ATO

high reliability | high applicability | high controllability

Server User Manual-Simplified Version

(0.05~2 KW)K3 series

Document version:
2024-10

Catalogue

This step-by-step guide for the local tone machine provides a basic explanation of wiring and debugging. Since customer requirements vary, this manual outlines a general debugging procedure. Please adjust specific details according to actual needs.

1 Check to Confirm the Servo D riverand M otor Are the Correct Models, and Note the Installation Environment.

Servo Drive Product Specifications

Naming Convention

Drives

	①	③	④
K3 S-4R5-1 1 ① ② ③ ④⑤	Serial number: K3 Range K5 Range ②	Rated output current: 0R6-0.6A 1R8-1.8A 2R8-2.8A	Communication: 1-Standard general purpose *-EtherCAT Bus-based ⑤
	Voltage level: S-single phase 220V H-single phase 220V H-three-phase 220V	4R5-4.5A 5R5-5.5A 6R5-6.5A 8R0-8.0A	Encoder Type 1-17bit 2-23bit

Electrical Machinery

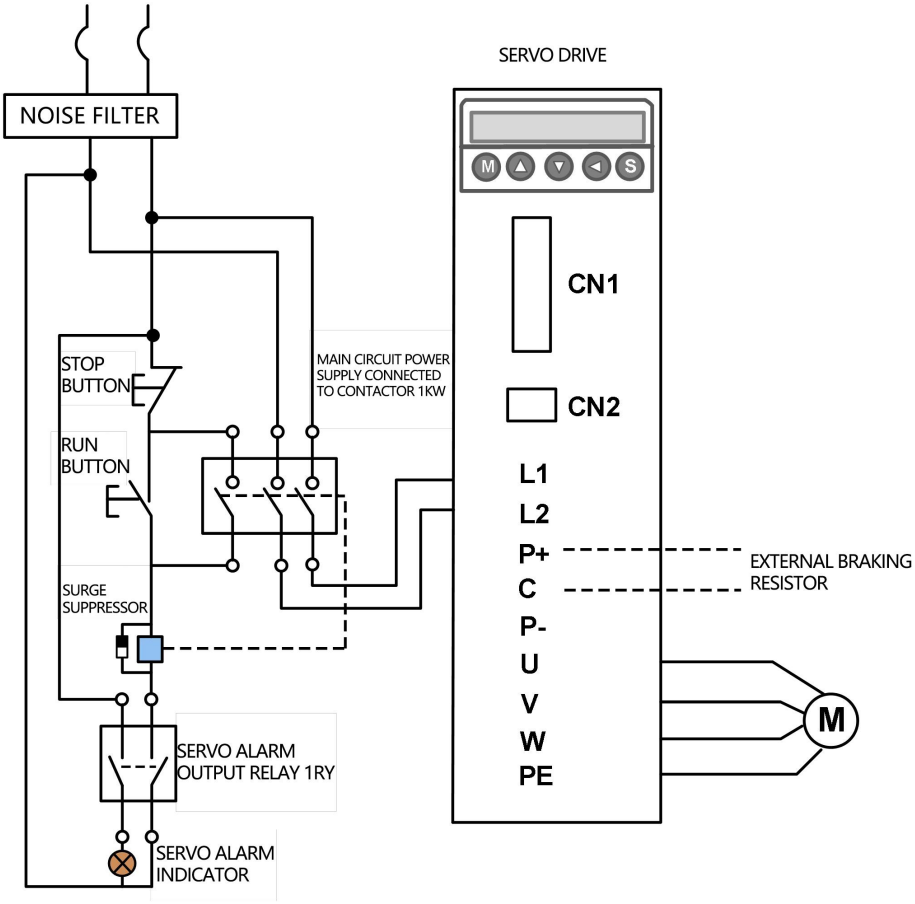
K 8 751 A N 2 L N 5 S 4 0
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫

①	③	④	⑥	⑧	⑨	⑪
K:range ②	Motor power:	Rated RPM:	Voltage Rating:	Encoder Type:	Polar Logarithm:	Motor Series:
Flange: 4-40flange	500-50W 101-100W	A-1000rB-1500r C-2000rD-2500r	2-220V	N-optical programming M-optical programming L-magnetically programmed	4-4polarized 5-5polarized	1-1series 2-2series
|	|	E-3000r	⑦	H-magnetically programmed	⑩	4-4series
9-90flange	202-2KW	*-reserve	Shaft/oil seal:		Interface Sp-ecifications:	⑫
A-110flange		⑤	S-optical shaft without oil seal		S-standardized	Fan:
B-130flange		Brakes:	K-Keyed shaft without oil seal		*-reserve	0-standardized
		N-conventional	T-optical shaft with oil seal			1-adding a fan
		A-brake	L-keyed shaft with oil seal			

*Note: The formula for calculating motor power is $102=10\times10^{2}=1000W=1KW$.

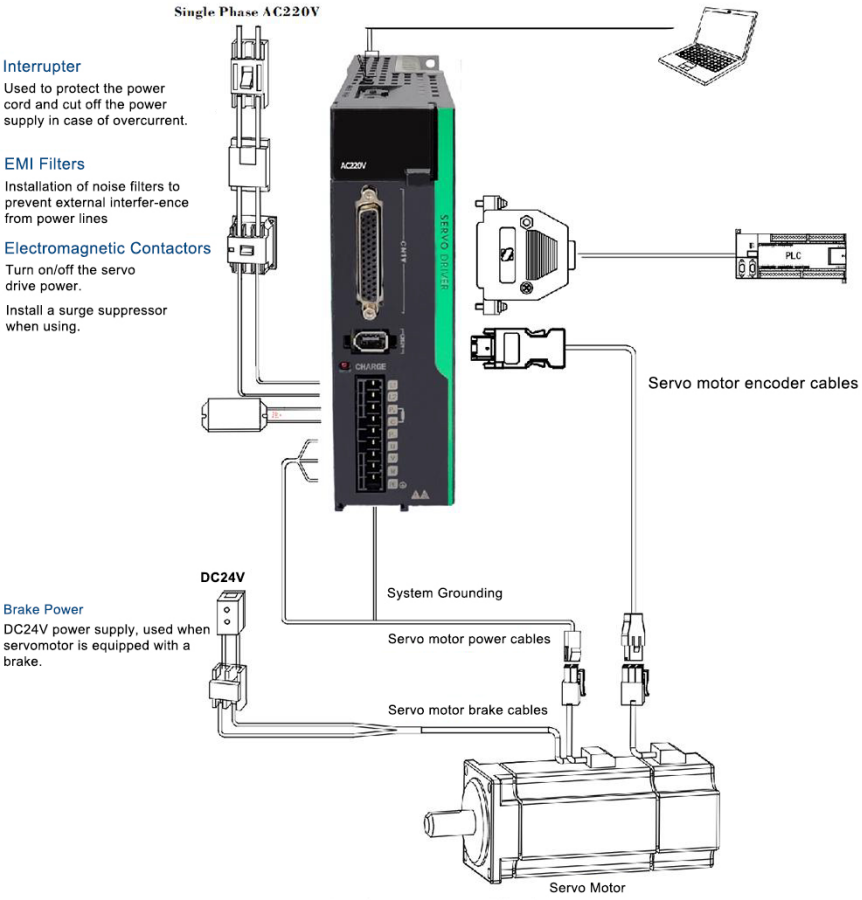
2. Wiring and Driver Dimension Diagram

Peripheral Device Wiring



Wiring For System Applications

SIZE A/B (SIZE C Three-phase support 220V)



*Note: (1) When an external braking resistor is required, connect the external resistor to P+/C.

