC.18	Any frequency reaching detection amplitude 1	0.0% ～ 100.0% （ maximum frequency）	0.001	0	○
HC.19	Any frequency reaching detection value 2	0.00Hz～maximum frequency	0.01Hz	50.00Hz	○
HC.20	Any frequency reaching detection amplitude 2	0.0% ～ 100.0% （ maximum frequency）	0.001	0Hz	○
HC.21	Zero current detection level	0.0%～300.0%	0.001	0.05	○
HC.22	Zero current detection delay time	0.01s～600.00s	0.01s	0.1s	○
HC.23	Output overcurrent threshold	0.0% 0.1%～300.0%（rated motor current）	0.001	2	○
HC.24	Output overcurrent detection delay time	0.00s～600.00s	0.01s	0.00s	○
HC.25	Any current reaching 1	0.0%～300.0%(rated motor current)	0.001	1	○
HC.26	Any current reaching 1 amplitude	0.0%～300.0%(rated motor current)	0.001	0	○
HC.27	Any current reaching 2	0.0%～300.0%(rated motor current)	0.001	1	○
HC.28	Any current reaching 2 amplitude	0.0%～300.0%(rated motor current)	0.001	0	○
HC.29	Load speed display coefficient	0.0001～6.5000	0.0001	1	○
HC.30	AI1 input voltage lower limit	0.00V～HC.31	0.01V	3.1V	○
HC.31	AI1 input voltage upper limit	HC.30～10.00V	0.01V	6.8V	○
HC.32	Cooling fan control	0：works when the AC drive is in running state 1：keeps working after power-on	1	0	○
HC.33	Module temperature threshold	0℃～100℃	1℃	75℃	○
HC.34	Heatsink temperature of inverter module	0.0℃～100℃	0.1℃	-	●
HC.35	Rectifier temperature of module	0.0℃～100℃	0.1℃	-	●
HC.36	Accumulative power-on time threshold	0h～65000h	1h	0	○
HC.37	Accumulative running time threshold	0h～65000h	1h	0	○
HC.38	Timing function	0：Disable；1:Enable	1	0	○
HC.39	Timing duration source	0：HC.40 1：AI1 2：AI2 3：AI3	1	0	○

HC.40	Timing duration	0.0Min～6500.0Min	0.1Min	0	○
HC.41	Current running time reached	0.0Min～6500.0Min	0.1Min	0	○
HC.42	Accumulative running time	0h～65535h	1h	-	●
HC.43	Number of decimal places for load speed display	0：0 decimal place；1：1 decimal place；2：2 decimal place；3：3 decimal place	1	1	○
HC.44	Accumulative power-on time	0h～65535h	1h		●
HC.45	Accumulative power consumption	-			●
HC.46	Wakeup frequency	Dormant frequency (HC.48) ～ maximum frequency（H0.06)	0.01Hz		○
HC.47	Wakeup delay time	0.0s～6500.0s	0.1s		○
HC.48	Dormant frequency	0.00Hz ～ Wakeup frequency（HC.46)	0.01Hz		○
HC.49	Dormant delay time	0.0s～6500.0s	0.1s		○

Group Hd User-defined Parameters

Function Code	Parameter Name	Setting Range	Min unit	Default	Property
Hd.00	User-defined function code 0	nH0.01～nHE.xx	1	H1-01	○
......	......	......	......	......	. ○
Hd.02	User-defined function code 2			H3-03	○

Group Eb Motor 1 Parameters

Function Code	Parameter Name	Setting Range	Min unit	Default	Property
Eb.00	Rated motor power	0.1kW～1000.0kW	0.1kW	Model dependent	▲
Eb.01	Rated motor frequency	0.00Hz ～ maximum frequency	0.01Hz	Model dependet	▲
Eb.02	Rated motor rotational speed	0rpm～65535rpm	1rpm	Model dependet	▲
Eb.03	Rated motor voltage	0V～2000V	1V	Model dependet	▲
Eb.04	Rated motor current	0.01A ～ 655.35A(AC drive power <= 55kW) 0.1A～6553.5A(AC drive power > 55kW)	0.01A	Model dependet	▲

