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Chapter One : Product inspection and model description

1.1 Product inspection

After the arrival of the product, please check and confirm the following items.

Confirm the project	check contents
Appearance	Check the appearance of the product to see if there is any damage due to transportation
Arrival product model	Check the nameplate of the brushless motor and the drive to see if the model is consistent with the order
Annex completeness	Check the list and the number of attachments
Motor shaft operating condition	Manual rotation of the servo motor spindle, can be easily rotated (with electromagnetic brake with the exception of the motor)

note!

- ★ Damaged brushless motor, brushless drive, can not be installed
- ★ The drive must be compatible with the performance of the brushless motor
- ★ In the process of confirmation of the project, if found any questions, please contact with the company's distributors or directly with the company

System characteristics:

Input voltage: AC150V-AC250V 50-60HZ

Operating temperature: -10-50°C

Use and save humidity: < 85% (No frosting condition)

With a number of intelligent protection function, the motor start and stop time can be adjusted, intelligent control, no current vicious impact on the drive and the motor has a very good protection, improve equipment life.

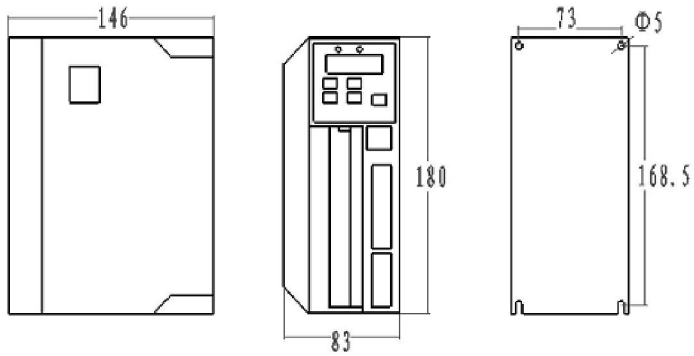
Protection mechanism: ipm overcurrent protection, software overcurrent protection, high voltage protection, motor overload protection, overspeed protection, low voltage protection, high temperature protection, Hall ABC break protection.

Input and output signals: Full optocoupler isolation

1.2 Product model and drive size

Drive description

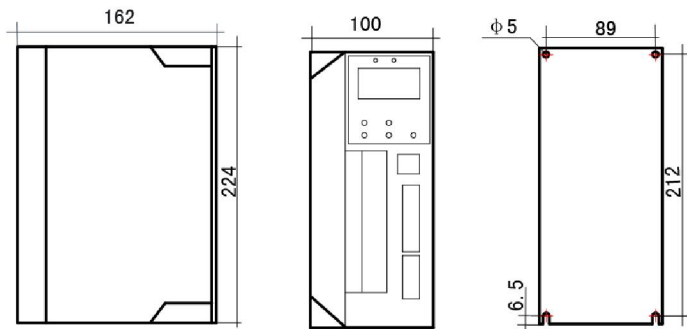
0-2KW Power section drive size:



Note: The dimensions are in

millimeters

2KW-5.5KW Power section drive size:



