Kullanım Kılavuzu
MSD220B Serisi Spindle Servo

HAWKSERVO

User manual

MSD220B Series Spindle Dedicated Servo

Contents

Chapter I Safety Precautions

⚠ DANGER: Indicates a condition that could result in death or serious personal injury.

⚠ CAUTION: Indicates a condition that may result in moderate or minor injury to persons and equipment damage. At the same time, it is also used to indicate wrong or unsafe use.

■ Arrival Inspection

⚠
◎ Do not install or run if the drive is damaged or any part is missing, or else it may result in equipment damage or personal injury.

■ Installation

⚠
◎ Hold the bottom of the product while installing and moving. Do not hold the shell only, in order to prevent injury or damage to the drive. ◎ Keep the drive away from flammable and explosive objects and heat sources, and install it on metal or other fire retardant objects. ◎ When the drive is installed in a cabinet or other enclosure, install a fan or other cooling devices and set the air vents to ensure that the ambient temperature is below 40°C, or else the drive may be damaged due to the high ambient temperature.

■ Wiring

⚡
◎ Wiring must be done by qualified electrical engineer, or else it may cause electric shock or damage to the drive. ◎ Make sure the power is disconnected before wiring, or else it may cause electric shock or fire. ◎ The grounding terminal ⏚ should be grounded reliably, or else the drive housing may be electrified (board and housing silk screen) ◎ Do not touch the main circuit terminals, and keep the wiring of the main circuit terminals of the drive away from the housing, or else it may cause electric shock. ◎ The connection terminals of braking resistor are P and C. Do not connect other terminals, or else it may cause fire.

⚠
◎ Before wiring, make sure that the rated voltage and the number of phases of the drive are consistent with those of the input power, or else it may cause fire or personal injury. ◎ Do not connect AC input power to the output terminals U, V and W of the drive, or else it will cause damage to the drive and void the warranty service. ◎ Do not carry out electric strength test for the drive, or else it will lead to damage to the drive. ◎ The main circuit terminal wiring of the drive and the control circuit wiring should be separated or vertically crossed, or else it will cause interference to the control signal. ◎ The wiring cable for main circuit terminals should use cable lugs with insulated sleeve. ◎ When the cable length between drive and motor exceeds 50m, it is recommended to use output reactor to protect the drive and motor.

■ Running

◎ Turn on the power after the drive wiring is complete and the cover plate is put on. It is strictly forbidden to remove the cover plate when it is live, or else it may cause electric shock.

◎ When auto reset or auto-restart on power failure is enabled for the drive, safety precautions should be taken for the device system to avoid personal injury.

◎ "Run/Stop" button may be invalid due to some function settings. A separate emergency power switch can be installed in the drive control system to avoid personal injury.

◎ When the drive is powered on, the terminals are still charged even if the drive is stopped; do not touch the terminals, or else it may cause electric shock.

◎ Do not control the start and stop of the drive with the circuit breaker, or else it may damage the drive.

◎ As the drive running speed increases quickly, please make sure that the motor and the mechanical equipment are in the allowed range before operation, or else the equipment may be damaged.

◎ Do not touch the radiator and braking resistor as the temperature is high, or else it may cause burns.

◎ The factory default parameters of the drive have been able to meet most of the equipment operating requirements. Do not modify the drive parameters unless necessary. Only the necessary parameters can be modified even if some devices have special needs, or else it may cause damage to the equipment.

■ Maintenance and inspection

◎ Do not touch the terminals of the drive when power is on, or else it may cause electric shock.

◎ Ask qualified electrical engineer for maintenance, inspection or replacement of parts and other work.

◎ Wait at least 10 minutes after power-off or make sure there is no residual voltage before performing maintenance and inspection, or else it may cause personal injury.

◎ There is a CMOS IC on the PCB. Do not touch it, or else the PCB may be damaged by static electricity.

■ Other

◎ It is forbidden to modify the drive without permission, or else it may cause personal injury. The drive modified without permission will make the warranty service void.

Chapter II Basic Wiring Connection

1   Wiring Diagram

MSD220B spindle servo driver

PS: User match by herself

DC 24V

24V+	40	Internal DC 24V Power Ps:capacity 100mA
DICOM	2	

	12	COM−
	14	DO1+ positioned
	30	DO1−
	15	DO2+ broken alarm
	9	DO2−
	11	DO3+
	13	DO3−
	29	DO4+
	22	DO4−

corotation running — DI1 — 16
reverse running — DI2 — 37
Pulse Syn control switch — DI3 — 10
stop control — DI4 — 39
switch — DI5 — 34
restoration broken — DI6 — 17
— DI7 — 3
— DI8 — 4

DC 24V

The max collector open circuit200kpps The max difference instruction pulse input500kpps

OCP	38
PULSE+	23
PULSE−	24
OCS	31
SIGN+	32
SIGN−	33
FG	

2KΩ / 2KΩ

Frequency divider

OA+	44
OA−	43
OB+	41
OB−	42
OZ+	28
OZ−	27
FG	
OCZ	26
GND	19

AM26LS32 or same CPU

Controller

Collector output Z pulse (use high speed opticalcouple) — High-speed optocoupler

Collector open circuit mode

AI1+	20
AI1−	5
FG	

AO1	21	analog output 1
GND	19	
AO2	25	analog output2
GND	19	
FG		

PS:output Voltage DC 0~10V The max output current 3mA

CN1

①24V power,internal limited−current resistance

OCP	38
PULSE−	24
OCS	31
SIGN−	33
FG	

Vcc24V

②12V~24V power, external limited−current resistance

PULSE+	23
PULSE−	24
SIGN+	32
SIGN−	33
FG	

Vcc12~24V

Vcc	R resistance parameter	
12V	1KΩ, 1/4W	$\frac{Vcc-1.5}{R+68}\approx10mA$
24V	2KΩ, 1/3W	

注: 1、( ) Twisted shielded pair
2、( ) matching power by user

2   Main Circuit Terminals and Functions

	L1C
	L2C
	R
	S
	T

AC power — Circuit breaker — Electromagnetic contactor — EMI filter

	U
	V
	W
	P⊕
	D
	C

Motor

Braking resistor

Yellow/green
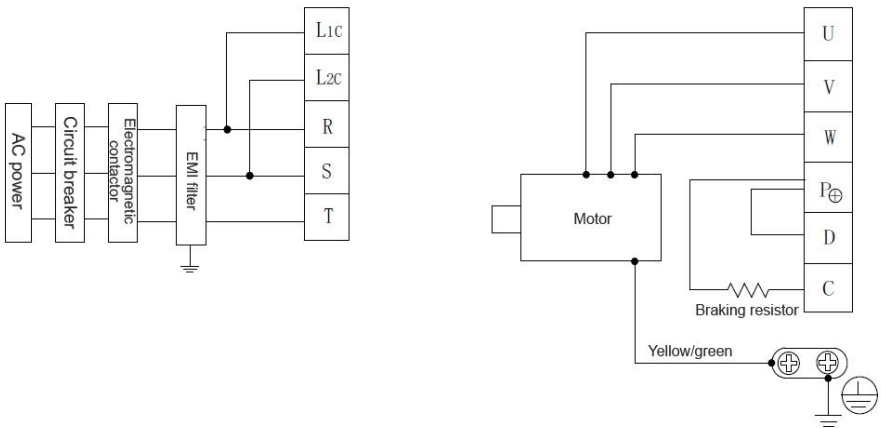
Terminal mark	Name	Description
L1c, L2c	Control circuit power input terminal	Control power input
R, S, T	Main circuit power input terminal	Three-phase main power connection point
P, N	DC bus positive/negative terminal	Common DC bus input point (connection point of external braking unit above 37kW)
P, C	Braking resistor connection terminal	Connection point of braking resistor below 30kW
U, V, W	Drive output terminal	Connect to three-phase motor
⏚	Ground terminal	Ground terminal

Wiring considerations:

A: Input power R, S, T:

   The input side wiring of the drive, no phase sequence requirements

B: DC bus P & N terminals:

   Please note that DC bus terminals P and N still have residual voltage when the power is cut off. Please wait until the power indicator is off and make sure that the voltage is less than 36VDC before contacting, or else it may cause electric shock.

   The wiring length of brake unit shouldn't exceed 10m. Use twisted pair or tight double-wire inparallel for wiring.

   Do not connect the braking resistor directly to the DC bus, or else it may damage the drive or even cause a fire.

C: Braking resistor connection terminals P & C:

   For the selection of braking resistor, refer to the recommended value and the wiring distance should be less than 5m, or else it may result in damage to the drive.

D: Drive output side U, V & W:

   Do not connect capacitor or surge absorber to the output side of the drive, or else it may cause frequent protection of the drive or even damage.

   If the motor cable is too long, it is easy to produce electrical resonance due to the impact of distributed capacitance, causing damage to the motor insulation or over-current protection of the drive due to greater leakage current. If the motor cable length is over 100m, an AC output reactor shall be installed.

E: Ground terminal PE ⏚:

   The terminals must be grounded reliably and the resistance must be less than 0.1Ω. Failure to do so may result in exception or even damage to the equipment.

   Do not share the ground terminal ⏚ with the neutral N terminal of the power supply.

2 Name and function of control circuit signal (CN1 plug)

(1) CN1 pin signal

CN1 Plug Pinout

6

(2)   Definition of CN1 terminal symbols

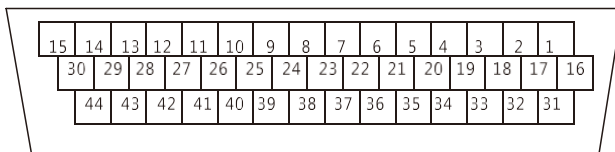| No	Symbol	Description	No	Symbol	Description	No	Symbol	Description
			16	GND	Analog power ground			
1	DI1	Digital input 1	17	AI1	Analog input terminal 1	31	PA-	Command pulse input A-
2	DI2	Digital input 2	18	AI2	Analog input terminal 2	32	PA+	Command pulse input A+
3	DI3	Digital input 3	19	OCP	Command pulse input 1(optional)	33	PB-	Command pulse input B-
4	DI4	Digital input 4	20	AI3	Analog input terminal 3	34	PB+	Command pulse input B+
5	DI5	Digital input 5	21	AO1	Analog output terminal 1	35	PZ-	Command pulse input Z-
6	DI6	Digital input 6	22	AO2	Analog output terminal 2	36	PZ+	Command pulse input Z+
7	DI10	Digital input 10	23	+10V	10V power	37	OA+	Phase A frequency dividing output +
8	COM	24V power ground	24	DI7	Digital input 7	38	OA-	Phase A frequency dividing output -
9	FM	High speed pulse/ Digital output	25	GND	Analog power ground	39	OB+	Phase B frequency dividing output +
10	DO1	Digital output 1	26	DO4	Digital output 4	40	OB-	Phase B frequency dividing output -
11	DO2	Digital output 2	27	COM	24V power ground	41	OZ+	Phase Z frequency dividing output +
12	DO3	Digital output 3	28	OCS	Command pulse input 2 (optional)	42	OZ-	Phase Z frequency dividing output -
13	CME	Digital output common terminal	29	+5V	Eternal encoder 5V power (reserved)	43	OA	Phase A open collector output
14	24V	24V power	30	OZ	Phase Z open collector output	44	OB	Phase B open collector output
15	OP	External power input terminal						

(3) Function of control terminals:

| Category	Terminal symbol	Terminal name	Description
Power	+10V-GND	External +10V power	Provide +10V power supply outside; maximum output current: 10mA Generally used as power supply for external potentiometer; potentiometer resistance range: 1kΩ ~ 5kΩ
	+24V-COM	External +24V power	Provide +24V power supply outside, generally used as the power supply for digital input/output terminals and external sensor Maximum output current: 200mA
	OP	External power input terminal	If DI is driven by external signals, OP needs to be connected with external power supply. If DI is driven by internal power supply, OP needs to be shorted internally with 24V
Analog input	AI1-GND	Analog input terminal 1	1. Input voltage range: DC 0V ~ 10V 2. Input impedance: 22kΩ
	AI2-GND	Analog input terminal 2	1. Input voltage range: DC -10V ~ +10V 2. Input impedance: 22KΩ
Digital input	DI1- OP	Digital input 1	1. Photo-coupler isolation, compatible with bipolar input 2. Input impedance: 2.4kΩ 3. Level input voltage range: 9V ~ 30V
	DI2- OP	Digital input 2	
	DI3- OP	Digital input 3	
	DI4- OP	Digital input 4	
	DI6- OP	Digital input 6	
	DI7- OP	Digital input 7	
	DI10- OP	Digital input 10	
	DI5- OP	High speed pulse input terminal	In addition to other DI features, it also can be used as high-speed pulse input channel. Maximum input frequency: 50kHz
Analog output	AO1-GND	Analog output 1	Output voltage range: 0V ~ 10V
	AO2-GND	Analog output 2	
Digital output	DO1-CME	Digital output 1	Photo-coupler isolation, open collector output Output voltage range: 0V ~ 24V Output current range: 0mA ~ 50mA Note: The digital output ground CME is internally isolated from the digital input ground COM
	DO2-CME	Digital output 2	
	DO3-CME	Digital output 3	
	DO4-CME	Digital output 4	
	FM- CME	High speed pulse output	Restricted by function code Pn8.00 "FM terminal output mode selection" As high-speed pulse output, the maximum frequency is 50kHz; As open-collector output, same as DO1 specification.

