■ Introduction

Thank you for using this series of drives!

This manual will provide you with a list of parameters of the drive, and the necessary information for debugging and operation. It is used for the technical personnel who conduct design, debugging, using and maintaining the drives.

This series of drives is the latest launch by our company with the features of high reliability, high-performance, multifunction and the intelligent AC motor drive. Stable, reliable, intelligent and easy to use are the highlight features. The contentof the manual includes basic technical parameters of the drive, control keyboard operation, fault handling as well as the relevant operation methods and caution matters.

In order to ensure that you can use this series of drives correctly, making full use of the excellent performance of the product , the safety of the user and equipment, please read this manual in detail before starting any operation to the drive. Meanwhile, reader should have basic knowledge of electrical wiring, electrical components and electrical principle diagram symbols. The incorrect use of the drive may cause abnormal operation, failure or even accidents such as damage to the equipment, injury and fatality!

In order to enhance the adaptability of the manual, we will use “drive” in the following content instead of the description of the usual inverter, motor controller, energy saving device,etc.

Since we are always committed to the continuous improvement of products and related information, the information provided by the company is subject to change without notice.

For the latest changes and more content, please contact our office or visit our website www.cumark.com.cn

Catalogue

■ Chapter1 Safety Information And Precautions

This chapter describes the safety instructions for the installation, operation, and maintenance of the drive. Ignoring these safety instructions may cause personal injury or damage to the motor and its drive. Please read the safety instructions before you do any operation on the device.

1.1 Warnings symbols and instructions

Table1.1 Warnings symbols and instructions

Warnings symbols	Name	Instructions
	**Dangerous voltage warning**	used to warn of the presence of high voltage, which may cause personal injury and / or damage to equipment.
	**Dangerous voltage warning**	Used to warn the device within 10 minutes after the main power cut will continue to exist in the presence of high voltage, may cause personal injury and / or damage to equipment.
	**General warning**	Used to warn of non electrical factors that may cause personal injury and / or damage to equipment.
	**Electrostatic discharge warning**	Used to warn of electrostatic discharge that can cause damage to equipment.
	**Surface high temperature warning**	Used to warn the parts of the surface temperature, exposure will cause burns.

1.2 Safety Caution

1) In the case of main power on, it is not allowed to maintain drive, motor cable or motor. After disconnecting the power, must wait at least 10 minutes before operating the drive, the electric motor or the electric cable, so that the DC circuit capacitor is discharged.

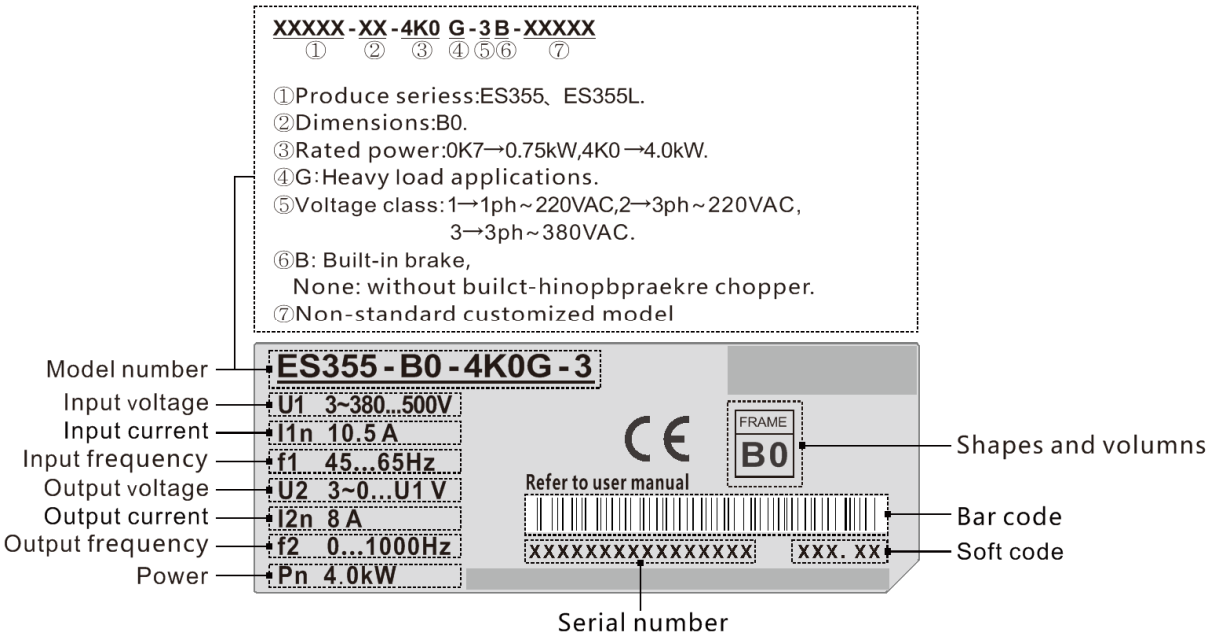
2) Do not carry on any insulation or the withstand voltage test to the drive or the drive module.

3) For the IT power supply system (ungrounded power system or with high resistance (more than 30ohms) grounding power system) installed on the drive, if the piezoresistor or the internal EMC filters does not disconnect, then the drive will be grounded by the piezoresistor / filter. This may cause damage to the drive. For a drive installed on the TN system with an angle to the ground, the drive will be damaged if the piezoresistor or internal EMC filter is not disconnected.

4) Even if the motor has been stopped, the circuit terminals R, S, T and V, U, W, and UDC-, UDC+, and PB are still possible with a dangerous voltage.Depending on the external connection, the drive control unit on the relay output terminal may be dangerous voltage (115V, 220 V or 230 V).

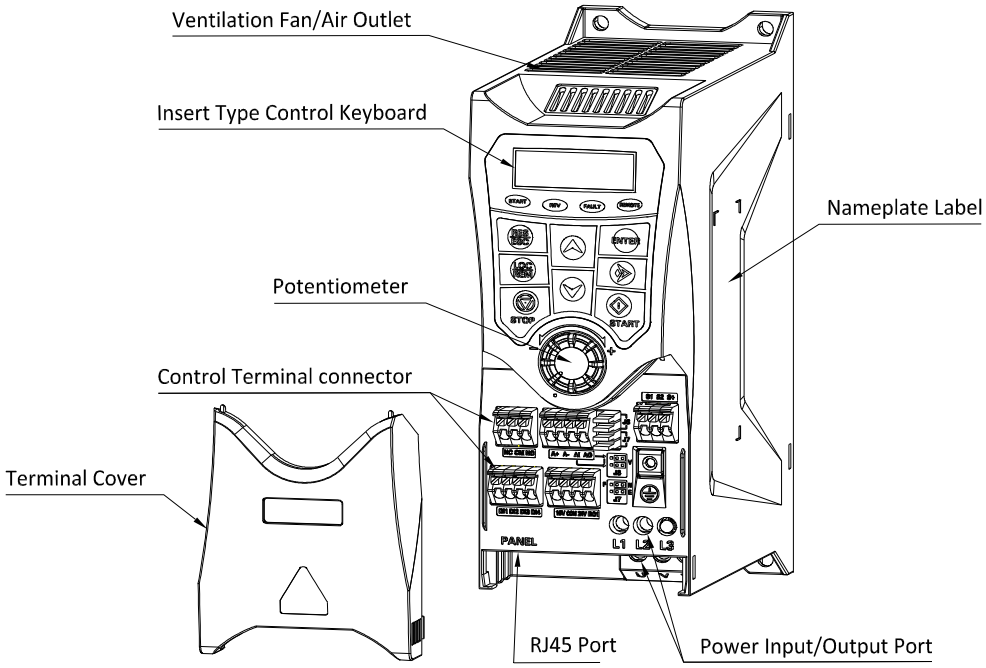
■ Chapter2 Product Information

2.1 Name Rule



Picture 2.1 Product name and brand identity

2.2 Drive structure diagram



Picture2.2 structure diagram

（Notice Some products have no fan by default）

2.3 Product model and parameters

Table 2.1 Product model and parameters

Model Code	Rated Output Current (A)	Rated Power (kW)	Wastage (W)	Noise Level (dB)	Air Volume (m3/h)	Shell code
1ph ~220V						
XXXX-B0-0K4G-1	2.5	0.4	40	*	*	B0
XXXX-B0-0K7G-1	4.5	0.75	65	36	30.6	
XXXX-B0-1K5G-1	7	1.5	80	36	30.6	
XXXX-B0-2K2G-1	9	2.2	92	36	30.6	
3ph ~220V						
XXXX-B0-0K4G-2	2.5	0.4	40	*	*	B0
XXXX-B0-0K7G-2	4	0.75	76	36	30.6	
XXXX-B0-1K5G-2	5	1.5	97	36	30.6	
XXXX-B0-2K2G-2	8	2.2	125	36	30.6	
3ph ~380V						
XXXX-B0-0K7G-3	2.5	0.75	40	*	*	B0
XXXX-B0-1K5G-3	4	1.5	76	36	30.6	
XXXX-B0-2K2G-3	5	2.2	97	36	30.6	
XXXX-B0-4K0G-3	8	4.0	125	36	30.6	

Note：（1）* Indicates that the product has no fan by default and uses natural convection to dissipate heat;（2）XXXX in the specification column of the above table indicates the series code，such as ES355、ES3550L,etc.

2.4 Technical data parameters

table2.2 Technical data parameters

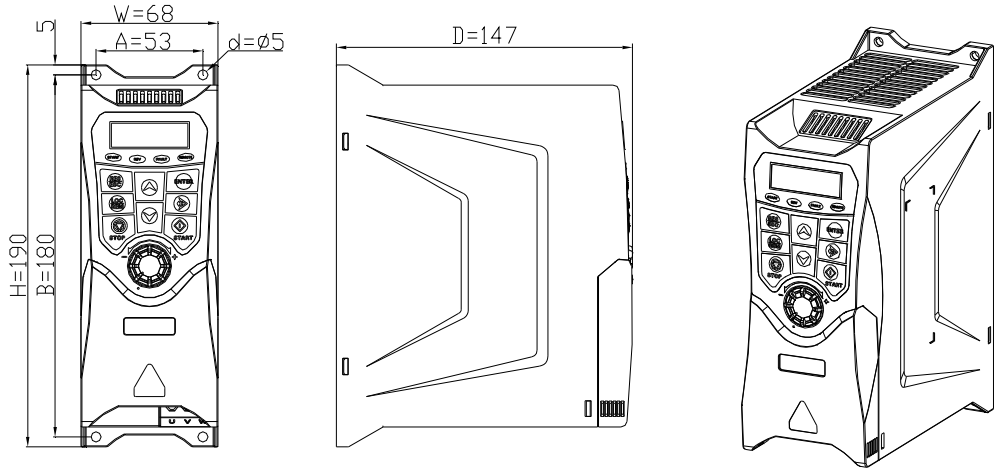
Item		Specification and Technical Data
Main power connection	Input voltage U1	1Ph ~220V±15%/3Ph ~220V±15%/3Ph ~380V±15%
	Input frequency f1	47~63Hz
	Input voltage U2	0…U1（V）（the maximum output voltage equals the input）
	Input frequencyf2	0-1000Hz
	Carrier frequency	2-12KHz（the device can intelligently and automatically make optimal adjustment according to load characteristics and drive temperature.）
	Input voltage unbalance	Maximum:±3% of rated inter-phase input voltage
	Efficiency	≈98%(when operating at rated power)
Basic functions	Input frequency resolution	Digital setting:0.01Hz/1RPM; Analog setting: maximum HZ/RPM x0.05%
	Control mode	Scalar control；SVC
	Startup torque	100% @0.5Hz(Scalar control）;100% @0.25Hz(SVC）
	Speed range	1:100(Scalar control）; 1:200（SVC）
	Torque boost	Automatic torque boos 1%-10%
	V/F curve	Intelligent adaptive
	V/F separation	full separation

Item		Specification and Technical Data
	Acceleration and deceleration curves	straight-line or S-curve acceleration and deceleration method
		Two acceleration time values. The acceleration and deceleration time range:0.0s-650.00s
	Simple PLC function	Achieve operation of up-to-16-stages speed(via built-in PLC or control terminals)
	Built-in PID	Conveniently achieve the process control close-loop control system
	Automatic voltage regulation（AVR)	When the grid voltage changes, the device automatically maintains constant output voltage.
	Automatic acceleration and deceleration function	In a certain range, automatic extension of acceleration/deceleration time, to prevent frequent over-voltage/over-current fault protection in the process of acceleration/deceleration.
	Protection function	Output short circuit protection, input & output phase loss protection, overcurrent protection, overvoltage protection,undervoltage protection, overheat protection, overload protection,STO(Safety torque stop function)
	STO	Make sure the equipment stops reliably during maintenance
	Non-stop during transient interruption	Keep the drive operating in a short time (by reducing feedback energy compensation voltage at the moment of power outage). The duration depends on the mechanical inertia of the load at that time.
	Magnetic flux brake	Enable the magnetic flux brake function, can achieve a fast stop in the case of no brake resistance
	Timing control	Timing control function. The time range and precision is 0.0-6500.0(min).
	Power-off synchronized	In the case of accidental power failure can ensure the drive steady stop
	Bus communication	The standard configuration uses the built Modbus, Optional Simple CAN communication
I/O input/ output interface	Command input mode	Control keyboard input, control terminal input, bus communication input, which can be switched mutually.
	Speed giving mode	Digital giving, analog giving(The external analog quantity is given with the panel potentiometer), pulse giving, bus communication giving and PID giving, which are mutually switched.
	Input terminal（Input)	**The following is the standard configuration:**
		4 digital input terminals(supports PNP and NPN ,where DI4 supports the maximum of 60 kHz high-speed pulse input).
		1 analog input terminals (supports 0-10V voltage input or 0-20mA voltage input).
		Two STO terminals
	Output terminal (output)	**The following is the standard configuration:**
		1 digital output terminals supports high-speed pulse output terminal (supporting0-50 kHZ square signal output）
		1 analog output terminals (supporting0-10V voltage output or 0-20mA voltage output).
		1 relay output terminal ,NO/NC select

Item		Specification and Technical Data
Display and control	Man-machine interface	Standard stationary type LED control keyboard, Support external removable LED or LCD control keyboard
	Parameters duplicating	Rapidly duplicating parameters via the LCD control keyboard
Application environment	Application site	Indoor, free of direct sunshine, dusts, corrosive gases, flammable gases, oil mist, water vapor, drip or salts.
	Altitude	At 0-1000m;When the altitude is 1000-4000m, the capacity is reduced by 1% as the altitude rises by 100m. (consult professionals for more accurate values).
	Operation ambient temperature	−10℃ to +55℃ (when the ambient temperature is 40℃-55℃, the drive is automatically derated to achieve self-protection).
	Relative humidity	Less than 95%RH. No droplets condensed (condensation)
	Sinusoidal vibration	(IEC 60068-2/-6.Test Fc) Max.0.1mm)(5 to 13.2Hz);max.7m/s²(13.2 to 100Hz)sinusoidal vibration Max.0.1mm(10 to 57Hz);max.10m/s²(57 to 150Hz) sinusoidal vibratio
	Impact	Not allowed (during operation); maximum 100m/s2,11ms(during storage and transportation with packing).
	Free fall	Not allowed (during operation); with packing：100cm
	Storage & transportation temperature	−40℃ to +70℃
Protection grade		IP20
Cooling mode		Natural air cooling (some models),Forced air cooling of the interior fan. The air flows from bottom to top. cooled radiator. Air-cooled radiator
Application standard		IEC 61800-3(2004);IEC 61800-5-1(2007);GB 12668.

■ Chapter3 Product dimensions and electrical installation

3.1 Outline and mounting dimensions



Picture3.1 Schematic diagram of Outline and wall mounting dimensions

Table3.1 Outline and wall mounting dimensions

Outline dimension	Installation Hole Width Spacing A (mm)	Installation Hole Height Spacing B (mm)	Installation Hole Size d (mm)	Appearance Width W (mm)	Appearance Height H (mm)	Appearance Thickness D (mm)	Net weight approximately（Kg）
B0	53	180	5.0	68	190	147	1.3

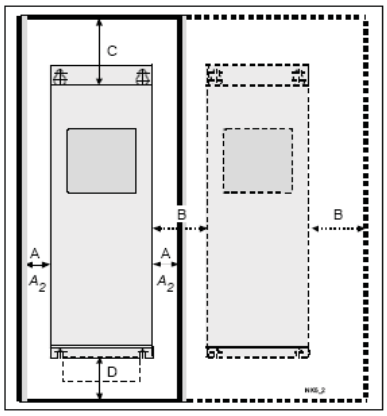
Note: For detailed size, please consult our professional staff.