SIZE A APPLICABLE DRIVE MODEL:0R6、1R8、2R8 UNIT mm

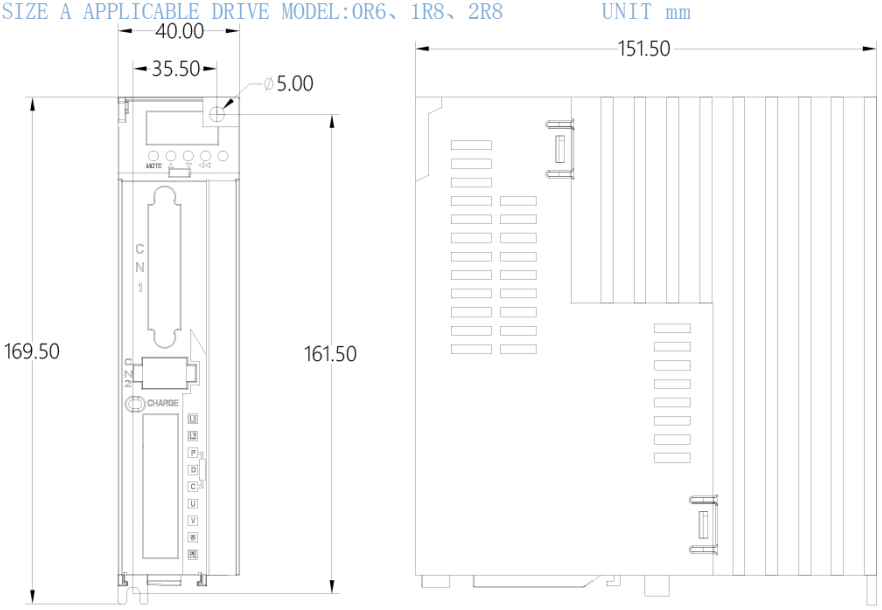


FIGURE SIZE A

SIZE B APPLICABLE DRIVE MODEL:4R5、5R5 UNIT mm

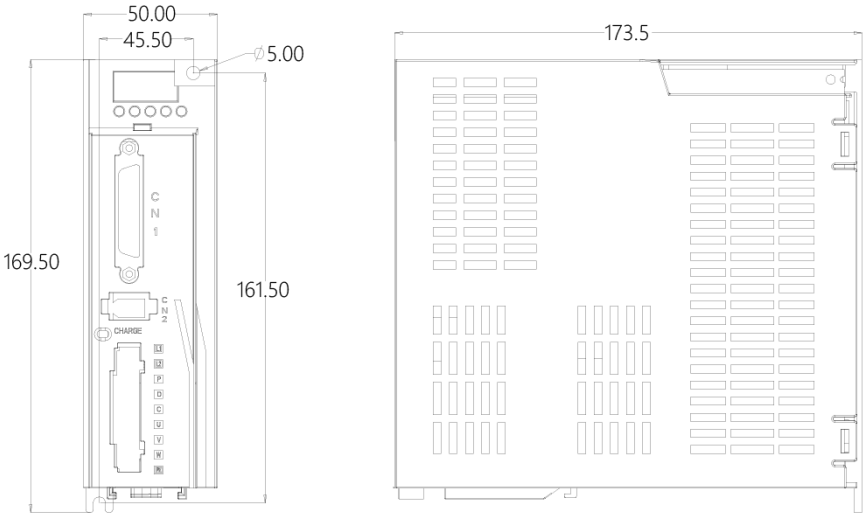
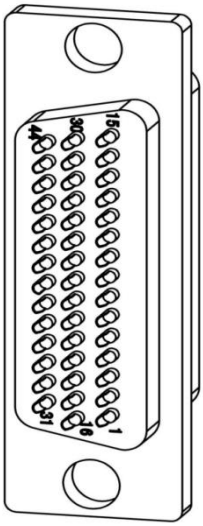
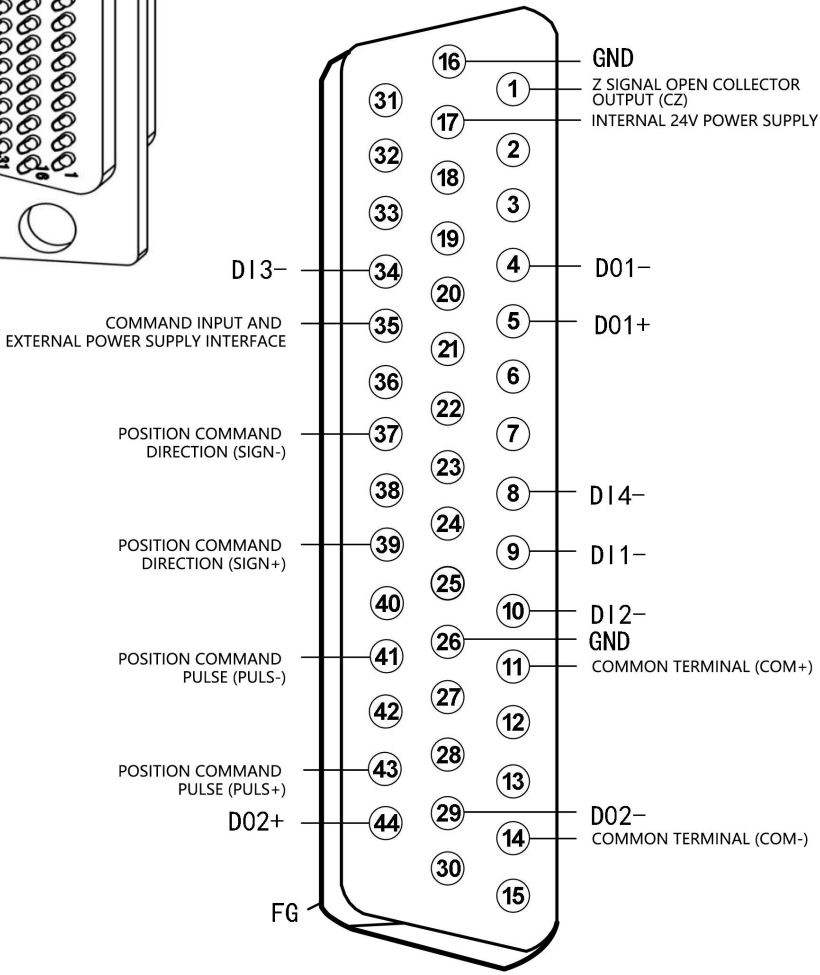


FIGURE SIZE B

3. CN1 Control Signal Terminal (Driver Side) Style and Terminal Definition





4. CN2 Encoder Interface (Driver Side) & CN3/4 Style and Terminal Definitions

CN2 terminal definition:

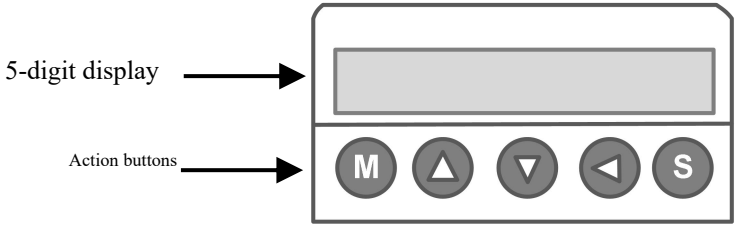
Stitch size	Signal name	Terminal marking	Functional description
1	5V digital power supply	E5V	Encoder + 5V power supply
2	Digital power ground	EOV	Encoder + 5V power ground
3	Barefoot	NC	-
4	Barefoot	NC	-
5	Positive differential input	PS+	Data communications PS+
6	Negative differential input	PS-	Data communications PS-

CN3/4 terminal definition:

Stitch size	Signal name	Functional description
1、2、3	-	Barefoot
4	RS485+	RS485 communication port
5	RS485-	
6	RS232-TXD	The RS232 transmitter connects to the receiver of the host computer
7	RS232-RXD	The RS232 receiver connects to the transmitter of the host computer.
8	GND	The earth

5. Driver Panel Operation Instructions

The display interface is mainly used for the user to adjust the parameters and the status monitoring of the driver.



Order number	Name	Explain		
1	Key	M	Switch key	Switch function codes sequentially
		SET	Save key	Save parameters or go to the next menu
		≪	Shift key	Carry the number of data change bits up or return to the parent menu
		▽	Decreasing key	The data or function code is incrementally displayed; in monitoring mode, the display parameters can be selected in a sequential loop.
		△	Increment key	The data or function code is incrementally displayed; in monitoring mode, the display parameters can be selected in reverse order.

Table 5-1: Five-Function Operation Buttons

among ▽ △ Hold to repeat the action. The longer you hold, the faster the repetition. 5 digits

The LED digital display shows various statuses and data. After modifying the parameter values, press SET, Digital display

donE, indicating that the value is confirmed and effective. If the parameter value is mo SET nd you do n M Exit, the parameter

Invalid number. When Er flashes, it indicates a drive alarm.