Category	Terminal symbol	Terminal name	Description
Command pulse input	OCP	Command pulse input 1 (optional)	Input command pulse interface; the maximum collector input frequency is 200KHz, the maximum differential input is 500KHz
	PA+	Command pulse input A+	
	PA-	Command pulse input A-	
	OCS	Command pulse input 2 (optional)	
	PB+	Command pulse input B+	
	PB-	Command pulse input B-	
	PZ+	Command pulse input Z+	
	PZ-	Command pulse input Z-	
Encoder frequency dividing output	OA+	Encoder phase A frequency dividing differential output	Encoder signal when output is divided, phase A pulse and phase B pulse meeting TIA/EIA-422-B standard are still orthogonal

Output signal is not isolated |
	OA-		
	OB+	Encoder phase B frequency dividing differential output	
	OB-		
	OZ+	Encoder phase Z frequency dividing differential output	
	OZ-		
	OA	Encoder phase A collector output	
	OB	Encoder phase B collector output	
	OZ	Encoder phase Z collector output	

**2 4** Encoder Interface Connection and Signal Definition (CN2 Plug)

2.4.1 Overview
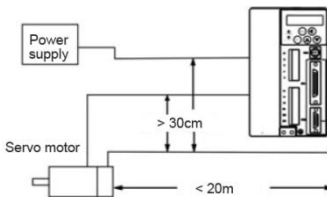
・ The distance between servo motor and servo drive should not exceed 20m.

・ Keep the encoder line at least 30cm from the motor and power lines; do not put them in the same pipe or bind them together.
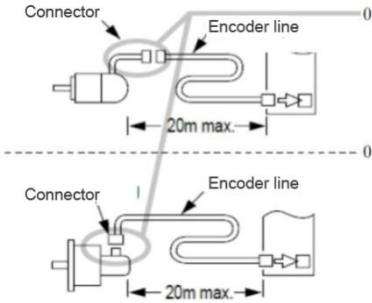
・The type of encoder plug is divided into aviation plug and cannon plug according to the motor type.

・If you want to make your own encoder line, select a shielded cable with good flexural strength and a core diameter at least $0.18mm^2$ (AWG24). Please refer to the figure below for correct connection.

2.4.2 Servo drive CN2 pinout and signal definition
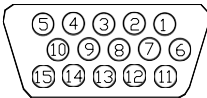
CN2Pinout

5	4	3	2	1
5V	A−	A+	W+	V+

10	9	8	7	6
B+	B−	W−	V−	U+

15	14	13	12	11
None	Z+	Z−	GND	U−

3 Communication Port Signal Wiring (CN3 Plug)

Servo drive provides CAN and RS485 communication ports, which are led through CN3 socket.

CN3 pinout and signal definition:

(6) RS485-   (5) RS485+

(4) CANL   (3) Reserved

(2) CANH   (1) GND
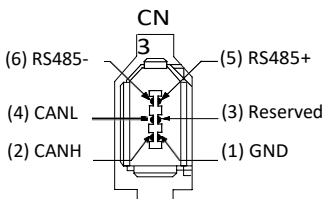
Pin No	Signal name	Terminal mark	Function & Description
1	Signal ground	GND	+5V and signal ground
2	CANH data transfer	CANH	CAN data + terminal
3	-	-	Reserved
4	CANL data reception	CANL	CAN data - terminal
5	RS-485 data transfer	RS-485(+)	Drive data transfers to differential + terminal
6	RS-485data transfer	RS-485(-)	Driver side data transfer differential - terminal

Chapter III Operation and Display

3.1 Introduction to Operation and Display Interface

With the operation panel, you can modify the function parameters of the servo drive and monitor the drive status. The appearance and function area are shown below:
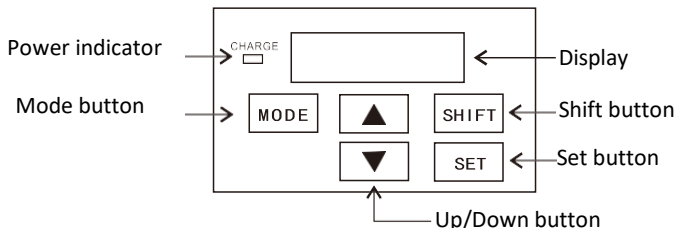
Digital display area:

5-bit LED display shows the set frequency, output frequency, various monitoring data and alarm code, etc.

Button description:

Button	Name	Function
MODE	Program button	Enter or exit level-1 menu
SET	Confirm button	Enter the menu screen step by step, confirm set parameters
△	Up button	Increase data or function code, start button of motor parameter self-learning
▽	Down button	Decrease data or function code, stop button of motor parameter self-learning
SHIFT	Shift button	Display parameters in cycle in the stop interface and running interface; select the parameter to be modified

3.2 Method of Viewing and Modifying Function Codes

The operation panel of MSD200A servo drive adopts three-level menu structure for parameter setting and other operations.

The three menu levels are: Function parameter group (level 1) → function code (level 2) → function code settings (level 3). The operation flow is shown below.
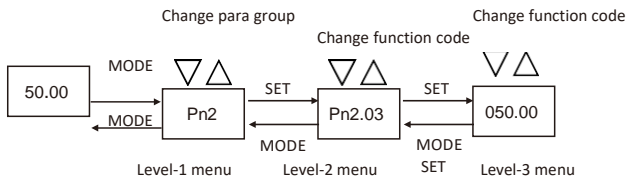
Note: In level-3 menu, you can press the MODE or SET button to return to level-2. The difference is that you can save the settings, return to level-2 menu and switch to next function code automatically by pressing the SET button; if you press the MODE button, it will return to level-2 menu directly without saving and return to the current function code.

Example: Changing function code Pn2.03 from 10.00Hz to 15.00Hz (bold letters indicate flashing digits)

```
                    MODE              △              SET              △
  ┌───────┐      ┌───────┐      ┌───────┐      ┌────────┐      ┌────────┐
  │ 50.00 │─────▶│  Pn0  │─────▶│  Pn2  │─────▶│ Pn2.00 │─────▶│ Pn2.03 │
  └───────┘      └───────┘      └───────┘      └────────┘      └────────┘
      ▲                                                             │
  MODE│                                                          SET│
      │                                                             ▼
  ┌───────┐ MODE ┌────────┐ SET ┌────────┐   △   ┌────────┐ SHIFT ┌────────┐
  │  Pn2  │◀─────│ Pn2.04 │◀────│ 015.00 │◀──────│ 010.00 │◀──────│ 010.00 │
  └───────┘      └────────┘     └────────┘       └────────┘       └────────┘
```
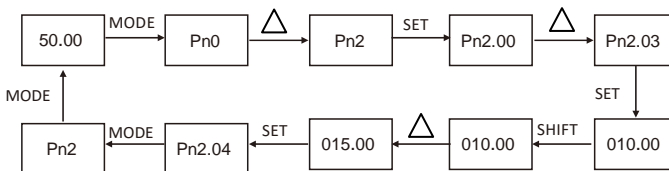
In level-3 menu, if the parameter doesn't have a flashing digit, this function code can't be modified. The possible reasons are as follows:

(1)This function code can't be modified, such as actual test parameters and running record parameters.

(2)This function code can't be modified in running status, but can be modified when the machine is stopped.

3.3 Viewing Status Parameters

In stop or running status, various status parameters can be displayed separately by pressing the SHIFT button. Whether the parameter is displayed is determined by binary bit of function code Pn0.09 (running parameter 1), Pn0.10 (running parameter 2), and Pn0.11 (stop parameter).

In stop status, 16 stop status parameters are available, including: set frequency, bus voltage, DI input status, DO output status, analog input AI1 voltage, analog input AI2 voltage, analog input AI3 Voltage, actual count value, actual length value, PLC running steps, load speed display, PID setting, PULSE input pulse frequency and 3 reserved parameters; you can press the button to switch the selected parameters in sequence.

In running status, five running status parameters (running frequency, set frequency, bus voltage, output voltage and output current) are displayed by default. Other parameters: output power, output torque, DI input status, DO output status, analog input AI1 voltage, analog input AI2 voltage, analog input AI3 voltage, actual count value, actual length value, line speed, PID setting and PID feedback, are determined by function code Pn0.09 and Pn0.10 (converted to binary) to display or not; you can press the button to switch the selected parameters in sequence.

When the drive is turned off and then turned on again, the displayed parameters are those selected before power-off by default.

3.4 Password Settings

The drive integrates password protection. When Pn0.27 is set as non-zero, it is the user password, and the password protection is enabled when you exit the function code editing status. When you press MODE again, it shows ".....". You must enter the correct password to enter the menu.

To cancel the password protection, enter the password and set Pn0.27 to 0.

3.5 Motor Parameters Self-learning

Vector control requires self-learning of motor parameters for optimal control. During self-learning, make sure that the motor is under no load or light load.

Self-learning steps are as follows:

● Modify Fn4.62 frequency command resolution, Pn2.05 maximum frequency and Pn2.07 Upper limit frequency according to the specific maximum frequency (if the maximum frequency of operation is lower than 320Hz, the above parameters do not need modification).

● Set acceleration/deceleration time Pn2.10, Pn2.11
● Set motor parameters (Fn2.00 ~ Fn2.05)
● Set encoder parameters (Pn6 group)
● Set Pn0.00 to 1000, current vector control
● Set Fn2.37 (set to 1 static self-learning or 2 rotary self-learning), and press the button when the keyboard displays TUNE (press the button to stop self-learning)

● Waiting for self-learning to finish

The motor runs at high-speed during tuning. Please tune the motor in no-load condition. Tuning with load will affect the accuracy of motor parameters and affect the system control effect.

If the drive alarms "Err19 (motor tuning fault)" during tuning, the motor function parameters are incorrect. Please check the motor-related function parameters and the lead from servo drive to the motor.

If the drive alarms "Err20 (encoder failure)" during tuning, the encoder feedback signal is incorrect. Please check the encoder-related function parameters and signal wiring and manually rotate the motor shaft to check if "dn0.52 (current location)" is displayed normally.

3.6 Motor Test Run

The software forces the servo to run when Fn0.00 is set to 1

The drive enters JOG mode when Fn0.01 is set to 1. Then, you can press the △ button to jog forward and press ▽ to jog reversely.