3.2 Mechanical installation

3.2.1 Installation environment requirements

1) The installation environment must meet the requirements specified in《Table2.2 technical data parameter table》；
2) This series of products are plastic casings and need to be used in the final system, which should be provided with appropriate fireproof,electrical and mechanical casings and comply with local laws and IEC standards.

3.2.2 Installation Space Requirements



The cabinet must provide enough free space for the components to ensure for sufficient cooling. Please comply with the minimum clearance requirements of each component. as shown in the picture on the right:

Requirements for natural air cooling space (without fan driver) :

A(A2)≥0mm，B≥20mm，C≥200mm，C≥75mm；

Forced air cooling space requirements (with fan driver) :

A(A2)≥0mm，B≥0mm，C≥50mm，C≥30mm；

Air inlet and outlet must be equipped with the grille, which is used :

• Direction of airflow direction

• Avoid touch
• Avoid of splashing water droplets sputter into the cabinet

The amount of the cooling air required for the cabinet should be determined by reference to the corresponding values of the rated power and technical data and the calculation of the total installed capacity in the cabinet.

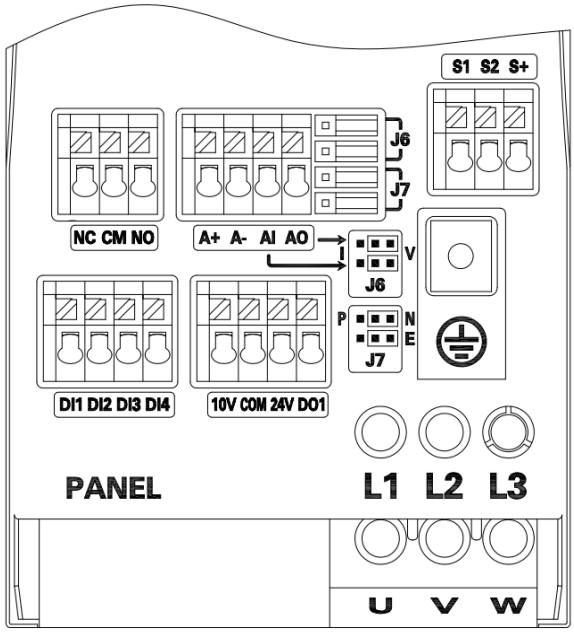
The cabinet system shall have measures to prevent the circulation of hot air, to avoid the hot air circulating outside the cabinet by guiding the hot air to leave the air inlet area. Following are possible solutions:

• Use the grille to guide the air flow of the air inlet and outlet area
• Air inlet and outlet are placed on different sides of the cabinet.
• The cold air inlet is located in the lower part of the front door, and an additional exhaust fan is installed at the top of the cabinet.

The cabinet can avoid the hot air circulation in the internal cabinet by using the leakproof wind shield. If the cabinet has the risk of condensation water, then use the cabinet heater. Although the main function of the heater is to keep the air dry, it may also be used to heat it at low temperatures. Please follow the instructions provided by the manufacturer when placing the heater. Among them the space around the drive can ensure the circulation of a certain amount of the cooling air and the maintenance to the drive. The specific data are detailed in the table below.

If there is more than one drive that needs to be installed in up and down arrangement, the spacing should be equal to C+D (see below). And the outlet air flow of the lower device can not be opposite to the air inlet of the upper device. And shall ensure that the temperature of the cooling air must not exceed the maximum ambient temperature limit of the drive.

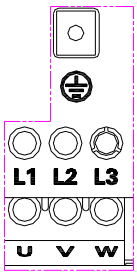
3.3 Electrical installation



Picture3.2 Electric terminal layout diagram

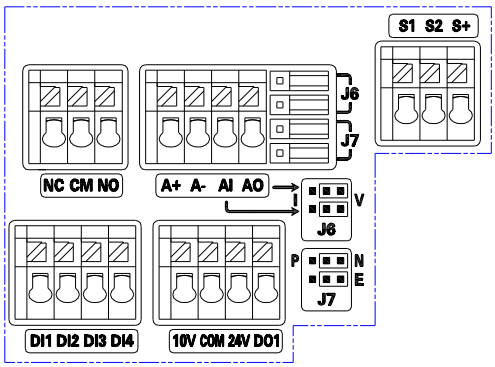
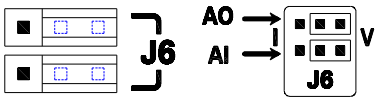
3.3.1 Description of the main loop terminal

able3.2 Description of the main loop terminal

Terminal	Terminal mark	Name	instruction
	L1、L2、L3	Three-phase power input terminal	AC input Three-phase power connection point, L1 and L2 are used for single-phase 220V power cables
	U、V、W	drive output terminal	Break resistance connection point
		Grounding terminal	The M3 screw Grounding terminal

3.3.2 Control Terminal

able3.3 Control terminal Description

Terminal	mark	Name	instruction
	DI1~DI4	DI Input terminal	supports PNP and NPN ,where DI4 supports the maximum of 60 kHz high-speed pulse input
	NC、CM 、NO	relay terminal	nominal parameter：3A/240VAC ;NC-CM ： normally open contact NO-CM:normally-closed contact
	A+、A-	485 input terminal	Respectively are positive end and negative end of 485 differential signal
	AI	analog input terminals	DC 0~10V/0~20mA： Vc Input Impedance 100KΩ Current input Impedance 500Ω
	AO	analog output terminals	DC 0~10V/0~20mA： The current output load is about 500Ω
	DO1	Open collector output terminal	Support 50kHz high-speed output, voltage≤48V，current≤50mA
	10V	+10V power	External potentiometer power supply 10V/10mA
	24V	+24V power	24V/200mA
	COM	Power supply and signal common	Common end of external control terminal（free from STO）
	S1、S2 、S+	STO terminals	Safety torque stop function
	J6	AO wire jumper	Current type on the left and voltage type on the right (default)
		AI wire jumper	Current type on the left and voltage type on the right (default)

	J7	DITerminal input jumper cap	PNP type on the left and NPN type on the right (default)
		EMC Ground jumper cap	Disconnect the left side and connect the right side (default)
	PANEL	RJ45 port	External keyboard and CAN communication port

Note:See section 3.3.5 Electrical Wiring Schematic Diagram.

3.3.3 Control Cable Selection

It is recommended that all control cables be shielded. For analog signals, it is recommended to use a double shielded twisted pair. For the pulse encoder to walk the line, please follow the instructions provided by the manufacturer of the encoder. Each signal is paired with a pair of separate shielded pairs. Different analog signals do not share the route. For low voltage digital signals, it is best to use a double shielded cable, but also can use a single layer shield (See Figure*b*) .

Picture a Twisted pair shielded cable

Picture b A single twisted pair shielded cable

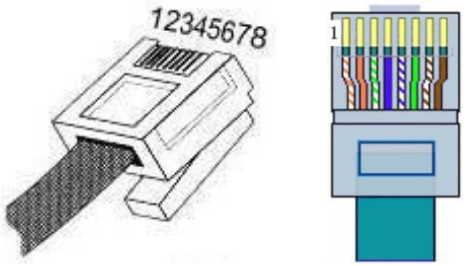
Analog signals and digital signals are separated by different cables.

For signal relay control, If its voltage is not more than 48 V, then the relay cable and the digital input signal cable can be arranged in the same cable.The proposed relay control signal uses a twisted pair. 24 VDC and 115 / 230 VAC signals are not arranged in the same cable.

Relay cable: Cable with braided metal shield (Such as Germany Lapp Kabel the LFLEX) has passed the test, and has been recognized by the industry.

Control keyboard cable: Control keyboard port using RJ45 interface, the extension of the line is a common standard for straight line (Plug in connector EIA/TIA568B standard).The cable length of the connection control keyboard and driver is not longer than 3m. Such as the use of more than five kinds of wires and has a good electromagnetic environment, extension of the line up to 15m.

Communication cable： The drive comes with the communication RJ45 terminal definition as below table and figure. Other forms of communication port, please refer to the corresponding expansion card of each specification.

Line number	Channel name	Target communication	graphical representation
1	CANH	CAN	
2	CANL		
3	+5V	External keyboard power supply	
4	A-	MODBUS	
5	A+		
6	GND	Plug-in keyboard reference ground	
7	GND	Communication reference ground	
8	GND		

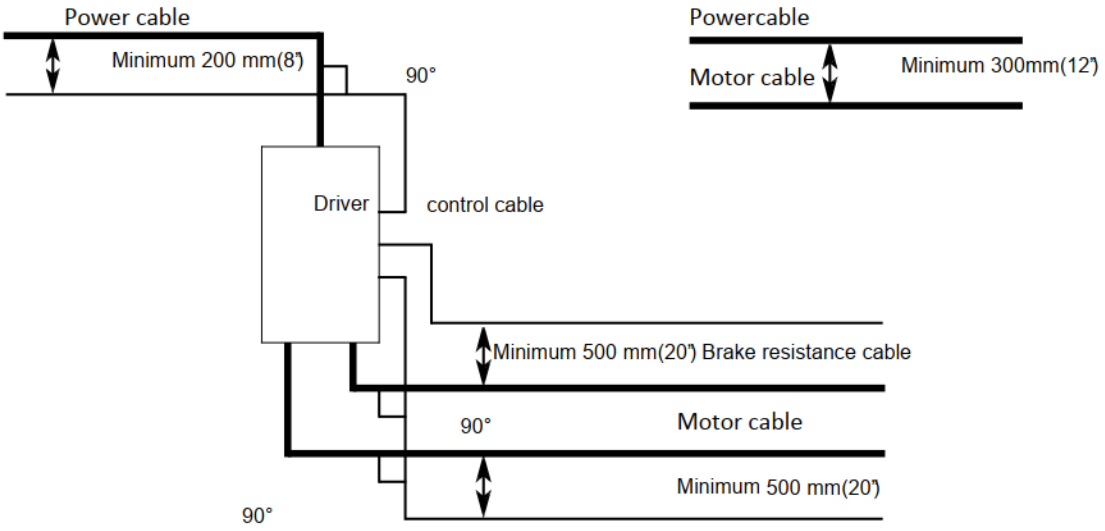
Be careful: Do not connect the two terminals in the shield layer of the cable which is from motor temperature sensor to drive directly to the ground. If one terminal can not install 3.3nF capacitor between the shielding layer and the ground, only one other terminal grounded.

3.3.4 Cable wiring

The cable of the motor must be far away from the other cables. Serveral motor cables can be arranged in side by side. It is proposed that the motor cable, the input power cable and the control cable are distributed in different wire slot.In order to avoid the electromagnetic interference caused by the fast change of the output voltage of the driver, the long distance from the motor cable and other cables should be avoided by walking the line side by side.

When the control cable must pass through the power cable, ensure that the included angle between the two cables is as far as possible to maintain 90 degrees. Do not put other cables across the drive.

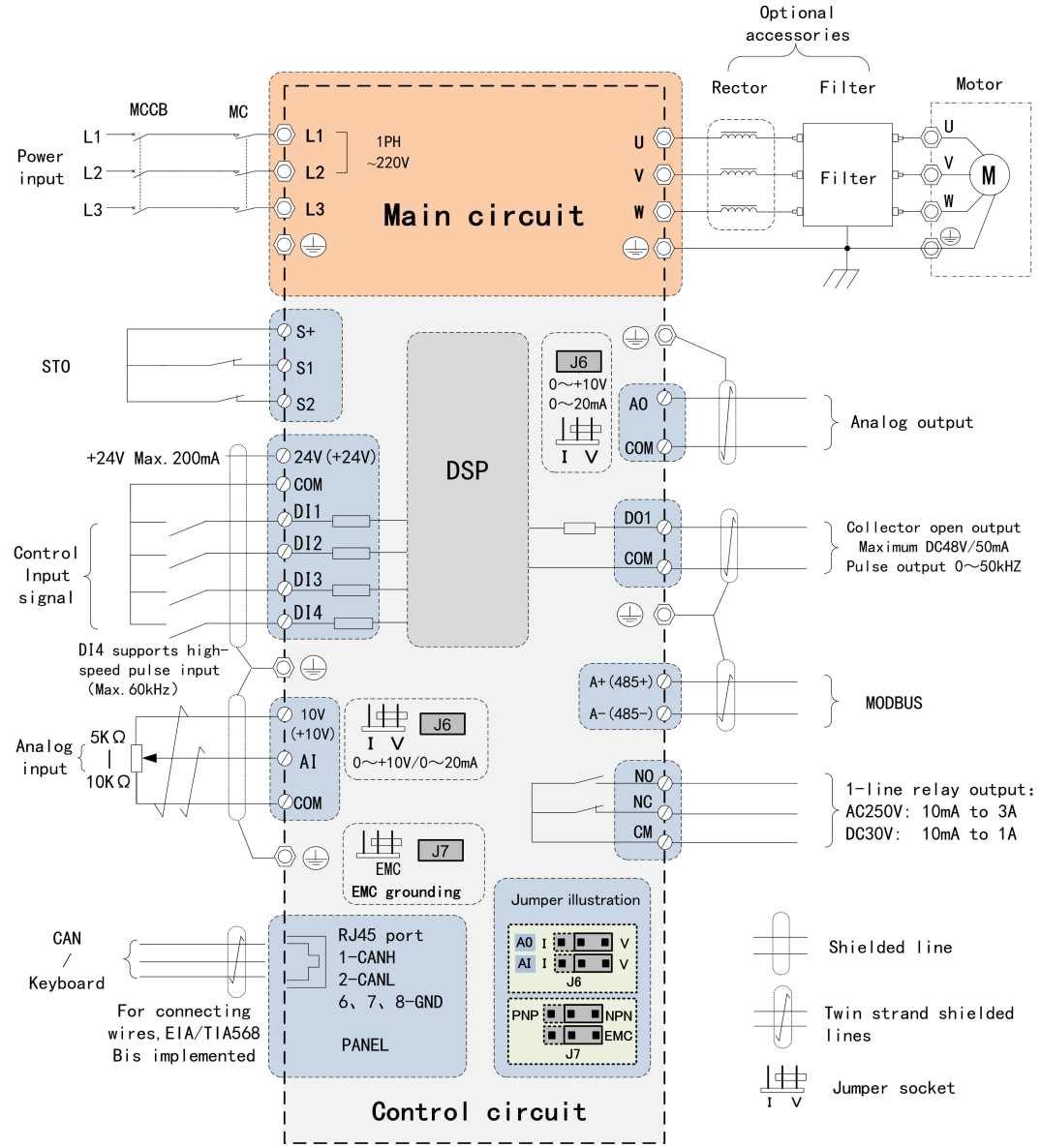
Keep a good connection between cable slots and good grounding. Aluminum wire slot can beused to improve the potential bonding



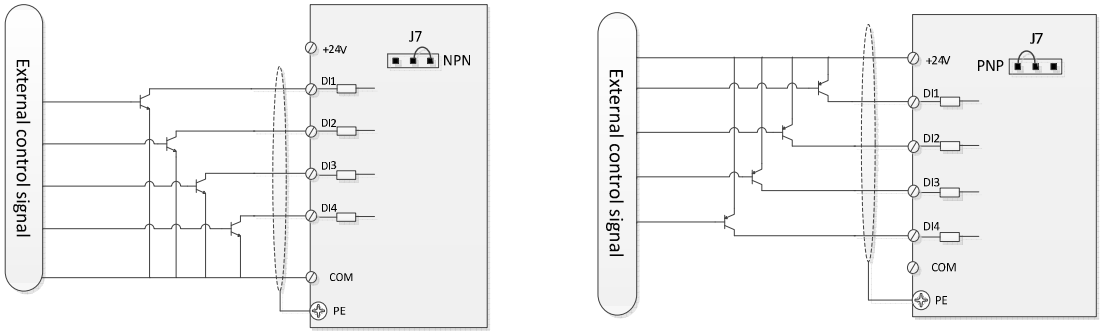
Picture3.3 Cable wiring diagram

3.3.5 Standard wiring diagram

1）Standard wiring diagram



2）Description of the connection between NPN and PNP of the multi-function DI terminal



a. NPN type connection mode

b. PNP type connection mode

Picture 3.4 Schematic diagram of electrical wiring

3.3.6 Terminal type

Table 3.4 terminal form and tightening torque

Dimension	Terminal screw Size	Tightening torque[Nm]	Terminal structure	Terminal symbol identification and description	Connection capacity
Control terminals	/	/	Spring crimp terminal	Refer to the wiring diagram	22~12AWG
Main loop terminal	M3	0.6~1.1	European square hole type compression joint terminal	L1、L2、L3、U、V、W	24~12AWG

3.4.1 Mechanical installation check list：

☐Ambient conditions must conform to the requirements.

☐Equipment properly fixed on the rack.

☐Cooling air flow is smooth,Cabinet put change draught fan air quantity whether or not enough.

☐Motor and actuator installation is completed.

☐On dust, drops splash water, damp air, corrosive gases whether there is sufficient assessment and take corresponding measures.