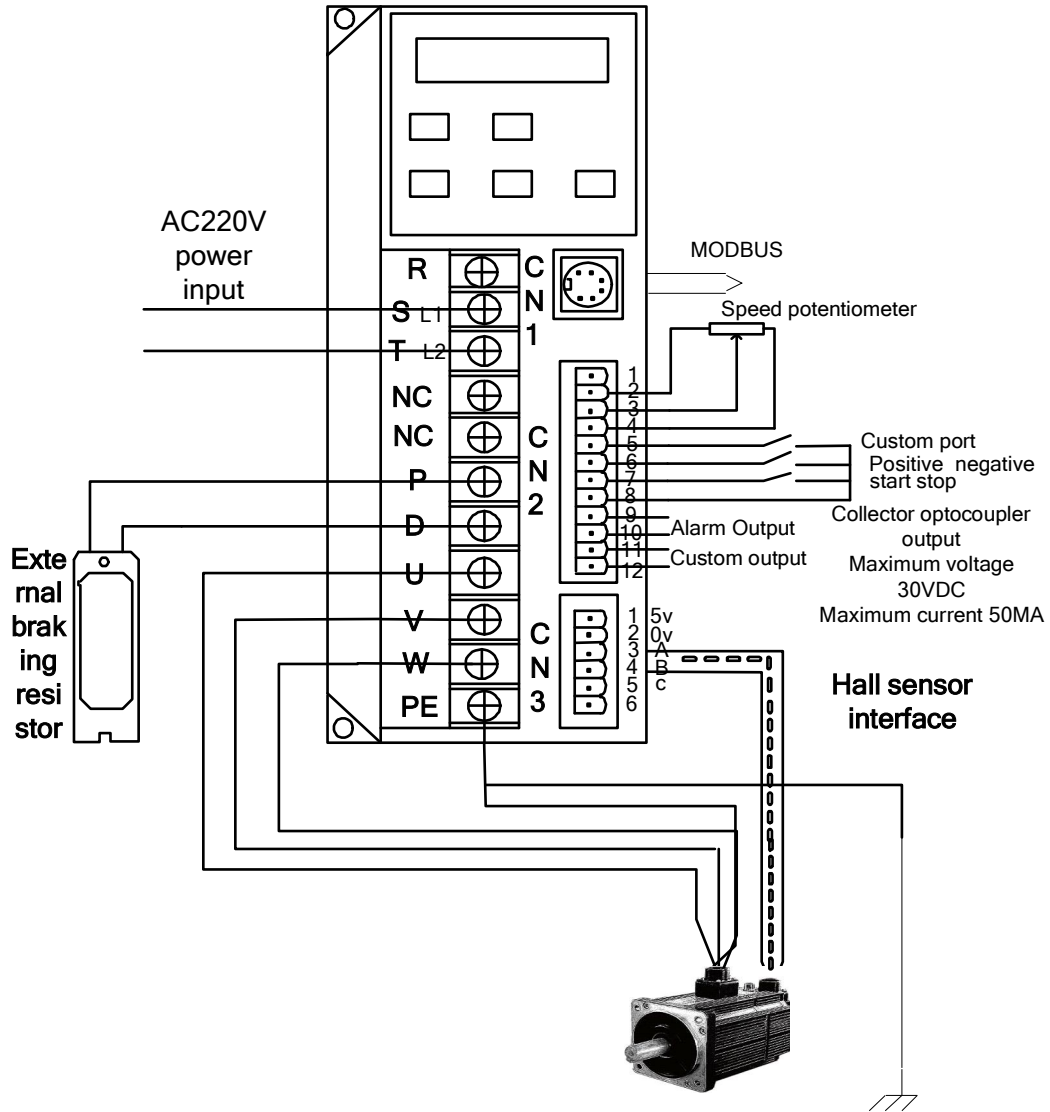
Note: The dimensions are in

millimeters

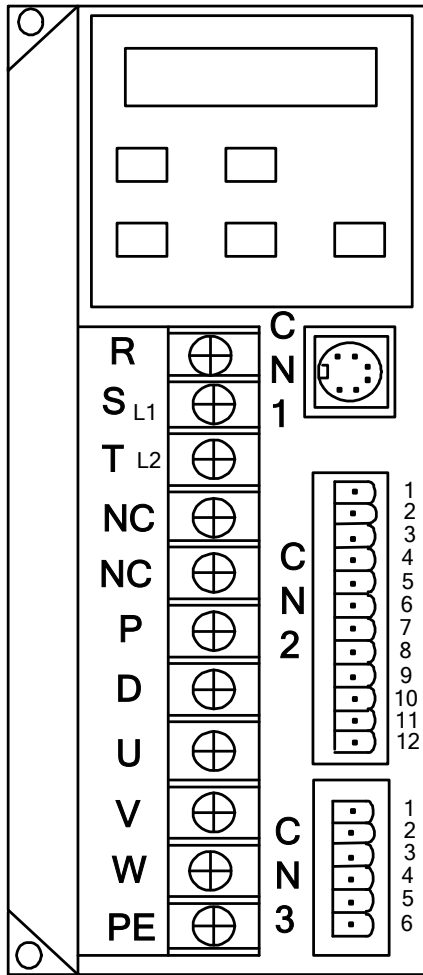
Chapter two: Installation, wiring and functional definition