Eb.05	Stator resistance	0.001Ω ～ 65.535Ω(AC drive power <=55kW) 0.0001Ω ～ 6.5535Ω(AC drive power >55kW)	0.001Ω	Model dependet	▲
Eb.06	Rotor resistance	0.001Ω ～ 65.535Ω(AC drive power <=55kW) 0.0001Ω ～ 6.5535Ω(AC drive power >55kW)	0.001Ω	Model dependet	▲
Eb.07	Leakage inductive reactance	0.01mH ～ 655.35mH(AC drive power <=55kW) 0.001mH ～ 65.535mH(AC drive power >55kW)	0.01mH	Model dependet	▲
Eb.08	Mutual inductive reactance	0.1mH ～ 6553.5mH(AC drive power <=55kW) 0.01mH ～ 655.35mH(AC drive power >55kW)	0.1mH	Model dependet	▲
Eb.09	No-load current	0.01A～H3.04 (AC drive power <=55kW) 0.1A～H3.04 (AC drive power >55kW)	0.01	Model dependet	▲
Eb.10~ Eb.13	Reserved	Reserved	Reserved	Reserved	Reserved
Eb.14	Auto-tuning selection	0: No auto-tuning 1: Asynchronous motor static auto-tuning 2: Asynchronous motor complete auto-tuning	1	0	▲

Group EC Motor 2 Vector Control Parameters

Function Code	Parameter Name	Setting Range	Min unit	Default	Property
EC.00	Speed loop proportional gain Kp1	0.1～10.0	0.1	3	○
EC.01	Speed loop integral time Ti1	0.010s～10.000s	0.001s	0.500s	○
EC.02	Speed loop proportional gain Kp2	0.1～10.0	0.1	2.0	○
EC.03	Speed loop integral time Ti2	0.010s～10.000s	0.001s	1.000s	○
EC.04	Switchover frequency 1	0.00～H4.06	0.01Hz	5.00Hz	○
EC.05	Switchover frequency 2	H4.05 ～ maximum frequency H0.06	0.01Hz	10.00Hz	○
EC.06	Time constant of speed loop filter	0～100	1	80	○
EC.07	Reserved	Reserved	Reserved	Reserved	○
EC.08	Vector over-excitation gain	0～200	1	64	○
EC.09	Vector control slip gain	50%～200%	0.01	1	

EC.10	Torque upper limit source in speed control mode	0：H4.12 1：AI1 2：AI2 3：AI3 4：Pulse setting 5：Communication setting	1	0	○
EC.11	Digital setting of torque upper limit in speed control mode	0.0%～200.0%	0.001	150.00%	○
EC.12	Reserved	Reserved	Reserved	Reserved	○
EC.13	Reserved	Reserved	Reserved	Reserved	○
EC.14~17	Reserved	Reserved	Reserved	Reserved	-
EC.18	Motor 1 Acceleration/Deceleration time selection	0：Same as motor 1 1：Acceleration/ Deceleration time 1 2：Acceleration/Deceleration time2 3 Acceleration/Deceleration time3 4 Acceleration/Deceleration time4	1	0	s
Group LA Process Control PID Function					
Function Code	Parameter Name	Setting Range	Min unit	Default	Property
LA.00	PID setting source	0：LA.01 1：AI1 2：AI2 3：AI3 4：PULSE setting（D7） 5：Communication setting 6：Multi-reference	1	0	○
LA.01	PID digital setting	0.0%～100.0%	0.001	50.0	○
LA.02	PID feedback source	0：AI1 1：AI2 2：AI3 3：AI1-AI2 4：PULSE setting（D7） 5：Communication setting 6：AI1+AI2 7：MAX(|AI1|, |AI2|) 8：MIN(|AI1|, |AI2|)	1	0	○
LA.03	PID setting feedback range	0～65535	1	1000	○
LA.04	Proportional gainP1	0.0～100.0	0.1	20.0	○
LA.05	Integral timeI1	0.01s～10.00s	0.01s	2.00	○
LA.06	Differential timeD1	0.000s～10.000s	0.001s	0	○