3.4.2 Electrical installation check list

☐ If the drive is connected to the IT (floating) power grid, Disconnect the varistor.

☐ If the storage period is more than one year,The reforming capacitor is required.(Please refer to our local representative for more information).

☐Drive properly grounded.

☐ Power supply (input power) voltage and the match rated input voltage of the drive.

☐ Power supply (input power) connected to L1/L2/L3 upper，

Terminals are tightened to the specified torque.

☐ Installed a suitable power supply (input power) fuses and circuit breakers.

☐ Motor is connected to the U/V/W,Terminals are tightened to the specified torque.

☐ Motor cable(As well as the braking resistance cable,If there)Separate from other cables.

☐ There is no power factor compensation capacitor in the motor cable.

☐ External control of the control unit is connected.

☐ There are no tools left in the drive,foreign bodies and boreholes produce conductive dust.

☐ Power supply (input power) voltage can not through the bypass connection applied to the input terminals of the drive.

☐ Motor junction boxes and other covers are installed in place.

■ Chapter4 Operating Display

4.1 LED Control Keyboard

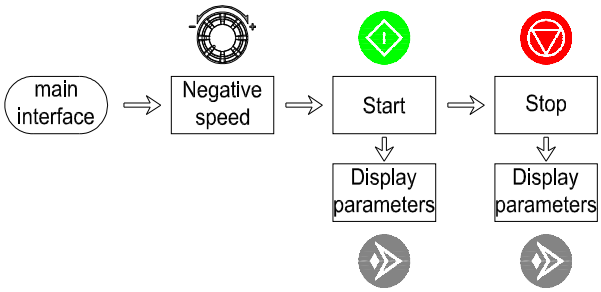
Table 4.1 LED Control keyboard function table

Graphical representation	Category	Lndicator code	State	Explain
	Status indicator light	REMOTE	ON	REM
			OFF	LOC
		FAULT	ON	FAULT
			OFF	No fault
		REV	ON	REV
			OFF	/
		START	ON	RUNNING
			OFF	STOP

Graphical representation	Key Code	Function
	【ENTER】key	Enter into the parameter menu and save the parameter values step by step.
	【RES/ESC】key	When the screen displays failure code (E-XX), Reset fault. In other cases, exit the menu step by step, Cancel edit.
	【Upward】key	Increase the parameter address (group, index), parameter values; Enter local given menu, Increase local given value.
	【Downward】key	Reduce the parameter address (group, index), parameter values; Enter local given menu, Reduce local given value.
	【Rightward】key	Forward to switch the monitoring signal (main interface), move the cursor right (menu interface).
	【LOC/REM】key	Switch between the local control mode and the remote control mode.
	【STOP】key	Stop the drive in local mode.
	【START】key	Start up the drive in local mode.
	Potentiometer knob	Clockwise rotation increases a given value, counterclockwise rotation decreases a given value.

4.2 Operating instructions

1）Initially, the control panel is in the main interface. The LED digital tube shows set value, such as motor speed 1500. The given value can be changed by rotating the potentiometer.

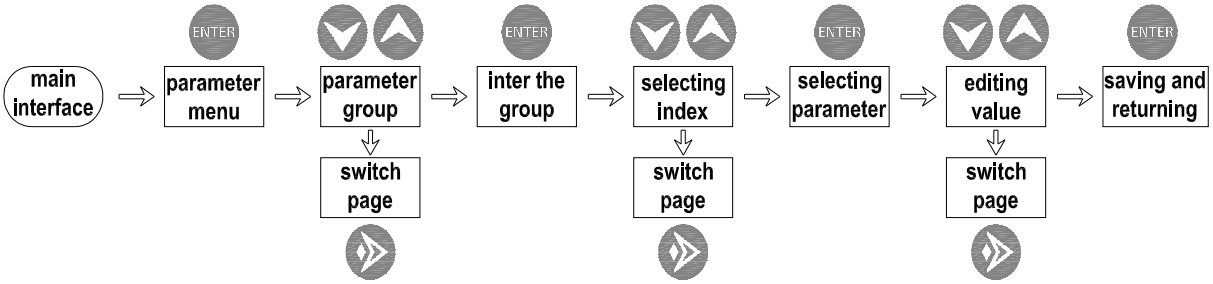


☞**Press the right function key to switch the monitoring signal,** 24 different parameters can be displayed at runtime,the display parameters can be modified,for details,see 56 groups of parameters.When the drive stops，7 different parameter values can be displayed，which are **03.00/03.06(Speed/Torque)**、**01.02**、**01.06**、**01.07**、**02.00**、**02.02**、**02.04**.

2）**Positive and negative values are given:**the control panel is in the main interface. ☞**Press【Downward】key** Negative speed or negative torque can be set given.☞ **Press【Upward】key** Positive speed or torque can be set for a given (default is positive for a given).

3）**Fault enquiry and reset:** Drive in failure status, the LED digital tube displays the fault code, such as E-01, and all digital tubes synchronously flashing. At this time, ☞**Press【 RES/ESC】key can reset the fault.** when the drive alarms, the LED screen displays the warning code, such as A-01. Alarm information will pop up once in every 10 seconds, and last for 3 seconds (flashing 3 hypo) then automatically hidden. ☞**Press the up and down or so four direction keys and the OK button to hide the fault or alarm message.**

4）**Change Parameter: ☞When the control panel is in the main interface, press the OK button to enter the parameter menu to view or modify the parameter values.** The parameter menu is a three level menu. **The first level menu for selecting parameter group, the second menu for selecting parameter index, and the third menu for editing parameter value**. Press the upward key to increase the parameter group, the index or the parameter value; press the downward key to decrease them. After edit finished, press the OK button to save the parameter values and return to the previous menu, or you can press the 【 **RES/ESC】key** to give up the edit. If there is no any keystrokes action in 1 minute, the Menu automatically exits.



5） When using the external removable LCD keyboard control, the local control mode is set to 21.00 Speed ref1 src, the signal source is set to 02.08 (Control panel ref1); When local control mode is set to torque 24.00 Torque ref1 src is 02.09 (Control panel ref2). Switch to potentiometer for timing, local control mode for speed set 21.00 Speed ref1 src except 02.08 (Control panel ref1) can be; Local control mode for torque 24.00 Torque ref1 src divided by 02.09 (Control panel ref2) can be set.

■ Chapter5 Drive Parameters

5.1 Parameter List Instruction

This chapter describes the parameters of the control program, including the actual signal.

01 Actual values

01 Actual values	Basic Signal of the Drive Monitoring	unit
01.00	Motor speed	0.1rpm
01.01	Output requency	0.1Hz
01.02	DC bus voltage	0.1V
01.03	Motor current	0.1A
01.04	Motor current%	0.1%
01.05	Heat sink temperature	0.1℃
01.06	Rectifier temperature	0.1℃
01.07	CPU temperature	0.1℃
01.08	IGBT Tjc	0.1℃
01.09	IGBT Tj	0.1℃
01.10	IGBT power loss	0.001kW
01.11	CPU usage	0.1%
01.12	Motor slip est	0.01Hz
01.19	PLL freq	0.1Hz
01.20	PLL volt	0.1Vrms
01.21	Output voltage	0.1Vrms
01.23	Motor temperature	0.1℃
01.25	Udc ripple	0.1V
01.26	spd ref1 gain	1
01.27	Power factor	0.001
01.28	Output power	0.1kW
01.29	Temp slew rate	0.1℃
01.30	Modulation depth	0.1%

02 I/O values

02 I/O values	Input and output signals	Unit
02.00	DI status status of the digital input DI1，DI2，DI3，DI4 status	-
02.01	DO status status of the digital output DO1 and relay output RO1	-

02.02	AI1 actual The actual value of the analog input AI1. Unit is V.	0.001V
02.03	AI1scaled The conversion value of the analog input AI1.	-
02.04	AO1 actual The actual value of the analog input AI2. Unit is V or mA.	0.001V or mA
02.05	Freqin actual The actual frequency of DI4 high speed pulse	1Hz
02.06	Freqin scaled The conversion value of DI4 high speed pulse	-
02.07	Freqout actual DO1 frequency output function.	1Hz
02.08	Control panel ref1 Given1 of the control keyboard.	1rpm
02.09	Control panel ref2 Given2 of the control keyboard.	0.1%
02.10	Fieldbus ref1 Given value1 of the field bus.	1rpm
02.11	Fieldbus ref2 Given value2 of the field bus.	0.1%

03 Control values

03 Control values	Speed control, torque control and other values	Unit
03.00	Speedre foutput	1rpm
03.01	Motor potent out	1rpm
03.02	Const speed out	1rpm
03.03	Speed ref unramp	1rpm
03.04	Speed reframped	1rpm
03.05	Control mode used	-
03.06	Torque refunramp	0.1%
03.07	Torque reframped	0.1%

04 Appvalues

04 App values	Process and Counter Values	Unit
04.00	Processact1	-
04.01	Processact2	-
04.02	Processact	-
04.03	ProcessPIDerr	-
04.04	ProcessPIDout	-
04.05	Line spd act	0.1m/min
04.06	Trq out Nm	0.1Nm
04.07	Trqout percent	0.1%
04.08	Tense ref	0.1N
04.09	Tense ref taped	0.1N
04.10	Roll dia est	1mm
04.11	Pulse counter	1

05 Timer & counter

05 Timer & counter	Value of the timer and counter	Unit
05.00	Run time: sec	1s
05.01	Run time: hour	1h
05.02	Poweron time: s	1s
05.03	Poweron time: h	1h
05.04	Total run time: s	1s
05.05	Total run time: h	1h
05.06	Total power on: s	1s
05.07	Total power on: h	1h
05.08	Fan on time: s	1s
05.09	Fan on time: h	1h
05.10	EEPROM wr tick	-
05.11	EEPROM wr tick k	-
05.12	Max udc	0.1V
05.13	Max Imag	0.1A
05.14	Max Tj	0.1℃
05.15	Max T_heatsink	0.1℃
05.16	Max T_cpu	0.1℃
05.17	IGBT usage hour	1h
05.18	IGBT usage sec	1s
05.19	P_Mot_kWh	0.1 kWh
05.20	P_Mot_MWh	1 MWh
05.21	P_Reg_kWh	0.1 kWh
05.22	P_Reg_MWh	1 MWh

06 Drive status

<table>
<tr><th>06 Drive status</th><th>Drive status word</th></tr>
<tr><td>06.00</td><td>Drive status word1 .
<table>
<tr><th>position</th><th>Name</th><th>Information</th></tr>
<tr><td rowspan="2">0</td><td rowspan="2">Ready</td><td>1=Drive ready to receive start command.</td></tr>
<tr><td>0=Drive not ready.</td></tr>
<tr><td rowspan="2">1</td><td rowspan="2">Fault</td><td>1=Drive fault.</td></tr>
<tr><td>0=Drive no fault.</td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">Alarm</td><td>1=Drive warning.</td></tr>
<tr><td>0=Drive no warning.</td></tr>
<tr><td rowspan="2">3</td><td rowspan="2">Limiting</td><td>1=Drive limited.</td></tr>
<tr><td>0= Drive unlimited.</td></tr>
<tr><td rowspan="2">4</td><td rowspan="2">Running</td><td>1= Drive running.</td></tr>
<tr><td>0=Drive not running.</td></tr>
<tr><td rowspan="2">5</td><td rowspan="2">Rev req</td><td>1=Drive starting reversal.</td></tr>
<tr><td>0=Drive starting forward.</td></tr>
<tr><td rowspan="2">6</td><td rowspan="2">Start req</td><td>1=Driver received Start request.</td></tr>
<tr><td>0=Drive not received Start request.</td></tr>
<tr><td rowspan="2">7</td><td rowspan="2">Stop req</td><td>1=Drive received shutdown request</td></tr>
<tr><td>0=Drive not received shutdown request.</td></tr>
<tr><td rowspan="2">8</td><td rowspan="2">JOG active</td><td>1=Drive jog operation.</td></tr>
<tr><td>0=Drive jog function not activated.</td></tr>
<tr><td rowspan="2">9</td><td rowspan="2">Int stop req</td><td>1=Drive internal forced shutdown activated.</td></tr>
<tr><td>0=Drive forced shutdown function not activated.</td></tr>
<tr><td rowspan="2">10</td><td rowspan="2">Ext run enable</td><td>1=Drive external operation enabled.</td></tr>
<tr><td>0=Drive external operation not enabled.</td></tr>
<tr><td rowspan="2">11</td><td rowspan="2">JOG2</td><td>1=Drive JOG2 activated.</td></tr>
<tr><td>0= Drive JOG1 activated.</td></tr>
<tr><td rowspan="2">12</td><td rowspan="2">DC charged</td><td>1=DC high voltage capacitor charging completed.</td></tr>
<tr><td>0=DC high voltage capacitor charging not completed.</td></tr>
<tr><td rowspan="2">13</td><td rowspan="2">Chg rly closed</td><td>1=Soft start relay closure.</td></tr>
<tr><td>0=Soft start relay disconnect.</td></tr>
<tr><td rowspan="2">14</td><td rowspan="2">Ext2</td><td>1=Control place2 activated.</td></tr>
<tr><td>0=Control place1activated.</td></tr>
<tr><td rowspan="2">15</td><td rowspan="2">Loc ctrl</td><td>1=Drive operates in remote control mode.</td></tr>
<tr><td>0=Drive operates in the local control mode.</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>06 Drive status</th><th>Drive status word</th></tr>
<tr><td>06.01</td><td>Drive status word 2.
<table>
<tr><th>position</th><th>Name</th><th>Information</th></tr>
<tr><td rowspan="2">0</td><td rowspan="2">Data log rdy</td><td>1=Software oscilloscope waveform cache updated.</td></tr>
<tr><td>0=Software oscilloscope waveform cache not updated.</td></tr>
<tr><td rowspan="2">1</td><td rowspan="2">OFF1</td><td>1=OFF1 (Deceleration stop) activated.</td></tr>
<tr><td>0=OFF1 (Deceleration stop) not activated.</td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">OFF2</td><td>1=OFF2 (Emergency stop coast stop) activated.</td></tr>
<tr><td>0=OFF2 (Emergency stop coast stop) not activated.</td></tr>
<tr><td rowspan="2">3</td><td rowspan="2">OFF3</td><td>1=OFF3 (Emergency stop deceleration stop) activated.</td></tr>
<tr><td>0=OFF3 (Emergency stop deceleration stop) not activated.</td></tr>
<tr><td>4</td><td>Motor Brk</td><td>1= activated; 0= not activated.</td></tr>
<tr><td>5</td><td>Ramp in zero</td><td>1=Ramp input forced to zero; 0=Normal operation.</td></tr>
<tr><td>6</td><td>Ramp out zero</td><td>1= Ramp output forced to zero0=Normal operation</td></tr>
<tr><td>7</td><td>Ramp hold</td><td>1=Ramp input forced to keep0= Normal operation</td></tr>
<tr><td rowspan="2">8</td><td rowspan="2">Modulating</td><td>1= Modulating, IGBT being controlled.</td></tr>
<tr><td>0=No modulating, IGBT not being controlled.</td></tr>
<tr><td>9</td><td>Fan on</td><td>1= cooling fan is on; 0= cooling fan is off</td></tr>
<tr><td>10</td><td>Start block</td><td>1=Start command not executed; 0=Normal operation</td></tr>
<tr><td>11</td><td>ID run req</td><td>1=Parameter identification function of the motor is activated;0=None</td></tr>
<tr><td rowspan="2">12</td><td rowspan="2">Main power on</td><td>1=The main power is on.</td></tr>
<tr><td>0=The main power supply is not normally powered or the voltage is insufficient.</td></tr>
</table></td></tr>
<tr><td>06.02</td><td>Drive status word 2.
<table>
<tr><th>position</th><th>Name</th><th>Information</th></tr>
<tr><td>0</td><td>AC src active</td><td>1=AC power activated 0=DC power activated</td></tr>
<tr><td>1</td><td>DC src active</td><td>1=DC power activated 0= AC power activated</td></tr>
<tr><td>2</td><td>Start inhibit</td><td>1 = Start inhibit 0 = normal</td></tr>
<tr><td>3</td><td>Spdref limit</td><td></td></tr>
<tr><td>4</td><td>Trqref limit</td><td></td></tr>
<tr><td>5</td><td>Rem in local</td><td></td></tr>
<tr><td>6</td><td>Imax limit</td><td></td></tr>
<tr><td>7</td><td>Volt limit</td><td></td></tr>
<tr><td>8</td><td>PM sync loss</td><td></td></tr>
<tr><td>9</td><td>PM flux boost</td><td></td></tr>
<tr><td>10</td><td>Zero freq</td><td></td></tr>
<tr><td>11</td><td>Flux build</td><td></td></tr>
</table></td></tr>
</table>