6. Block Diagram

6.1 Position Control Signal Terminal Wiring Block Diagram

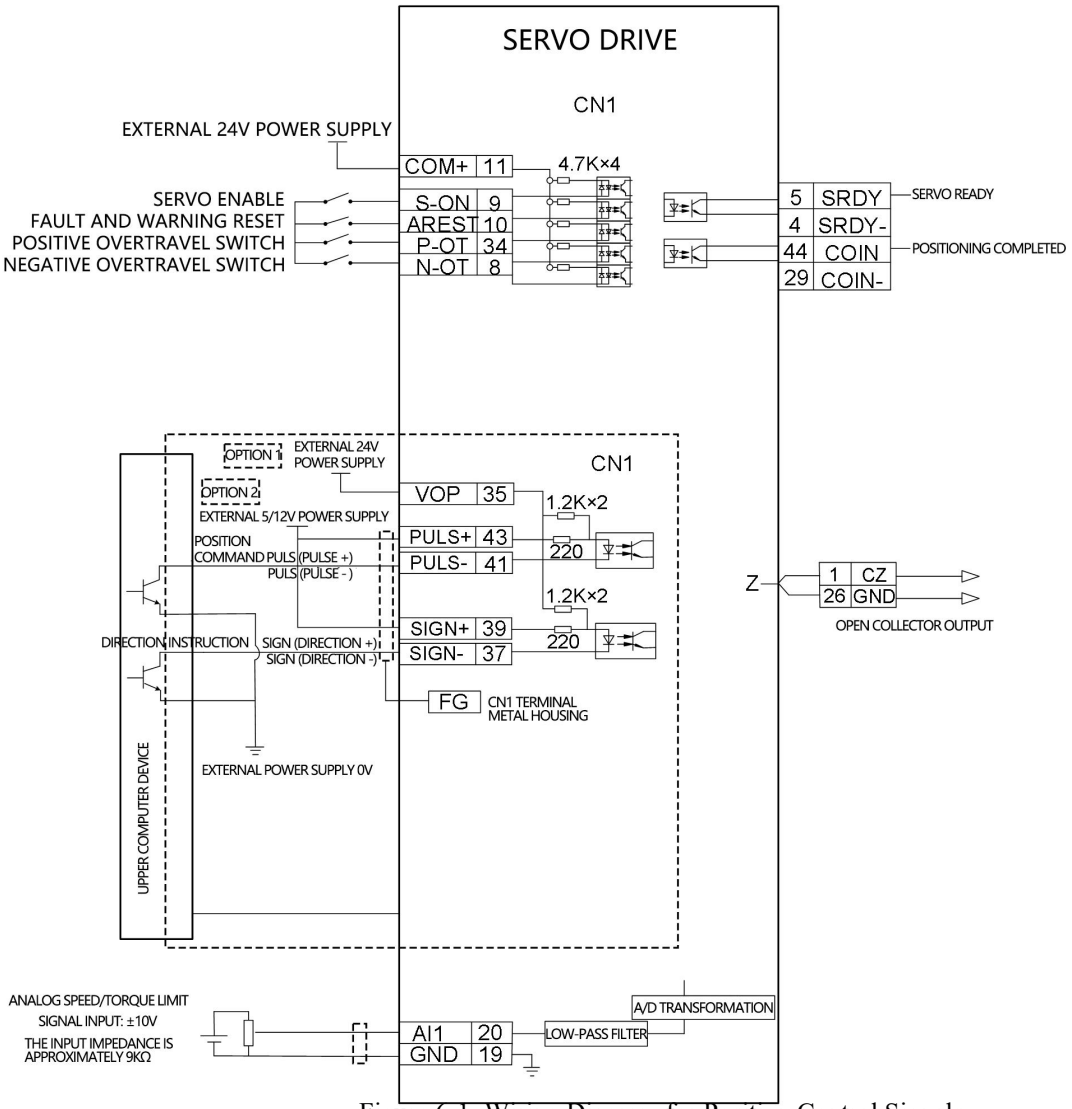
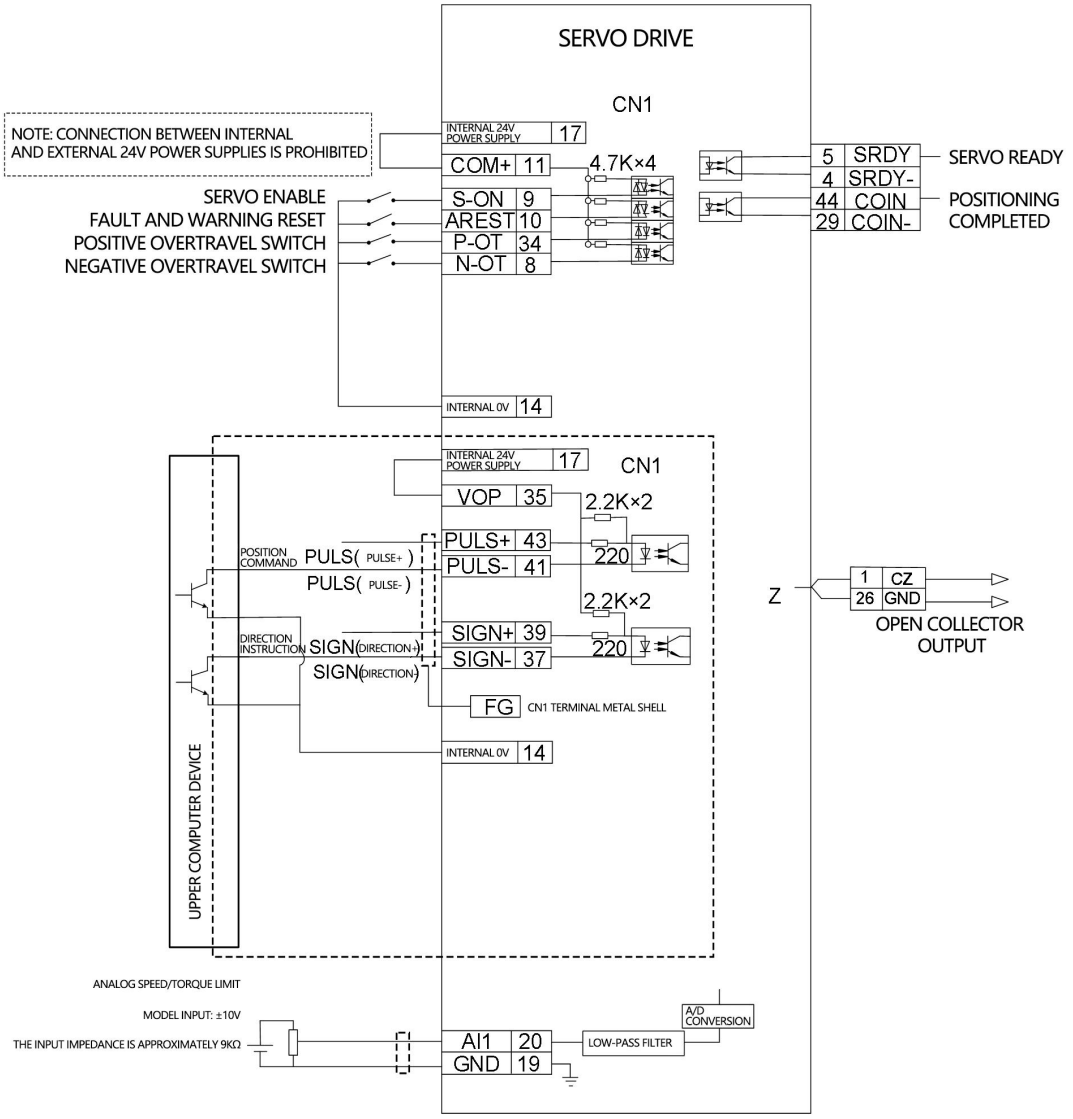


Figure 6-1: Wiring Diagram for Position Control Signals

pay attention to：

The single-ended drive configuration reduces the operating frequency. The resistor R value is determined by the pulse input circuit, with a drive current of 10-15mA and a maximum external power supply voltage of 25V. When using "Option 1" single-ended wiring, the 24V external power supply can be directly connected to the driver's corresponding port as shown in the diagram. For "Option 2" single-ended wiring, the 5V external power supply can be directly connected to the driver's corresponding port.

When using "Option 2" with an external 12V power supply, a resistor (R=510-820Ω) must be connected in series to the driver's corresponding port as shown in the diagram. (Note: Only one of the "Option 1" or "Option 2" wiring methods can be used; otherwise, the driver may be damaged.)



use the internal power supply for brake output signals, as this may affect the driver's normal operation.)

② When the terminal switch input signal uses the internal 24V power supply, the internal 24V power supply should be shorted to the common terminal COM+. When the pulse receiving circuit is used, the internal 24V power supply should be shorted to VOP, and the negative terminal of the signal should be connected to COM-.

7. Abbreviated Code of Function

7.1 P00 Basic Control Parameters

Number P□□-□□	Parameter name	Unit	Set range	Windows default	Effective method
P00-00	Control model	—	0～6	1	With immediate effect

Set value	Control model	Notes
0	Speed mode	The servo driver operates in speed control mode, controlling the motor speed through analog channels, parameter settings, and internal multi-speed settings.
1	Position mode	The servo driver operates in position control mode, which controls the motor's positioning through external position pulses and internal multi-segment position settings, and adjusts the motor's operating speed by pulse frequency.
2	Torque mode	The servo driver operates in torque control mode, and the motor output torque can be controlled through the analog channel and parameter setting.
3	Torque mode Speed mode	The servo driver controls the external digital input terminal (function code M1_SEL) to switch between torque and speed modes. Control model: Torque mode → M1_SEL: OFF; Speed mode → ON
4	Speed mode Position mode	The servo driver controls the external digital input terminal (function code M1_SEL) to switch between speed and position modes. Control model: Speed mode → M1_SEL: OFF; Position mode → ON
5	Torque mode Position mode	The servo driver controls the external digital input

terminal, function code M1_SEL, to switch between torque and position modes.

Control model	M1_SEL
Torque mode	OFF
Position mode	ON

6	Torque mode Speed mode Position mode	The servo driver controls the external digital input terminals, using function codes M1_SEL and M2_SEL, to switch between torque, speed, and position modes. Control model / M2_SEL / M1_SEL Torque mode / OFF / OFF Speed mode / ON / OFF Position mode / – / ON

P00-01	Motor rotation direction	–	0～1	0	Power on again
	Facing the motor end: 0-counterclockwise direction is positive 1-Clockwise direction is positive				
P00-02	Invert the split frequency output	–	0～1	0	Power on again
	Set the logic of A and B phase to reverse the phase relationship between A and B pulses. The 0-pulse output is not inverted: during forward rotation, A leads B. 1-Pulse output inversion: During forward rotation, B precedes A.				
P00-03	Manufacturer password	–	0～65535	0	With immediate effect
	Ganico manufacturer password				
P00-04	Restore factory settings		0～2	0	With immediate effect
	0-Operation 1-Reset to factory settings (excluding P06/P11 group parameters) 2-Clear alarm records				
P00-05	Default monitoring parameters	–	0～99	0	With immediate effect
	Set the default display monitoring parameters after power-on				
P00-08	Absolute value system selection	–	0～2	0	
	0-Incremental Position Mode 1-Absolutely Linear Position Mode 2-Absolutely Rotational Position Mode				
P00-09	LED alarm display selection	–	0～1	0	With immediate effect
	0-Output alarm information immediately 1-Do not output alarm information				
P00-10	Servo enable (S-ON) filter time	ms	0～64	0	

	constant				
	Filtering time for DI function code 1 (FunIN.1: S-ON)				
P00-11	Minimum resistance allowed by the driver	Ω	0～9999	-	Show
P00-15	Resistor setting	-	0～3	0	With immediate effect
	0-Use the built-in resistance for regeneration 1-1-Use an external regeneration resistor and allow natural cooling 2-2-Use an external regeneration resistor to force air cooling 3-13-No need for a resistor; the main capacitor absorbs the current				

P00-16	Power of the external regeneration resistor	W	1～65535	40	With immediate effect
	Set the power value of the external regeneration resistor				
P00-17	Resistance value of the external regeneration resistor	Ω	1～1000	50	With immediate effect
	Set the resistance value of the resistor				
P00-18	Servo enable OFF shutdown mode selection	-	0～1	0	With immediate effect
	0-Free stop, keep the system running freely 1-Stop at zero speed and maintain free running state				
P00-19	Fault No.2 Resettable fault shutdown mode selection	-	0～1	0	With immediate effect
	0-Free stop, keep the system running freely 1-Stop at zero speed and maintain free running state				
P00-20	Selection of Over-travel Shutdown Mode	-	0～2	1	With immediate effect
	0-Free stop, keep the system running freely 1-Stop at zero speed, position locked 2-Stop at zero speed and keep the free running state				
P00-22	Brake output ON to command receive delay	ms	0～500	250	With immediate effect
	The interval between the motor's brake engagement and the start of receiving operation commands after the servo is powered on.				
P00-23	In the static state, the brake output remains OFF until the motor is powered off for a delay period.	ms	1～1000	150	With immediate effect
	Brake-off delay time from motor stationary to de-energized				
P00-24	Rotation state, speed threshold when brake output is OFF	rpm	0～3000	30	With immediate effect