LA.07	PID parameter switchover condition	0: No switchover 1: Switchover via DI 2: Automatic switchover based on deviation	1	0	○
LA.08	PID parameter switchover deviation 1	0.0%～LA.09	0.001	20.0	○
LA.09	PID parameter switchover deviation 2	LA.08～100.0%	0.001	80.0	○
LA.10	Proportional gainP2	0.0～100.0	0.1	20.0	○
LA.11	Integral timeI2	0.01s～10.00s	0.01s	2.00	○
LA.12	Differential timeD2	0.000s～10.000s	0.001s	0.000	○
LA.13	PID initial value	0.0%～100.0%	0.001	0.0	○
LA.14	PID initial value holding time	0.00～650.00s	0.01s	0.00	○
LA.15	Maximum deviation between two PID outputs in forward direction	0.00%～100.00%	0.0001	1.00	○
LA.16	Maximum deviation between two PID outputs in reverse direction	0.00%～100.00%	0.0001	1.00	○
LA.17	PID Cut-off frequency of PID reverse rotation	0.00～maximum frequency	0.01Hz	2.00	○
LA.18	PID deviation limit	0.0%～100.0%	0.001	0.0	○
LA.19	PID differential limit	0.00%～100.00%	0.0001	0.10	○
LA.20	PID setting change time	0.00～650.00s	0.01s	0.00	○
LA.21	PID feedback filter time	0.00～60.00s	0.01s	0.00	○
LA.22	PID output filter time	0.00～60.00s	0.01s	0.00	○
LA.23	PID action direction	0：Forward action 1：Reverse action	1	0	○
LA.24	PID integral property	Unit's digit (Integral separated) 0: Invalid 1: Valid Ten's digit (Whether to stop integraloperation when the output reaches the limit) 0:Continue integral operation 1: Stop integral operation	11	00	○
LA.25	Detection value of PID feedback loss	0.0% 0.1%～100.0％	0.001	0.0	○
LA.26	Detection time of PID feedback loss	0.0s～20.0s	0.1s	0.0	○

LA.27	PID operation at stop	0: No PID operation at stop 1: PID operation at stop	1	0	○
LA.28	Reserved	-	-	-	○
Group Lb Multi-Reference and Simple PLC Function					
Function Code	Parameter Name	Setting Range	Min unit	Default	Property
Lb.00	Reference 0	-100.0%～100.0% (100.0%- maximum frequency H0.06)	0.01	0.0	○
Lb.01	Reference 1	-100.0%～100.0%	0.01	0.0	○
Lb.02	Reference 2	-100.0%～100.0%	0.01	0.0	○
Lb.03	Reference 3	-100.0%～100.0%	0.01	0.0	○
Lb.04	Reference 4	-100.0%～100.0%	0.01	0.0	○
Lb.05	Reference 5	-100.0%～100.0%	0.01	0.0	○
Lb.06	Reference 6	-100.0%～100.0%	0.01	0.0	○
Lb.07	Reference 7	-100.0%～100.0%	0.01	0.0	○
Lb.08	Reference 8	-100.0%～100.0%	0.01	0.0	○
Lb.09	Reference 9	-100.0%～100.0%	0.01	0.0	○
Lb.10	Reference 10	-100.0%～100.0%	0.01	0.0	○
Lb.11	Reference 11	-100.0%～100.0%	0.01	0.0	○
Lb.12	Reference 12	-100.0%～100.0%	0.01	0.0	○
Lb.13	Reference 13	-100.0%～100.0%	0.01	0.0	○
Lb.14	Reference 14	-100.0%～100.0%	0.01	0.0	○
Lb.15	Reference 15	-100.0%～100.0%	0.01	0.0	○
Lb.16	Simple PLC running mode	0：Stop after the AC drive runs one cycle 1：Keep final values after the AC drive runs one cycle 2：Repeat after the AC drive runs one cycle	1	0	○
Lb.17	Simple PLC retentive selection	Unit's digit (Retentive upon power failure) 0: No 1: Yes Ten's digit (Retentive upon stop) 0: No 1: Yes	11	0	○
Lb.18	Running time of simple PLC reference 0	0.0s(h)～6553.5s(h)	0.1s(h)	0	○