<table>
<tr><th>06 Drive status</th><th>Drive status word</th></tr>
<tr><td>06.03</td><td>Speed control status word.
<table>
<tr><th>position</th><th>Name</th><th>Information</th></tr>
<tr><td rowspan="2">0</td><td rowspan="2">Zero speed</td><td>1=Actual speed has reached zero speed limit and zero speed delay.</td></tr>
<tr><td>0=Not enter the zero speed state.</td></tr>
<tr><td rowspan="2">1</td><td rowspan="2">Reverse</td><td>1=Actual speed is negative, i.e. Reverse.</td></tr>
<tr><td>0=Actual speed is positive, i.e. Corotation.</td></tr>
<tr><td>2</td><td>Ramp up</td><td>1 = Ramp up, Speed absolute value increases.
0 = No acceleration.</td></tr>
<tr><td>3</td><td>Ramp down</td><td>1 = Ramp down, Speed absolute value decreases.
0 = No deceleration.</td></tr>
<tr><td>4</td><td>At setpoint</td><td>1 = Deviation of actual speed and ramp input in the speed window.</td></tr>
<tr><td>5</td><td>Reserved</td><td>1 = VF scalar control activated.
0 = Vector control activated.</td></tr>
<tr><td>6</td><td>Regen active</td><td>1 = Power generation operation.
0 = Jog operation.</td></tr>
<tr><td>7</td><td>Reserved</td><td>1 = Open loop vector control activated.
0 = Open loop vector control not activated.</td></tr>
<tr><td>8</td><td>Pos ctrl</td><td>1 =Position control activated.</td></tr>
<tr><td>9</td><td>ACIM active</td><td>1 = Asynchronous motor activated.</td></tr>
<tr><td>10</td><td>PMSM active</td><td>1 = Synchronous motor activated.</td></tr>
<tr><td>11</td><td>SynRM active</td><td>1 = Synchronous reluctance motor activated.</td></tr>
<tr><td>12</td><td>ID run</td><td>1 = Motor parameter auto-tuning activated.</td></tr>
<tr><td>13</td><td>Torque limit</td><td>1 = Torque limiting</td></tr>
<tr><td>14</td><td>Speed limit</td><td>1 = Speed limiting</td></tr>
<tr><td>15</td><td>Exc active</td><td>1 = Pre excitation of induction motor</td></tr>
</table></td></tr>
<tr><td>06.04</td><td>Infeed ctrl word
Retain</td></tr>
</table>

<table>
<tr><th>06 Drive status</th><th>Drive status word</th></tr>
<tr><td>06.05</td><td>Field bus control word
<table>
<tr><th>Position</th><th>Name</th><th>Information</th></tr>
<tr><td>0</td><td>Stop</td><td>0=Maintain current status 1= Drive stop</td></tr>
<tr><td>1</td><td>Start</td><td>0=Maintain current status 1= Drive start</td></tr>
<tr><td>2</td><td>StopMode OFF2</td><td>1 =Mandatory for emergency shutdown mode</td></tr>
<tr><td>3</td><td>StopMode OFF3</td><td>1 =Mandatory for coast stop mode.</td></tr>
<tr><td>4</td><td>Local ctrl</td><td>1 =Request for local control.</td></tr>
<tr><td>5</td><td>StopMode ramp</td><td>1 =Mandatory for deceleration stop mode.</td></tr>
<tr><td>6</td><td>StopMode coast</td><td>1 =Mandatory for coast stop mode.</td></tr>
<tr><td>7</td><td>Run enable</td><td>1 = Run enable.
0 = Run inhibit.</td></tr>
<tr><td>8</td><td>Reset</td><td>0->1 Reset drive fault.</td></tr>
<tr><td>9</td><td>Jog1</td><td>1 = Jog 1 start.</td></tr>
<tr><td>10</td><td>Jog2</td><td>1 = Jog 2 start.</td></tr>
<tr><td>11</td><td>Remote</td><td>1 = Request for remote control.</td></tr>
<tr><td>12</td><td>Ramp in 0</td><td>1 =Force the input of the given ramp generator as 0.</td></tr>
<tr><td>13</td><td>Ramp hold</td><td>1 = Force the output of the given ramp generator to remain constant.</td></tr>
<tr><td>14</td><td>Ramp out 0</td><td>1 = Force the output of the given ramp generator as 0.</td></tr>
<tr><td>15</td><td>Ext2 sel</td><td>1 = Reversal command</td></tr>
</table></td></tr>
</table>

08 Fault & Alarm Log

08 Fault & Alarm Log	Fault and Alarm log	
08.00	Latest Alarm Code	-
08.01	Latest Fault Code	-

09 System Info

09 System Info	Drive system Info	
09.00	Driver ID	-
09.01	Drive type	-
09.02	Firmware version	-
09.03	Encoder type	-
09.04	PWM freq	-
09.05	App macro active	-
09.06	Specil version	-

10 Start/Stop/Dir

10 Start/Stop/Dir	Selection of signal sources of start / stop / direction	Def
10.00	Ext1startfunc 0：Notselected 1：In1 RUN, In2 DIR 2：In1 FWD, In2 REV 3：RUN/STOP/DIR 4：FWD/REV/STOP 5：Fieldbus 6：Panel	In1FWD,In2RVD
10.01	Ext1 start In1 *Refer to parameters of 10.00* P.01.00.00(Bit pointer) 0：CONST.FALSE Always be 0 1：CONST.TRUE Always be 1 2048：Digital input DI1*(02.00 DI state, position 0)* 2049：Digital input DI2 2050：Digital input DI3 2051：Digital input DI4	DI1
10.02	Ext1 start In2 *Refer to parameters of 10.01*	DI2
10.03	Ext1 start In3 *Refer to parameters of 10.01*	CONST.FALSE
10.04	Ext2 start func *Refer to parameters of 10.00*	Not selected
10.05	Ext2 start In1 *Refer to parameters of 10.01*	CONST.FALSE
10.06	Ext2 start In2 *Refer to parameters of 10.01*	CONST.FALSE
10.07	Ext2 start In3 *Refer to parameters of 10.01*	CONST.FALSE
10.08	JOG1 start *Refer to parameters of 10.01*	CONST.FALSE
10.09	JOG2 start *Refer to parameters of 10.01*	CONST.FALSE
10.10	JOG enable ，0：JOG Inhibit，1：JOG Enable	CONST.FALSE
10.11	Fault reset sel, No reset command; 1: Has reset command.	CONST.FALSE
10.12	Run enable 0: Running is inhibited, 1: Running enable.	CONST.TRUE
10.13	Emergency stop 0: Emergency stop; 1: Keep the current state.	CONST.TRUE
10.14	EM stop mode OFF1：Deceleration stop, Deceleration time is the acceleration and deceleration time1. OFF2：Coast stop OFF3：Deceleration stop, Deceleration time is the emergency stop time.	OFF2
10.15	Start enable 0: Start inhibit; 1: Start enable.	CONST.TRUE

10 Start/Stop/Dir	Selection of signal sources of start / stop / direction	Def
10.16	Upperlimit 0: Limit activated; 1: Limit not activated.	CONST.TRUE
10.17	Lowerlimit 0 : Limit activated; 1: Limit not activated.	CONST.TRUE

11 Start/Stop Mode

11 Start/Stop Mode	Start Stop Mode Settings	Def
11.00	Stop mode 0：RAMP 1：COAST	RAMP
11.01	Ext1/Ext2 sel P.01.00.00(Bit pointer) 0：CONST.FALSE Always be 0 1：CONST.TRUE Always be 0 2048：Digital input DI1 *(02.00 DI state, position 0)* 2049：Digital input DI2 2050：Digital input DI3 2051：Digital input DI4	CONST.FALSE
11.02	Ext1 ctrl mode 0：Speed 1：Torque 2：Min Speed and torque mode, take the minimum value of speed regulation output or the torque given. 3：Max Speed and torque mode, take the maximum value of speed regulation output or the torque given. 4：Add Speed and torque mode, take the sum of the speed regulation output and the torque given. 5：Position Point to point position control mode. 6：Homing Position control mode with origin regression. 7：Profvel Position control mode with trajectory planning.	Speed
11.03	Ext2 ctrl mode *Refer to the parameters of 11.02*	Speed
11.04	Local ctrl mode 0：Speed 1：Torque	Speed
11.05	Ext1 trig type 0：Edge trigger 1：Level trigger	Level
11.06	Ext2 trig type *Refer to the parameters 11.05*	Level

13 Analog & pulse in

13 Analog & pulse in	Analog quantity and pulse input	Def
13.00	AI1 input max [0.000V, 10.000V]	10.000V
13.01	AI1 input min [0.000V, 10.000V]	0.000V
13.02	AI1 superv act	No action
	0：No action 1：Fault 2：Alarm	
13.03	AI1 superv sel 0:Monitor inhibited;1: Monitor enabled.	00b
	BIT0: AI min sup BIT1: AI max sup	
13.04	AI1 calibration	No action
	0：No action 1：AI_MIN_TUNE 2：AI_MAX_TUNE	
13.05	AI1 max scale [-32768, 32767]	1500
13.06	AI1 min scale [-32768, 32767]	0
13.07	AI1 input type	-
13.08	AI1simenable	Disable
	0：Disable 1：Enable	
13.09	AI1 sim data [-32768, 32767]	0
13.10	AI1 filter time [0.01s, 10.00s]	0.10s
13.11	Freqinput max [0Hz, 60000Hz]	10000Hz
13.12	Freqinput min [0Hz, 60000Hz]	0Hz
13.13	Freq inmax scale [-32768, 32767]	1500
13.14	Freq inmin scale [-32768, 32767]	0
13.15	Freq insim enable	Disable
	0：Disable 1：Enable	
13.16	Freq insim data [-32768, 32767]	0
13.17	Freq infilter time [0.01s, 10.00s]	0.10s

14 Digital I/O

14 Digital I/O	Digital input and output	Def
14.00	DI1 on delay [0, 65535 ms]	2ms
14.01	DI1 off delay [0, 65535 ms]	2ms

14 Digital I/O	Digital input and output	Def
… …	…	…
14.06	DI4 on delay [0, 65535 ms]	2ms
14.07	DI4 off delay [0, 65535 ms]	2ms
14.08	DO1 on delay [0, 65535 ms]	0 ms
14.09	DO1 off delay [0, 65535 ms]	0 ms
14.10	RO1 on delay [0, 65535 ms]	0 ms
14.11	RO1 off delay [0, 65535 ms]	0 ms
14.12	DI logic The logical type of digital input. The normal logic indicates that the terminal and the COM terminal are short circuit to 1, on the contrary is 0. The anti logic indicates that the terminal is disconnected from the COM terminal by 1, on the contrary by 0. BIT0: DI1 DI1 logic, 0=Normal, 1=Anti logic. BIT1: DI2 DI2 logic, 0=Normal, 1=Anti logic. BIT2: DI3 DI3 logic, 0=Normal, 1=Anti logic. BIT3: DI4 DI4 logic, 0=Normal, 1=Anti logic.	0000b
14.13	DI sim enable 0=Simulation shutdown, 1=Simulation enabled. BIT0: DI1 DI1 The simulation enable or data BIT1: DI2 DI2 The simulation enable or data BIT2: DI3 DI3 The simulation enable or data BIT3: DI4 DI4 The simulation enable or data	0000b
14.14	DI sim data 0: Terminal disconnection, 1: Terminal closure.	0000b
14.15	DI status underlay *Refer to parameters 14.12* BIT0: DI1 DI1 Actual state. BIT1: DI2 DI2 Actual state. BIT2: DI3 DI3 Actual state. BIT3: DI4 DI4 Actual state.	-
14.16	DO logic Logical type of the digital output. When the normal logic signal is 1, the output terminal is closed, on the contrary is disconnected. When the anti logic signal is 0, the output terminal is closed, on the contrary is disconnected. BIT0: DO1 DO1 Logic, 0=Normal,1=Anti logic. BIT1: RO1 RO1 Logic, 0=Normal,1=Anti logic.	0000b
14.17	DO sim enable 0: Simulation shutdown, 1: Simulation enable. BIT0: DO1 DO1 simulation enable or data BIT1: RO1 RO1 simulation enable or data	0000b
14.18	DO sim data 0: Terminal disconnection, 1: Terminal closure	0000b
14.19	DO1 source	Running

14 Digital I/O	Digital input and output	Def
	P.01.00.00 0：CONST.FALSE 1：CONST.TRUE 6144：Ready*(06.00 Status word 1, position 0)* 6148：Running*(06.00 Status word 1, position 1)* 6145：Fault*(06.00 Status word 1, position 1)* 6146：Alarm *(06.00 Status word 1, position 2)* 6450：Start req *(06.00 Status word 1, position 6)* 6158：Ext2*(06.00 Status word 1, position 14)* 6159：Loc ctrl *(06.00 Status word 1, position 15)* 6192：Zero speed*(06.03 Speed control status word, position 0)* 6193：Reverse*(06.03 Speed control status word, position 1)* 6196：At setpoint（*(06.03 Speed control status word, position 4)* 6205：Torq limit*(06.03 Speed control status word, position 13)* 6206：Speed limit（*(06.03 Speed control status word, position 14)*	
14.20	RO1 source *Refer to parameters 14.19*	Running
14.21	DO1level type 0：Edge 1：Level	Level
14.22	DO1edge type 0：Rising Trigger the DO pulse output by rising edge. 1：Falling Trigger the DO pulse output by falling edge. 2：Both Trigger the DO pulse output by rising and falling edge.	Rising
14.23	DO1pulse width [0, 65535ms]	500ms
14.24	RO1level type 0：Edge 1：Level	Level
14.25	RO1edge type 0：Rising Trigger the DO pulse output by rising edge. 1：Falling Trigger the DO pulse output by falling edge. 2：Both Trigger the DO pulse output by rising and falling edge.	Rising
14.26	RO1pulse width [0, 65535ms]	500ms
14.27	DO JOG mask	0

15 Analog & pulse out

15 Analog & pulse out	Analog output and pulse output	Def
15.00	AO1 source	Motor speed

15 Analog & pulse out	Analog output and pulse output	Def
	P.01.00 0： Zero 256：Motor speed 257：Output frequency 258：DC bus voltage 259：Motor current 260：Motor current % 268：Motor slip est 277：Output voltage 278：Motor torque 279：Motor temperature 284：Output power	
15.01	AO1 output max [0.000mA, 20.000mA] or [0.000V, 10.000V]	10.000V
15.02	AO1 output min [0.000mA, 20.000mA] or [0.000V, 10.000V]	0.000V
15.03	AO1 source max [-32768, 32767]	15000
15.04	AO1 source min [-32768, 32767]	0
15.05	AO1 sim data [0mA, 20.000mA]or[0V, 10.000V]	10.000V
15.06	AO1 sim enable 0：Disable 1：Enable	Disable
15.07	AO1 output mode 0：Normal 1：Absolute	Normal
15.08	AO1 output type must be consistent with the jumper position of the terminal panel jumper switch J6. 0：Voltage Select the voltage type output. 1：Current Select the current type output.	Voltage
15.09	AO1 filter time [0.01s, 10.00s]	0.1s
15.10	Freq out source *Refer to parameters 15.00*	0
15.11	Freq outmax [0Hz, 50000Hz]	10000Hz
15.12	Freq outmin [0Hz, 50000Hz]	0 Hz
15.13	Freq out src max [-32768, 32767]	15000
15.14	Freq outsrc min [-32768, 32767]	0
15.15	Freq out sim enable *Refer to parameters 15.18* 0：Disable 1：Enable	Disable
15.16	Freq out sim data [0Hz, 60000Hz]	10000 Hz
15.17	Freq out filter time [0.01s, 10.00s]	0.1s
15.18	Freq out enable User can enable the frequency output via this parameter. 0：Disable 1：Enable	Disable