	Motor Threshold for Brake Output OFF Signal During Operation				
P00-25	Rotation state: The motor remains powered off until the brake output is OFF for a delay.	ms	1～1000	500	With immediate effect
	The motor is in rotation. After enabling the OFF function, the output delay for the motor brake-off signal is applied.				
P00-27	User password	—	0～65535	-	Power outage takes effect
	Set and enter passwords				

P00-33	Servo enable ON to brake output ON delay	ms	0～1000	0	With immediate effect
	The delay time from when the servo enable is ON to when the brake output (BK) is ON				

7.2 P01 Position Control Parameters

Number P□□-□□	Parameter name	Unit	Set range	Windows default	Effective method
P01-00	The electronic number of teeth is 1	—	1～1073741824	1048576	With immediate effect
	The first set of electronic gear ratio molecules in the position setting instruction mode is only valid when the position mode is active.				
P01-02	The numerator of the electronic tooth count is 2	—	1～1073741824	10000	With immediate effect
	The first set of electronic gears for setting position command mode is the denominator, which is only valid when in position mode.				
P01-04	The electronic number of teeth is 2 more than the molecular number.	—	1～1073741824	1048576	With immediate effect
	The second set of electronic gear ratio numerator in position command mode is valid only when the position mode is active.				
P01-06	The numerator of the electronic tooth count is 2	—	1～1073741824	10000	With immediate effect
	The second set of electronic gears for setting position command mode is the sub-division gear, which is only valid when the position mode is active.				
P01-08	Position command source	—	0～2	0	With immediate effect
	0-Pulse command 1-Step quantity set 2-Multi-position command set				
P01-09	Pulse instruction input channel selection	—	0～1	0	With immediate effect

	0-Low-speed channel; 1-High-speed channel				
P01-10	Pulse input form	—	0～3	0	Power outage takes effect
	0-Pulse + symbol, positive logic; 1-Pulse + symbol, negative logic; 2. Two-phase orthogonal pulse (4 times frequency); 3-CCW pulse + CW pulse				
P01-11	Feedback output pulse count	P/r	35～32767	2500	Power outage takes effect
	Set the number of pulses per cycle for the pulse output terminals OA and OB.				

P01-12	Feedback output pulse source selection	—	0～2	0	Power outage takes effect
	0-encoder frequency division output; 1-pulse instruction synchronization output; 1-2-Frequency division or synchronous output is prohibited				
P01-13	Position command low-pass filter time constant	ms	0～6553.5	0	With immediate effect
	The parameter can be set to reduce the mechanical impact when the input pulse command frequency changes abruptly.				
P01-15	Mean filter time constant	s	0～128	0	With immediate effect
	Filtering time constant for the average value of position setting commands (encoder units)				
P01-16	Clear action selection	-	0～2	0	With immediate effect
	Set conditions to clear positional deviation: Position deviation = (position command-position feedback) (encoder unit) Clear position deviation when 0-servo enable is OFF. 1-Clear position deviation when servo fails; 2-Servo enable is turned off and the ClrPosErr signal from DI input clears the position deviation.				
P01-17	Position feedforward control selection	—	0～3	0	With immediate effect
	The source of the feedforward signal of the speed loop is set. In position control mode, the speed feedforward control can improve the response speed of position command 0-no speed feedforward; 1-Internal speed feedforward, the position command (encoder unit) corresponding speed information as the speed loop feedforward source; 2-Use AI1 as the speed feedforward input, with the analog signal from the AI 1 input channel serving as the speed loop feedforward source; 3-Use AI2 as the speed feedforward input, and the corresponding speed value of the analog channel AI2 input as the feedforward source of the speed loop.				
P01-18	Complete the output condition after positioning	—	0～3	0	With immediate effect

	Output when: 0-Absolute position deviation is less than P01-19; 1-Absolute position deviation is less than P01-19 and the filtered position command is 0; 2-Absolute position deviation is less than P01-19 and the unfiltered position command is 0; 3-Absolute position deviation is below the positioning completion/approach threshold and the filtered position command is 0, with the output maintained for at least the duration set by P01-52.

P01-19	Location completion range	encoder / Instruction unit	1～65535	734	With immediate effect
	In position control, the signal indicating the completion of servo motor positioning is generated when the command pulse from the host computer and the servo motor displacement (position deviation) are below this parameter. The signal is then output to confirm whether the positioning is complete.				
P01-20	Locate the approximate range value	encoder / Instruction unit	1～65535	65535	With immediate effect
	Threshold of absolute value of position deviation of servo driver output positioning proximity signal				
P01-27	Origin return control selection	—	0～6	0	With immediate effect
	0-Close origin reset; 1-Enable the origin reset function by inputting the HomingStart signal through DI; 2-Enable the electrical reset function by inputting the HomingStart signal through DI; 3-Start origin reset immediately after power-on; 4-Return to the origin immediately; 5-Start the electrical reset command; 6-Use the current location as the origin.				
P01-28	Origin Operation Mode	—	0～13	0	With immediate effect
	0-Positive return to zero, the deceleration point and origin are the origin switches; 1. Reverse return to zero, the deceleration point and the origin are the origin switches; 2. Positive return to zero, the deceleration point and the origin are the motor Z signal; 3. Reverse reset: The deceleration point and origin are designated as the motor's Z-axis signal. 4. Positive return to zero, the deceleration point is the origin switch, the origin is the motor Z signal; 5. Reverse return to zero, the deceleration point is the origin switch, the origin is the motor Z signal; 6. Positive return to zero, with the deceleration point and origin serving as				

	the positive overtravel cutoff; 7. Reverse reset: The deceleration point and origin are the reverse overtravel cutoff points. 8. Positive return to zero, the deceleration point is the positive overtravel switch, the origin is the motor Z signal; 9. Reverse return to zero, the deceleration point is the reverse over travel switch, the origin is the motor Z signal; 10. Forward return to zero, the deceleration point and the origin are the mechanical limit position; 11-Reverse return to zero: The deceleration point and origin are the mechanical limit positions, with the origin being the motor Z signal. 12-Foreward return to zero: The deceleration point is the mechanical limit position, with the origin being the motor Z signal. 13. Reverse return to zero, the deceleration point is the mechanical limit position, the origin is the motor Z signal.				
P01-29	High-speed search for the origin switch signal speed	rpm	0～3000	100	With immediate effect
	The maximum speed of the motor when setting the deceleration point signal or setting the electrical time will trigger an alarm if the process takes too long.				

P01-30	The speed of the low-speed search for the origin switch signal	rpm	0～1000	10	With immediate effect
	Motor speed at the origin reset				
P01-31	Acceleration and deceleration time when searching for the origin	ms	0～1000	1000	With immediate effect
	Motor acceleration at the origin return to zero				
P01-32	Filter origin time	ms	0～65535	10000	With immediate effect
	Maximum search time for origin				
P01-33	Mechanical origin offset	Instruction unit	-1073741824 ～ 10 73 74 18 24	0	With immediate effect
	Set the absolute position of the motor after resetting the origin				
P01-35	Condition of electronic gear shift	-	0～1	0	With immediate effect
	0: The position instruction is 0, and it switches to 1 after 2.5ms. 1: Real-time switching				

P01-36	Mechanical Origin Offset and Limit Handling	—	0～3	0	With immediate effect

The relationship between the mechanical origin and the mechanical zero point when setting the origin to zero and the treatment of the overtravel switch encountered in the process of origin to zero

Set value	Mechanical Origin Offset and Limit Handling	Remarks	
		Mechanical origin	Overhang processing method
0	P01-33 is the coordinate after origin reset. When encountering a limit, it reactivates the origin reset and reverses to find the origin.	The mechanical origin and the mechanical zero point are not coincident. After the origin is returned to zero, the motor stops at the mechanical origin, and the mechanical origin coordinates are forced to P01-33.	Send the origin return trigger signal again to execute the origin return in servo reverse mode.
1	P01-33 is the relative offset after origin reset. When encountering a limit, it reactivates the origin reset and reverses the origin search.	The mechanical origin coincides with the mechanical zero point. After the motor has fixed the mechanical origin, it continues to move the displacement set by P01-33 and then stops.	Send the origin return trigger signal again to execute the origin return in servo reverse mode.
2	P01-33 is the coordinate after origin return, and it automatically reverses to zero when encountering a limit.	The mechanical origin and the mechanical zero point are not coincident. After the origin is returned to zero, the motor stops at the mechanical origin, and the mechanical origin coordinates are forced to P01-33.	Servo auto reverse, continue to return to origin
3	P01-33 is the relative offset after origin reset. It automatically reverses to zero when encountering a limit.	The mechanical origin coincides with the mechanical zero point. After the motor has fixed the mechanical origin, it continues to move the displacement set by P01-33 before stopping.	Servo auto reverse, continue to return to origin

P01-37	Z pulse output polarity selection	—	0～1	1	Power outage takes effect
0-Positive output (Z pulse as high level) 1-Negative output (Z pulse as					

	low level)				
P01-38	Position pulse along selection	—	0～1	0	Power outage takes effect
	0-Valid on the falling edge	1-rising edge valid			

P01-51	Location completion window time	ms	0～30000	0	With immediate effect
	The time difference between the positioning deviation and the positioning completion threshold must exceed the set window time for the positioning completion signal to output a valid status.				
P01-52	Location completion time	ms	0～30000	0	With immediate effect
	P01-18 equals the COIN (Completed Positioning) signal's valid duration. If the position command is not 0 during this period, the COIN signal becomes invalid. When set to 0, the signal remains valid from output until the next command arrives.				
P01-53	Encoder pulse count (32 bits)	P/r	0～262143	0	Power outage takes effect
	When the set value is less than 35, the encoder's frequency division pulse count is determined by the P01-11 set value; when the set value is 35 or greater, the frequency division pulse count is determined by the P01-53 set value.				
P01-55	Number of position commands per motor revolution	P/r	0～8388608	0	Power outage takes effect
	Set the number of position commands required for each motor rotation. When P01-55=0, the parameters for electronic gear ratios 1 and 2 (P01-00~P01-06) and the switching conditions for electronic gear ratios (P01-35) are active. When P01-55=0, the electronic gear ratio is $\frac{B}{A} = \frac{\text{Encoder resolution}}{\text{P01-55}}$ At this time, the electronic gear ratios 1 and 2 are inactive. The 20-bit encoder has a resolution of 1048576P/r. 23-bit encoder with resolution of 8388608P/r; The resolution of 2500 line encoder is 10000P / r.				