When the motor has been identified, you can test the drive and motor in speed mode and check if the motor operation is normal at high speed and low speed and if the motor has vibration and large noise. If the simple trial run is successful, connect it to host computer, and control the drive and motor running through the host computer.

Set the running frequency (Pn2.03), run with the operation panel to let the motor run at different speed segments, and monitor whether the output current is normal and whether the motor runs smoothly.

Chapter IV Troubleshooting

If the system of MSD200A Spindle Servo Drive has any fault during operation, the spindle servo drive will immediately protect the motor to stop output and the fault relay contact will operate. The panel of the spindle servo drive will display the fault code, and the corresponding fault type and common solutions are shown in the table below. The table is for reference only, please do not carry out maintenance or alternation without authorization. If the problem can't be solved, please contact our company or agent for technical support.

Fault	Display on operation panel	Cause	Measures
Inverter unit protection	Err01	1. Spindle servo drive output circuit is short-circuited 2. The wire of motor and spindle servo drive is too long 3. Module is overheating 4. Internal wiring of spindle servo drive is loose 5. Main control board is abnormal 6. Drive board is abnormal 7. Inverter module is abnormal	1. Exclude peripheral problems 2. Install reactor or output filter 3. Check if the air duct is clogged and if the fan is working properly and exclude the problems 4. Plug in all the cables properly 5. Seek technical support 6. Seek technical support 7. Seek technical support
Acceleration overcurrent	Err02	1. Output circuit of spindle servo drive is grounded or short-circuited 2. The control mode is vector and no parameter tuning is ongoing 3. Acceleration time is too short 4. Manual torque boost or V/F curve is not suitable 5. Voltage is too low 6. The motor being started is spinning 7. Sudden load in the acceleration process 8. Spindle servo drive is too small	1. Exclude peripheral problems 2. Perform motor parameter tuning 3. Increase the acceleration time 4. Adjust manual boost torque or V/F curve 5. Adjust the voltage to normal range 6. Select speed tracking start or wait for the motor to stop before starting 7. Cancel the sudden load 8. Use spindle servo drive of higher power level
Deceleration overcurrent	Err03	1. Output circuit of spindle servo drive is grounded or short-circuited 2. The control mode is vector and no parameter tuning 3. Deceleration time is too short 4. Voltage is too low 5. Sudden load in the acceleration process 6. No brake unit and brake resistor installed	1. Exclude peripheral problems 2. Perform motor parameter tuning 3. Increase the deceleration time 4. Adjust the voltage to normal range 5. Cancel the sudden load 6. Install brake unit and resistor
Constant speed overcurrent	Err04	1. Output circuit of spindle servo drive is grounded or short-circuited 2. The control mode is vector and no parameter tuning is ongoing 3. Voltage is too low 4. Sudden load in the acceleration process 5. Spindle servo drive is too small	1. Exclude peripheral problems 2. Perform motor parameter tuning 3. Adjust the voltage to normal range 4. Cancel the sudden load 5. Use spindle servo drive of higher power level
Acceleration overvoltage	Err05	1. Input voltage is too high 2. The motor is dragged by external force during acceleration 3. Acceleration time is too short 4. No brake unit and brake resistor installed	1. Adjust the voltage to normal range 2. Cancel the external force or install braking resistor 3. Increase the acceleration time 4. Install brake unit and resistor

Fault	Display on operation panel	Cause	Measures
Deceleration overvoltage	Err06	1. Input voltage is too high 2. The motor is dragged by external force during deceleration 3. Deceleration time is too short 4. No brake unit and brake resistor installed	1. Adjust the voltage to normal range 2. Cancel the external force or install braking resistor 3. Increase the deceleration time 4. Install brake unit and resistor
Constant speed overvoltage	Err07	1. Input voltage is too high 2. The motor is dragged by external force during running	1. Adjust the voltage to normal range 2. Cancel the external force or install braking resistor
Control power fault	Err08	1. The input voltage isn't within standard range	1. Adjust the voltage to required range
Undervoltage fault	Err09	1. Instantaneous power failure 2. The input voltage of spindle servo drive is not within the required specifications 3. Bus voltage is abnormal 4. Rectifier bridge and buffer resistor are abnormal 5. Drive board is abnormal 6. Control board is abnormal	1. Reset the fault 2. Adjust the voltage to normal range 3. Seek technical support 4. Seek technical support 5. Seek technical support 6. Seek technical support
Spindle servo drive overload	Err10	1. The load is too large or a motor stall occurred 2. Spindle servo drive is too small	1. Reduce the load and check the motor and mechanical conditions 2. Use spindle servo drive of higher power level
Motor overload	Err11	1. Check if motor protection parameter PnC.01 is set appropriately 2. The load is too large or a motor stall occurred 3. Spindle servo drive is too small	1. Set this parameter correctly 2. Reduce the load and check the motor and mechanical conditions 3. Use spindle servo drive of higher power level
Input phase loss	Err12	1. Three-phase input power is abnormal 2. Drive board is abnormal 3. Lightning protection board is abnormal 4. Main control board is abnormal	1. Check and exclude problems in the peripheral circuit 2. Seek technical support 3. Seek technical support 4. Seek technical support
Output phase loss	Err13	1. The wire from spindle servo drive to the motor is abnormal 2. Three-phase output of the spindle servo drive is unbalanced when the motor is running 3. Drive board is abnormal 4. Module exception	1. Exclude peripheral problems 2. Check the three-phase winding of the motor and exclude problems 3. Seek technical support 4. Seek technical support
Module overheating	Err14	1. Ambient temperature is too high 2. Air duct is blocked 3. Fan is damaged 4. Module thermistor is damaged 5. Inverter module is damaged	1. Reduce the ambient temperature 2. Clean the air duct 3. Replace the fan 4. Replace the thermistor 5. Replace the inverter module
External device fault	Err15	1. External fault signal input via multi-function terminal DI 2. External fault signal input via virtual IO function	1. Reset operation 2. Reset operation
Communication failure	Err16	1. Host computer is not working properly 2. Communication line is abnormal 3. Communication expansion card PnA.00 isn't set correctly 3. Communication parameter PnA group isn't set correctly	1. Check the host computer wiring 2. Check the communication line 3. Correctly set the communication expansion card 4. Set the communication parameters correctly

Fault	Display on operation panel	Cause	Measures
Contactor fault	Err17	1. Drive board and power supply are abnormal 2. The contactor is abnormal	1. Replace the drive board or power board 2. Replace the contactor
Current detection fault	Err18	1. Check if Hall element is normal 2. Drive board is abnormal	1. Replace the Hall element 2. Replace the drive board
Motor tuning fault	Err19	1. Motor parameters are not set according to the nameplate 2. Parameter tuning process timed out	1. Set the motor parameters correctly according to the nameplate 2. Check the wire from spindle servo drive to the motor
Encoder fault	Err20	1. Encoder model does not match 2. Encoder connection error 3. Encoder is damaged 4. PG card is abnormal	1. Set the encoder type correctly according to the actual situation 2. Exclude the line fault 3. Replace the encoder 4. Replace the PG card
EEPROM reading/writing fault	Err21	1. EEPROM chip is damaged	1. Replace the main control board
Spindle servo drive hardware fault	Err22	1. Overvoltage 2. Overcurrent	1. Exclude overvoltage fault 2. Exclude overcurrent fault
Short circuit to ground fault	Err23	1. Motor is shorted to ground	1. Replace the cable or motor
Cumulative run-time arrival fault	Err26	1. Accumulated running time reaches the set value	1. Use the parameter initialization function to clear the log information
User defined fault 1	Err27	1. User-defined fault 1 signal input via multi-function terminal DI 2. User-defined fault 1 signal input via virtual IO function	1. Reset operation 2. Reset operation
User defined fault 2	Err28	1. User-defined fault 2 signal input via multi-function terminal DI 2. User-defined fault 2 signal input via virtual IO function	1. Reset operation 2. Reset operation
Accumulated power-on time arrival fault	Err29	1. Accumulated power-on time reaches the set value	1. Use the parameter initialization function to clear the log information
Current limit fault	Err40	1. The load is too large or a motor stall occurred 2. Spindle servo drive is too small	1. Reduce the load and check the motor and mechanical conditions 2. Use spindle servo drive of higher power level
Excessive speed deviation fault	Err42	1. Encoder parameter setting is not correct 2. No parameter tuning 3. Settings of excessive speed deviation detection parameters PnC.36 and PnC.37 are unreasonable	1. Set the encoder parameters correctly 2. Perform motor parameter tuning 3. Set the testing parameters correctly according to the actual situation

Fault	Display on operation panel	Cause	Measures
Motor over speed fault	Err43	1. Encoder parameter setting is not correct 2. No parameter tuning 3. Settings of motor overspeed detection parameters PnC.34 and PnC.35 are unreasonable	1. Set the encoder parameters correctly 2. Perform motor parameter tuning 3. Set the testing parameters correctly according to the actual situation
Homing missing	Err54	1. Index positioning home signal is abnormal 2. The setting of PnE.23 home judgment deviation pulse is too small 3. DI as home and home search frequency is set too high 4. DI as home and spindle drive ratio setting is not reasonable 5. Home signal is disturbed	1. Check the home signal wiring 2. Reset the appropriate PnE.23 value 3. Set the appropriate home search frequency 4. Set the correct spindle gear ratio 5. Ground motor and drive properly
Excessive pulse deviation	Err55	1. Follow-up deviation during pulse position synchronization is too large 2. Electronic gear ratio for pulse position synchronization is unreasonable	1. Increase the acceleration of pulse given frequency 2. Correct the proportional gain setting of pulse position synchronization 3. Set the correct electronic gear ratio
Excessive positioning control pulse deviation	Err56	Follow-up deviation during positioning control is too large	Correct positioning control proportional gain

Chapter V Parameter List

"☆": The set value of this parameter can be changed while the spindle servo drive is in stop or running state.

"★": The set value of this parameter can't be changed while the spindle servo drive is in running state.

"●": The value of this parameter is actual test value and can't be changed;

"*": The parameter is "vendor parameter" and is only set by the manufacturer;

Function code	Name	Setting range	Minimum unit	Default	Change
		Pn0 System Management Parameter Group			
Pn0.00	Function selection application switch 0	Ones place: Rotation direction selection (speed control effective) 0: CCW direction is the forward direction 1: CW direction is the forward direction 2~3: Reserved Tens place: Control mode selection 0: Speed control mode 1: Torque control mode 2~6: Reserved Hundreds place: Running command selection 0: Operation panel command channel 1: Terminal command channel	1	1000	★
		2: Serial port communication command channel Thousands place: Servo control mode 0: Voltage vector control 1: Current vector control 2: V/F control			
Pn0.01	Servo current control mode	0: Voltage SVPWM 1: Current SPWM	1	1	★
Pn0.03	Carrier frequency	0.5kHz~16.0kHz	0.01kHz	Depending on model	☆
Pn0.04	Motor selection	0: Motor 1 1: Motor 2	1	0	☆
Pn0.09	LED running display parameter 1	Ones place: Running monitoring 0 1: Running speed 2: Set speed 4: Bus voltage (V) 8: Output voltage (V) Tens place: Running monitoring 1 1: Output current (A) 2: Output power (kW) 4: Output torque (%) 8: DI input status Hundreds place: Running monitoring 2 1: DO output status 2: AI1 voltage (V) 4: AI2 voltage (V) 8: AI3 voltage (V) Thousands place: Running monitoring 4 1: Count value 2: Length value 4: Motor speed (r/min) 8: PID setting	1111	17	☆