Lb.19	Acceleration/deceleration time of simple PLC reference 0	0～3	1	0	○
Lb.20	Running time of simple PLC reference 1	0.0s(h)～6553.5s(h)	0.1s(h)	0	○
Lb.21	Acceleration/deceleration time of simple PLC reference 1	0～3	1	0	○
Lb.22	Running time of simple PLC reference 2	0.0s(h)～6553.5s(h)	0.1s(h)	0.0	○
Lb.23	Acceleration/deceleration time of simple PLC reference 2	0～3	1	0	○
Lb.24	Running time of simple PLC reference 3	0.0s(h)～6553.5s(h)	0.1s(h)	0.0	○
Lb.25	Acceleration/deceleration time of simple PLC reference 3	0～3	1	0	○
Lb.26	Running time of simple PLC reference 4	0.0s(h)～6553.5s(h)	0.1s(h)	0.0	○
Lb.27	Acceleration/deceleration time of simple PLC reference 4	0～3	1	0	○
Lb.28	Running time of simple PLC reference 5	0.0s(h)～6553.5s(h)	0.1s(h)	0.0	○
Lb.29	Acceleration/deceleration time of simple PLC reference 5	0～3	1	0	○
Lb.30	Running time of simple PLC reference 6	0.0s(h)～6553.5s(h)	0.1s(h)	0.0	○
Lb.31	Acceleration/deceleration time of simple PLC reference 6	0～3	1	0	○
Lb.32	Running time of simple PLC reference 7	0.0s(h)～6553.5s(h)	0.1s(h)	0.0	○
Lb.33	Acceleration/deceleration time of simple PLC reference 7	0～3	1	0	○
Lb.34	Running time of simple PLC reference 8	0.0s(h)～6553.5s(h)	0.1s(h)	0.0	○
Lb.35	Acceleration/deceleration time of simple PLC reference 8	0～3	1	0	○
Lb.36	Running time of simple PLC reference 9	0.0s(h)～6553.5s(h)	0.1s(h)	0.0	○
Lb.37	Acceleration/deceleration time of simple PLC reference 9	0～3	1	0	○
Lb.38	Running time of simple PLC reference 10	0.0s(h)～6553.5s(h)	0.1s(h)	0.0	○

Lb.39	Acceleration/deceleration time of simple PLC reference 10	0～3	1	0	○
Lb.40	Running time of simple PLC reference 11	0.0s(h)～6553.5s(h)	0.1s(h)	0.0	○
Lb.41	Acceleration/deceleration time of simple PLC reference 11	0～3	1	0	○
Lb.42	Running time of simple PLC reference 12	0.0s(h)～6553.5s(h)	0.1s(h)	0.0	○
Lb.43	Acceleration/deceleration time of simple PLC reference 12	0～3	1	0	○
Lb.44	Running time of simple PLC reference 13	0.0s(h)～6553.5s(h)	0.1s(h)	0.0	○
Lb.45	Acceleration/deceleration time of simple PLC reference 13	0～3	1	0	○
Lb.46	Running time of simple PLC reference 14	0.0s(h)～6553.5s(h)	0.1s(h)	0.0	○
Lb.47	Acceleration/deceleration time of simple PLC reference 14	0～3	1	0	○
Lb.48	Running time of simple PLC reference 15	0.0s(h)～6553.5s(h)	0.1s(h)	0.0	○
Lb.49	Acceleration/deceleration time of simple PLC reference 15	0～3	1	0	○
Lb.50	Time unit of simple PLC running	0：s 1：h	1	0	○
Lb.51	Reference 0 source	0： Lb.00 1：AI1 2：AI2 3：AI3 4：PULSE setting 5：PID	1	0	○
Group LC Swing Frequency, Fixed Length and Count					
Function Code	Parameter Name	Setting Range	Min unit	Default	Property
LC.00	Swing frequency setting mode	0：Relative to the central frequency 1：Relative to the maximum frequency	1	0	○
LC.01	Swing frequency amplitude	0.0%～100.0%	0.001	0.0	○
LC.02	Jump frequency amplitude	0.0%～50.0%	0.001	00.0	○
LC.03	Swing frequency cycle	0.1s～3000.0s	0.1s	10.0	○
LC.04	Triangular wave rising time coefficient	0.1%～100.0%	0.001	50.0	○