7.3 P02 Speed Control Parameters

Number P□□-□□	Parameter name	Unit	Set range	Windows default	Effective method
P02-00	Speed command source	—	0～4	0	With immediate effect
	0-Source of the main speed command A; 1-Assisted speed command B source; 2-A+B; 3-A/B switch; 4-Communication is given.				
P02-01	Source of Main Speed Command A	—	0～2	0	With immediate effect
	0-Parameter settings (P02-03); 1-AI1; 2-AI2				
P02-02	Auxiliary speed command B source	—	0～5	1	With immediate effect
	0-Parameter setting (P02-03); 1-AI1; 2-AI2; 3-0 (no effect); 4-0 (no effect); 5-Multi-speed command.				
P02-03	Speed command parameter setting	rpm	-3300 ～ 3300	200	With immediate effect
	Internal speed setpoint				
P02-04	Dot speed setting	rpm	0～3300	100	With immediate effect
	Set the dot speed to a global value				
P02-05	Maximum speed threshold	rpm	0～3300	3300	With immediate effect
	Set the speed threshold, usually determined by the motor				
P02-06	Forward speed threshold	rpm	0～3300	3300	With immediate effect
	Set forward rotation speed threshold				
P02-07	Reverse speed threshold	rpm	0～3300	3300	With immediate effect
	Set reverse speed threshold				
P02-08	Velocity command acceleration ramp time constant	ms	0～65535	0	With immediate effect

	Time to accelerate from 0 to 1000rpm				
P02-09	Speed command deceleration slope time constant	ms	0～65535	0	With immediate effect
	Time to reduce speed from 1000rpm to 0				
P02-14	Speed reaches the signal threshold.	rpm	10～3300	1000	With immediate effect
	Set the threshold for the actual speed to reach the desired value				
P02-15	Zero-speed output signal threshold	rpm	1～3300	10	With immediate effect
	Set zero speed output signal				

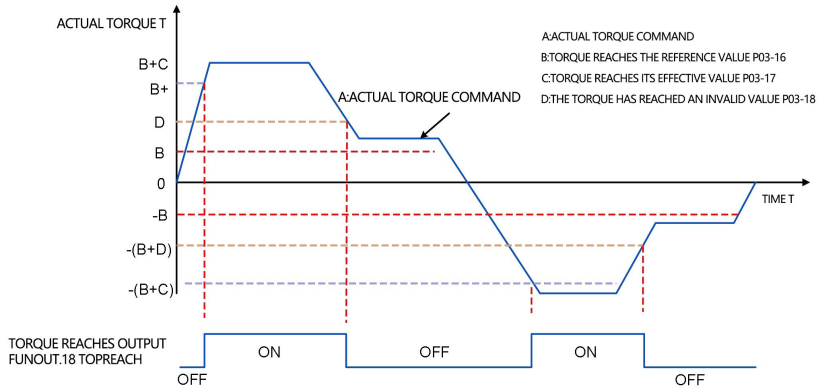
7.4 P03 Torque Control Parameters

<table>
<tr><th>Number P □□-□□</th><th>Parameter name</th><th>Unit</th><th>Set range</th><th>Windows default</th><th>Effective method</th></tr>
<tr><td rowspan="2">P03-00</td><td>Torque command selection</td><td></td><td>0～4</td><td>0</td><td>With immediate effect</td></tr>
<tr><td colspan="5">
<table>
<tr><th>Set value</th><th>Control model</th><th>Remarks</th></tr>
<tr><td>0</td><td>Main pivot instruction A source</td><td>The function code P03-01 is used to select the actual input instruction source.</td></tr>
<tr><td>1</td><td>Auxiliary pivot instruction B source</td><td>The actual input instruction source is selected by function code P03-02.</td></tr>
<tr><td>2</td><td>Main instruction A comes Source + Auxiliary Instruction B Source</td><td>The input instruction source selected by function code P03-01 and P03-02 is used as the actual torque instruction.</td></tr>
<tr><td>3</td><td>Switch between main instruction A source and auxiliary instruction B source</td><td>The switch between A and B sources was performed by the DI function FunIN.4 (Cmd_Sel).
<table>
<tr><th>FunIN.4 (Cmd_Sel) status</th><th>Command selection</th></tr>
<tr><td>Of no avail</td><td>Source of Main Torque Command A</td></tr>
<tr><td>valid</td><td>Source of Auxiliary Torque Command B</td></tr>
</table></td></tr>
<tr><td>4</td><td>Communication given</td><td>The function code P31-11 is operated by the communication mode to input the torque command.</td></tr>
</table>
</td></tr>
<tr><td>P03-01</td><td>Main Torque Command A Source</td><td>—</td><td>0～2</td><td>0</td><td>With immediate effect</td></tr>
<tr><td colspan="5">0-The parameter is determined by P03-03; 1-External analog AI1 determines; 2-External analog
The AI2 model makes the decision.</td></tr>
<tr><td>P03-02</td><td>Source of Auxiliary Torque</td><td>rpm</td><td>0～2</td><td>1</td><td>With immediate ef-</td></tr>
</table>

	Command B				fect
	0-The parameter is determined by P03-03; 2-External analog AI2 decides.	1-External analog signal AI1 determines;			
P03-03	Internal parameter setting of torque command	%	-300.0～300.0	0	With immediate effect
	Set internal torque value				
P03-04	Torque command filter time constant	ms	0～30.00	0.79	With immediate effect
	Set the torque command filter time constant				
P03-05	Second torque command filter time constant	ms	0～30.00	0.79	With immediate effect
	Set the torque command filter time constant. The second gain takes effect during rigid level switching.				

P03-06	Torque limiting source	—	0～4	0	With immediate effect
	0-Positive and negative internal torque limits; 1. Positive and negative external torque limit (using P-CL and N-CL); 2. T-LMT as external torque limit input; 3. Positive and negative external torque and minimum external T-LMT value as torque limit (using P-CL and N-CL). 4. Switching between positive/negative internal torque limits and T-LMT torque limits (using P-CL and N-CL selection).				
P03-07	Selection of Analog Torque Limiting Channel	—	1～2	2	With immediate effect
	1-AI1; 2-AI2				
P03-08	Forward rotation internal torque limit	%	0.0~300.0	300.0	With immediate effect
	When P03-00 is set to 0 or 4, the internal torque limit for forward rotation is 100.0%, which corresponds to 100% of the motor's rated torque.				
P03-09	Inversion internal torque limit	%	0.0~300.0	300.0	With immediate effect
	When P03-00 is set to 0 or 4, the internal torque limit is reversed.100.0% corresponds to 100% of the motor's rated torque.				
P03-10	Forward rotation external torque limit	%	0.0~300.0	300.0	With immediate effect
	When P03-00 is set to 1 or 3, the internal torque limit for forward rotation is 0.100% of the motor's rated torque.				
P03-11	Reverse external torque limit	%	0.0~300.0	300.0	With immediate effect
	When P03-00 is set to 1 or 3, the internal torque limit is reversed.100.0% corresponds to 100% of the motor's rated torque.				
P03-12	Selection of speed limit mode in torque control	—	0～2	0	With immediate effect
	Speed limit source under torque control mode: 0-Internal speed limit; 1-V-LMT as an external constraint; 2-DIFUN3 function Select speed limit, invalid signal is set speed by P03-14, valid signal is set speed by P03-15.				
P03-13	Channel selection of analog velocity limit	—	1～2	1	With immediate effect
	1-AI1 2-AI2				
P03-14	Torque control forward speed limit / torque control speed limit	rpm	0～3300	3300	With immediate effect
	Set the speed limit value 1 in torque mode				

P03-15	Torque control reverse speed limit / Torque control speed limit 2	rpm	0～3300	3300	With immediate effect
	Set speed limit value 2 in torque mode				

P03-16	Torque reaches the reference value	%	0.0~300.0	300.0	With immediate effect
	See P03-18 timing diagram for details				
P03-17	Torque reaches effective value	ms	0.0~300.0	1.0	With immediate effect
	See P03-18 timing diagram for details				
P03-18	The torque reached an invalid value	ms	0.5～30.0	1.0	With immediate effect
	The Torque Arrival Function (FunOUT.18: ToqReach) determines whether the actual torque command has reached the valid range. When this condition is met, the driver outputs the corresponding DO signal for the host computer to use.  Actual torque command (viewable via P0B-02): A; torque reaches the reference value P03-16: B; The torque reaches its effective value (P03-17: C). Torque reaches invalid value P03-18: D; C and D are the bias on B. Therefore, when the torque arrival DO signal transitions from invalid to valid, the actual torque command must satisfy |A| ≥ B+C. Otherwise, the torque arrival DO signal remains invalid. Conversely, when the torque arrival DO signal transitions from valid to invalid, the actual torque command must satisfy |A|<B+D. Otherwise, the torque arrival DO signal remains valid. Otherwise, the torque reaches the DO signal, which remains active.				
P03-19	Time limit for speed in torque mode	ms	0.5～30.0	1.0	With immediate effect
	The speed limit value is exceeded and the time reaches the parame-				

	ter set time to output the speed limit signal (FunOUT.8: V-LT)				