Function code	Name	Setting range	Minimum unit	Default	Change
Pn0.10	LED running display parameter 2	Ones place: Running monitoring 5 1: PID feedback 2: PLC stage 4: Feedback speed, unit 0.01KHz 8: Feedback speed Tens place: Running monitoring 6 1: Remaining runtime 2: AI1 voltage before calibration 4: AI2 voltage before calibration 8: AI3 voltage before calibration Hundreds place: Running monitoring 7 1: Line speed 2: Current power-on time 4: Current running time 8: PULSE input pulse speed, unit 1Hz Thousands place: Running monitoring 8 1: Communication setting value 2: Encoder feedback speed 4: Main speed X display 8: Auxiliary speed Y display	1111	0	☆
Pn0.11	LED stop display parameters	Ones place: Downtime monitoring 0 1: Set speed (Hz) 2: Bus voltage (V) 4: DI input status 8: DO output status Tens place: Downtime monitoring 1 1: AI1 voltage (V) 2: AI2 voltage (V) 4: AI3 voltage (V) 8: Count value Hundreds place: Downtime monitoring 2 1: Length value 2: PLC stage 4: Load speed display 8: PID setting Thousands place: Downtime monitoring 3 1: PULSE input pulse speed, unit0.01kHz 2: Reserved 4: Reserved	1111	03	☆
		8: Reserved			
Pn0.13	Servo drive temperature	0.0℃ ~ 100℃	0.1℃		●
Pn0.17	DSP software version	-			●
Pn0.19	Accumulated power-on time	0h ~ 65535h	1h		●
Pn0.20	Accumulated power consumption	0° ~ 65535°	1°		●
Pn0.23	Function code read-only control	0: Function code read-only invalid 1: Function code read-only valid	1	0	☆
Pn0.25	Fault record display times	0 ~ 15 0: Last fault 1: One fault before last fault 2: Two faults before last fault 3: Three faults before last fault	15	5	☆
Pn0.26	Parameter initialization	0: No operation 01: Restore default parameters 02: Clear record information 03: Restore default parameters, including motor parameters	1	0	★

Function code	Name	Setting range	Minimum unit	Default	Change
Pn0.27	User password	0~65535	1	0	☆
Pn0.28	UF group password	0~65535	1	0	☆
Pn1 Torque Control Parameter Group					
Pn1.00	Drive torque upper limit source	0: Digital setting 1 (Pn1.03) The following ranges correspond to the upper torque limit (Pn1.03) 1: AI1 2: AI2 3: AI3 4: PULSE setting 5: Communication given 6: MIN (AI1, AI2) 7: MAX (AI1, AI2) Full range of option 1-7 corresponds to Pn1.03	1	0	★
Pn1.01	Reserved				
Pn1.02	Reserved				
Pn1.03	Driving torque upper limit digital setting	-200.0% ~ 200.0%	0.1%	150.0%	☆
Pn1.04	Reserved				
Pn1.05	Forward maximum frequency for torque control	0.00Hz ~ Maximum frequency	0.01Hz	50.00Hz	☆
Pn1.06	Reverse maximum frequency for torque control	0.00Hz ~ Maximum frequency	0.01Hz	50.00Hz	☆
Pn1.07	Torque control acceleration time	0.00s ~ 650.00s	0.01s	0.00s	☆
Pn1.08	Torque control deceleration time	0.00s ~ 650.00s	0.01s	0.00s	☆
Pn2 Speed Control Parameter Group					
Pn2.00	Speed control application switch 0	Ones place, Tens place: Source of main speed command A 0: Digital setting 1 (no power failure memory) 1: Digital setting 2 (power failure memory) 2: AI1 3: AI2 4: AI3 5: PULSE setting (DI5) 6: Multi-speed command 7: Simple PLC 8: PID 9: Communication given A: Pulse synchronization B~F: Reserved Hundreds place: Choice of upper limit speed source 0: Digital setting (Pn2.07) 1: AI1 2: AI2 3: AI3 4: PULSE setting (DI5) 5: Communication given Thousands place: Reserved	1	0	★

Function code	Name	Setting range	Minimum unit	Default	Change
Pn2.01	Speed control application switch 1	Ones place, Tens place: Source of auxiliary speed command B 0: Digital setting 1 (no power failure memory) 1: Digital setting 2 (power failure memory) 2: AI1 3: AI2 4: AI3 5: PULSE setting (DI5) 6: Multi-speed command 7: Simple PLC 8: PID 9: Communication given A: Pulse synchronization B~F: Reserved Hundreds place: Source of speed control (drive) torque upper limit 0: Function code Pn2.13 setting 1: AI1 2: AI2 3: AI3 4: PULSE setting (DI5) 5: Communication given 6: MIN (AI1, AI2) 7: MAX (AI1, AI2) Thousands place: Reserved	1	0	★
Pn2.02	Speed control application switch 2	Ones place, Tens place: Choice of speed source 0: Main speed A 1: Result of main and auxiliary operation (the operation relation is determined by tens place) 2: Switch between main speed A and auxiliary speed B 3: Switch between main speed A and result of main and auxiliary operation 4: Switch between auxiliary speed B and result of main and auxiliary operation 5 ~ 14: Reserved Hundreds place: Speed source main and auxiliary operation relationship 0: Main + auxiliary 1: Main - auxiliary 2: Bigger of the two 3: Smaller of the two Thousands place: Reserved	11	00	☆
Pn2.03	Internal speed command	0.00Hz ~ Maximum speed Pn2.25	0.01Hz	50.00Hz	☆
Pn2.05	Maximum speed	50.00Hz ~ 300.00Hz (3000.0Hz)	0.01Hz	50.00Hz	★
Pn2.07	Upper limit speed	Lower limit speed Pn2.09 ~ Maximum speed Pn2.05	0.01Hz	50.00Hz	☆
Pn2.08	Upper limit speed bias	0.00Hz ~ Maximum speed Pn2.05	0.01Hz	0.00Hz	☆
Pn2.09	Lower limit speed	0.00Hz ~ Upper limit speed Pn2.07	0.01Hz	0.00Hz	☆
Pn2.10	Acceleration time 1	0.00s ~ 65000s	0.01s	Depending on model	☆
Pn2.11	Deceleration time 1	0.00s ~ 65000s	0.01s	Depending on model	☆
Pn2.13	Digital setting of speed control (drive) torque upper limit	0.0% ~ 200.0%	0.1%	150.0%	☆
Pn2.15	Digital setting of speed control (braking) torque upper limit	0.0%~ 200.0%	0.1%	150.0%	☆
Pn2.16	Jog speed	0.00Hz ~ Maximum speed	0.01Hz	2.00Hz	☆
Pn2.17	Jog acceleration time	0.0s ~ 6500.0s	0.1s	20.0s	☆
Pn2.18	Jog deceleration time	0.0s ~ 6500.0s	0.1s	20.0s	☆

Function code	Name	Setting range	Minimum unit	Default	Change
		Pn3 Pulse Synchronization Parameter Group			
Pn3.00	Pulse synchronization mode	0: Speed synchronization 1: Position synchronization	1	0	★
Pn3.01	Pulse mode selection	0: Pulse + direction 1: Two orthogonal pulses	1	1	★
Pn3.02	Orthogonal pulse AB phase sequence	0: Forward 1: Reverse	1	0	★
Pn3.03	Acceleration time (position synchronization)	0.0 ~ 6500.0s	0.1s	0.0s	☆
Pn3.04	Deceleration time (position synchronization)	0.0 ~ 6500.0s	0.1s	0.0s	☆
Pn3.05	Feedforward gain (position synchronization)	0.00 ~ 2.00	0.01	1.00	★
Pn3.06	Proportional gain 1 (position synchronization)	0.00 ~ 100.00	0.01	1.50	☆
Pn3.07	Numerator of electronic gear ratio	1 ~ 30000	1	1	☆
Pn3.08	Denominator of electronic gear ratio	1 ~ 30000	1	1	☆
Pn3.09	Pulse frequency filter time	0.00 ~ 10.00s	0.01s	0	☆
Pn3.10	Reserved				
Pn3.11	Proportional gain switching choice (position synchronization)	0: Do not switch 1: Switch automatically according to the deviation	1	1	☆
Pn3.12	Proportional gain 2 (position synchronization)	0.00 ~ 100.00	0.01	15.00	☆
Pn3.13	Proportional gain switching position deviation level 1 (position synchronization)	0 ~ 30000	1	5	☆
Pn3.14	Proportional gain switching position deviation level 2 (position synchronization)	0 ~ 30000	1	50	☆
Pn3.15	Acceleration compensation gain	0.00 ~ 10.00	0.01	0.00	☆
Pn3.16	Maximum pulse deviation	0 ~ 10000	1	500	☆
Pn3.17	Reserved				
Pn3.18	Deviation limit	0 ~ 1000	1	0	☆
Pn3.19	Reserved				
Pn3.20	Reserved				
Pn3.21	Detection value of excessive pulse deviation	0 ~ 2000	1	600	☆
Pn3.22	Detection time of excessive pulse deviation	0.00 ~ 10.00s	0.01s	1.00s	☆
		Pn4 Gain Parameter Group			
Pn4.00	Speed loop proportional gain 1	1 ~ 100	1	30	☆
Pn4.01	Speed loop integral time 1	0.01s ~ 10.00s	0.01s	0.50s	☆
Pn4.02	Switching speed 1	0.00 ~ Pn4.05	0.01Hz	5.00Hz	☆
Pn4.03	Speed loop proportional gain 2	1 ~ 100	1	20	☆
Pn4.04	Speed loop integral time 2	0.01s ~ 10.00s	0.01s	1.00s	☆
Pn4.05	Switching speed 2	Pn4.02 ~ Maximum speed	0.01Hz	10.00Hz	☆
Pn4.06	Slip compensation factor	50% ~ 200%	1%	100%	☆
Pn4.07	Speed loop filter time constant	0.000s ~ 1.000s	0.001s	0.016s	☆
Pn4.08	Vector control over excitation gain	0~200	1	64	☆
Pn4.13	M-axis current loop proportional gain	0~20000	1	2000	☆

Function code	Name	Setting range	Minimum unit	Default	Change
Pn4.14	M-axis current loop integral gain	0 ~ 20000	1	1300	☆
Pn4.15	T-axis current loop proportional gain	0 ~ 20000	1	2000	☆
Pn4.16	T-axis current loop integral gain	0 ~ 20000	1	1300	☆
Pn4.17	Speed loop integral property	Ones place: Integral separation 0: Invalid 1: Valid	1	0	☆
Pn5 Current SPWM Gain Parameter Group					
Pn5.00	Speed loop proportional gain P	10 ~ 120	1	80	☆
Pn5.01	Speed loop integral gain limiter I	10 ~ 150s	1%	100	☆
Pn5.02	Frequency point of acceleration and deceleration integral time constant change	1.00 ~ 100.00	0.01Hz	40.00Hz	☆
Pn5.03	Deceleration integral time constant	0.001s ~ 2.000s	0.001s	0.100	☆
Pn5.04	Acceleration integral time constant	0.001s ~ 2.000s	0.001s	0.080	☆
Pn5.05	Frequency point of steady speed integral time constant change	1.00 ~ 100.00	0.01Hz	50.00Hz	☆
Pn5.06	Constant speed integral time constant compensation factor	0.010s ~ 2.000s	0.001	0.050	☆
Pn5.07	Speed loop integral time constant offset value	0.010s ~ 2.000s	0.001s	0.030s	☆
Pn5.08	S-curve time constant when velocity loop integral time constant is changed	0.010s ~ 2.000s	0.001s	0.020s	☆
Pn5.09	K2 gain	1 ~ 500	1	450	☆
Pn5.10	Zero speed current gain	5 ~ 100	1	20	☆
Pn5.11	Zero speed current limit	5 ~ 150	1	60	☆
Pn5.12	Current gain transform frequency point	0.01 ~ 200.00	0.01	50.00	☆
Pn5.13	Torque limit value	100 ~ 1000	1	800	☆
Pn5.14	Motor base frequency point slip frequency	0.10 ~ 30.00	0.01	4.00	
Pn5.15	Maximum slip at zero motor speed	10 ~ 100	1	80	
Pn5.16	Maximum slip percentage above the base frequency of motor	10 ~ 150	1	100	
Pn5.17	Motor high speed slip compensation calculation factor	1.00 ~ 100.00	0.01	50.00	
Pn5.18	Maximum slip upper limit of motor base frequency	0.10 ~ 60.00	0.01	15.00	
Pn6 Encoder Parameter Group					
Pn6.00	Number of encoder pulses	1 ~ 65535	1	2500	★
Pn6.01	Servo encoder type	0: ABZ incremental encoder 1: UVW incremental encoder 2: Resolver 3: Sinusoidal encoder 4: Wire saving UVW encoder 5: Tamagawa serial bus encoder 6: Tamagawa absolute encoder	1	0	★
Pn6.02	Speed feedback PG selection	0: Local PG 1: Extended PG 2: PULSE input (DI5)	1	0	★