16 System

<table>
<tr><th>16 System</th><th>Drive system settings. Parameter lock, Parameter restore, User parameter setting, etc.</th><th>Def</th></tr>
<tr><td rowspan="2">16.00</td><td>Local lock Select the signal source of inhibiting local control (LOC/REM button on the control panel). 0: local control permitted, 1: local control inhibited.</td><td rowspan="2">CONST.FALSE</td></tr>
<tr><td>P.01.00.00
0：CONST.FALSE
1：CONST.TRUE
2048：Digital input DI1（02.00 DI state，position 0）
2049：Digital input DI2
2050：Digital input DI3
2051： Digital input DI4</td></tr>
<tr><td rowspan="2">16.01</td><td>Parameter lock Select the status of the parameter lock. The parameter lock prevents the parameter from being modified.</td><td rowspan="2">Open</td></tr>
<tr><td>0：Open Parameter lock open. Parameter values can be modified.
1：Locked The parameter values cannot be modified from the control keyboard.
2：Notsaved Parameters lock open. User can modify the parameter values, but changes will not be saved if the power is cut off.</td></tr>
<tr><td>16.02</td><td>Pass code Enter different passwords to obtain different parameters access rights. [0, 65535]</td><td>0</td></tr>
<tr><td rowspan="2">16.03</td><td>Param restore</td><td rowspan="2">Done</td></tr>
<tr><td>0：Done No action or parameter restore completed.
1：Default Restore to custom defaults, excluding motor and encoder related parameters.
2：Clear all Restore all parameters to the custom defaults.
3： Factory Reserved for manufacturers.</td></tr>
<tr><td rowspan="2">16.04</td><td>Param save manual</td><td rowspan="2">Done</td></tr>
<tr><td>0：Done No action or parameter save completed.
1：Request to save the parameters to the memory, next time will be automatically restored when power on.</td></tr>
<tr><td>16.05</td><td>Param set sel
0：No request
1：Load by I/O
The parameter set 1~4 is selected by a combination of parameters of 16.08 and 16.09 Combined selection parameter set 1~4：
<table>
<tr><th>Parameter set switch input 1 Status</th><th>Parameter set switch input 2 Status</th><th>Selected user parameter set</th></tr>
<tr><td>0</td><td>0</td><td>Load the parameter set1</td></tr>
<tr><td>1</td><td>0</td><td>Load the parameter set2</td></tr>
<tr><td>0</td><td>1</td><td>Load the parameter set3</td></tr>
<tr><td>1</td><td>1</td><td>Load the parameter set4</td></tr>
</table>
2-5：Load set1- Load set4
6-9：Save to set1- Save to set4</td><td>Norequest</td></tr>
</table>

16 System	Drive system settings. Parameter lock, Parameter restore, User parameter setting, etc.	Def
16.08	Param set in1 P.01.00.00 0：CONST.FALSE 1：CONST.TRUE 2048：Digital input DI1（*02.00 DI state，position 0*） 2049：Digital input DI2 2050：Digital input DI3 2051： Digital input DI4	CONST.FALSE
16.09	Param set in2 *Refer to parameters of 16.08*	CONST.FALSE
16.10	Set as default *Refer to parameters of 16.03* 0：Done 1：Save as default	Done
16.11	Fan on temp [0.0, 150.0℃]	40.0℃
16.12	Fan off temp [0.0, 150.0℃]	30.0℃
16.13	Fan off delay [0.0, 6553.5s]	30.0s
16.14	Fan ctrl mode 0：Auto 1：On while run 2：Always on 3：Always off	Auto
16.15	System reboot 0：No request 1：Reboot request	No request
16.16	System language 0：English 1：Chinese	Chinese

17 Data logger

17 Data logger	Software Oscilloscope Setup	Def
17.00	Data log enable 0：Disable 1：Enable	Enable
17.01	Acquire mode 0：Auto 1：Normal 2：Single	Normal
17.02	Sample rate [10Hz, 24000Hz]	1000Hz
17.03	CH1 source	Iu
17.04	CH2 source	Iv
17.05	CH3 source	
17.06	CH4 source	
17.07	CH5 source	
17.08	CH6 source	
17.09	CH7 source	
17.10	CH8 source	

17 Data logger	Software Oscilloscope Setup	Def
17.11	Trigger source	
17.12	Force trig 0：Done 1：Force trig	Done
17.13	Trig level [-32768, 32767]	0
17.14	Event trig source 0: No trigger, 1: trigger. P.01.00.00 0：CONST.FALSE 1：CONST.TRUE	CONST.FALSE
17.15	Trig edge sel 0：Rising Rising edge trigger acquisition. 1：Falling edge trigger acquisition. 2：Rising and falling edge trigger acquisition.	Rising
17.16	Event edge sel *Refer to the parameter 17.15*	Rising
17.17	Channel num [1, 8]	6
17.18	Channel size	-

19 Speed calculation

19 Speed Calculation	Speed Calculation	Def
19.00	Speed scaling [150rpm, 30000rpm]	1500rpm
19.01	Speed filter time [0.0ms, 10.0ms]	2.0ms
19.02	Zero speed delay [0.0s, 6000.0s]	0.5s
19.03	Zero speed level [0 rpm, 1500rpm]	30rpm
19.04	Speed window [0rpm, 1500rpm]	30rpm

20 Limits

20 Limits	Limits Control	Def
20.00	Maximum speed [-30000rpm, 30000rpm]	1500rpm
20.01	Minimum speed [-30000rpm, 30000rpm]	-1500rpm
20.02	Pos speed enable P.01.00.00 0：CONST.FALSE 1：CONST.TRUE 2048：Digital input DI1*(02.00 DI State,position 0)* 2049：Digital input DI2 2050：Digital input DI3 2051：Digital input DI4	CONST.TRUE
20.03	Neg speed enable *Refer to parameters 20.02*	CONST.TRUE= [1]
20.04	Torque ref max [0%, 300.0%]	200.0%
20.05	Torque ref min [-300.0%, 0%]	-200.0%
20.06	Max motor torque [0.0%, 300.0%]	200.0%
20.07	Max regen torque [0.0%, 300.0%]	200.0%

21 Speed reference

21 Speed Reference	Speed Reference	Def
21.00	Speed ref1 src P.01.00 0：Zero 515：AI1scaled *Refer to parameters 02.03* 518：Freq in scaled *Refer to parameters 02.06* 520：Control panel ref1 *Refer to parameters 02.08* 521：Control panel ref2 *Refer to parameters 02.09* 522：Fieldbus ref1 *Refer to parameters 02.10* 523：Fieldbus ref2 *Refer to parameters 02.11* 769：Motor potent out *Refer to parameters 03.01* 770：Const speed out *Refer to parameters 03.02* 1028：Process PID out *Refer to parameters 04.04*	AI1scaled
21.01	Speed ref2 src *Refer to parameters 21.00*	Freq in scaled=[518]
21.02	Speed ref1 func Define the mathematical function of the two reference signal synthesis speed setpoint2 which are selected by the parameters *21.00 (Signal source for givenspeed 1) and 21.01 (Signal source for givenspeed 2).* 0：Ref1 The signal selected by the parameter *21.00 (Signal source for speed given 1)* is used as the speed given value1. 1：Add(Ref1 + Ref2) 2：Sub（Ref1-Ref2） 3：Mul（Ref1xRef2） 4：Min 5：Max 6：Abs	Ref1
21.03	Speed ref2 sel Select the signal source switching between the speed given1 and speed given2. 0: select the speed given1 which is composed by the parameter *21.02 (Speed given operation function);* 1: select the speed given2 which is composed by the parameter *21.01 (Signal source of speed given2).* P.01.00.00 0：CONST.FALSE 1：CONST.TRUE 2048：Digital input DI1*(02.00 DI Satus,Position 0)* 2049：Digital input DI2 2050：Digital input DI3 2051：Digital input DI4	CONST.FALSE
21.04	Speed ref share [-10.000, 10.000]	1.000
21.05	Speed ref JOG1 [-30000rpm, 30000rpm]	150rpm
21.06	Speed ref JOG2 [-30000rpm, 30000rpm]	300rpm
21.07	Pot save mode	-

21 Speed Reference	Speed Reference	Def
	0：Reset 1：Store	
21.08	Pot up source *Refer to parameters 21.03*	CONST.FALSE
21.09	Pot down source *Refer to parameters 21.03*	CONST.FALSE
21.10	Pot output max [0, 30000rpm]	1500rpm
21.11	Pot output min [-30000rpm, 0rpm]	-1500rpm
21.12	Pot ramp time [0.1s, 100.0s]	10.0s
21.13	Pot output	
21.14	Slow down spd ref [0, 30000]	30rpm
21.15	Up slowrqst	CONSTTRUE
21.16	Down slow rqst	CONSTTRUE

22 Speed ramp

22 Speed ramp	Speed ramp	Def
22.00	Acc time1 [0.01s, 655.35s]	Depends on model
22.01	Dec time1 [0.01s, 655.35s]	Depends on model
22.02	Acc time2 [0.01s, 655.35s]	Depends on model
22.03	Dec time2 [0.01s, 655.35s]	Depends on model
22.04	EM stop time [0.01s, 655.35s]	1.00s
22.05	Jog acc time [0.01s, 655.35s]	5.00s
22.06	Jog dec time [0.01s, 655.35s]	5.00s
22.07	Shape acc time1 [0.01s, 655.35s	0.20s
22.08	Shape acc time2 [0.01s, 655.35s]	0.20s
22.09	Shape dec time1 [0.01s, 655.35s]	0.20s
22.10	Shape dec time2 [0.01s, 655.35s]	0.20s
22.11	Speed scaling	1500rpm
22.12	Ramp time sel P.01.00.00 0：CONST.FALSE select the acceleration deceleration time 1 1：CONST.TRUE select the acceleration deceleration time 2 2048：Digital input DI1 *(02.00 DI State, Position 0)* 2049：Digital input DI2 2050：Digital input DI3 2051：Digital input DI4	CONST.FALSE

23 Speed control

23 Speed Control	Speed Control	Def
23.00	Speed Kp [0.00, 30.00]	1.00
23.01	Speed Ti [0, 3000ms]	60ms
23.02	Torque Kp [0.00, 30.00]	1.00
23.03	Droop rate [0.0, 1000.0%]	0.0%

24 Torque reference

24 Torque Reference	Torque Reference	Def
24.00	Torque ref1 src P.01.00 0：Zero 515：AI1scaled *Refer to parameters 02.03* 518：Freq in scaled *Refer to parameters 02.06* 520：Control panel ref1 *Refer to parameters 02.08* 521：Control panel ref2 *Refer to parameters 02.09* 522：Fieldbus ref1 *Refer to parameters 02.10* 523：Fieldbus ref2 *Refer to parameters 02.11* 769：Motor potent out *Refer to parameters 03.01* 770：Const speed out *Refer to parameters 03.02* 1028：Process PID out *Refer to parameters 04.04*	AI1scaled
24.01	Torque ref2 src *Refer to parameters 24.00*	AI2scaled
24.02	Torque ref funcv Define the mathematical function of the two reference signal synthesis torque given value 1 which are selected by the parameters *24.00 (signal source of the torque given 1) and 24.01 (signal source of the torque given 2).* 0：Ref1 The signal selected by *24.00 (signal source of the torque given 1)* is used as the torque given value 1. 1：Add(Ref1 + Ref2) 2：Sub（Ref1-Ref2） 3：Mul（Ref1xRef2） 4：Min 5：Max 6：Abs	Ref1
24.03	Torque ref2 sel P.01.00.00 0：CONST.FALSE 1：CONST.TRUE 2048：Digital input DI1*(02.00 DI Satus,Position 0)* 2049：Digital input DI2 2050：Digital input DI3 2051：Digital input DI4	CONST.FALSE

24 Torque Reference	Torque Reference	Def
24.04	Torque load share [0.000, 10.000]	1.000
24.05	Torque acc time [0.00, 655.35s]	0.10s
24.06	Torque dec time [0.00, 655.35s]	0.10s
24.07	Torque filter time [0, 10000ms]	1ms
24.08	FricTrqstatic [0, 100.0%]	0.0%
24.09	FricTrqslide [0, 100.0%]	0.0%
24.10	Inertial trq [0, 100.0%]	0.0%

25 Critical speed

25 Critical Speed	Set critical speed or speed range to be avoided,such as mechanical resonance issues	Def
25.00	Critspeed1lo [0, 30000rpm]	0
25.01	Critspeed1hi [0, 30000rpm]	0
25.02	Critspeed2lo [0, 30000rpm]	0
25.03	Critspeed2hi [0, 30000rpm]	0
25.04	Critspeed3lo [0, 30000rpm]	0
25.05	Critspeed3hi [0, 30000rpm]	0
25.06	Critspeedsel 0：Disable ） 1：Enable	Disable

26 Constant speeds

26 Constant Speeds	Selection and value of multi segment velocity	Def
26.00	Const speed0） [-30000rpm, 30000rpm]	750rpm
…	…	…
26.15	Const speed15 *Refer to parameters 26.00*	0 rpm
26.16	Define a multi segment 0~15 mode with a total of 4 signals selected by a parameter of *26.18 to 26.21*	Packed= [1]

<table>
<tr><th>26 Constant Speeds</th><th>Selection and value of multi segment velocity</th><th>Def</th></tr>
<tr><td>Packed</td><td>4 signal combinations to produce the 16 options, respectively corresponding to the multi segment speed 0~15,the specific combinations are as follows:
<table>
<tr><th>Multi speed option 1</th><th>Multi speed option 2</th><th>Multi speed option 3</th><th>Multi speed option 4</th><th>Multi segment speed selection</th></tr>
<tr><td>0</td><td>0</td><td>0</td><td>0</td><td>Const speed0</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>0</td><td>Const speed1</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>0</td><td>Const speed2</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>0</td><td>Const speed3</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td>0</td><td>Const speed4</td></tr>
<tr><td>1</td><td>0</td><td>1</td><td>0</td><td>Const speed5</td></tr>
<tr><td>0</td><td>1</td><td>1</td><td>0</td><td>Const speed6</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>0</td><td>Const speed7</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>1</td><td>Const speed8</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>1</td><td>Const speed9</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>1</td><td>Const speed10</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>1</td><td>Const speed 11</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td>1</td><td>Const speed 12</td></tr>
<tr><td>1</td><td>0</td><td>1</td><td>1</td><td>Const speed 13</td></tr>
<tr><td>0</td><td>1</td><td>1</td><td>1</td><td>Const speed 14</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>1</td><td>Const speed 15</td></tr>
</table>
If you need to use the multi segment speed 0, you need to set the parameter 21.00 spd ref1 src to P03.02 Const speed out.</td><td>0</td></tr>
<tr><td>Separate</td><td>The 4 signals are used to select the multi segment speed 0~4, among which the priority of the multi segment speed 4 is the highest, and the priority of the multi segment speed 1 is the lowest.. The specific correspondence is as follows：
<table>
<tr><th>Multi speed option1</th><th>Multi speed option2</th><th>Multi speed option3</th><th>Multi speed option4</th><th>Multi segment speed selection</th></tr>
<tr><td>0</td><td>0</td><td>0</td><td>0</td><td>Const speed0</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>0</td><td>Const speed1</td></tr>
<tr><td>x</td><td>1</td><td>0</td><td>0</td><td>Const speed2</td></tr>
<tr><td>x</td><td>x</td><td>1</td><td>0</td><td>Const speed3</td></tr>
<tr><td>x</td><td>x</td><td>x</td><td>1</td><td>Const speed4</td></tr>
</table>
If you need to use the multi segment speed 0, you need to set the parameter 21.00 spd ref1 src to P03.02 Const speed out.</td><td>1</td></tr>
<tr><td>26.17</td><td>Const speed out [-30000rpm, 30000rpm]</td><td>0 rpm</td></tr>
<tr><td rowspan="2">26.18</td><td>Const speed sel1 Signal source of the multi segment speed selection 1.
Note: the usage method of the multi segment speed selection 1~4 refer to the parameters 26.16 (Multi speed mode).</td><td rowspan="2">CONST.FALSE</td></tr>
<tr><td>P.01.00.00
0：CONST.FALSE
1：CONST.TRUE
2048：Digital input DI1 (02.00 DI State, Position 0)
2049：Digital input DI2
2050：Digital input DI3
2051：Digital input DI4</td></tr>
</table>

26 Constant Speeds	Selection and value of multi segment velocity	Def
26.19	Const speed sel2 *Refer to parameters 26.18*	CONST.FALSE
26.20	Const speed sel3 *Refer to parameters 26.18*	CONST.FALSE
26.21	Const speed sel4 *Refer to parameters 26.18*	CONST.FALSE

27 Process PID

27 Process PID	PID for Process Control	Def
27.00	PID activate 0：Disable 1：Enable	Disable
27.01	Referencesource P.01.00 0：Zero 515：AI1scaled *Refer to parameters 02.03* 518：Freq in scaled *Refer to parameters 02.06* 520：Control panel ref1 *Refer to parameters 02.08* 521：Control panel ref2 *Refer to parameters 02.09* 522：Fieldbus ref1 *Refer to parameters 02.10* 523：Fieldbus ref2 *Refer to parameters 02.11*	P.27.02
27.02	Ref internal [-32768, 32767]	0
27.03	Ref filter time [0.01s, 3.00s]	0.1s
27.04	Reference actual	
27.05	Feedback func Select the operation mode of feedback signal source 1 and feedback signal source 2. 0：Fbk1 Select feedback 1 as the actual feedback of PID. 1：Add Select feedback 1 plus feedback 2 as actual feedback. 2：Sub Select feedback 1 minus feedback 2 as actual feedback. 3：Min Select the small value of feedback 1 and feedback 2 as feedback. 4：Max Select the big value of feedback 1 and feedback 2 as feedback.	Fbk1
27.06	Feedback 1 source *Refer to parameters 27.01*	AI1 scaled
27.07	Feedback 2 source *Refer to parameters 27.01*	Freq in scaled
27.08	Feedback1 max [-32768, 32767]	32767
27.09	Feedback1 min [-32768, 32767]	0
27.10	Feedback2 max [-32768, 32767]	32767
27.11	Feedback2 min [-32768, 32767]	0
27.12	Feedback gain [0.10, 10.00]	1.00
27.13	Fbk filter time [0.01s, 2.00s]	0.001s
27.14	Feedback actual	
27.15	PID Kp [0.01, 100.00]	1.00
27.16	PID Ti [0.10s, 20.00s]	1.00s
27.17	PID Td [0.00s, 20.00s]	0.000s
27.18	Deriv filter time [0.01s, 20.00s]	0.000s
27.19	Error invert sel	Disable