2.1 Machine wiring diagram and signal definition:

Machine wiring diagram:



2.2 Control signal definition:



CN1--MODBUS485		
CN2Terminal definition		
Number	symbol	Features
1	-	-
2	+5V	Analog+5V power supply
3	SN	Analog input
4	GND	Analog GND
5	IO3	Custom port
6	IO2	Positive and reverse
7	IO1	start stop
8	GPCOM	Input signal common
9	DO1+	Alarm output +
10	DO1-	Alarm Output-
11	DO2+	Custom output+
12	DO2-	Custom output-
CN3 terminal definition		
Number	symbol	Features
1	+5V	Hall +5V
2	GND	Hall GND
3	A	A
4	B	B
5	C	C
6	-	-

Power terminal definition description	Number	symbol	Features
	1	R	Main circuit power input terminal, input 220V, 50Hz. Use single-phase 220V power supply should be connected L1, L2.
	2	S L1	
	3	T L2	
	4	NC	Reserved port is no function
	5	NC	Reserved port is no function
	6	P	External braking resistor P, D terminal, (internal brake resistor installed) When using external high power discharge
	7	D	
	8	U	Motor output U, V, W, PE phase, the motor must be connected with the motor U, V, W, PE one by one correspondence.
	9	V	
	10	W	
11	PE		

third chapter: Parameters and function list

3.1 Parameter definition:

The parameters are defined as the following three groups, defined as follows:

Group 0: Monitor parameters	(E.g Un-XX)
Group 1: Diagnostic alarm parameters	(E.g AL-XX)
Group 2: main function parameters	(E.g FnXXX)

Control mode description:

Sz	Analog speed mode
Sr	Internal register speed mode
Tz	Analog torque mode
Tr	Internal register torque mode

Parameter code after filling the special code description

- (★) Read-only register (can only be viewed can not be set)
- (●) You must reboot the settings to take effect
- (▲) Power does not remember (set after the power will not remember)
- (■) Immediately after confirmation

3.2 Monitor the parameters:

Code	Features	unit	Control mode	Remarks
Un-00	Software version number	-	ALL	★
Un-01	Given speed	0.1r	ALL	-
Un-02	Given torque	%	ALL	-
Un-03	Motor speed	%	ALL	-
Un-04	Current torque	%	ALL	-
Un-05	Motor current	0.01A	ALL	-
Un-11	Bus voltage	V	ALL	-
Un-12	Simulate the current speed of the speed	0.1r	ALL	-
Un-13	Analog Torque Current Torque	%	ALL	-
Un-14	Module temperature	0.1℃	ALL	-
Un-15	Average load rate	%	ALL	-
Un-16	Input status monitoring DI8-DI5	-	ALL	-
Un-17	Input status monitoring DI4-DI1	-	ALL	-
Un-18	Output status monitoring DO4-DO1	-	ALL	-
Un-19	Keep it	-	ALL	-
Un-21	Pulse command frequency display	1KHz	P	-

3.3 Fault diagnosis alarm parameters:

Code	Features	unit	Control mode	
AL-01	Ipm Overcurrent protection	-	ALL	-
AL-02	Software overcurrent protection	-	ALL	-
AL-03	High voltage protection	-	ALL	-
AL-04	Motor overload protection	-	ALL	-
AL-05	Overspeed protection	-	ALL	-
AL-06	Low voltage protection	-	ALL	-
AL-07	-	-	ALL	-
AL-08	Temperature is too high	-	ALL	-
AL-09	Memory error	-	ALL	-
AL-10	Chip error	-	ALL	-
AL-11	Hall ABC disconnected	-	ALL	-
AL-12	-	-	ALL	-
AL-13	Emergency stop alarm	-	ALL	-
AL-14	Discharge alarm	-	ALL	-
AL-15	Motor temperature is too high alarm	Applicable only with temperature sensor motor		

When a fault alarm occurs, check the cause of the fault and clear it. Then press and hold the SET button for 2 seconds or use the terminal function to clear the alarm.