LC.05	Set length	0m～65535m	1m	1000	○
LC.06	Actual length	0m～65535m	1m	0	○
LC.07	Number of pulses per meter	0.1～6553.5	0.1	100.0	○
LC.08	Set count value	1～65535	1	1000	○
LC.09	Designated count value	1～65535	1	1000	○
Group ob Monitoring Parameters - monitor the AC drive's running state					
Function Code	Parameter Name	Setting Range	Min unit	Default	Property
ob.00	Running frequency	0.00Hz～H0.02Hz	0.01Hz	50.00Hz	●
ob.01	Output current	0.01A～655.35A	0.01A	0.00A	●
ob.02	Output voltage	0V~380V	1V	0V	●
ob.03	Bus voltage	0.0V~810.0V	0.1V	620.0v	●
ob.04	Set frequency	0.00Hz～H0.02Hz	0.01Hz	50.00Hz	●
ob.05	Output torque	0.0%~200.0%	0.1%	0.0%	●
ob.06	Output power	0.0kw~1000.0kw	0.1kW	0.0	●
ob.07	AI1 voltage	0.00V~10.00V	0.01V	0.00V	●
ob.08	AI2 voltage	0.00V~10.00V	0.01V	0.00V	●
ob.09	AI3 voltage	-10.00V~10.00V	0.01V	0.00V	●
ob.10	DI state	H.0000~H.FFFF	1	H.0000	●
ob.11	DO state	H.0000~H.FFFF	1	H.0000	●
ob.12	AI1 voltage before correction	0.00V~10.00V	0.01V	0.00V	●
ob.13	AI2 voltage before correction	0.00V~10.00V	0.01V	0.00V	●
ob.14	AI3 voltage before correction	-10.00V~10.00V	0.01V	0.00V	●
ob.15	PID setting	0~65535	1	0	●
ob.16	PID feedback	0~65535	1	0	●
ob.17	Feedback speed	0.0Hz～H0.02Hz	0.1Hz	0.0Hz	●
ob.18	Encoder feedback speed	0.00Hz～H0.02Hz	0.01Hz	0.00Hz	●
ob.19	Load speed	0.00Hz～H0.02Hz	0.01Hz	0.00Hz	●
ob.20	Main frequency	0.00Hz～H0.02Hz	0.01Hz	0.00Hz	●
ob.21	Auxiliary frequency	0.00Hz～H0.02Hz	0.01Hz	0.00Hz	●
ob.22	Output voltage upon V/F separation	0V~380V	1V	0V	●
ob.23	Target voltage upon V/F separation	0V~380V	1V	0V	●
ob.24	Remaining running time	0.0~6553.5	0.1Min	0.0Min	●

ob.25	Current power-on time	0.0~6553.5	0.1Min	0.0Min	●
ob.26	Current running time	0.0~6553.5	0.1Min	0.0Min	●
ob.27	Input pulse frequency	0.00~300.00kHz	0.01kHz	0.00kHz	●
ob.28	Input pulse frequency	0.0~300.0kHz	0.1kHz	0.0kHz	●
ob.29	Length value	0~65535	1	0	●
ob.30	Counter value	0~65535	1	0	●
ob.31	Linear speed	0 m/Min ~65535 m/Min	1m/Min	0 m/Min	●
ob.32	Communication setting value	0.00~100.00	0.01	0.00	●
ob.33	Reserved	Reserved	Reserved	Reserved	Reserved
ob.34	Target torque (%)	0.0%~ 150.0%	0.1%	150.0%	●
ob.35	Faults message	0~65535	1	0	●
ob.36	Current fault	0~65535	1	0	●
ob.37	Motor temperature	0~65535	1	0	●
ob.38	Drive state	0~65535	1	0	●
ob.39	Product ID	Factory to determine	-	T.xxxx	●
ob.40	Software version	Factory to determine	-	cv.xxx	●
Group oE Monitoring Parameters - monitor the AC drive's fault state					
Function Code	Parameter Name	Setting Range	Min unit	Default	Property
oe.00	G/A type display	1: G type (constant torque load) 2: A type (variable torque load e.g. fan and pump)	1	Model dependent	
oe.01	1st fault type	0：No fault 1：E-oCA 2：E-oCd 3：E-oCc 4：E-ovA 5：E-ovd 6：E-ovc 7：E-boL 8：E-LU 9：NULL 10： E-IPL 11： E-oPL 12： E-GF	—	—	●