27 Process PID	PID for Process Control	Def
	0：Disable 1：Enable	
27.20	output trim mode 0：Direct 1：Speed 2：Torque	Direct
27.21	Out max [-32768, 32767]	1500
27.22	Out min [-32768, 32767]	-1500
27.23	Bal enable sel 0：Disable 1：Enable	Disable
27.24	Bal ref [-32768, 32767]	0
27.25	Sleep mode 0：No sleep Process control never goes to hiberation mode. 1：Sleep internal Process control enable hiberation externally. 2：Sleep external Process control enable hiberation by external signal, and will be triggered when the actual speed is less than the value of the following clause of 27.26. 3：Sleep by error Enable hiberation when the deviation is less than the value of the following clause of 27.28.	No sleep
27.26	Sleep level [-32768, 32767]	900
27.27	Sleep delay [0.0, 6553.5s]	60.0s
27.28	Wakeup level [-32768, 32767]	1000
27.29	Wakeup delay [0.0, 6553.5s]	1.0s
27.30	Sleep enable sel P.01.00.00 0：CONST.FALSE 1：CONST.TRUE 2048：Digital input DI1 *(02.00 DI State, Position 0)* 2049：Digital input DI2 2050：Digital input DI3 2051：Digital input DI4	CONST.FALSE
27.31	Calc enable sel P.01.00.00 0：CONST.FALSE 1：CONST.TRUE	Running
27.32	Feedback loss mode 0：Disable No detection. 1：External Detection by external terminal input. 2：Internal Detection by judging the PID error.	Internal
27.33	FbklossminspeedPID [0, 3000.0rpm]	30.0rpm
27.34	Fbk losssrc Select the input terminal for the external feedback missing signal. *Refer to parameters 27.30*	False
27.35	Fbk losslevel [0, 30000]	3000
27.36	Fbk loss delay [0, 60.0s]	3.0s

29 Timer function

<table>
<tr><th>29 Timer Function</th><th>Timer Function Setting</th><th>Def</th></tr>
<tr><td rowspan="2">29.00</td><td>Timer enable</td><td rowspan="2">Disable</td></tr>
<tr><td>0：Disable 1：Enable</td></tr>
<tr><td>29.01</td><td>Timer status
<table>
<tr><th>Position</th><th>Name</th><th>Description</th></tr>
<tr><td>0</td><td>Timer1 compare</td><td>Timer 1 compare</td></tr>
<tr><td>1</td><td>Timer2 compare</td><td>Timer 2 compare</td></tr>
<tr><td>2</td><td>Timer3 compare</td><td>Timer 3 compare</td></tr>
<tr><td>3</td><td>Timer1 period</td><td>Timer 1 cycle trigger</td></tr>
<tr><td>4</td><td>Timer2 period</td><td>Timer 2 cycle trigger</td></tr>
<tr><td>5</td><td>Timer3 period</td><td>Timer 3 cycle trigger</td></tr>
</table></td><td></td></tr>
<tr><td>29.02</td><td>Timer1 period [0.1min, 6553.5min]</td><td>1.0s</td></tr>
<tr><td>29.03</td><td>Timer1 duty [0.0%, 100.0%]</td><td>50.0%</td></tr>
<tr><td>29.04</td><td>Timer2 period [0.1min, 6553.5min]</td><td>1.0s</td></tr>
<tr><td>29.05</td><td>Timer2 duty [0.0%, 100.0%]</td><td>50.0%</td></tr>
<tr><td>29.06</td><td>Timer3 period [0.1min, 6553.5min]</td><td>1.0s</td></tr>
<tr><td>29.07</td><td>Timer3 duty [0.0%, 100.0%]</td><td>50.0%</td></tr>
<tr><td rowspan="2">29.08</td><td>long period</td><td rowspan="2">Disable</td></tr>
<tr><td>0：Disable 1：Enable</td></tr>
</table>

30 Fault function

<table>
<tr><th>30 Fault function</th><th>Fault Protection Function Setting</th><th>Def</th></tr>
<tr><td rowspan="2">30.00</td><td>Ext fault 1 src</td><td rowspan="2">CONST.FALSE</td></tr>
<tr><td>P.01.00
0：CONST.FALSE
1：CONST.TRUE
2048：Digital input DI1 (02.00 DI State, Position 0)
2049：Digital input DI2
2050：Digital input DI3
2051：Digital input DI4</td></tr>
<tr><td>30.01</td><td>Ext fault 2 src Refer to parameters 30.00</td><td>CONST.FALSE</td></tr>
<tr><td rowspan="2">30.02</td><td>Groud fault act</td><td rowspan="2">Fault</td></tr>
<tr><td>0：No action 1：Fault 2：Alarm</td></tr>
<tr><td rowspan="2">30.03</td><td>Input phase loss</td><td rowspan="2">Fault</td></tr>
<tr><td>0：No action 1：Fault 2：Alarm</td></tr>
<tr><td rowspan="2">30.04</td><td>Motor phase loss</td><td rowspan="2">Fault</td></tr>
<tr><td>0：No action 1：Fault 2：Alarm</td></tr>
<tr><td>30.06</td><td>OH alarm level [40.0℃, 120.0℃]</td><td>90.0℃</td></tr>
<tr><td rowspan="2">30.07</td><td>Fault auto reset</td><td rowspan="2">Disable</td></tr>
<tr><td>0：Disable 1：Enable</td></tr>
</table>

30 Fault function	Fault Protection Function Setting	Def
30.08	Fault trial num [1, 20]	5
30.09	Fault trial wait [0.01s, 150.00s]	1.00s
30.10	Trial cnt reset [0.01s, 150.00s]	60.00s
30.11	ChopIGBT fault act Action to be performed when the brake IGBT fails.	Fault
	0：No action 1：Fault 2：Alarm	

32 Factory setting

32 Factory Setting	Optimization of the factory configuration of the kernel factory configuration settings (Default value)	Def
32.04	Kp_vdc_max [2048, 16384]	4096
32.05	Ki_vdc_max [419, 16384]	1638
32.06	Kp_vdc_max_f [2048, 16384]	4096
32.07	Ki_vdc_max_f [419, 16384]	1638
32.08	Kp_fctr [819, 16384]	2048
32.09	Kp_vctrl [819, 16384]	2048
32.10	AI1 gain [2048, 8192]	4096
32.11	AI1 offset [-200, 200]	0 mV/1mA
32.12	AO1 gain [2048, 8192]	3805
32.13	AO1 offset [-200, 200]	45 mV/1mA
32.14	UDC gain [30000, 36664]	32768

34 Logic function

<table>
<tr><th>34 Logic Function</th><th colspan="3">Edge counters, comparators, combinational logic, timers and other functions setting</th><th>Def</th></tr>
<tr><td>34.00</td><td colspan="3">Can be connected to any bit of the status word by a bit pointer.
<table><tr><th>No</th><th>Name</th><th>Describption</th></tr><tr><td>0</td><td>Edge1</td><td>Edge counter 1 output.</td></tr><tr><td>1</td><td>Edge2</td><td>Edge counter 2 output.</td></tr><tr><td>2</td><td>Edge3</td><td>Edge counter 3 output.</td></tr><tr><td>3</td><td>Comp1</td><td>Comparator 1 output.</td></tr><tr><td>4</td><td>Comp2</td><td>Comparator 2 output.</td></tr><tr><td>5</td><td>Comp3</td><td>Comparator 3 output.</td></tr><tr><td>6</td><td>Logic1</td><td>Logic 1 function output.</td></tr><tr><td>7</td><td>Logic2</td><td>Logic 2 function output.</td></tr><tr><td>8</td><td>Logic3</td><td>Logic 3 function output.</td></tr><tr><td>9</td><td>Ontime1</td><td>Timer 1 output.</td></tr><tr><td>10</td><td>Ontime2</td><td>Timer 2 output.</td></tr><tr><td>11</td><td>Ontime3</td><td>Timer 3 output.</td></tr><tr><td>12~15</td><td>Reserved</td><td>Retain</td></tr></table></td><td></td></tr>
<tr><td>34.01</td><td colspan="3">Edge cnt1 val [0, 65535]</td><td>0</td></tr>
<tr><td>34.02</td><td colspan="3">Edge cnt1 src</td><td>CONST.FALSE</td></tr>
</table>

34 Logic Function	Edge counters, comparators, combinational logic, timers and other functions setting	Def
	P.01.00.00 0：CONST.FALSE 1：CONST.TRUE 2048：Digital input DI1 *(02.00 DI State, Position 0)* 2049：Digital input DI2 2050：Digital input DI3 2051：Digital input DI4	
34.03	Edge cnt1 reset *Refer to parameters 34.02*	CONST.FALSE
34.04	Edge cnt1 edge 0：Rising 1：Falling 2：Both	Rising
34.05	Edge cnt1 duty [0,65535]	100
34.06	Edge cnt1 period [0,65535]	120
34.07	Edge cnt1 clear 0：Disable 1：Enable	Disable
...	…	…
34.15	Edge cnt3 val *Refer to parameters 34.01*	0
34.16	Edge cnt3src *Refer to parameters 34.02*	CONST.FALSE
34.17	Edge cnt3reset *Refer to parameters 34.02*	CONST.FALSE
34.18	Edge cnt3edge *Refer to parameters 34.04*	Rising
34.19	Edge cnt3duty *Refer to parameters 34.05*	100
34.20	Edge cnt3period *Refer to parameters 34.06*	120
34.21	Edge cnt3clear *Refer to parameters 34.07*	
34.22	Comp1 output	0
34.23	Comp1 A src P.01.00 0：Zero	Zero
34.24	Comp1 B val [-32767,32767]	120
34.25	Comp1 range [-32767,32767]	20
34.26	Comp1in abs 0：Disable 1：Enable	Disable
34.27	Comp1out inv *Refer to parameters 34.26*	Disable
34.28	Comp1 win *Refer to parameters 34.26*	Disable
...	…	…
34.36	Comp3 output *Refer to parameters 34.22*	0
34.37	Comp3 A src *Refer to parameters 34.23*	Zero
34.38	omp3 B val *Refer to parameters 34.24*	100
34.39	Comp3 range *Refer to parameters 34.25*	20

34 Logic Function	Edge counters, comparators, combinational logic, timers and other functions setting	Def
34.40	Comp3 in abs *Refer to parameters 34.26*	Disable
34.41	Comp3 out inv *Refer to parameters 34.26*	Disable
34.42	Comp3 win *Refer to parameters 34.26*	Disable
34.43	Logic1 A src P.01.00.00 0：CONST.FALSE 1：CONST.TRUE 2048：Digital input DI1 *(02.00 DI State, Position 0)* 2049：Digital input DI2 2050：Digital input DI3 2051：Digital input DI4	CONST.FALSE
34.44	Logic1 B src *Refer to parameters 34.43*	CONST.FALSE
34.45	Logic1 C src *Refer to parameters 34.43*	CONST.FALSE
34.46	Logic1 func 0：AND Logic and 1：OR Logic or 2：NOT Logic non 3：XOR Logic exclusive or 4：Toggle Logic reverse 5：NAND Logic and non	AND
...	…	…
34.51	Logic3 A src *Refer to parameters34.43*	CONST.FALSE
34.52	Logic3 B src *Refer to parameters34.43*	CONST.FALSE
34.53	Logic3 B src *Refer to parameters34.43*	CONST.FALSE
34.54	Logic3 func *Refer to parameters34.46*	AND
34.55	Ontime1 enable src P.01.00.00 0：CONST.FALSE timer stops 1：CONST.TRUE timer starts 2048：Digital input DI1 *(02.00 DI State, Position 0)* 2049：Digital input DI2 2050：Digital input DI3 2051：Digital input DI4	CONST.FALSE
34.56	Ontime1 comp val [0.0, 6553.5]	6553.5 s
34.57	Ontime1 cnt [0, 65535]	0
...	…	…
34.61	Ontime3 enable src *Refer to parameters 34.55*	CONST.FALSE
34.62	Ontime3 comp val *Refer to parameters 34.56*	6553.5 s
34.63	Ontime3 cnt *Refer to parameters 34.57*	0

35 Math function

35 Math function	Linear scaling、Arithmetic expression、integrator、Filter and other functions set up	Def
35.00	Linear1 x src Select the signal source of retiomatric conversion 1 input X. P.01.00 0：Zero	Zero
35.01	Linear1 y [-32767,32767]	0
35.02	Linear1 x max [-32767,32767]	32767
35.03	Linear1 x min [-32767,32767]	0
35.04	Linear1 y max [-32767,32767]	32767
35.05	Linear1 y min [-32767,32767]	0
35.06	Linear1 x abs 0：Disable 1：Enable	Disable
35.07	Linear1 y dec [0, 7]	0
35.08	Linear1 y unit [0, 63]	0
...	…	…
35.18	Linear3 x src *Refer to parameters35.00*	Zero
35.19	Linear3 y *Refer to parameters35.01*	0
35.20	Linear3 x max *Refer to parameters35.02*	32767
35.21	Linear3 x min *Refer to parameters35.03*	0
35.22	Linear3 y max *Refer to parameters35.04*	32767
35.23	Linear3 y min *Refer to parameters35.06*	0
35.24	Linear3 x abs	Disable
35.25	Linear3 y dec	0
35.26	Linear3 y unit	0
35.27	Math1 x src P.01.00 0：Zero	Zero
35.28	Math1 y src *Refer to parameters 35.27*	Zero
35.29	Math1 func 0：Add x + y 1：Sub x - y 2：Min The small one of X and Y 3：Max The big one of X and Y 4：Abs Absolute value of X 5：Mul x * y / k(k is a scaling factor) 6：Div X * k / y(k is a scaling factor)	Add
35.30	Math1 factor [-32768,32767]	0
35.31	Math1 output [-32768,32767]	0
...	…	…

35 Math function	Linear scaling、Arithmetic expression、integrator、Filter and other functions set up	Def
35.37	Math3 x src *Refer to parameters35.27*	Zero
35.38	Math3 y src *Refer to parameters35.27*	Zero
35.39	Math3func *Refer to parameters35.29*	Add
35.40	Math3factor	0
35.41	Math3output	0
35.42	Integrator1src *Refer to parameters35.27*	Zero
35.43	Integrator1output [0, 65535]	0
35.44	Integrator1scaling [0, 65535]	0
……	…	…
35.48	Integrator3src *Refer to parameters35.42*	
35.49	Integrator3output	
35.50	Integrator3scaling	
35.51	Filter1 input src P.01.00 0：Zero	Zero
35.52	Filter1 output [0, 65535]	0
35.53	Filter1 timeconst [0.00, 655.35]	1.00 s
……	…	…
35.57	Filter3 input src *Refer to parameters35.51*	Zero
35.58	Filter3output *Refer to parameters35.52*	0
35.59	Filter3timeconst *Refer to parameters35.53*	1.00 s

42 Mech brake

47Multi step ctrl	Simple multi stage speed circle control to save PLC and other control equipments. Support 16 stage speed and time definitions.	Def
42.00	Mech brake enable 0：Disable Brake output signal is always turn off. 1：Enable No brake response. 2：Enable with ack has brake response. When the response is abnormal, system will produce a protective action.	Disable
42.01	Mech ack src P.01.00.00 0：CONST.FALSE 1：CONST.TRUE 2048：Digital input DI1 *(02.00 DI State, Position 0)* 2049：Digital input DI2 2050：Digital input DI3 2051：Digital input DI4	False
42.02	Brake open delay [200ms，2000ms]	600ms

47Multi step ctrl	Simple multi stage speed circle control to save PLC and other control equipments. Support 16 stage speed and time definitions.	Def
42.03	Brake close delay [200ms，2000ms]	600ms
42.04	Brake open torque [50.0%, 200.0%]	100.0%
42.05	Brake check rqst src P.01.00.00 0：CONST.FALSE 1：CONST.TRUE 2048：Digital input DI1 *(02.00 DI State, Position 0)* 2049：Digital input DI2 2050：Digital input DI3 2051：Digital input DI4	False
42.06	Brake check torque [50.0%, 200.0%]	150.0%
42.07	Brake check time [0.5s，10.0s]	2.0s
42.08	Brake slip limit [15rpm，60rpm]	30rpm
42.09	Brake open trq mem	0.1%
42.10	Brake close trq mem	0.1%