3.3.1 The cause of the malfunction and the removal method:

AL001: ipm overcurrent protection

Cause of the malfunction	Check the fault	Troubleshooting
Drive output short circuit	Check the motor and the drive connection status and lead short circuit	Exclude short-circuit state, and to prevent the metal conductor exposed.
Abnormal electrical wiring	Check the order of the connections of the motor connected to the drive	According to the instructions of the wiring order of re-wiring
IGBT abnormal	Heat sink temperature anomalies	Sent to the dealer or factory inspection
Control parameter settings abnormal	The set value is much larger than the factory setting	Restore to factory settings, and then by the amount set
Control command to set the exception	Check the control input command is whether the changes are too severe	Correction of the input command rate of change in, or open the filter function

AL002: Software over-current protection (Ipm overcurrent protection)

AL003: High-voltage protection

Cause of the malfunction	Check the fault	Troubleshooting
The main circuit input voltage is higher than the rated voltage allowed	Voltmeter measuring the main circuit input voltage is allowed at the rated voltage value	Use the correct voltage source in series regulator
Power input error (the correct power supply system)	Voltmeter for measuring power system is consistent with the specifications defined	Use the correct voltage source in series regulator
Drive hardware failure	This error occurs when permitted by the the voltmeter determination of the main circuit input voltage at rated voltage or less still	Sent to the dealer or factory inspection

AL004: Motor overload protection

Cause of the malfunction	Check the fault	Troubleshooting
More than the drive rated load continuous use	Monitoring parameters Un015 can see the drive, look at the monitoring parameters, the average load rate is not continuous	Improve the capacity of the motor or reduce load

	in more than 100%	
Control system parameter settings	Mechanical system is placed earthquake	Adjust the control loop gain
Improper	Rapid deceleration constant setting	Acceleration and deceleration set the time to slow down
Motor, encoder wiring error	Check UVW and encoder wiring	Correct wiring
Poor motor encoder	Returned to the dealer or factory overhaul	

AL005: Overspeed protection

Cause of the malfunction	Check the fault	Troubleshooting
Speed input command changes had severe	Whether the abnormal detection signal detection meter analog input voltage signal	Adjust the signal input rate of change in, or open the filter function
Given the speed is too large	Check the speed of a given command is too large	Change to the appropriate speed value

AL006: Low Voltage Protection

Cause of the malfunction	Check the fault	Troubleshooting
The main circuit input voltage is lower than rated allowed input voltage value	Check the main circuit input voltage wiring is correct	To re-confirm the voltage wiring
The main circuit input voltage source	Voltmeter to measure the main circuit voltage	Reaffirmation of the power switch
Power input errors (non-power input)	Voltmeter for measuring power system is consistent with the specifications defined	Use the correct voltage source in series regulator

AL008: Temperature is too high

Cause of the malfunction	Check the fault	Troubleshooting
Ambient temperature is too high	Check the drive ambient temperature value	Plus fans or cooling devices
More than the drive rated load continuous operation	Check whether the load is too big or motor current is too high	Improve the capacity of the motor or reduce load
Discharge frequency is too high	Check frequent start and stop, load inertia volume	Installation of an external braking resistor or reduce the load
Drive output short circuit	Check the drive output wiring	Correct wiring

AL009: Memory errors

Cause of the malfunction	Check the fault	Troubleshooting
Memory data access exception	Parameter reset or power reset	Reset is still abnormal, please return it to the dealer or factory overhaul

AL010: Chip error

Cause of the malfunction	Check the fault	Troubleshooting
Chip data access exception	Parameter reset or power reset	Reset is still abnormal, please return it to the dealer or factory overhaul

AL011: Encoder ABZ break

Cause of the malfunction	Check the fault	Troubleshooting
Encoder connection ABZ phase disconnect	Check encoder connection is normal.	Correctly connect the encoder cable

AL012: Encoder UVW break

Cause of the malfunction	Check the fault	Troubleshooting
UVW disconnect the encoder connection	Check encoder connection is normal.	Correctly connect the encoder cable