oe.02	2nd fault type	13：Reserved 14：E-oL1 15：E-oL2 16：E-oL3 17：E-Epr 18：E-dIE 19：E-rTo 20：E-PTo 21：E-cCF 22：E-Eto 23：E-cEr 24：E-pCE 25：E-pGL	—	—	●
oe.03	3rd (latest) fault type	26：E-trn 27: Reserved 28:E-cbc 29: E-SLO 30：E-SLE 31：E-CRP 32：ERR30 33：E-LLE 40：E-ud1 41：E-ud2 42: Reserved 43： Reserved	—	—	●
oe.04	Frequency upon 3rd fault	—	—	—	●
oe.05	Current upon 3rd fault	—	—	—	●
oe.06	Bus voltage upon 3rd fault	—	—	—	●
oe.07	DI status upon 3rd fault	—	—	—	●
oe.08	Output terminal status upon 3rd fault	—	—	—	●
oe.09	AC drive status upon 3rd fault	—	—	—	●
oe.10	Power-on time upon 3rd fault	—	—	—	●
oe.11	Running time upon 3rd fault	—	—	—	●
oe.12	Frequency upon 2nd fault	—	—	—	●
oe.13	Current upon 2nd fault	—	—	—	●
oe.14	Bus voltage upon 2nd fault	—	—	—	●
oe.15	DI status upon 2nd fault	—	—	—	●
oe.16	Output terminal status upon 2nd fault	—	—	—	●
oe.17	AC drive status upon 2nd fault	—	—	—	●
oe.18	Power-on time upon 2nd fault	—	—	—	●

oe.19	Running time upon 2nd fault	—	—	—	●
oe.20	Frequency upon 1st fault	—	—	—	●
oe.21	Current upon 1st fault	—	—	—	●
oe.22	Bus voltage upon 1st fault	—	—	—	●
oe.23	DI status upon 1st fault	—	—	—	●
oe.24	Output terminal status upon 1st fault	—	—	—	●
oe.25	AC drive status upon 1st fault	—	—	—	●
oe.26	Power-on time upon 1st fault	—	—	—	●
oe.27	Running time upon 1st fault	—	—	—	●

Appendix 2 Identify Symbols Displayed Via LED

The relationship between characters displayed by LED and characters/numbers are as follows::

The relationship between characters displayed by LED and characters/numbers							
LED display	**Meanings of characters**	**LED display**	**Meanings of characters**	**LED display**	**Meanings of characters**	**LED display**	**Meanings of characters**
	0		A		I		T
	1		b		J		t
	2		C		L		U
	3		C		N		u
	4		d		n		y
	5		E		o		-
	6		F		P		8.
	7		G		q		.
	8		H		r		
	9		h		S		

Warranty Agreement

1. The warranty period of the product is 18 months (refer to the barcode on the equipment). During the warranty period, if the product fails or is damaged under the condition of normal use by following the instructions, Tideway will be responsible for free maintenance.
2. Within the warranty period, maintenance will be charged for the damages caused by the following reasons:
a. Improper use or repair/modification without prior permission
b. Fire, flood, abnormal voltage, other disasters and secondary disaster
c. Hardware damage caused by dropping or transportation after procurement
d. Improper operation
e. Trouble out of the equipment (for example, external device)
3. If there is any failure or damage to the product, please correctly fill out the Product Warranty Card in detail.
4. The maintenance fee is charged according to the latest Maintenance Price List of Tideway.
5. The Product Warranty Card is not re-issued. Please keep the card and present it to the maintenance personnel when asking for maintenance.
6. If there is any problem during the service, contact Tideway's agent or Tideway directly.
7. This agreement shall be interpreted by Wuxi Technology Tideway Co., Ltd.

Service Department: Taiway Technology Wuxi Co.,Ltd.
Address: Room 502, No. 999 Building, Gaolang East Road，Wuxi city ,Jiangsu
Phone：400-680-9336 Zip code：214000
Website：http://www.tdw-tech.com

Product Warranty Card

Customer information	Add. of unit:	
	Name of unit: P.C.:	Contact person:
		Tel.:
Product information	Product model: ：	
	Body barcode (Attach here):	
	Name of agent:	
Failure information	(Maintenance time and content): Maintenance personnel: ：	