7.5 P04 IO Input/output Parameters

Number P□□-□□	Parameter name	Unit	Set range	Windows default	Effective method
P04-00	Valid DI function allocation for power-on 1	—	0～0xFFFF	0	Power outage takes effect
	0~0xFFFF Bit0: FunIN.1 Bit1: FunIN.2... Bit15: FunIN.16				
P04-01	Valid DI function allocation for power-on 2	—	0～0xFFFF	0	Power outage takes effect
	0~0xFFFF Bit0: FunIN.17 Bit1: FunIN.18... Bit15: FunIN.32				
P04-02	Select the function of the DI1 terminal	—	0～37	1	Power outage takes effect

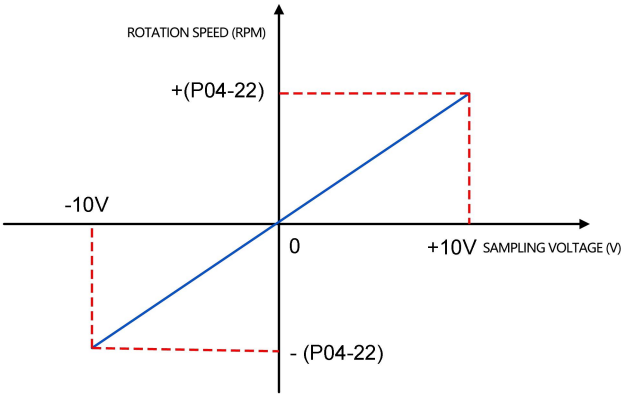
Set value	DI terminal function	Set value	DI terminal function
0	Do not assign DI function	19	JOGCMD- (reverse stop)
1	S-ON (servo enable)	20	PosStep (Enable step size)
2	ALM-RST (fault and warning reset)	21	HX1 (Handwheel Scale Signal 1)
3	Gain switch	22	HX2 (Handwheel Scale 2)
4	Command selector	23	HXEN (Handwheel Enable Signal)
5	DIR-SEL (Directional Selective Execution of Instructions)	24	Gear Selection
6	CMD1 (Command 1 for Multi-Phase Execution)	25	ToqD irSel (torque direction setting)
7	CMD2 (Command to Switch Multiple Executions 2)	26	SpdDirSel (Speed Direction Setting)
8	CMD3 (Command 3 for Multi-Phase Execution)	27	PosDirSel (Position Direction Setting)
9	CMD4 (Command 4 for Multi-Phase Instruction Switching)	28	PosInSen (Multi-Stage Position Instruction Enable)
10	M1-SEL (Mode Switch 1)	29	XintFree (interrupted termination)
11	M2-SEL (Mode Switch 2)	30	--
12	ZCLAMP (zero clamp)	31	HomeSwitch (home button)
13	INHIBIT (position instru-	32	HomingStart (Enable origin

	ction prohibition)		return)
14	Positive overtravel switch	33	XintInhibit (interrupt fixed length prohibition)
15	N-OT (reverse overtravel switch)	34	EmergencyStop
16	Positive external torque limit	35	ClrPosErr (Clear Position Deviation)
17	Negative external torque limit	36	V_LmtSel (internal velocity limit source)
18	JOGCMD+ (Forward Jog)	37	Pulseinhibit (pulse instruction prohibition)

P04-03	DI1 terminal logic selection	—	0～4	0	Power outage takes effect
	Input polarity: 0-0 to 4 0-Low level valid 1-High level valid 3-the falling edge is valid 4-the rising edge and falling edge are valid.			2-rising edge valid	
P04-04	Select the function of the DI2 terminal	—	0～37	2	Power outage takes effect
	—				
P04-05	DI2 terminal logic selection	—	0～4	0	Power outage takes effect
	Input polarity: 0 to 4 0 (low level valid) The falling edge is valid 4-both rising and falling edge are valid.			1-Valid on high level 2-Valid on rising edge	
P04-06	Select the function of the DI3 terminal	—	0～37	14	Power outage takes effect
	—				
P04-07	DI3 terminal logic selection	—	0～4	0	Power outage takes effect
	Input polarity: 0 to 4 0 (low level valid) The falling edge is valid 4-both rising and falling edge are valid.			1-Valid on high level 2-Valid on rising edge	
P04-08	Select the function for the DI4 terminal	—	0～37	15	Power outage takes effect
P04-09	DI4 terminal logic selection	—	0～4	0	Power outage takes effect
	Input polarity: 0 to 4 0 (low level valid) The falling edge is valid 4-both rising and falling edge are valid.			1-Valid on high level 2-Valid on rising edge	
P04-10	DI5 terminal function selection	—	0～37	12	Power outage takes effect
P04-11	DI5 terminal logic selection	—	0～4	0	Power outage takes effect

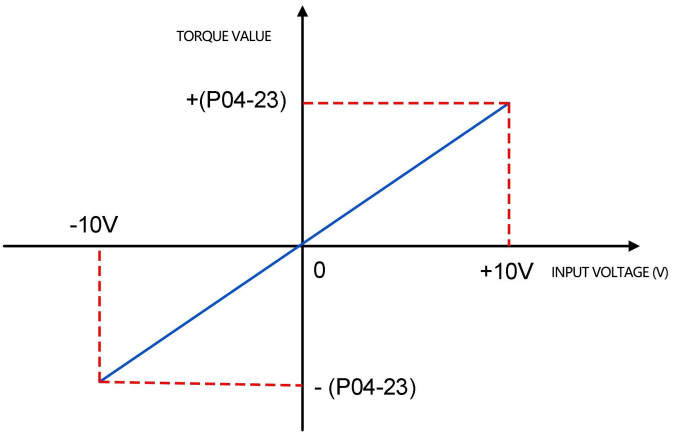
	Input polarity: 0 to 4 0 (low level valid) The falling edge is valid 4-both rising and falling edge are valid.			1-Valid on high level 2-Valid on rising edge	
P04-12	Select the function for the DI6 terminal	—	0～37	13	Power outage takes effect
P04-13	DI6 terminal logic selection	—	0～4	0	Power outage takes effect
	Input polarity: 0 to 4 0 (low level valid) The falling edge is valid 4-both rising and falling edge are valid.			1-Valid on high level 2-Valid on rising edge	
P04-14	Select the function of the DI7 terminal	—	0～37	3	Power outage takes effect
	—				
P04-15	DI7 terminal logic selection	—	0～4	0	Power outage takes effect
	Input polarity: 0 to 4 0 (low level valid) The falling edge is valid 4-both rising and falling edge are valid.			1-Valid on high level 2-Valid on rising edge	
P04-16	Select the function for the DI8 terminal	—	0～37	31	Power outage takes effect
	—				

P04-17	DI8 terminal logic selection	—	0～4	0	Power outage takes effect
	Input polarity: 0 to 4 0 (low level valid) The falling edge is valid 4-both rising and falling edge are valid.			1-Valid on high level 2-Valid on rising edge	
P04-18	Select the function for the DI9 terminal	—	0～37	0	Power outage takes effect
	—				
P04-19	DI9 terminal logic selection	—	0～4	0	Power outage takes effect
	Input polarity: 0 to 4 0 (low level valid) The falling edge is valid 4-both rising and falling edge are valid.			1-Valid on high level 2-Valid on rising edge	
P04-20	Valid DI function allocation for power-on 3	—	0～0 xFFFF	0	Power outage takes effect
	0~0xFFFF Bit0-corresponds to FunIN.33 Corresponding to FunIN.48			Bit1 corresponds to FunIN.34..... Bit15-	
P04-21	Valid DI function allocation for power-on 4	—	0～0 xFFFF	0	Power outage takes effect
	0~0xFFFF Bit0-corresponds to FunIN.49 Corresponding to FunIN.64			Bit1 corresponds to FunIN.50..... Bit15-	
P04-22	Analog 10V corresponds to speed value	1rpm	0~6000	3000rpm	With immediate effect
	The corresponding motor speed value is set when the sampling voltage is 10 V.				



$$\text{Speed setpoint} = \frac{\text{Sampling voltage}}{10} \times (\text{P04-22})$$

In position control mode, when using speed feedforward with the feedforward source being AI1 or AI2

	(P01-17=2 or 3); In speed control mode, the speed command originates from analog set parameters (P02-01 or P02-02 =1 or 2). In the torque control mode, the speed limit is determined by the analog setting (P03-13=1 or 2).				
P04-23	The analog signal of 10V corresponds to the torque value.	Times	1.00~8.00	1.00	With immediate effect
	The torque value corresponding to the sampling voltage of 10V is set. The torque value is expressed in the form of multiples of the rated torque of the motor. 1.00 times corresponds to 1 times the rated torque of the motor. In torque control mode, the torque command originates from analog set points (P03-01 or P03-02 =1 or 2). In torque control mode, the torque limit is determined by the analog timing (P 03-07=1 or 2).  Torque given value=$\frac{\text{sampled voltage}}{10} \times$ (P04-23) In torque control mode, the torque command originates from analog input settings (P03-01 or P03-02 =1 or 2). In torque control mode, the torque limit is set by analog input (P03-07=1 or 2).				
P04-24	AI1 bias in affine function	mv	0~1000.0	0	With immediate effect
	Set the zero drift-corrected driver sampling voltage to 0, and AI1 will display the actual input voltage.				