Function code	Name	Setting range	Minimum unit	Default	Change
Pn6.03	Encoder phase sequence / main direction	0: Forward 1: Reverse	1	0	★
Pn6.04	Encoder installation position angle	0.0 ~ 359.9°	0.1°	0.0°	★
Pn6.05	UVW signal direction	0: Forward 1: Reverse	1	0	★
Pn6.06	UVW signal home position angle	0.0 ~ 359.9°	0.1°	0.0°	★
Pn6.07	Number of spinning pole pairs	1 ~ 65535	1	1	★
Pn6.08	Number of UVW pole pairs	1 ~ 65535	1	4	★
Pn6.09	Speed feedback PG disconnection detection time	0.0: No action 0.1s ~ 10.0s	0.1	0.0	★
Pn6.10	Numerator of motor gear ratio	1 ~ 65535	1	1	★
Pn6.11	Denominator of motor gear ratio	1 ~ 65535	1	1	★
Pn7 Terminal Input Parameter Group					
Pn7.00	DI1 terminal function selection	0: No function 1: Forward running (FWD)	1	1	★
Pn7.01	DI2 terminal function selection	2: Reverse running (REV) 3: Three-wire running control	1	2	★
Pn7.02	DI3 terminal function selection	4: Forward jog (FJOG) 5: Reverse jog (RJOG)	1	52	★
Pn7.03	DI4 terminal function selection	6: Terminal UP 7: Terminal DOWN	1	55	★
Pn7.04	DI5 terminal function selection	8: Free stop 9: Fault reset (RESET)	1	51	★
Pn7.05	DI6 terminal function selection	10: Running pause 11: External fault normally open input	1	9	★
Pn7.06	DI7 terminal function selection	12: Multi-command terminal 1 13: Multi-command terminal 2	1	0	★
Pn7.07	Reserved	14: multi-command terminal 3 15: Multi-command terminal 4	1	0	★
Pn7.08	Reserved	16: Acceleration / deceleration selection terminal 1 17: Acceleration / deceleration selection terminal 2 18: Speed source switch	1	0	★
Pn7.09	DI10 terminal function selection	19: UP / DOWN setting reset (terminal & keyboard) 20: Running command switch terminal 21: Acceleration / deceleration disabled 22: PID pause 23: PLC status reset 24: Swing frequency pause 25: Register input 26: Counter reset 27: Length count input 28: Length reset 29: Torque control disabled 30: PULSE speed input (valid only for DI5) 31: Reserved 32: Immediate DC braking 33: External fault normally closed input 34: Speed setting effective terminal 35: PID action reversal terminal 36: When external stop terminal 1 is controlled with keypad, this terminal can be used to stop, equivalent to STOP button on the keyboard. 37: Control command switch terminal 2 38: PID integral pause terminal 39: Speed source X and preset speed switch terminal 40: Speed source Y and preset speed switch terminal 41: Motor selection terminal 1	1	0	★

Function code	Name	Setting range	Minimum unit	Default	Change
Pn7.09	DI10 terminal function selection	42: Motor selection terminal 2 43: PID parameter switch terminal 44: User defined fault 1 45: User defined fault 2 46: Clear running time 47: Emergency stop 48: External stop terminal 2 49: Deceleration DC braking 50: Speed control/torque control switch 51: Analog command gain switching 52: Pulse synchronous mode switching (pulse speed synchronization <-> pulse position synchronization) 53: Pulse position synchronous control switching (with forward command) 54: Positioning control switch (without command) 55: Positioning control switch (with forward command) 56: Positioning control switch (with reverse command) 57: Index / incremental positioning mode switching 58: Relocate 59: Terminal home signal input 60: Multi-section positioning length command 1 61: Multi-section positioning length command 2 62: Multi-section positioning length command 3 63: Reserved	1	0	★
Pn7.10	DI filter time	0.000s ~ 1.000s	1	0.010s	☆
Pn7.11	Terminal command mode	0: Two-wire type 1 1: Two-wire type 2 2: Three-wire type 1 3: Three-wire type 2	1	0	★
Pn7.12	Rate of change per second of terminal UP/DOWN	0.001Hz ~ 65.535Hz	1	1.00Hz	☆
Pn7.13	Curve 1minimum input	0.00V ~ Pn7.15	0.01	0.00V	☆
Pn7.14	Curve 1minimum input setting	-100.0% ~ +100.0%	0.1	0.0%	☆
Pn7.15	Curve 1 maximum input	Pn7.13 ~ +10.00V	0.01	10.00V	☆
Pn7.16	Curve 1maximum input setting	-100.0% ~ +100.0%	0.1	100.0%	☆
Pn7.17	AI1 filter time	0.00s ~ 10.00s		0.10s	☆
Pn7.18	Curve 2minimum input	-10.00V ~ Pn7.20		-10.00V	☆
Pn7.19	Curve 2 minimum input setting	-100.0% ~ +100.0%		-100.0%	☆
Pn7.20	Curve 2maximum input	Pn7.18 ~ +10.00V		10.00V	☆
Pn7.21	Curve 2 maximum input setting	-100.0% ~ +100.0%		100.0%	☆
Pn7.22	AI2 filter time	0.00s ~ 10.00s		0.10s	☆
Pn7.23	Curve 3minimum input	-10.00V ~ Pn7.25		-10.00V	☆
Pn7.24	Curve 3 minimum input setting	-100.0% ~ +100.0%		-100.0%	☆
Pn7.25	Curve 3 maximum input	Pn7.23 ~ +10.00V		10.00V	☆
Pn7.26	Curve 3 maximum input setting	-100.0% ~ +100.0%		100.0%	☆
Pn7.27	AI3 filter time	0.00s ~ 10.00s		0.10s	☆
Pn7.28	PULSE minimum input	0.00kHz ~ Pn7.30		0.00kHz	☆
Pn7.29	PULSE minimum input setting	-100.0% ~ 100.0%		0.0%	☆
Pn7.30	PULSE maximum input	Pn7.28 ~ 100.00kHz		50.00kHz	☆
Pn7.31	PULSE maximum input setting	-100.0% ~ 100.0%		100.0%	☆

Function code	Name	Setting range	Minimum unit	Default	Change
Pn7.32	PULSE filter time	0.00s ~ 10.00s		0.10s	☆
Pn7.33	AI setting curve selection	Ones place: AI1 curve selection 1: Curve 1 (2 points, see Pn7.13 ~ Pn7.16) 2: Curve 2 (2 points, see Pn7.18 ~ Pn7.21) 3: Curve 3 (2 points, see Pn7.23 ~ Pn7.26) 4: Curve 4 (4 points, see Fn6.00 ~ Fn6.07) 5: Curve 5 (4 points, see Fn6.08 ~ Fn6.15) Tens place: AI2 curve selection, same as above Hundreds place: AI3 curve selection, same as above		321	☆
Pn7.34	AI lower than minimum input setting selection	Ones place:AI1 lower than minimum input setting selection 0: Corresponding setting of minimum input 1:0.0% Tens place: AI2 lower than minimum input setting selection 0: Corresponding setting of minimum input 1:0.0% Hundreds place: AI3 lower than minimum input setting selection 0: Corresponding setting of minimum input 1:0.0%		000	☆
Pn7.35	DI1 delay time	0.0s ~ 3600.0s		0.0s	★
Pn7.36	DI2 delay time	0.0s ~ 3600.0s		0.0s	★
Pn7.37	DI3 delay time	0.0s ~ 3600.0s		0.0s	★
Pn7.38	DI input terminal valid status setting 1	0: High level 1: Low level Ones place: DI1 Tens place: DI2 Hundreds place: DI3 Thousands place: DI4 Ten-thousands place: DI5		00000	★
Pn7.39	DI input terminal valid state setting 2	0: High level 1: Low level Ones place: DI6 Tens place: DI7 Hundreds place: DI8 Thousands place: DI9 Ten-thousands place: DI10		00000	★
Pn8 Terminal Output Parameter Group					
Pn8.00	FM terminal output selection	0: Pulse output (FMP) 1: Open collector on-off output(FMR)	1	1	☆
Pn8.01	FMR output selection	0: No output	1	4	☆
Pn8.02	DO4 output selection	1: Drive is running 2: Fault output (fault stop)	1	0	☆
Pn8.03	DO3 output selection	3: FDT1 output of speed level detection 4: Speed reached	1	0	☆
Pn8.04	DO1 output selection	5: Zero speed running (no output during stop)	1	21	☆
		6: Motor overload pre-alarm 7: Drive overload pre-alarm 8: Set count value reached 9: Specified count value reached 10: Length reached 11: PLC cycle completed 12: Accumulated running time reached 13: In speed limit 14: In torque limit 15: Operation is ready 16: AI1 > AI2 17: Upper limit speed reached			

Function code	Name	Setting range	Minimum unit	Default	Change
Pn8.05	DO2output selection	18: Lower limit speed reached (operation related) 19: Undervoltage status output 20: Communication settings 21: Positioning completed 22: Positioning close 23: Zero speed running 2 (output during stop) 24: Cumulative power-on time reached 25: FDT2 output of speed level detection 26: Speed arrival 1 output 27: Speed arrival2 output 28: Current arrival1 output 29: Current arrival2 output 30: Timing arrival output 31: AI1 input exceeds upper/lower limits 32: Unloading 33: Running direction 34: Zero current detection 35: Module temperature reached 36: Software overcurrent output 37: Lower limit speed reached (operation irrelevant) 38: Fault output (operation continues) 39: Motor overtemperature pre-alarm 40: Running time reached 41: User-defined output 1 42: User-defined output 2 43: Incremental positioning completed (500ms high level) 44: Absolute positioning completed (500ms high level) 45: Indexing positioning completed (500ms high level)	1	2	☆
Pn8.06	FMP output selection	0: Running speed	1	0	☆
Pn8.07	AO1 output selection	1: Set speed 2: Output current	1	0	☆
Pn8.08	AO2 output selection	3: Output torque 4: Output power 5: Output voltage 6: PULSE input (100.% corresponds to 100.0kHz) 7: AI1 8: AI2 9: AI3 10: Length 11: Count value 12: Communication Settings 13: Motor speed 14: Output current (100.0% corresponds to 1000.0A) 15: Output voltage (100.0% corresponds to 1000.0V) 16: Reserved	1	1	☆
Pn8.09	FMP output maximum speed	0.01kHz ~ 100.00kHz	0.01kHz	50.00kHz	☆
Pn8.10	AO1 zero offset coefficient	-100.0% ~ 100.0%	0.1%	0.0%	☆
Pn8.11	AO1 gain	-10.00 ~ 10.00	0.01	1.00	☆
Pn8.12	AO2 zero offset coefficient	-100.0% ~ 100.0%	0.1%	0.0%	☆
Pn8.13	AO2 gain	-10.00 ~ 10.00	0.01	1.00	☆
Pn8.14	Reserved				●
Pn8.15	Reserved				●
Pn8.16	Reserved				●
Pn8.17	FMR output delay time	0.0s ~ 3600.0s	0.1s	0.0s	☆
Pn8.18	DO4 output delay time	0.0s ~ 3600.0s	0.1s	0.0s	☆