AL013: Emergency stop alarm

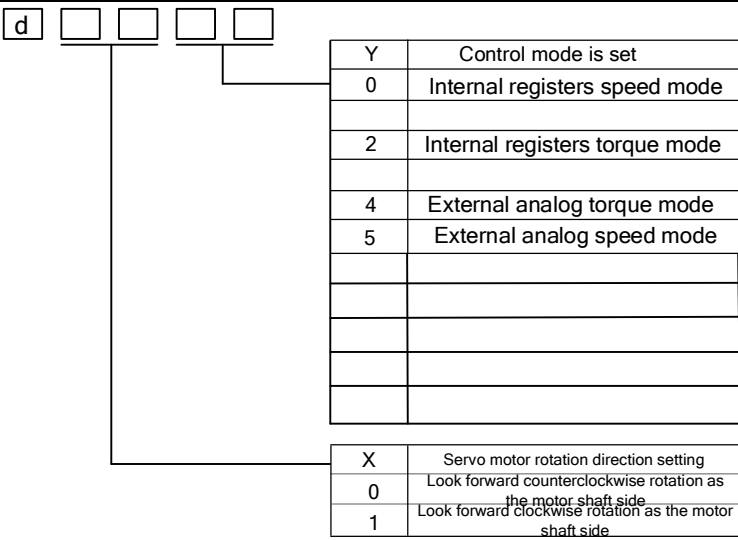
Cause of the malfunction	Check the fault	Troubleshooting
Emergency stop start	Check the emergency stop switch	Open the emergency stop switch

3.3.2 List of operating tips and response methods:

Action prompt code	Indicates the content
IOEER	Input terminal function has a repeated definition, the terminal will be set repeatedly set to 30 no function and then set to solve
EPEER	Save the wrong time, prohibit the amendment, whether the password protected state, when the entry is a password to protect the read and write
Red	Whether to continue to save the password, if you press OK again, the new password will be saved
EER	If you enter a password in fn026, this code will be displayed if the password is incorrect

4.4 The main functional area parameters:

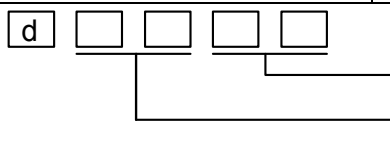
- (★) Read-only register (Can only view can not be set)
- (●) Must re-boot settings to take effect
- (▲) Power and not memory (After power settings are not memory)
- (■) Effect immediately after confirmation
- (-) Unit does not do the initial value or set according to demand

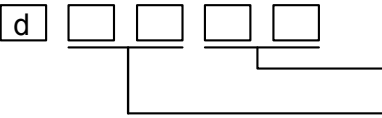
Code	Function	Setting range	Unit	initial value	Cont rolm ode	S e t	Rem arks																							
Fn000	Control mode and set in the forward direction	Two-parameter	-	0 0	ALL	●																								
	 <table border="1" style="display: inline-table; margin-right: 20px;"> <tr><td>Y</td><td>Control mode is set</td></tr> <tr><td>0</td><td>Internal registers speed mode</td></tr> <tr><td>2</td><td>Internal registers torque mode</td></tr> <tr><td>4</td><td>External analog torque mode</td></tr> <tr><td>5</td><td>External analog speed mode</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table> <table border="1" style="display: inline-table;"> <tr><td>X</td><td>Servo motor rotation direction setting</td></tr> <tr><td>0</td><td>Look forward counterclockwise rotation as the motor shaft side</td></tr> <tr><td>1</td><td>Look forward clockwise rotation as the motor shaft side</td></tr> </table>							Y	Control mode is set	0	Internal registers speed mode	2	Internal registers torque mode	4	External analog torque mode	5	External analog speed mode									X	Servo motor rotation direction setting	0	Look forward counterclockwise rotation as the motor shaft side	1
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X	Servo motor rotation direction setting																													
0	Look forward counterclockwise rotation as the motor shaft side																													
1	Look forward clockwise rotation as the motor shaft side																													
Fn001	Driver Enable to select Settings	0~1	-	0	ALL	■	-																							
0: External terminal to enable 1: Internal parameters to enable																														
Fn002	Drive internal parameters enable to select Settings	0~1	-	0	ALL	▲	-																							
0: Enable 1: energy (this parameter after the power failure memory, boot to 0. For boot automatically enable set parameter Fn047 number)																														
Fn003	Motor maximum speed limit is set	0~6000	1r/min	3000	ALL	■	-																							
Fn004	Motor maximum torque limit setting	0~800%	%	300	ALL	■	-																							
Fn006	Jog speed settings	0~30000	0.1r/min	1000	ALL	■	-																							
Fn007	Jog mode, enter the settings	-	-	-	ALL	■	-																							
Fn008	Parameters to modify the switch (manual adjustment)	0~1	-	1	ALL	■	-																							
	0: prohibit the storage of the modified parameters: Allow save the modified parameters																													
Fn009	Modify the parameters	0~1	-	1	ALL	■	-																							