43 Winder

43 Winder	For rewinding, winding, constant tension control, etc	Def
43.00	Winder mode 0：Winder 1：Unwinder	Winder
43.01	Gear ratio [0.001, 30.000]	1.000
43.02	Thickness [0.001, 30.000]	0.100mm
43.03	Web width [1, 30000]	1000mm
43.04	Density [1, 30000]	1000kg/m3
43.05	Line spd max [0.1, 3000.0]	300.0m/min
43.06	Line spd src	AI1 scaled
43.07	Dia calc mode 0：LINE SPEED 1：ENCODER 2：ROLL_PULSE 3：EXT_FBK	LINESPEED
43.08	Roll dia src	AI1 scaled
43.09	Roll pulse src	CONST.FALSE
43.10	Roll pulse scaling	1
43.11	Core diameter	100mm
43.12	Full roll dia	1000mm
43.13	Dia reset rqst	CONST.FALSE
43.14	Dia preset rqst	CONST.FALSE
43.15	Dia preset data	100mm
43.16	Min spd dia calc	30rpm
43.17	Tense src	Freq in scaled
43.18	Tmax	30.0N

43 Winder	For rewinding, winding, constant tension control, etc	Def
43.19	Tape mode	0
43.20	Max tape [0, 100.0]	0.0%

47 Multi step ctrl

47Multi step ctrl	Simple multi stage speed circle control to save PLC and other control equipments. Support 16 stage speed and time definitions.	Def
47.00	Speed out The speed of a given pointer is controlled by pointing to the parameter P48.00.	-
47.01	Run enable src	P.06.00.04
47.02	Mode 0：Single Single cycle，And keep the final value. 1：Repeat Circulation mode. 2; Single & Stop Single cycle,And automatically shut down。Restart need to issue a stop command.	0
47.03	Save mode 0：Disable Not enabled. Shut down with no nomemory. 1：Enable Storage. Stop memory operation phase.	0
47.04	Stage At the current stage of the multi segment speed loop, user can edit as the starting phase. [0, 15]	0
47.05	Timer The current cycle phase corresponds to the clock，users can edit as initial time. [0.0, 6553.5]	0
47.06	TimeSet0 The zeroth section corresponds to the time setting.To set to 0 to indicate that the segment is ignored and skipped automatically. [0.0, 6553.5]	0
…	…	…
47.21	TimeSet15 [0.0, 6553.5]	0
47.22	SpeedSet0 [0, 65535]	0
…	…	…
47.37	SpeedSet15 [0, 65535]	0

48 Switch Sync

48 Switch sync	Used for synchronous or asynchronous AC motors soft start,power frequency synchronous,etc. To achieve the impact of the motor without access to the grid.	Def
48.00	Status word for synchronous switching controller. Position / Name / Information 0 / Sync out / 1=Switching action. 0 / Sync out / 0=Switching no action. 1:15 / Reserved /	0

48 Switch sync	Used for synchronous or asynchronous AC motors soft start,power frequency synchronous,etc. To achieve the impact of the motor without access to the grid.	Def
48.01	Phase err The phase error value of the motor and the power grid	-
48.02	Switch enable Enable the synchronous switching	Disable
48.03	Phase comp The phase compensation size for synchronous switching control is used to compensate for the phase lag caused by the contactor delay and the load.	6deg
48.04	Speed comp The phase of the motor needs to be modified to synchronize with the grid before the synchronous switching. When enable the synchronous switching, the speed compensation is automatically added to the given speed.	0

49 Data storage

49 Data storage	16 bit data storage parameters that can be written or read using pointer settings of other parameters	Def
49.00	Data storage1 [-32768,32767]	0
…	…	…
49.07	Data storage8 [-32768,32767]	0

51 Embedded Modbus

51 Embedded Modbus	Embedded Modbus settings	Def
51.00	Modbus enable 0：Disable 1：Enable	Enable
51.01	Node address [0, 247]	1
51.02	Baudrate 0：4800 1：9600 2：19200 3：38400 4：57600 5：115200 6：230400 7：460800 8：921600	4800
51.03	Format 0：8, N, 1 8 bit data,No verification,1stop bit 1：8, N, 2 8 bit data,No verification,2stop bits 2：8, E, 1 8 bit data,Parity check,1stop bit 3：8, O, 1 8 bit data,Odd parity check,1stop bit	8, E, 1
51.04	Master mode 0：Disable 1：Enable	Disable
51.05	Reg data P.01.00 0：Zero	Zero
51.06	Reg addr [0, 65535]	2

51 Embedded Modbus	Embedded Modbus settings	Def
51.07	Comm cycle Modbus work as the master station, set the communication cycle. Unit is 1ms. [0, 65535]	100 ms
51.08	Slave addr [0, 247]	0
51.09	Diagnostics	0
51.10	Packet recv count [0, 65535]	
51.11	Packet send count [0, 65535]	
51.12	Bus message count [0, 65535]	
51.13	UART error count [0, 65535]	
51.14	CRC error count [0, 65535]	
51.15	Frame error count [0, 65535]	

52 VF Cruve

52 VF Cruve	VF Cruve set	Def
52.00	VF Cruve	1
	0：Straight line VF 1：Straight line VF 2：1.2 Power Cruve 3：1.7 Power Cruve 4：2 Power Cruve 5：VF Completely separated mood（Free downtime）	
52.01	Lift Mode	0
	0：Manual torque lifting 1：Automatic torque lifting	
52.03	Lift LimitFrq [0 , 50.00Hz]	10.00Hz
52.04	Mutl VF Frq0 [0 , 1000.00Hz]	10.00Hz
52.05	Mutl VF Volt0 [0 , 100%]	20%
52.06	Mutl VF Frq1 [0 , 1000.00Hz]	20.00Hz
52.07	Mutl VF Volt1 [0 , 100%]	40%
52.08	Mutl VF Frq2 [0 , 1000.00Hz]	30.00Hz
52.09	Mutl VF Volt2 [0 , 100%]	60%
52.10	Mutl VF Frq3 [0 , 1000.00Hz]	40.00Hz
52.11	Mutl VF Volt3 [0 , 100%]	80%
52.12	VF Separate FrqSet [0 , 1200.00Hz]	1000.00Hz
52.13	VF Separate VoltSet	380V
52.14	VF Separate FrqScr	
52.15	VF Separate VoltScr	
52.16	VF Separate VoltScr	1 Hz
52.17	VF Separate VoltScr	0.1 Vrms

60 Motor control

60 Motor control	Motor control set	Def
60.00	Carrier freq set Carrier frequency setting of the drive. Affected by the temperature of the drive and the frequency of the motor, The actual carrier frequency may be different, refer to parameter P09.04. [2kHz, 12kHz] Enhance the carrier can reduce motor noise. For long-distance transmission, if no reactor at the output side, it is necessary to reduce the carrier to reduce the reflected voltage of motor, to avoid motor insulation failure and burned.	Model correlation
60.01	Slip gain [0.00, 1.00]	1.00
60.02	Torque boost [0.00, 1.00]	0.00
60.03	SC brake time [0.0s, 100.0s]	0.0s
60.04	Res damp gain [0.00, 3.00]	0.50
60.05	Excitation time [0.0s, 5.0s]	0.0s
60.06	Fly restart Speed tracking enable control can only be used in open loop V/F control mode of the asynchronous 0：Disable 1：Enable	Disable
60.07	Vdc max control 0：Disable 1：Enable 2：Enable at equeal Activation of the overvoltage stall, but is invalid in the deceleration. Used for periodic load equipment.	Enable
60.08	Vdc min control 0：Disable 1：Enable	Disable
60.13	Over modu gain [0, 15]	15%
60.14	PWM mode 0：AUTO THD The PWM mode is automatically adjusted to minimize the output voltage harmonics. 1：AUTO SL The PWM mode is automatically adjusted to minimize the IGBT switching loss. 2：SVPWM SVPWM represents a continuous PWM mode, DPWM means intermittent PWM mode. 3：DPWM MIN DPWM MIN mode, micro drive series driver does not support DPWM mode. 4：DPWM MAX 5：DPWM3 6：DPWM2 7：DPWM1 8：DPWM0	THD
60.15	Flux brake gain [0, 100]	0%
60.16	Energy opt gain [0, 50]	0%
60.17	FOC spd max [0, 32767]	30000rpm

62 Motor parameter

62 Motor parameter	Motor parameter setting	Def
62.00	Pole pairs [1, 30]	Model correlation
62.01	No-load current [0A, 400.0A]	Model correlation
62.02	Stator resist [0Ω, 65.535Ω]	Model correlation
62.03	Rotor resist [0Ω, 65.535Ω]	Model correlation
62.04	Stator induct [0mH, 3000.0mH]	Model correlation
62.05	Leak induct coef [0%, 20.0%]	Model correlation
62.06	d-axis induct [0.00mH, 300.00mH]	Model correlation
62.07	q-axis induct [0.00mH, 300.00mH]	Model correlation
62.08	Back EMF coef	Model correlation
62.09	Core sat coef [50, 100]	80%
62.10	PM with squirrel [50, 100]	0

63 Startup parameter

63 Startup parameter	Start Related Parameter Settings	Def
63.00	Motor nom power [0.00kW, 630.00 kW]	Model correlation
63.01	Motor nom volt [0 V, 1000 V]	Model correlation
63.02	Motor nom current [0.0 A, 1200.0 A]	Model correlation
63.03	Motor nom speed [0 RPM, 30000 RPM]	Model correlation
63.04	Motor nom freq [0 Hz, 1000 Hz]	50Hz
63.05	Motor type 0：ACIM Asynchronous motor, three phase AC induction motor, Squirrel cage rotor. 1：PMSM Permanent magnet motor.Three phase AC synchronous motor, Permanent magnet rotor and sinusoidal back EMF voltage.	ACIM
63.06	ID run request	No request

63 Startup parameter	Start Related Parameter Settings	Def
	0：No request **1：Normal** Normal operation of auto tuning. Ensure that in all cases have good control accuracy. Auto tuning run for continued 90 seconds. Under normal circumstances, this mode should be selected. Notice： • In the following two cases to perform routine auto tuning. Must disconnect the mechanical connection between motor and driven equipment：If the load torque is higher than 20%；If the mechanical device driven by the motor is not able to withstand the rated speed transients during the normal auto tuning operation. • Before starting auto tuning，please check the motor turn. During auto tuning, motor will be forward。 Warning！Motor in the running speed can reach about 50... 100% of rated speed. Before the start auto tuning operation, please confirm whether can ensure safety. **2：Standstill** Static auto tuning operation. Motor power into the dc or ac current. For asynchronous motors, the motor will not turn(For permanent magnet motor and synchronous reluctance motor，motor rotation travel less than half turn) . Notice：Only by the influence of the connected mechanical parts，can not conduct Normal auto tuning run time, select the mode(For example, the rising edge of activation or lift applications) . **3：Auto-phasing** Only applicable to synchronous motor，Used to identify initial Angle encoder under stationary state.	
63.07	Drive mode	0
	0：Open loop vector 1：VF control	
63.08	Phase inversion Change the motor's turn.	Normal, UVW
	0：Normal, UVW Motor phase sequence is normal. 1：Invert, UWV Motor phase inverting,V and W exchange.	
63.09	Macro sel	Factory
	0：Factory Default factory application macros. 1：Retain	

■ Chapter6 Field Bus

6.1 Data set

Address	Name	Address	Name
0001	Fieldbus control word (corresponding to monitoring parameter address 6.05)	0005	Field bus actual value1
0002	Field bus given 1(corresponding to monitoring parameter address02.15)	0006	Field bus actual value2
0003	Field bus given 2(corresponding to monitoring parameter address02.16)	0007-0018	Field bus module input1-12(parameter50.05-50.16)
0004	Field bus status word	0019-0030	Field bus module output1-12(parameter50.17-50.28)

Fieldbus control word can be viewed by parameter 6.05， Please refer to this manual before.

1）Field bus status word format

No.	Name	Meaning	No.	Name	Meaning
0	Ready	1：Operationalreadiness	8	At setpoint	1：The output is consistent with the set (speed arrival or torque arrival)
1	Enabled	1：Run enable	9	Torque limited	1：Torque limited
2	Modulating	1：PWM signal output	10	Speed limited	1：Speed limited
3	Following ref	1：	11	EXT2 active	1：Control ground 2 effective
4	Em OFF2	1：Free parking mode	12	Local ctrl	1：Local ctrl
5	Em OFF3	1：Emergency stop mode	13	Zero speed	1：Zero speed
6	Start inhibit	1：Start inhibit	14	Direction reverse	1：Direction reverse
7	Alarm	1：Alarm	15	Fault	1：Fault

2）Related parameters

parameter address	parameter name	parameter values
51.00	Modbus enable	Enable = [1]
51.01	Node address	-
51.02	Baudrate	-
51.03	Format	-

3）Sample

The following is an example of node address equal to 1,The last CRC check code is only applicable to this case,To change any data should be recalculated after CRC check code,Can use the software automatically generated.

☞ Read drive status

Request frame：01 03 06 00 00 01 84 82

Response frame：01 03 02 B4 81 0F 24

☞ Modify drive given speed(First, the signal source for the given speed is field bus given 1）

Request frame：01 06 00 02 03 E8 28 B4

Response frame

☞ boot drive(Modify the external control to start first、Stop command signal source for fieldbus communication)

Request frame：01 06 00 01 08 82 5F AB

(Where 0x0882 for startup command,Note that bit 7 and bit 11 must always be maintained at a level of 1)

Response frame slightly
☞ Stop driver
Request frame：01 06 00 01 08 81 1F AA
(Where 0x0881 is a shutdown command,Note that bit 7 and bit 11 must always be maintained at a level of 1)
Response frame slightly
☞ Read parameter 22.00Acc time1(Acceleration time 1)Attribute
Request frame：01 42 0000 1600 77 A5
Response frame：01 42 00 0008 AC 7E 78
☞ Read parameter22.00Acc time1(Acceleration time 1)Default value
Request frame：01 42 0001 1600 26 65
Response frame：01 42 000101 F4 28 12
☞ Read parameter 22.01 Dec time1(Deceleration time 1)Minimum value
Request frame：01 42 00 02 16 01 17 A5
Response frame：01 42 00 02 00 01 19 C5
☞ Read parameter 22.01 Dec time1(Deceleration time 1)Maximum value of
Request frame：01 42 00 03 16 01 46 65
Response frame：01 42 00 03 EA 60 C6 8D
☞ Read parameter 01 Actual values(actual value)Containednumber of parameters
Request frame：01 42 00 04 16 01 F7 A4
Response frame：01 42 00 04 00 0D F9 C1

6.2 Modbus

MODBUS communication protocol based on master-slave mode，Communication is initiated by the master station,Receive requests from the machine and respond to,*Address of master station and slave station should be consistent*,Broadcast support，At this time the main station address is 0。MODBUS build upon the universal asynchronous transceiver (UART),*The master and the baud rate and frame format of station also need consistent.*

MODBUS basic unit is a byte,The format of the RTU mode frame is as follows (the middle omitted part is determined by the function code)：

Node address	Function code	…	CRC check code	
1 byte	1 byte	…	Low 8 bit	1 byte

Be careful：For the 16 bit register address、Number and data, etc.,The big endian format storage,High byte in front,Low byte after.but,CRC check code(Polynomial 0xA001)Using small end storage,Low byte in front,High byte after.

For more instructions please refer to *Modbus_Application_Protocol_V1_1b3.pdf*，User can be from *www.modbus.org* Download this document.