Function code	Name	Setting range	Minimum unit	Default	Change
Pn8.19	DO3 output delay time	0.0s ~ 3600.0s	0.1s	0.0s	☆
Pn8.20	DO1 output delay time	0.0s ~ 3600.0s	0.1s	0.0s	☆
Pn8.21	DO2 output delay time	0.0s ~ 3600.0s	0.1s	0.0s	☆
Pn8.22	DO output terminal valid status selection	0. Positive logic 1. Inverse logic Ones place: FMR Tens place: DO4 Hundreds place: DO3 Thousands place: DO1 Ten-thousands place: DO2	11111	00000	☆
Pn8.23	User-defined output variable selection (EX)1	0: Running speed 1: Set speed 2: Bus voltage 3: Output voltage 4: Output current 5: Start/stop status flag 6: Control status flag 7: Count value 8: Meter value 9: Inverter module temperature 10: AI1 input 11: AI2 input	None	0	☆
Pn8.24	User-selected comparison method 1	Ones place: Comparison and test method 0: Equal to (EX == X1) 1: Greater than or equal to 2: Less than or equal to 3: Interval comparison (X1 ≤ EX ≤ X2) 4: Bit test (EX & X1 = X2) Tens place: Output method 0: False value output 1: True value output	None	00	☆
Pn8.25	User-defined dead zone 1	0 ~ 65535	None	0	☆
Pn8.26	User-defined first comparison value 1	0 ~ 65535	None	0	☆
Pn8.27	User-defined second comparison value 1	0 ~ 65535	None	0	☆
Pn8.28	User-defined output variable selection (EX)2	0: Running speed 1: Set speed 2: Bus voltage 3: Output voltage 4: Output current 5: Start / stop status flag 6: Control status flag 7: Count value 8: Meter value 9: Inverter module temperature 10: AI1 input 11: AI2 input	None	0	☆
Pn8.29	User-selected comparison method 2	Ones place: Comparison and test method 0: Equal to (EX == X1) 1: Greater than or equal to 2: Less than or equal to 3: Interval comparison (X1 ≤ EX ≤ X2) 4: Bit test (EX & X1 = X2) Tens place: Output method 0: False value output 1: True value output	None	00	☆

Function code	Name	Setting range	Minimum unit	Default	Change
Pn8.30	User-defined dead zone 2	0 ~ 65535	None	0	☆
Pn8.31	User-defined first comparison value 1	0 ~ 65535	None	0	☆
Pn8.32	User-defined second comparison value 2	0 ~ 65535	None	0	☆
PnA Communication Parameter Group					
PnA.00	Type of communication	0: 485 communication 1: Reserved 2: Reserved 3: CAN.LINK 4: Reserved	1	0	☆
PnA.01	Baud rate	Ones place: MODBUS 0: 300BPS 1: 600BPS 2: 1200BPS 3: 2400BPS 4: 4800BPS 5: 9600BPS 6: 19200BPS 7: 38400BPS 8: 57600BPS 9: 115200BPS Tens place: Reserved Hundreds place: Reserved Thousands place: CAN.LINK baud rate 0: 20Kbps 1: 50Kbps 2: 100Kbps 3: 125Kbps 4: 250Kbps 5: 500Kbps 6: 1M	1	6005	☆
PnA.02	Data Format	0: No parity (8.N.2) 1: Even parity (8.E.1) 2: Odd parity (8.O.1) 3: 8.N.1	1	0	☆
PnA.03	Local address	1 ~ 247, 0 is the broadcast address	1	1	☆
PnA.04	Response delay	0ms ~ 20ms	1ms	2	☆
PnA.05	Communication timeout	0.0(Invalid), 0.1s ~ 60.0s	0.1s	0.0	☆
PnA.06	Data transfer format options	Ones place: MODBUS 0: Non-standard MODBUS protocol 1: Standard MODBUS protocol Tens place: Reserved	1	01	☆
PnA.07	Communication reading current resolution	0: 0.01A 1: 0.1A	1	0	☆
PnC Fault and Protection Parameter Group					
PnC.00	Motor overload software protection options	0: Disabled 1: Enabled	1	1	☆
PnC.01	Motor overload software protection gain	0.20 ~ 10.00	0.01	1.00	☆
PnC.02	Motor overload warning factor	50% ~ 100%	1%	80%	☆
PnC.03	Overvoltage stall gain	0 ~ 100	1	0	☆
PnC.04	Overvoltage stall protection voltage	120% ~ 150%	1%	130%	☆
PnC.05	Overcurrent stall gain	0 ~ 100	1	20	☆

Function code	Name	Setting range	Minimum unit	Default	Change
PnC.06	Overcurrent stall protection current	100% ~ 200%	1%	150%	☆
PnC.07	Ground short-circuit protection options after power-on	0: Invalid 1: Valid	1	1	☆
PnC.08	Reserved	—	—	—	●
PnC.09	Fault auto reset times	0 ~ 20	1	0	☆
PnC.10	Fault DO during fault auto reset	0: No action	1	0	☆
	Action selection	1: Action			
PnC.11	Fault auto reset interval	0.1s ~ 100.0s	0.1s	1.0s	☆
PnC.12	Input phase loss protection options	0: Disabled 1: Enabled	1	0	☆
PnC.13	Output phase loss protection options	0: Disabled 1: Enabled	1	1	☆
PnC.14	Fault protection action selection 1	Ones place: Motor overload (Er011) 0: Free stop 1: Stop according to stop mode 2: Continue to run Tens place: Input phase loss (Er012) Hundreds place: Output phase loss (Er013) Thousands place: External fault (Er015) Ten-thousands place: Communication error (Er016)	11111	00000	☆
PnC.15	Fault protection action selection 2	Ones place: Encoder error (Er020) 0: Free stop Tens place: Function code reading/writing error (Er021) 0: Free stop 1: Stop according to stop mode Hundreds place: Reserved Thousands place: Motor overheating (Er025) Ten-thousands place: Running time reached (Err26)	11111	00000	☆
PnC.16	Fault protection action selection 3	Ones place: User-defined fault 1(Err27) 0: Free stop 1: Stop according to stop mode 2: Continue to run Tens place: User-defined fault 2(Err28) 0: Free stop 1: Stop according to stop mode 2: Continue to run Hundreds place: Power-on time reached (Err29) 0: Free stop 1: Stop according to stop mode 2: Continue to run Thousands place: Unload (Err30) 0: Free stop 1: Deceleration stop 2: Decelerate to 7% of the rated motor speed and continue running; automatically return to set speed if the load isn't removed Ten-thousands place: PID feedback lost during running (Err31) 0: Free stop 1: Stop according to stop mode 2: Continue to run	11111	00000	☆
PnC.17	Fault protection action selection 4	Ones place: Speed deviation is too large (Err42) 0: Free stop 1: Stop according to stop mode 2: Continue to run Tens place: Motor over speed (Err43) Hundreds place: Initial position error (Err51)	11111	00000	☆

Function code	Name	Setting range	Minimum unit	Default	Change
PnC.18	Reserved	—	—	—	●
PnC.19	Reserved	—	—	—	●
PnC.20	Reserved	—	—	—	●
PnC.21	Continuing running speed options when fault occurs	0: Run at current running speed 1: Run at set speed 2: Run at upper speed limit 3: Run at lower speed limit 4: Run at abnormal standby speed	1	0	☆
PnC.22	Abnormal standby speed setting	60.0% ~ 100.0% (current target speed)	0.1%	100.0%	☆
PnC.23	Motor temperature sensor type	0: No temperature sensor 1: PT100 2: PT1000	1	0	☆
PnC.24	Motor over-temperature protection threshold	0℃ ~ 200℃	1℃	110℃	☆
PnC.25	Motor overheating pre-alarm threshold	0℃ ~ 200℃	1℃	90℃	☆
PnC.26	Instantaneous stop action selection	0: Invalid 1: Decelerate according to deceleration time 1 2: Decelerate according to deceleration time 2 3: Decelerate according to deceleration time 3 4: Decelerate according to deceleration time 4 5: Decelerate according to current deceleration time 6: Automatic deceleration	1	0	☆
PnC.27	Automatic deceleration switching point at instantaneous stop	0.00Hz ~ Maximum speed	0.01Hz	0.00Hz	☆
PnC.28	Instantaneous stop voltage rise judgment time	0.00s ~ 100.00s	0.01s	0.50s	☆
PnC.29	Instantaneous stop action judgment voltage	60.0% ~ 100.0% (standard bus voltage)	0.1%	80.0%	☆
PnC.30	Unload protection options	0: Invalid 1: Valid	1	0	☆
PnC.31	Unload detection level	0.0 ~ 100.0%	0.1%	10.0%	☆
PnC.32	Unload detection time	0.0 ~ 60.0s	0.1s	1.0s	☆
PnC.33	Reserved				
PnC.34	Over speed detection value	0.0% ~ 50.0% (Maximum speed)	0.1%	20.0%	☆
PnC.35	Over speed detection time	0.0s ~ 60.0s	0.1s	5.0s	☆
PnC.36	Excessive speed deviation detection value	0.0% ~ 50.0% (Maximum speed)	0.1%	20.0%	☆
PnC.37	Excessive speed deviation detection time	0.0s ~ 60.0s	0.1s	0.0s	☆
PnE Positioning Control Parameter Group					
PnE.00	Positioning control effective	0: Invalid 1: Valid	1	0	☆
PnE.01	Positioning mode options	0: Incremental 1: Absolute 2: Indexing plate	1	2	★
PnE.02	Index plate positioning encoder options	0: Motor encoder 1: Spindle encoder	1	0	★
PnE.03	Lines of spindle positioning dedicated encoder	1 ~ 65535	1	1024	★
PnE.04	Numerator of spindle gear ratio (spindle side gear)	1 ~ 10000	1	1	★
PnE.05	Denominator of spindle gear ratio (motor side gear)	1 ~ 10000	1	1	★