	switch (PC communication)						
	0: PC communication, the ban on Save the modified parameter 1: allows you to save the modified parameters						
Fn010	The display area is selected by default settings	0~29	-	15	ALL	■	-
	Corresponding monitoring area 0 ~ 29 parameter setting (3 is the current working speed)						
Fn011	The countdown for the first time failure alarm code	-	-	-	ALL	★	-
Fn012	Penultimate fault alarm code	-	-	-	ALL	★	-
Fn013	The third to last fault alarm code	-	-	-	ALL	★	-
Fn014	Fourth from the bottom of the fault alarm code	-	-	-	ALL	★	-
Fn015	The fifth from the bottom of the fault alarm code	-	-	-	ALL	★	-
Fn017	Restore the factory setting	0~13	-	-	ALL	■	-
	=3 Restore the factory setting =13 Save the current parameters to the factory settings (Note: This action will overwrite the original factory value)						
Fn018	Bleed resistor output power settings	0~32000	W	200	ALL	■	-
Fn019	Bleed resistor resistance settings	20~32000	Ω	150	ALL	■	-
Fn024	The electromagnetic brake open delay (this time delay can release the brake)	0~32000	10ms	10	ALL	■	-
Fn025	The electromagnetic brake close delay (to enable the delay this time brake to hold together)	0~32000	10ms	100	ALL	■	-
	Go to enable this time delay or speed less than 30 rev / points brake cohesion						
Fn026	User password is set	0~32000	-	0	ALL	■	-
	Password are invalid password is set, 0 can directly modify the password, type a password to enter this parameter in the default according to the confirmation prompt red if you do not want to modify you can press mode to exit, otherwise once again confirm that the changes completed. If password protection, password to enter the parameter and enter the settings according to the confirmed password to enter the correct unlock password, if you set an invalid error message is displayed. Want to remove the password only need to enter the correct password to re-enter this parameter confirmation prompt, enter 0 and press the red again confirm the password will be deleted						
Fn028	Password-protected mode selection	0~3	-	0	ALL	■	-

	0: Password-protected prohibited to modify the parameter password protected mode selection 1: Prohibited to read and write password protection 2: Password protection, prohibit read (special modes of communication, allowing communications to modify the parameters, but prohibited to read and the parameters View) 3: No restrictions on the password-protected (This parameter is only set to modify the password input or no password)						
Fn030	Drive communication address selection	1~250	-	1	ALL	■	-
Fn031	Communication mode selection	0~1	-	1	ALL	■	-
	0:asic 1:rtu						
Fn032	Communication baud rate selection	-	-	11520	ALL	■	-
	9600 set for 960 115200 set for 11520						
Fn033	Data bits to select 1: 7, 2: 8	1~2	-	2	ALL	■	-
Fn034	Parity bits select the	0~2	-	0	ALL	■	-
	0: No 1: Odd number 2: Even						
Fn035	Stop bit mode selection (1: A, 2: Two)	1~2	-	1	ALL	■	-
Fn039	Motor current	0~10	A	4	ALL	■	-
Fn045	Motor pole pairs	0~99	对	2	ALL	■	-
Fn047	Boot automatically enabled (internal energy)	0~1	-	0	ALL	■	-
	0: The boot does not automatically enable 1: Boot automatically enabled When Fn001(Driver Enable to select settings) parameter is set to 1(Internal energy), Fn047 parameter is also set to 1, the system will immediately enable and immediately enable the next power-on self test is completed. Warning: This parameter will be automatically enabled, and will bring a certain degree of risk, caution.						
Fn050	Gain switching mode	0~4	-	0	P S	■	-
	0: Not the switch has been used to gain an 1: According to the speed switch, the switch when the speed is greater than a given speed 2: Switch according to the IO port 3: Switch according to the retention of the number of pulses, when stranded pulses greater than a given number of pulses after switching to gain 2 4: According to the pulse frequency switching frequency greater than the switch to gain less than the switch to gain a						
Fn051	Gain switching time	0~30000	ms	30	P S	■	-
	Generally should not be less than 20ms or they may gain step control of step Note: The conditions are met, gain a switch to gain time, gain two conditions are not set up to switch to gain a						
	Gain from2to1,thedelay time	0~30000	ms	0	P S	■	-