P04-25	AI1 Input filter time constant	ms	0~655.35	2.0	With immediate effect
	The software is used to set the filter time constant of the input voltage signal of AI1. The filter function can not eliminate or restrain the zero drift and dead time.				

P04-27	AI1 dead zone	mv	0~1000.0	10	With immediate effect
	Set the driver sampling voltage to 0 when the AI1 input voltage range is specified.				
P04-28	AI1 zero drift	mv	0~1000.0	0	With immediate effect
	Zero drift: The sampling voltage value of the servo driver relative to GND when the analog channel input voltage is 0. Use the auxiliary function P0D-10=1 (simulated channel auto-adjust) to automatically adjust the AI1 zero drift, and the adjusted AI1 zero drift value will be stored in P04-28. If the zero drift is greater than 500.0mV, Er.903 (AI zero drift is too large) will occur. If the sampling voltage is greater than 11.5V, Er.824 (AD sampling overvoltage fault) will occur. In torque control mode, the torque command is derived from the analog voltage setpoint.				
P04-29	AI2 bias in affine function	mv	0~1000.0	0	With immediate effect
P04-30	AI2 Input filter time constant	ms	0~655.35	2.0	With immediate effect
P04-32	AI2 dead zone	mv	0~1000.0	10	With immediate effect
P04-33	AI2 zero drift	mv	0~1000.0	0	With immediate effect
P04-40	D01 Terminal Function Selection	—	0~22	1	With immediate effect

Set value	DO function name	Set value	DO function name
0	Do not assign DO function	12	ALMO1: Output 3-bit alarm code
1	S-RDY: Servo ready	13	ALMO2: Output 3-bit alarm code
2	TGON: Motor rotation	14	ALMO3: Output 3-bit alarm code
3	ZERO: Zero speed signal	15	Xintcoin: Determination of completion of long interrupt
4	V-CMP: Velocity consistency	16	HomeAttain: Origin reset completed
5	COIN: Location completed	17	ElecHomeAttain: Power reset completed
6	NEAR: Find nearby	18	ToqReach: Torque arrival
7	C-LT: torque limit	19	V-Arr: Velocity Arrival
8	V-LT: Velocity limited	20	IntRdy: Angle Identification Output
9	BK: band-type brake	21	DB: DB brake output
10	WARN: warn	22	CmdOk: Internal command output
11	ALM: hitch		

P04-41	D01 terminal logic selection	—	0~1	0	With immediate effect
	Output polarity setting: 0~1 0-On when valid; 1-Off when valid.				
		—			

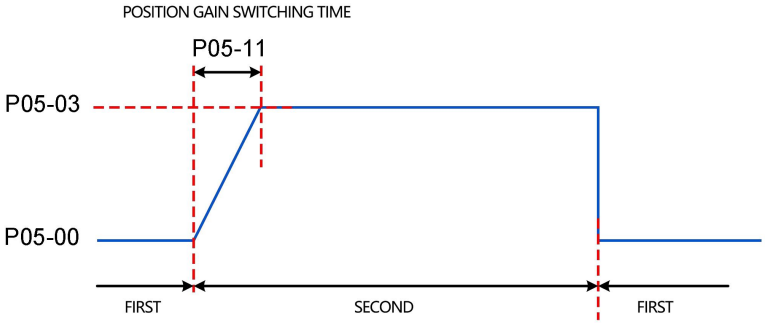
P04-42	D02 Terminal Function Selection		0~22	5	With immediate effect
	—				
P04-43	D02 terminal logic selection	—	0~1	0	With immediate effect
	Output polarity setting: 0~1 0-On when valid; 1-Off when valid.				
P04-44	D03 Terminal Function Selection	—	0~22	3	With immediate effect

	—				
P04-45	D03 terminal logic selection	—	0~1	0	With immediate effect
	Output polarity setting: 0~1 0-On when valid; 1-Off when valid.				
P04-46	D04 terminal function selection	—	0~22	11	With immediate effect
	—				
P04-47	D04 terminal logic selection	—	0~1	0	With immediate effect
	Output polarity setting: 0~1 0-On when valid; 1-Off when valid.				
P04-48	D05 terminal function selection	—	0~22	16	With immediate effect
	—				
P04-49	D05 terminal logic selection	—	0~1	0	With immediate effect
	Output polarity setting: 0~1 0-On when valid; 1-Off when valid.				
P04-50	A01 Function Selection	—	0~9	0	With immediate effect
	0-Motor speed (1V/1000rpm) 1-Speed command (1V/1000rpm) 2-Torque command (1V/100%) 3-position deviation (0.05V per command unit) 4-position deviation (0.05V per encoder unit) 5-position command speed (1V/1000rpm) 6-Positioning completion command (Completed: 5V, Incomplete: 0V) 7-Speed feedforward (1V/1000rpm) 8-AI1 voltage (1V/1V) 9-AI2 voltage (1V/1V)				
P04-51	A01 Bias Voltage	mv	-10000~10000	5000	With immediate effect
	Setting the Bias Voltage for Analog Output Port A01				
P04-52	A01 magnification	Times	-99.99~99.99	1.00	With immediate effect
	Set the multiplier for analog output port A01				

7.6 Gain and Auto-Tuning Class Parameters in P05 Group

Number P□□-□□	Parameter name	Unit	Set range	Windows default	Effective method
P05-00	Position loop gain	Hz	0.0~2000.0	40.0	With immediate effect
	This parameter determines the responsiveness of the position loop. A larger gain can shorten the positioning time, but it may cause excessive vibration.				
P05-01	Speed loop gain	Hz	0.1~2000.0	25.0	With immediate effect
	This parameter determines the response of the speed loop. The larger the value, the faster the response. However, setting it too large may cause vibration, so be careful.				
P05-02	Integral time constant of velocity loop	ms	0.15~512.00	31.83	With immediate effect
	The smaller the value, the stronger the integration effect, and the faster the deviation approaches zero when stopping.				
P05-03	Second position loop gain	Hz	0.0~2000.0	64.0	With immediate effect
	—				
P05-04	Second speed loop gain	Hz	0.1~2000.0	40.0	With immediate effect
	—				
P05-05	Second speed loop integral time constant	ms	0.15~512.00	40.00	With immediate effect
	—				
P05-06	Second gain mode settings	—	0~1	1	With immediate effect
	0-First gain fixed, switch between P/PI modes using external DI 1-Set gain switching according to P05-07 conditions				
P05-07	Gain switching condition selection	-	0~10	0	With immediate effect
	0-First gain fixed (PS) 1-Use external DI switch (PS) 1-Torque command high (PS) 3-Speed instruction large (PS) 4-High rate of change in speed commands (PS) 5-Speed command high-low threshold (PS) 6-Large positional deviation (P) 7-Position command (P) 8-Location Complete (P) 9-Actual speed is high (P)				

	10-Position command + actual speed (P)				
P05-08	Gain switching delay time	ms	0.0~1000.0	5.0	With immediate effect
	Set the duration for which the switching condition is required when returning from the second gain to the first gain				
P05-09	Gain switching level	-	0~20000	50	With immediate effect
	Set the level to satisfy the gain switching condition. The actual handover action is influenced by both the handover level and the handover delay, as described in P05-07. The handover level unit varies according to the handover gain condition.				

P05-10	Gain switching delay	-	0~20000	30	With immediate effect
	The delay is set to satisfy the gain switching condition. The actual handover is affected by the level and the delay, and the unit of delay varies according to the handover condition. Set P05-09 to be ≥ P05-10. If the set value of P05-09 is less than P05-10, the system will automatically set P05-09 to P05-10.				
P05-11	Gain switching delay time	ms	0.0~1000.0	3.0	With immediate effect
	In position control mode, if P05-03 (second position loop gain) is significantly higher than P05-00 (position loop gain), configure the transition time from P05-00 to P05-03 after the switching action is triggered. The impact of the position loop gain increase can be reduced by using this parameter.  If P05-03 is less than or equal to P05-00, this parameter is invalid and the system will immediately switch to the second gain.				
P05-12	Load moment of inertia ratio	Times	0.00~120.00	1.00	With immediate effect
	The ratio of mechanical load inertia to the rotational inertia of the motor itself				
P05-13	Velocity feedforward filter time constant	ms	0.00~64.00	0.50	With immediate effect
	The filter time constant of the speed feedforward can reduce the impact of the feedforward after setting.				
P05-14	Velocity feedforward gain	%	0.0~100.0	0.0	With immediate effect
	Increasing this parameter improves the response to position commands and reduces the position deviation of steady-state speed.				

P05-15	Torque feedforward filter time constant	ms	0.00~64.00	0.50	With immediate effect
	The filter time constant of torque feedforward can reduce the impact of feedforward after setting				
P05-16	Torque feedforward gain	%	0.0~100.0	0.0	With immediate effect
	Increasing this parameter improves the response to position commands and reduces the bit error of steady-state speed.				

P05-17	Speed feedback filter options	-	0~4	1	With immediate effect

Set value	Effect of speed feedback filtering
0	Speed feedback average filtering
1	Velocity feedback 2 times average filtering
2	Velocity feedback 4 times average filter
3	Velocity feedback 8 average filter

P05-18	Speed feedback low-pass filter cutoff frequency	Hz	100~4000	4000	With immediate effect

The cutoff frequency of the first-order low-pass filter for the speed feedback is set.

The smaller the setting is, the less the speed feedback fluctuation is, but the greater the feedback delay is. The cutoff frequency is 4000Hz, and no filtering effect is achieved.

P05-19	Pseudo-differential feedforward control coefficient	-	0.0~100.0	100.0	With immediate effect

Set the speed loop control mode.

When this coefficient is set to 100.0, the speed loop operates in PI control (the default mode), ensuring rapid dynamic response.