Function code	Name	Setting range	Minimum unit	Default	Change
PnE.06	Index positioning home source options	0: Position encoder Z signal 1: DI terminal (DI5)	1	0	★
PnE.07	Home search direction	0: Forward 1: Reverse 2: Current direction	1	2	★
PnE.08	Home search frequency	0.01 ~ Maximum frequency	0.01Hz	10.00Hz	☆
PnE.09	Positioning control start frequency	0.00 ~ Maximum frequency	0.01Hz	20.00Hz	☆
PnE.10	Acceleration time (positioning control)	0.01 ~ 655.35s	0.01s	3.00s	☆
PnE.11	Deceleration time (positioning control)	0.01 ~ 655.35s	0.01s	3.00s	☆
PnE.12	Proportional gain 1 (positioning control)	0.00 ~ 100.00	0.01	1.00	☆
PnE.13	DI terminal home filter coefficient	0 ~ 200	1	10	☆
PnE.14	Positioning completion deviation range	0 ~ 1000	1	10	☆
PnE.15	Positioning completion deviation limit	0 ~ 1000	1	2	☆
PnE.16	Proportional gain switch options	0: Do not switch 1: Switch automatically according to the deviation	1	1	☆
PnE.17	Proportional gain 2 (positioning control)	0.00 ~ 100.00	0.01	10.00	☆
PnE.18	Proportional gain switching pulse deviation 1	0 ~ 30000	1	5	☆
PnE.19	Proportional gain switching pulse deviation 2	0 ~ 30000	1	50	☆
PnE.20	Index plate position command	0 ~ 65535	1	0	☆
PnE.21	Index plate position command source options	0: Specified by PnE.20 1: Specified by multi-position command (PnE.38~PnE.53)	1	0	☆
PnE.22	Maximum frequency of positioning operation	0.00Hz ~ Maximum frequency	0.01Hz	50.00Hz	☆
PnE.23	Home detection judgment error	0 ~ 1000	1	10	☆
PnE.24	Positioning proximity judgment pulse	0 ~ 10000	1	100	☆
PnE.28	Encoder Z phase detection judgment error	1 ~ 1000	1	4	
PnE.25 ~ PnE.37	Reserved				
PnE.38	Location-control position command 1 low order	0 ~ 65535	1	0	☆
PnE.39	Location-control position command 1 high order	0 ~ 65535	1	0	☆
PnE.40	Location-control position command 2 low order	0 ~ 65535	1	0	☆
PnE.41	Location-control position command 2 high order	0 ~ 65535	1	0	☆
PnE.42	Location-control position command 3 low order	0 ~ 65535	1	0	☆
PnE.43	Location-control position command 3 high order	0 ~ 65535	1	0	☆
PnE.44	Location-control position command 4 low order	0 ~ 65535	1	0	☆
PnE.45	Location-control position command 4 high order	0 ~ 65535	1	0	☆
PnE.46	Location-control position command 5 low order	0 ~ 65535	1	0	☆
PnE.47	Location-control position command 5 high order	0 ~ 65535	1	0	☆
PnE.48	Location-control position command 6 low order	0 ~ 65535	1	0	☆
PnE.49	Location-control position command 6 high order	0 ~ 65535	1	0	☆
PnE.50	Location-control position command 7 low order	0 ~ 65535	1	0	☆

Function code	Name	Setting range	Minimum unit	Default	Change
PnE.51	Location-control position command 7 high order	0 ~ 65535	1	0	☆
PnE.52	Location-control position command 8 low order	0 ~ 65535	1	0	☆
PnE.53	Location-control position command 8 high order	0 ~ 65535	1	0	☆
PnE.54	Positioning control command direction 1	0: Forward 1: Reverse Ones place: Positioning control command 1 direction Tens place: Positioning control command 2 direction Hundreds place: Positioning control command 3 direction Thousands place: Positioning control command 4 direction Ten-thousands place: Positioning control command 5 direction	1	00000	☆
PnE.55	Positioning control command direction 2	0: Forward 1: Reverse Ones place: Positioning control command 6 direction Tens place: Positioning control command 7 direction Hundreds place: Positioning control command 8 direction	1	00000	☆
		Fn2 Motor 1 Parameter Group			
Fn2.00	Motor type selection	0: Common asynchronous motor 1: Spindle servo motor 2: Permanent magnet servo motor	1	0	★
Fn2.01	Motor rated power	0.1kW ~ 630.0kW	0.1kW	Depending on model	★
Fn2.02	Motor rated voltage	0V ~ 1140V	1V	Depending on model	★
Fn2.03	Motor rated current	0.01A ~ 655.35A (power <= 55kW) 0.1A ~ 6553.5A (power > 55kW)	0.01A	Depending on model	★
Fn2.04	Motor rated frequency	0.00Hz ~ Pn2.05	0.01Hz	Depending on model	★
Fn2.05	Motor rated speed	0rpm ~ 65535rpm	1rpm	Depending on model	★
Fn2.06	Asynchronous motor stator resistance	0.001Ω ~ 65.535Ω (power <=55kW) 0.0001Ω ~ 6.5535Ω (power >55kW)	0.001Ω	Depending on model	★
Fn2.07	Asynchronous motor rotor resistance	0.001Ω ~ 65.535Ω (power <=55kW) 0.0001Ω ~ 6.5535Ω (power >55kW)	0.001Ω	Depending on model	★
Fn2.08	Asynchronous motor leakage inductance	0.01mH ~ 655.35mH (power <=55kW) 0.001mH ~ 65.535mH (power >55kW)	0.01mH	Depending on model	★
Fn2.09	Asynchronous motor mutual inductance	0.1mH ~ 6553.5mH (power <=55kW) 0.01mH ~ 655.35mH (power >55kW)	0.1mH	Depending on model	★
Fn2.10	Asynchronous motor no-load current	0.01A ~ Fn2.03 (power <=55kW) 0.1A ~ Fn2.03 (power >55kW)	0.01	Depending on model	★
Fn2.16	Permanent magnet servo motor stator resistance	0.001Ω ~ 65.535Ω	0.001Ω	Depending on model	★
Fn2.17	Permanent magnet servo motor d-axis inductance	0.01mH ~ 655.35mH	0.01mH	Depending on model	★
Fn2.18	Permanent magnet servo motor q-axis inductance	0.01mH ~ 655.35mH	0.01mH	Depending on model	★
Fn2.20	Permanent magnet servo motor back EMF	0.1V ~ 6553.5V	0.1V	Depending on model	★
Fn2.37	Tuning options	0: No operation 1: Asynchronous machine stationary tuning 2: Asynchronous machine complete tuning 11: Synchronous machine no-load tuning 12: Synchronous machine loaded tuning	1	0	★

Function code	Name	Setting range	Minimum unit	Default	Change
		Fn4 Auxiliary Function Parameter Group			
Fn4.00	Reserved				
Fn4.01	Reserved				
Fn4.02	Reserved				
Fn4.03	Acceleration time 2	0.0s ~ 6500.0s	0.1s	Depending on model	☆
Fn4.04	Deceleration time 2	0.0s ~ 6500.0s	0.1s	Depending on model	☆
Fn4.05	Acceleration time 3	0.0s ~ 6500.0s	0.1s	Depending on model	☆
Fn4.06	Deceleration time 3	0.0s ~ 6500.0s	0.1s	Depending on model	☆
Fn4.07	Acceleration time 4	0.0s ~ 6500.0s	0.1s	Depending on model	☆
Fn4.08	Deceleration time 4	0.0s ~ 6500.0s	0.1s	Depending on model	☆
Fn4.09	Jump speed 1	0.00Hz ~ Maximum speed	0.01Hz	0.00Hz	☆
Fn4.10	Jump speed 2	0.00Hz ~ Maximum speed	0.01Hz	0.00Hz	☆
Fn4.11	Jump speed range	0.00Hz ~ Maximum speed	0.01Hz	0.01Hz	☆
Fn4.12	Positive / negative dead time	0.0s ~ 3000.0s	0.1s	0.0s	☆
Fn4.13	Reverse control	0: Reverse enabled 1: Reverse disabled	1	0	☆
Fn4.14	Speed lower than lower speed operation	0: 0: Run at lower speed limit 1: Downtime 2: Zero speed running	1	0	☆
Fn4.15	Droop control	0.00Hz ~ 10.00Hz	0.01Hz	0.00Hz	☆
Fn4.16	Set cumulative power-on reached time	0h ~ 65000h	1h	0h	☆
Fn4.17	Set cumulative running reached time	0h ~ 65000h	1h	65000h	☆
Fn4.18	Start protection options	0: No 1: Yes	1	0	☆
Fn4.19	Speed detection value (FDT1)	0.00Hz ~ Maximum speed	0.01Hz	50.00Hz	☆
Fn4.20	Speed detection hysteresis value (FDT1)	0.0% ~ 100.0% (FDT1 level)	0.1%	5.0%	☆
Fn4.21	Speed arrival detection width	0.0% ~ 100.0% (Maximum speed)	0.1%	0.0%	☆
Fn4.22	Whether jump speed is valid during acceleration / deceleration	0: Invalid 1: Valid	1	0	☆
Fn4.23	Cumulative running time reached action options	0: Continue to run 1: Fault tips	1	0	★
Fn4.24	Cumulative power-on time reached action options	0: Continue to run 1: Fault tips	1	0	★
Fn4.25	Acceleration time 1/2 speed switching point	0.00Hz ~ Maximum speed	0.01Hz	0.00Hz	☆
Fn4.26	Deceleration time 1/2 speed switching point	0.00Hz ~ Maximum speed	0.01Hz	0.00Hz	☆
Fn4.27	Terminal jog priority	0: Invalid 1: Valid	1	0	☆
Fn4.28	Speed detection value (FDT2)	0.00Hz ~ Maximum speed	0.01Hz	50.00Hz	☆
Fn4.29	Speed detection hysteresis value (FDT2)	0.0% ~ 100.0% (FDT2 level)	0.1%	5.0%	☆
Fn4.30	Arbitrary arrival speed detection value 1	0.00Hz ~ Maximum speed	0.01Hz	50.00Hz	☆
Fn4.31	Arbitrary arrival speed detection range 1	0.0% ~ 100.0% (Maximum speed)	0.1%	0.0%	☆
Fn4.32	Arbitrary arrival speed detection value 2	0.00Hz ~ Maximum speed	0.01Hz	50.00Hz	☆

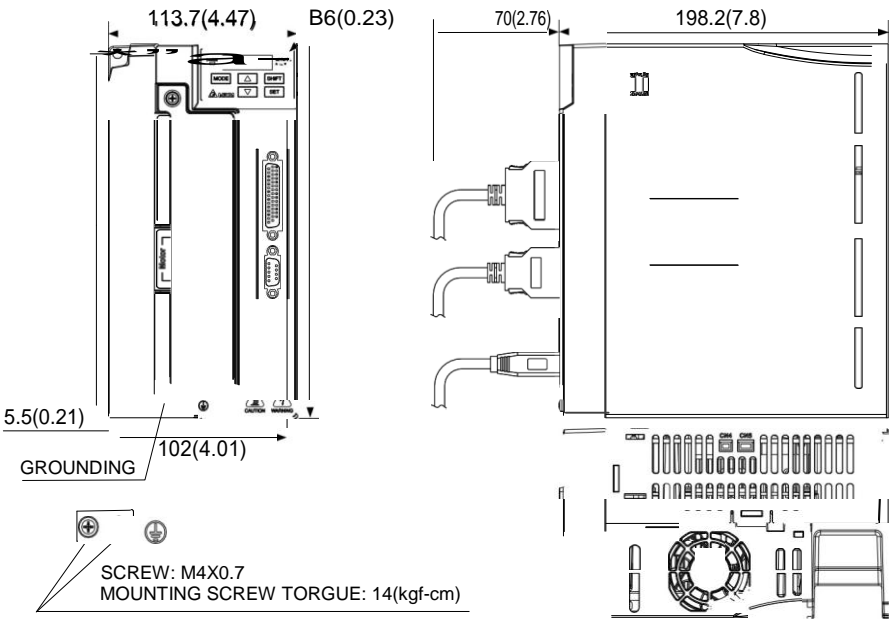| Function code	Name	Setting range	Minimum unit	Default	Change
Fn4.33	Arbitrary arrival speed detection value 2	0.0% ~ 100.0% (Maximum speed)	0.1%	0.0%	☆
Fn4.34	Zero current detection level	0.0% ~ 300.0% 100.0% corresponds to no output when motor rated current is stopped	0.1%	5.0%	☆
Fn4.35	Zero current detection delay time	0.01s ~ 600.00s	0.01s	0.10s	☆
Fn4.36	Software overcurrent point	0.0% (not detected) 0.1% ~ 300.0% (motor rated current)	0.1%	200.0%	☆
Fn4.37	Software overcurrent detection delay time	0.00s ~ 600.00s	0.01s	0.00s	☆
Fn4.38	Arbitrary arrival current 1	0.0% ~ 300.0% (motor rated current)	0.1%	100.0%	☆
Fn4.39	Arbitrary arrival current 1 width	0.0% ~ 300.0% (motor rated current)	0.1%	0.0%	☆
Fn4.40	Arbitrary arrival current 2	0.0% ~ 300.0% (motor rated current)	0.1%	100.0%	☆
Fn4.41	Arbitrary arrival current 2 width	0.0% ~ 300.0% (motor rated current)	0.1%	0.0%	☆
Fn4.42	Timed function options	0: Invalid 1: Valid	1	0	☆
Fn4.43	Timed running time options	0: Fn4.44 setting 1: AI1 2: AI2 3: AI3 Analog input range corresponds to Fn4.44	1	0	☆
Fn4.44	Timed running time	0.0Min ~ 6500.0Min	0.1Min	0.0Min	☆
Fn4.45	AI1 input voltage protection value lower limit	0.00V ~ Fn4.46	0.01V	3.10V	☆
Fn4.46	AI1 input voltage protection value upper limit	Fn4.45 ~ 10.00V	0.01V	6.80V	☆
Fn4.47	Module temperature reached	0℃ ~ 100℃	1℃	75℃	☆
Fn4.48	Cooling fan control	0: Cooling fan is running when the motor is running 1: Cooling fan is always running after power on	1	0	☆
Fn4.49	Wake up speed	Sleeping speed (Fn4.51) ~ Maximum speed (Pn2.25)	0.01Hz	0.00Hz	☆
Fn4.50	Wake-up delay time	0.0s ~ 6500.0s	0.1s	0.0s	☆
Fn4.51	Sleeping speed	0.00Hz ~ Wake up speed (Fn4.49)	0.01Hz	0.00Hz	☆
Fn4.52	Sleep delay time	0.0s ~ 6500.0s	0.1s	0.0s	☆
Fn4.53	Set running arrival time	0.0Min ~ 6500.0Min	0.1Min	0.0Min	☆
Fn4.54	Auxiliary speed source Y range options when superimposed	0: Relative to maximum speed 1: Relative to speed source X	1	0	☆
Fn4.55	Auxiliary speed source Y range when superimposed	0% ~ 150%	1%	100%	☆
Fn4.56	Command source binding to speed source	Ones place: Operation panel command, bound to speed source options 0: No binding 1: Digital setting speed 2: AI1 3: AI2 4: AI3 5: PULSE setting (DI5) 6: Multi-speed 7: Simple PLC 8: PID 9: Communication given Tens place: Terminal command, bound to speed source options Hundreds place: Serial port communication command, bound to speed source options Thousands place: Automatic running, bound to speed source options	1	0000	☆