Fn052	This feature is gain switching mode in order to prevent frequent switching back and forth affect performance. Immediately when the conditions are met from 1-2 when the switching time to switch to the 2, but when the time that must pass this parameter is set to switch from 2 to 1 and then switch the switching time to gain a						
Fn053	Switching conditions (speed, motor speed is greater than a given speed, switch to the gain of 2)	0~30000	ms	1000	P S	■	-
Fn058	Speed proportional gain 1 (this parameter in the non-gain switching mode)	1~10000	Hz	100	P S	■	-
Fn059	Speed integral gain (in the non-gain switching mode this parameter)	1~10000	-	20	P S	■	-
Fn062	Speed proportional gain 2	1~10000	Hz	150	P S	■	
Fn063	Speed integral gain of 2	1~10000	-	20	P S	■	
Fn064	Speed feedforward gain	0~99	%	0	P S	■	
Fn065	Speed feed forward low pass filter	0~1000	0.1ms	0	P S	■	
Fn090	Speed command filter (in addition to torque)	0~500	0.1ms	0	P S	■	-
Fn093	Speed command given unit	0~1	-	0	S	■	-
	0: 0.1r/min 1: 1r/min						
Fn094	Speed mode acceleration time	0~30000	ms	0	S	■	
Fn095	Speed mode deceleration time	0~30000	ms	0	S	■	
Fn096	Internal speed reference0	0~30000	0.1r/min	0	Sr	■	-
Fn097	Internal speed reference1	0~30000	0.1r/min	100	S	■	-
Fn098	Internal speed reference2	0~30000	0.1r/min	200	S	■	-
Fn099	Internal speed reference3	0~30000	0.1r/min	300	S	■	-
Fn100	Internal speed reference4	0~30000	0.1r/min	400	S	■	-
Fn101	Internal speed reference5	0~30000	0.1r/min	500	S	■	-
Fn102	Internal speed reference6	0~30000	0.1r/min	600	S	■	-
Fn103	Internal speed reference7	0~30000	0.1r/min	700	S	■	-
Fn171	Torque limit choice	0~2	-	0	P S	■	-
	0: Only by the maximum torque limit (Fn004) 1: Torque limit port invalid state by the positive and negative torque limit (Fn172, Fn173, decide whether restricted by the IO port) 2: External analog torque limit (the absolute value of the analog torque in the torque limit port invalid state by the positive and negative torque limit (Fn172,						