6.3 Function code and frame format

at present,Only the following functions are supported(Suffix H said sixteen decimal,Suffix D said ten decimal)

03H	Reading a keep register	Reads the current value of the N parameter
06H	Write a single register	Rewrite the current value of a single parameter
08H	Diagnosis	For testing, checking communication link status, supporting the following sub function code： 0x00 returns query data 0x01 reset communication Initialize and restart the serial port of the slave device,Clear all communication event counters. 0x04 forced to listen only mode Forcing the specified slave to listen only mode, the slave will not respond to this message.
10H or 16D	Write multiple registers	Rewriting continuity the current value of the N parameter
42H or 66D	Read parameter related information	Used to read the drive parameters related information to support the following sub function code： 0x00 Read the attributes of the specified parameters

		0x01 Read the default values for the specified parameters 0x02 Read the minimum value of the specified parameter 0x03 Read the maximum value of the specified parameter 0x04 Read the number of parameters for the specified parameter group 0x05 Read the visibility of the specified parameter group
55H or 85D	Read data log	

03H Request frame →3H Response frame（The number of bytes is equal to 2 times the number of registers）

Node address	03	Register start address		Number of registers	
		High 8 bit	Low 8bit	High 8 bit	Low 8bit

Node address	03	Number of bytes	Register data 1		…
			High 8 bit	Low 8bit	…

06H Request frame 06H Response frame（The same with the left side request）

Node address	06	Register address		Register data	
		High 8 bit	Low 8bit	High 8bit	Low 8bit

08H Request frame

Node address	08	Sub function code		Data	
		High 8 bit	Low 8 bit	High 8 bit	Low 8 bit

10H Request frame（The number of bytes is equal to 2 times the number of registers）

Node address	10	Register start address		Number of registers		Number of bytes	Register data 1		…
		High 8 bit	Low 8 bit	High 8 bit	Low 8 bit		High 8 bit	Low 8 bit	…

10H Response frame（Returns the first 6 bytes of the request frame）

42H Request frame

Node address	42	Sub function code		Parameter address	
		High 8 bit	Low 8 bit	High 8 bit	Low 8 bit

42H Response frame

Node address	42	Sub function code		Parameter information	
		High 8 bit	Low 8 bit	High 8 bit	Low 8 bit

6.4 Parameter address

Parameter address is 16 bits，High 8 bit parameter group number，Low 8 bit is within the group index

GROUP	INDEX	Address	
		Hexadecimal	Decimal system
00 Communication data	01-30 Data set	0001-001E	0001-0030
01 Parameter group 01	00- 255 Parameter 01.00-01.255	0100-01FF	256-511
02 Parameter group 02	00- 255 Parameter 02.00-02.255	0200-02FF	512-767
…	…	…	…
63 Parameter group 63	00- 255 Parameter 63.00-63.255	3F00-3FFF	16128-16383

Notice：

1、For each actual parameter, please refer to this manual.

2、The use of PLC as the main station parameter address need to add 40001,If the communication address of parameter 01.00 is 40257.

■ Chapter7 Maintenance

7.1 Summary of daily maintenance

This chapter introduces the description of relevant preventive maintenance. Due to changes in drive usage environment, as temperature, humidity, smoke, dust, etc factors and drives' aging of the internal components of the factors etc may cause the drive to produce various kinds of faults.Therefore, in the storage, the usage of process must be carried out daily check and regular maintenance.

■Drive through the transport, before the use, should check whether the element in good condition, If screw fastening.

■ Drive in the normal use of the period should be regularly cleaned up dust, And check whether the screw is loose.

■ If drive is not used in long-term, proposed electricity charging once in the half year. Charging half hour is appropriate in order to prevent the failure of electronic devices.

■ Drive should be avoided in wet and metal dust environment to use. Must be placed in electrical cabinets with protective measures or protecting room in the field.

In normal operation of the drive, please confirm the following matters：

■ Whether the motor has abnormal sound and vibration.

■ Whether drives and motors are fever abnormity.

■ Whether ambient temperature is too high.

■ Whether the output current value is normal.

■ Whether drive's cooling fan is functioning properly.

Maintenance cycle：

The following table shows the routine maintenance cycle recommended by our company.
For more understand detailed information, please contact the local service representative office.

Maintenance cycle	Maintenance	Explai006E
Each year (storage)	DC capacitor reforming	see alsoCapacitor charging
Each 6 to 12 months, depending on the amount of dust in the environment	Sink temperature inspection and cleaning	see also sink .
Each year	Power connection fastening degree check	
	Cooling fan visual inspection	see alsocooling fan.
Each 3 years, if the ambient temperature is higher than 40 °C (104 °F).Otherwise Each 6 years.	Replace cooling fan	see alsocooling fan.
Each 6 years, if the ambient temperature is higher than 40 °C (104 °F). Or the drive is suffered to periodic heavy load or continuous rated load. Otherwise each 9 years.	DC capacitor replacement	Contact our local service representative.

7.2 Sink maintenance and cleaning

The fins of the sink may accumulate the dust in the air. If the sink is not clean, drive will occur overheat warning and failure. In normal environment, the sink should carry out inspection once a year. In dusty environment inspection is more frequent.
Clean the radiator in the following manner (When needed)：

1) Remove the cooling fan.

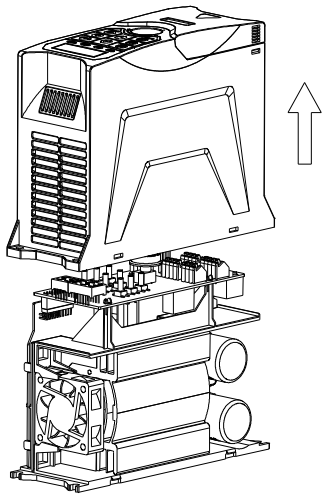
2)With a clean compressed air to blow (arid) from bottom to top, at the same time the vacuum cleaner is used to collect the dust at the air outlet.

Be careful： If the dust may enter the adjacent equipment, please clean it in the other room.

3)Re install the cooling fan.

7.3 Replace the fan

Fan's actual life depending on the use of drive as well as the ambient temperature.From the noise of fan bearings and the gradual rise of the heat sink temperature (Although the sink has been cleaned)upper, it can be predicted Fan failure. If driver used in key positions, user have to replace the fan when the fan is just beginning to make an abnormal noise.



How to remove the fan：

As shown in the drawing, use a small flat-head screwdriver to pry out the four fasteners from the bottom of the machine and pull out the middle shell in the direction of the arrow to replace the fan.

Be careful！The airflow direction is from the bottom up. When installing the fan, the air flow direction is upward.General fan has its steering and wind direction indicator arrow on the body. At the same time pay attention to arrange fan power cord, Avoid fan extrusion and blowing straight shaking the line.

7.4 Capacitor Charging

After a long storage time, capacitors need to be charged, in order to avoid damage of capacitance and limit the possibility of the high current leakage of the capacitor.The best way to achieve this goal is to use a DC power that can regulate the current limit.

1) According to the size of the drive, in 300…800mA range set current limit.
2) Connecte to the 2 input phases(L1 and L2) DC power supply.
3) And then set the DC voltage to the rated voltage of the drive (1.35*Un AC) Charging for at least 1 hour. If the DC voltage is not available, drive has been stored for more than 12 months without power supply, please consult us before power on.

7.5 Other maintenance operations

Transfer user parameter settings to the new drive module（ The selected models if there is this function）

When replacing the drive module, the parameters copy function of the control keyboard can be used to transfer the user parameters from the fault driver module.

By using pluggable type control terminal board can not dismantle the original control wiring of fauty drive and fast transfer under the condition of the terminal connectivity.

7.6 Fault tracking and processing

This chapter lists all of the alarm (warning) and fault information,Including possible causes and corrective actions.Alarm / fault code is displayed on the driver's control keyboard (LED Version display in the form of E-XX).Alarm or fault information is used to indicate that the driver is in an abnormal state.Most alarms and faults can be identified and corrected using the information in this chapter.If you can not rule out the fault,Please contact our representative office.In this chapter,

7.6.1 Fault code and interpretation

Code	Fault name	Possible causes	Terms of settlement
01	SC(Output short circuit)	Output phase to phase short circuit、Or output to earth short circuit、Or output to the bus short circuit.	Check whether the motor is short circuit、Check wiring and cable short circuit.Check whether there is a power factor compensation capacitor or surge absorber in the motor cable.
02	OC(Motor over current)	Motor current exceeds the maximum permissible level of hardware.	Check the motor rated parameters is consistent with the nameplate、Check the acceleration and deceleration time is too fast.
03	OV(Bus overvoltage)	Bus voltage exceeds the maximum permissible level.	Check whether the overpressure stall enable.Check whether the brake resistance is within the recommended range.
04	OH(Drive over heat)	Drive within the radiator temperature is too high、Or the internal cavity temperature is too high、Or module chip temperature is too high.	Check cooling fan、Ventilation cooling system is normal、Radiator is dust clogging、Check if the ambient temperature is within the allowable range.
05	GF(Earth leakage)	The sum of the output current is not zero,And greater than the allowable value.	Check wiring is loose、Check whether the motor cable leakage.Or the motor output line is too long and there is no additional output reactor.

Code	Fault name	Possible causes	Terms of settlement
06	ADC(ADC Fault)	Motor current sensor fault、Analog to digital converter fault or control panel.	Contact local agents or vendors.
07	NTC LOSS(Temperature sensor break)	Drive internal temperature sensor disconnection.	Contact local agents or vendors.
08	ENC INIT	The encoder is found to be faulty during initialization.	Check the encoder wiring is correct,Check the encoder wiring is correct.
10	EEPROM	Memory failure,Failed write parameter.	Contact local agents or vendors.
11	CPU OVERLOAD	CPU load over 100%,Failure to complete real-time task.Or stack overflow.	Contact local agents or vendors.
12	PARA ERROR	The parameters of the motor are conflicting with each other。	Check motor parameters are set correctly.
13	MOTOR OH	The temperature of the motor exceeds the set fault point.	Check whether the motor is overloaded、Check motor overheating protection settings are correct.
14	AI LOSS	Analog input out set of range.	Check whether analog input is broken or short.
15	EXT FAULT	External user defined fault.	Check external fault signal。
16	SUPPLY LOSS	Abnormal power supply.Or lack of phase,Or unbalanced three-phase input, or insufficient capacity.	Check whether the lack of phase.Check whether the capacitance value is normal.
17	OUTPUT LOSS	Output current anomalyOr the output phase,or IGBT and peripheral anomalies can not be controlled.	Check whether the motor is short of phase.Check whether the motor vibration。Or contact local agents or vendors.

Code	Fault name	Possible causes	Terms of settlement
18	ID RUN	Motor self identification fault.	Check whether the motor has been connected.Check the motor nameplate parameters are set correctly.
19	MODBUS FAULT	MODBUS Communication failure.	Check MODBUS communication.
22	PAR SET ERR	Backup parameter set error in memory.	Parameter set not backup.
23	UNDER VOLTAGE	Drive operation,Power supply under pressure.	Check whether the power supply is normal.Check whether the soft start is normal.
24	SPEED FEEDBACK	Speed feedback fault.	Speed feedback speed feedback phase disconnection or positive feedback.
25	OVER SPEED	Overspeed.	Motor speed,Check encoder settings are correct,Check whether the feedback is positive feedback.
27	RUNTIME LIMITTED	Run time is limited.	Contact local agents.
28	PID FBK LOSS	Process PID feedback break.	Check whether the PID disconnection detection is correct,Check whether the external wire break.
31	BRAKE SLIP	The brake during the inspection,Motor slip.	Check whether the need to replace the brake,Check the brake check settings are correct.
32	BRAKE FLT	Open the front brake,Start moment can not be reached.	Check whether the normal brake.
33	BRAKE SAFE CLOSE	Open loop control,The motor works in the low speed dangerous area,Brake force close.	Check whether speed given is too low.

Code	Fault name	Possible causes	Terms of settlement
34	BRAKE OL	After the brake open,Actual compliance exceeds the maximum allowable torque of the drive.	Check whether the load is too high，Check the brake control circuit is normal.
35	BRAKE ACK FLT	After the brake open,Non response signal.	Check the brake response signal is normal.
36	BRAKE SYNC FLT	Lifting control,Motor speed and the given estimated deviation is too large,Magnetic flux anomaly.	Check motor parameters are set correctly.
37	POWER OFF	When the power off function is enabled,the running power supply is suddenly interrupted.	Check whether the power failure is real
40	PM SYNC LOSS	Multiple step out of step in the starting process of synchronous motor.	Check whether the initial angle identification parameter is set correctly
41	MOTOR STALL	Motor blocking fault，The rotor is almost impossible to rotate,The moment has reached the maximum torque.	Check if the machine is locked
42	STO Fault （1.0 version）	STO signal input	The connector between STO and 24V terminals may loose or singal triggered
43	STO Fault (1.1 version)	STO signal input	The connector between STO and 24V terminals may loose or singal triggered
44	STO Terminal 1 trigered (1.1 version)	STO signal input	The connector between STO 1 and 24V terminals may loose or STO 1 singal triggered
45	STO Terminal 2 trigered (1.1 version)	STO signal input	The connector between STO 2 and 24V terminals may loose or STO 1 singal triggered
50	Drive overload	Output current of drive exceed rated current for a while	Use bigger rating drive

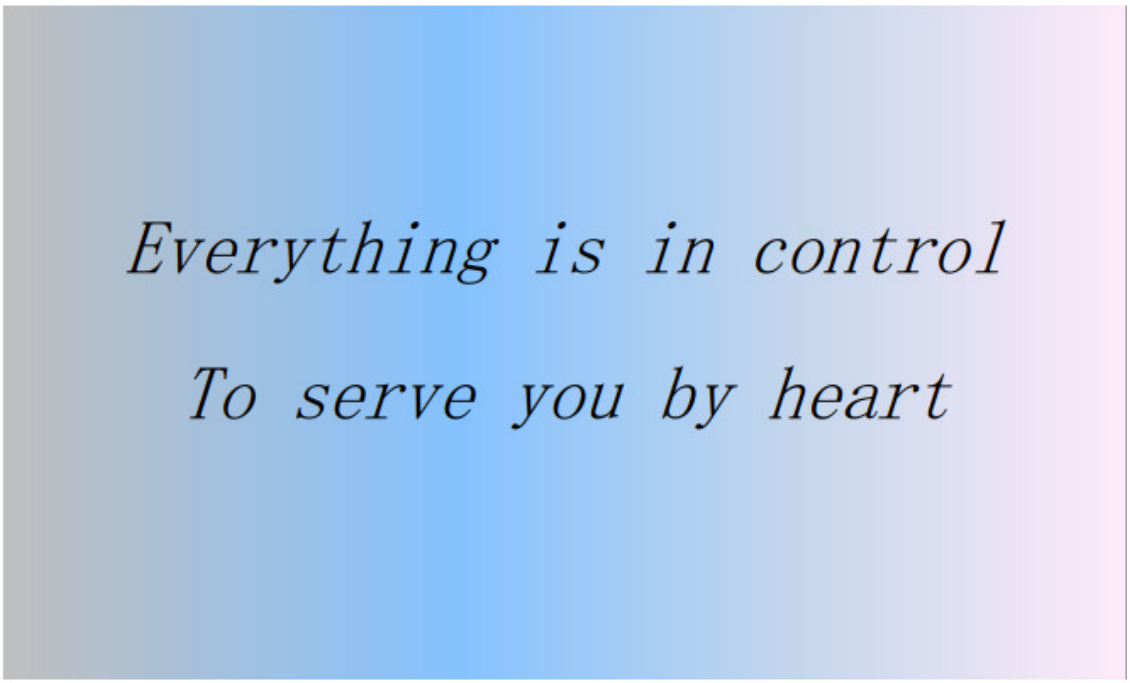
7.6.2 Fault reset

Can be controlled by pressing the keyboard 【RES/ESC】 

,Or cut off the power supply for a period of time to reset the fault.After troubleshooting,Motor can start again.

■ Product Warranty Card

User Information	User address:	
	Name of user：	Contacts：
	Contact number：	Zip code：
On-product Information	Product model：	
	Product barcode：	
	Distributor：	
Fault Information	Fault description： Fill in person： date：	
Service Quality Evaluation	☐good ☐preferably ☐general ☐difference More evaluation content： Fill in person： date：	



■ OQC Card

Inspection conclusion ： This product has passed the inspection, leave the factory is permitted.

Remarks:
This product is qualified according to the delivery inspection.

Approved by:

Shenzhen Cumark Sci. & Tech. Co.,Ltd.

Matters need attention

1.The product warranty period is 18 months from the factory product,Or 12 months from the product debugging,To expire first the shall prevail.Customer is a guarantee of products stipulated by the local vendors may be related to the above terms,In its sales and warranty provisions are described in detail.Our company does not assume any liability beyond the warranty terms.

2.The fuselage bar code is the only basis for the judge warranty period.

3.Warranty period,Under the condition of normal use, users according to the manual,Product failure or damage,Division I is responsible for free maintenance.On the transport process,Open the package、 installation、 Commissioning and use of the resulting damage is not responsible for the drive.For collateral damage our company does not undertake any responsibility.

4.Warranty period,By the following causes lead to product failure ordamage,Maintenance costs will be charged according to the regulations.

1) Incorrect use、 Improper installation or maintenance of the transformation.

2) earthquake、 thunder and lightning、 Voltage abnormity、 fire、 Floods andother natural disasters or two hypo-disasters.

3) Buy the arrival of the later generations to fall or handling damage.

4) The product itself outside of the disorder,Factors such as externalequipment, etc.

5) In excess of specified in the manual product technical indicators or its rated range application under the condition of bad environment,Such as excessive ambient temperature,corrosion、 Dust pollution, etc.

5. Product failure or damage occurs,Would you please fill in the right 《product warranty card》 items in the content.

6.Service charge is calculated according to the actual cost,If there is a contract,According to the principle of contract priority processing.

7. Please be sure to keep this card,And the warranty is presented to the maintenance unit.

8. If there is any doubt about this agreement,Please contact your dealer first.The company reserves the right of final interpretation of the above terms and conditions.

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