Function code	Name	Setting range	Minimum unit	Default	Change
Fn4.57	Auxiliary speed source bias options	0	0	0	●
Fn4.58	Auxiliary speed source bias speed when superimposed	0.00Hz ~ Maximum speed Pn2.05	0.01Hz	0.00Hz	☆
Fn4.59	Digital setting speed stop memory options	0: No 1: Yes	1	1	★
Fn4.60	Acceleration / deceleration time unit	0: 1 sec 1: 0.1 sec 2: 0.01 sec	1	1	★
Fn4.61	Acceleration / deceleration time reference speed	0: Maximum speed (Pn2.05) 1: Set speed 2: 100Hz	1	0	★
Fn4.62	Speed command resolution	1: 0.1Hz 2: 0.01Hz When changing the decimal point of the speed command, please note to change the maximum speed and upper limit speed.	1	2	★
Fn4.63	Speed command UP / DOWN reference during running	0: Running speed 1: Set speed	1	1	★
Fn4.64	Carrier speed adjusted with temperature	0: No 1: Yes	1	0	☆
Fn4.65	Analog gain switching value	0.00 ~ 100.00%	0.01%	100.00%	☆
FnA Start / Stop Control Parameter Group					
FnA.00	Startup mode	0: Start directly 1: Speed tracking and restart 2: Asynchronous machine pre-excitation start	1	0	☆
FnA.01	Speed tracking mode	0: Start from stop speed 1: Start from zero speed 2: Start from the maximum speed	1	0	★
FnA.02	Revolution tracking speed	1 ~ 100	1	20	☆
FnA.03	Start speed	0.00Hz ~ 10.00Hz	0.01Hz	0.00Hz	☆
FnA.04	Start speed hold time	0.0s ~ 100.0s	0.1s	0.0s	★
FnA.05	Start DC braking/ pre-excitation current	0% ~ 100%	1%	0%	★
FnA.06	Start DC braking/ pre-excitation time	0.0s ~ 100.0s	0.1s	0.0s	★
FnA.07	Acceleration and deceleration mode	0: Linear acceleration/deceleration 1: S curve acceleration/deceleration A 2: S curve acceleration/deceleration B	1	0	★
FnA.08	S curve start period time proportion	0.0% ~ (100.0%.FnA.09)	0.1%	30.0%	★
FnA.09	S curve end period time proportion	0.0% ~ (100.0%.FnA.08)	0.1%	30.0%	★
FnA.10	Stop mode	0: Deceleration stop 1: Free stop	1	0	☆
FnA.11	Stop DC braking start speed	0.00Hz ~ Maximum speed	0.01Hz	0.00Hz	☆
FnA.12	Stop DC braking waiting time	0.0s ~ 100.0s	0.1s	0.0s	☆
FnA.13	Stop DC braking current	0% ~ 100%	1%	0%	☆
FnA.14	Stop DC braking time	0.0s ~ 100.0s	0.1s	0.0s	☆
FnA.15	Braking usage	0% ~ 100%	1%	100%	☆

Function code	Name	Setting range	Minimum unit	Default	Change
dn0 Monitoring Parameter Group					
dn0.00	Running speed (Hz)		0.01Hz		●
dn0.01	Set speed (Hz)		0.01Hz		●
dn0.02	Bus voltage (V)		0.1V		●
dn0.03	Output voltage (V)		1V		●
dn0.04	Output current (A)		0.01A		●
dn0.05	Output power (kW)		0.1kW		●
dn0.06	Output torque (%)		0.1%		●
dn0.07	DI input status		1		●
dn0.08	DO output status		1		●
dn0.09	AI1 voltage (V)		0.01V		●
dn0.10	AI2 voltage (V)		0.01V		●
dn0.11	AI3 voltage (V)		0.01V		●
dn0.12	Count value		1		●
dn0.13	Length value		1		●
dn0.14	Motor speed		1r/min		●
dn0.15	PID setting		1		●
dn0.16	PID feedback		1		●
dn0.17	PLC stage		1		●
dn0.18	PULSE input pulse speed(Hz)		0.01kHz		●
dn0.19	Feedback speed (unit 0.1Hz)		0.1Hz		●
dn0.20	Remaining runtime		0.1Min		●
dn0.21	AI1 voltage before correction		0.001V		●
dn0.22	AI2 voltage before correction		0.001V		●
dn0.23	AI3 voltage before correction		0.001V		●
dn0.24	Line speed		1m/Min		●
dn0.25	Current power-on time		1Min		●
dn0.26	Current running time		0.1Min		●
dn0.27	PULSE input pulse speed		1Hz		●
dn0.28	Communication settings		0.01%		●
dn0.29	Encoder feedback speed		0.01Hz		●
dn0.30	Main speed X display		0.01Hz		●
dn0.31	Auxiliary speed Y display		0.01Hz		●
dn0.32	View any memory address value		1		●
dn0.33	Synchronous machine rotor position		0.0°		●
dn0.34	Motor temperature value				●
dn0.35	Target torque (%)		0.1%		●
dn0.36	Spinning position		1		●

Function code	Name	Setting range	Minimum unit	Default	Change
dn0.37	Power factor angle		0.1°		●
dn0.38	ABZ location				●
dn0.39	VF separation target voltage		1V		●
dn0.40	VF separation output voltage		1V		●
dn0.41	DI input status intuitive display				●
dn0.42	DO input status intuitive display				●
dn0.43	DI function status intuitive display 1				●
dn0.44	DI function status intuitive display 2				●
dn0.45 ~ dn0.49	Reserved				●
dn0.50	Positioning control tracking error (quadruplicated frequency)		1pulse		●
dn0.51	Pulse position tracking error (quadruplicated frequency)		1pulse		●
dn0.52	Relative home position (quadruplicated frequency)		1pulse		●
dn0.53	External pulse given motor running frequency (after transmission ratio calculation)		0.01Hz		●
dn0.54	Reserved				●
dn0.55	External pulse given frequency		0.01kHz		●
dn0.56	Positioning complete signal		1		●
dn0.57	Positioning close		1		●
dn0.58	Home retrieved		1		●
dn0.59	Interval pulses of two home signals (quadruplicated frequency)		1pulse		●
dn0.60	Relative home position low order (quadruplicated frequency)		1pulse		●
dn0.61	Relative home position high order (quadruplicated frequency)		1pulse		●
dn0.62	Relative home position direction		1		●
dn0.63	Pulses given number low order (quadruplicated frequency)		1pulse		●
dn0.64	Pulse given number high order (quadruplicated frequency)		1pulse		●
En0 Last Fault Record Parameter Group					
En0.00	Type of last fault	0: No fault 1: Reserved 2: Acceleration overcurrent (ERR02) 3: Deceleration overcurrent (ERR03) 4: Constant speed overcurrent (ERR04) 5: Acceleration overvoltage (ERR05) 6: Deceleration overvoltage (ERR06) 7: Constant speed overvoltage (ERR07) 8: Buffer resistor overload fault (ERR08) 9: Undervoltage fault (ERR09) 10: Drive overload (ERR10) 11: Motor overload (ERR11)	—	—	●

Function code	Name	Setting range	Minimum unit	Default	Change
En0.00	Type of last fault	12: Input phase loss (ERR12) 13: Output phase loss (ERR13) 14: Module overheating (ERR14) 15: External fault (ERR15) 16: Communication error (ERR16) 17: Contactor fault (ERR17) 18: Current detection fault (ERR18) 19: Motor tuning fault (ERR19) 20: Encoder/PG card fault (ERR20) 21: Parameter reading/writing fault (ERR21) 22: Drive hardware fault (ERR22) 23: Motor short to ground fault (ERR23) 24: Reserved (ERR24) 25: Reserved (ERR25) 26: Running time reached (ERR26) 27: User-defined fault 1 (ERR27) 28: User-defined fault 2 (ERR28) 29: Power-on time reached (ERR29) 30: Unload (ERR30) 31: PID feedback lost during running (ERR31) 40: Fast current limit timeout fault (ERR40) 41: Switching motor fault during running (ERR41) 42: Excessive speed deviation (ERR42) 43: Motor overspeed (ERR43) 45: Motor overtemperature (ERR45) 51: Initial position error (ERR51) 54: Home missing (ERR54) 55: Excessive follow-up deviation during pulse position synchronization (ERR55) 56: Excessive deviation indirectional control position (ERR56) 90: Number of encoder lines set incorrectly (Fn90, alarm only) 91: Encoder not connected (Fn91, alarm only)	—	—	●
En0.01	Speed during last fault	—	—	—	●
En0.02	Current during last fault	—	—	—	●
En0.03	Bus voltage during last fault	—	—	—	●
En0.04	Status of input terminal during last fault	—	—	—	●
En0.05	Status of output terminal during last fault	—	—	—	●
En0.06	Drive status during last fault	—	—	—	●
En0.07	Time of last fault (start counting from power-on)	—	—	—	●
En0.08	Time of last fault (start counting from running)	—	—	—	●
En1 Previous Fault Record Parameter Group (same as En0 parameter group)					
En2 Previous Two Faults Record Parameter Group (same as En0 parameter group)					
En3 Previous Three Faults Records Parameter Group (same as En0 parameter group)					
En4 Previous Four Faults Records Parameter Group (same as En0 parameter group)					

Accessory Mounting Dimensions

113.7(4.47)   B6(0.23)   70(2.76)   198.2(7.8)

5.5(0.21)

GROUNDING

102(4.01)

SCREW: M4X0.7
MOUNTING SCREW TORGUE: 14(kgf-cm)

Single phase 220V: 2.2kW

Three-phase 220V: 2.2kW-4kW

Three-phase 380V: 2.2kW-7.5kW