	Fn173)) Note: The maximum torque limit in all modes (given the minimum limit torque onset)						
Fn172	Torque limit (positive torque)	0~800	%	100	P S	■	
Fn173	Torque limit (counter torque)	0~800	%	100	P S	■	
Fn185	Internal torque is given 0	0~800	%	0	Tr	■	-
Fn186	Internal torque is given 1	0~800	%	5	T	■	-
Fn187	Internal torque is given 2	0~800	%	10	T	■	-
Fn188	Internal torque is given 3	0~800	%	15	T	■	-
Fn189	Torque mode, the speed limit set	0~2	%	0	T	■	-
	0: Without limiting the (limited only by the maximum speed limit) 1: Subject to the the Fn190 a given limit (at the same time by the maximum speed limit) in the state of the torque limiting port does not 2: By Fn190 given limited by the analog speed limit in the state of the torque limiting port does not(Absolute value) (As well as by the maximum speed limit)						
Fn190	Torque mode, the speed limit for a given speed	0~32000	r/min	2000	T	■	-
Fn197	Forward rotation prohibition	0~1	-	0	ALL	■	-
	0: Forward rotation prohibition invalid 1: Forward rotation prohibition effective						
Fn198	Reverse rotation prohibits	0~1	-	0	ALL	■	-
	0: Reverse rotation prohibition invalid 1: Reverse rotation prohibit effective						
Fn199	Terminal filter time	0~100	ms	1	ALL	■	-
Fn200	I/O1 Terminal definition	0~30	-	-	ALL	■	
	 <p>Y Terminal function defined to choose The logical relationship X between positive and negative (the default is 1)</p>						
Y setting selection parameters are as follows: 00: Brushless start, 01: Alarm reset, 02: Reserved, 03: Reserved, 04: Gain switching, 05: Reserved, 06: Speed limit, 07: Internal speed selection 1 (1 bit), 08: Internal speed selection 2 (2 digits), 09: internal speed selection 3 (3 digits), 10: speed direction, 11: reservation, 12: internal torque selection 1 (1 bit), 13: internal torque selection 2 (2 bits), 14: reserved, 15: keep, 16: Reserved, 17: Reserved, 18: Reserved, 19: Reserved, 20: Reserved, 21: Reserved, Anti-torque limit, 29: emergency stop 30: no function All terminals that are not used need to be set to 30 XSet the select parameters as follows: 0: Anti-logic (Port is not connected to the case) 1: Positive logic (Port connected) (Input terminal can not be set to repeat, if so repeat, will IOEER warning)							

Fn201	I02 input terminal definition	0~30	-	-	ALL	■	
	Ibid						
Fn202	I03 input terminal definition	0~30	-	-	ALL	■	
	Ibid						
Fn210	D01 Output terminal definition	0~14	-	-	ALL	■	
	 <p>Y Terminal function defined to choose The logical relationship X between positive and negative (the default is 1)</p>						
	<p>Y setting selection parameters are as follows 00: start output, 01: ready to output, 02: speed reached, 03: reserved 04: electromagnetic brake control signal output, 05: alarm output, 06: overload warning, 07: torque limit 08: speed limit, 09: reserved, 10: instruction error warning, 11: instruction range arrival 12: Reserved, 14: Gain switching monitorin</p> <p>X Set the select parameters as follows: 0: Anti-logic (Port is not connected to the case) 1: Positive logic (Port connected) (Output terminal can be repeated to define)</p>						
Fn211	D02 Output terminal definition	0~14	-	-	ALL	■	
	Ibid						
Fn220	Analog speed input 0-5v corresponds to the speed value	0~20000	r/min	1000	Sz	■	
Fn221	Simulation speed zero drift compensation	±30000	0.1r/min	0	Sz	■	-
	Note: For reversing the speed of adjustment in the case of a single power Speed, zero-drift compensation can be set to a given simulation speed of the negative half, so that you can half the voltage of zero speed, whichReversible analog speed control.						
Fn222	Analog speed input the maximum limit	0~6000	r/min	3000	Sz	■	-
Fn223	Analog torque input +-10v corresponding torque	0~800	%	100	Tz	■	-
	Note: For positive and negative torque adjustment in the case of the single-power speed control, zero-drift compensation can be set to the negative half of the torque of a given simulation, so that you can half the voltage as zero torquein order to achieve the positive and negative control of the analog torque.						

Fn224	Analog torque zero drift compensation	0~800	%	0	Tz	■	-
Fn225	Analog torque is the maximum limit	0~800	%	100	Tz	■	-
Fn226	Low-pass filtering of the simulation speed	1~150	0.1ms	10	Sz	■	-
	Increasing this value can reduce the simulation noise, reduce mechanical shock, but it will extend the response time, reduce this value will reduce the response time to improve performance, but the noise becomes large.						
Fn227	Low-pass filtering of the analog torque	1~500	0.1ms	10	Tz	■	-
	Increasing this value can reduce the simulation noise, reduce mechanical shock, but it will extend the response time, reduce this value will reduce the response time to improve performance, but the noise becomes large.						