When the value is 0.0, the integral effect of the speed loop is obvious, and the low frequency interference can be filtered out, but the dynamic response is slow.

By adjusting P05-19, the speed loop can not only have a fast response, but also can not increase the overshoot of speed feedback, and can also improve the anti-jamming ability of the low frequency band.

P05-22	Auto-adjust mode selection	-	0~2	0	With immediate effect

0 -Automatic parameter adjustment is invalid. Adjust parameters manually.

1-parameter self-adjusting mode, the gain parameter is automatically adjusted by the rigid table;

2-Positioning mode, the gain parameter is automatically adjusted by the rigid table.

P05-23	Rigidity grade selection	ms	0~31	12	With immediate effect

The rigidity of servo system is set, the higher the rigidity level, the stronger the gain, the faster the response, but the excessive rigidity will cause vibration.

0 The stiffness of the 31st grade was the strongest.

		—			

P05-24	Adaptive Mode Selection for Bandpass Filter		0~4	0	With immediate effect
	0-Adaptive notch filter is not updated; 1-1 adaptive notch filter is effective (the third group of notch filter); 2-2 adaptive notch filters were effective (the third and fourth group of notch filters); 3-only the resonance point was tested, which was displayed on P05-44; 4-Restore the values of the third and fourth group of notch filters to the factory state.				

P05-25	Online Inertial Identification Mode	—	0~3	0	With immediate effect
	0-Disable online identification; 1-Online identification is enabled, with gradual changes; 2-Online identification is enabled, with general changes; 3-Enable online recognition for quick changes				
P05-26	Mode selection for low frequency resonance suppression	—	0~1		With immediate effect
	0-Set vibration frequency manually; 1-Automatic identification of vibration frequency				
P05-27	Mode Selection for Offline Inertial Identification	—	0~1	0	With immediate effect
	0-Positive and Negative Triangle Wave Mode (short stroke) 1-JOG Stop Mode (long stroke)				
P05-44	Resonance frequency identification results	Hz	0~2	0	With immediate effect
	When P05-24 equals 3, it displays the current mechanical resonance frequency.				
P05-53	Low-frequency resonance frequency	Hz	1.0~	100.0	With immediate effect
	Under the position control and full closed loop function, the frequency of the low frequency resonance suppression filter is set to 100.0Hz, and the filter is invalid.				

7.7 P06 Drive and Motor Internal Parameters

Number P□□-□□	Parameter name	Unit	Set range	Windows default	Effective method
P06-00	Motor type	—	—	—	Power outage takes effect
	Set motor model				
P06-01	Software version	—	—	—	—
	Display the servo driver software version number				
P06-03	Servo driver model	—	0~65535		Power outage takes effect
	Display the servo driver model				

7.8 P08 Fault and Protection Group Parameters

Number P□□-□□	Parameter name	Unit	Set range	Windows default	Effective method
P08-01	Over-speed level setting	rpm	0～10000	0	With immediate effect
	If the motor speed exceeds this preset value, over-speed protection will be triggered. When set to 0, it is 1.2 times the maximum motor speed.				
P08-02	Selection of Phase Loss Protection for Power Supply	—	0～2	0	With immediate effect
	0-Enable fault prohibition warning 1-Enable faults and warnings 2-Disable faults and warnings Our company offers a series of servo drives supporting single-phase 220V, three-phase 220V, and three-phase 380V input voltage levels. When significant voltage fluctuations or phase loss occur, the drives can flexibly select phase loss protection modes according to the P08-02 configuration.				
P08-03	The function of the encoder is to store data in a timely manner when the power is cut off.	—	0～1	0	With immediate effect
	0-Do not enable 1-Turn on to execute the power failure save function. The driver will automatically save the encoder feedback pulse count value (P0B-07) when the power fails.				
P08-04	Maximum position pulse frequency	kHz	100~4000	4000	With immediate effect
	When the position control mode is set and the position command source is a pulse command (P01-08=0), the maximum input pulse frequency is specified. If the actual pulse input frequency exceeds the value set in P 08-04, the servo driver will trigger an Er.020 (abnormal position command input).				
P08-05	Location deviation detection range	encoder Unit / Command unit	1~ 107374182	–	With immediate effect
	The default value for 23 encoders is 27486951. The default value for 20 encoders is 3435868. The default value for the 2500-line encoder is 32767.				

	The fault threshold of excessive position deviation in position control mode is set. When the position deviation exceeds the threshold, the servo driver will trigger Er.029 (Excessive Position Deviation).				
P08-07	Ride Protection	—	0～1	1	With immediate effect

Set value	Function	Remarks
0	Disable	Set P08-07 to zero when in vertical or towed load application to shield the fly-by-wire fault (Er.C07) detection.
1	Enable	Enable the speed limit protection feature.

<table>
<tr><td rowspan="2">P08-08</td><td>Low-frequency resonance position deviation judgment threshold</td><td>Encoder unit</td><td>1~1000</td><td>5</td><td>With immediate effect</td></tr>
<tr><td colspan="5">Set the servo driver to enable the automatic low-frequency resonance suppression function (P05-26=1) and determine the position deviation threshold to detect mechanical low-frequency resonance. If the position deviation exceeds the value set in P08-08, it is considered that low-frequency resonance has occurred. Reducing P08-08 can improve the sensitivity of low-frequency resonance detection.</td></tr>
<tr><td rowspan="2">P08-09</td><td>DI8 filter time constant</td><td>25ns</td><td>0~255</td><td>80</td><td>Power outage takes effect</td></tr>
<tr><td colspan="5">The DI8 is a high-speed DI input port that can filter out spike interference by setting P08-09 when external input signals contain such interference.</td></tr>
<tr><td rowspan="2">P08-10</td><td>DI9 filter time constant</td><td>25ns</td><td>0~255</td><td>80</td><td>Power outage takes effect</td></tr>
<tr><td colspan="5">The DI9 is a high-speed DI input port that can filter out spike interference by setting P08-10 when external input signals contain such interference.</td></tr>
<tr><td rowspan="2">P08-11</td><td>Low-speed pulse input terminal filter time constant</td><td>25ns</td><td>0~255</td><td>30</td><td>Power outage takes effect</td></tr>
<tr><td colspan="5">When the position control mode is set, the position command source is the pulse command (P01-08=0), and the low-speed pulse input terminal (P01-09=0) is selected, the filtering time constant of the low-speed pulse input terminal is set.
When the low speed pulse input terminal has the spike interference, the spike interference can be suppressed by setting P08-11, so as to prevent the interference signal from entering the servo driver and causing the motor to act wrongly.
<table>
<tr><th>Maximum input pulse frequency</th><th>Recommended filter parameters (unit: 25ns)</th></tr>
<tr><td><167k</td><td>30</td></tr>
<tr><td>167k~250k</td><td>20</td></tr>
<tr><td>250k~500k</td><td>10</td></tr>
</table></td></tr>
<tr><td rowspan="2">P08-12</td><td>Speed feedback display value filtering time constant</td><td>ms</td><td>0~5000</td><td>0</td><td>With immediate effect</td></tr>
<tr><td colspan="5">The speed feedback signal is used to show the filtering time constant, so that the speed display is more smooth.</td></tr>
<tr><td rowspan="2">P08-14</td><td>Velocity DO filter time constant</td><td>ms</td><td>0~5000</td><td>10</td><td>With immediate effect</td></tr>
<tr><td colspan="5">The low-pass filter time constant is set according to the speed feedback and</td></tr>
</table>

	the speed information corresponding to the position command. The P08-14 module can determine the DO outputs based on the speed feedback signals (TGON for motor rotation, V-CMP for speed consistency, V-ARR for speed arrival, and ZERO for zero speed).

	Orthogonal encoder filtering time constant	25ns	0~255	30	Power outage takes effect

P08-15

The spike interference in the feedback signal of the incremental orthogonal encoder can be filtered and suppressed after setting this parameter.

Given the motor's actual speed, the recommended filter time constants are listed in the table below.

Motor speed (unit: rpm)	Recommended filter parameters (unit: 25ns)
4000~6000	20
<4000	30

	Filter time constant of high speed pulse input terminal	25ns	0~255	3	Power outage takes effect

P08-16

When the position control mode is set, the position command source is the pulse command (P01-08=0), and the high-speed pulse input terminal (P01-09=1) is selected, the filtering time constant of the high-speed pulse input terminal is set.

When the high-speed pulse input terminal has the spike interference, the spike interference can be suppressed by setting P08-16, so as to prevent the interference signal from entering the servo driver and causing the motor to act wrongly.

Maximum input pulse frequency	Recommended filter parameters (unit: 25ns)
500k~1M	5
>1M	3

P08-17	Alarm time for locked rotor and overheating	ms	10～65535	200	With immediate effect

Time threshold for detecting locked rotor overheating fault in servo drive

P08-18	Enable the overtemperature protection for locked rotor conditions.	-	0 ～ 1	0	With immediate effect

Set value	Function
0	Detection of Overtemperature Protection of Shielded Motor Stalling

		(Er.019)			
	1	Enable motor stalling over temperature protection (Er.019) detection			
P08-19	Fault selection of encoder multi-turn overflow	-	0 ～ 1	0	With immediate effect

For absolute position linear mode (P00-08=1), set P08-19=1 to disable multi-turn overflow fault detection when no encoder overflow fault is detected.

Set value	Function
0	Do not block
1	Shield

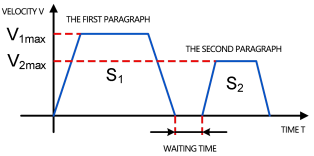
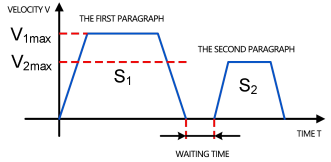
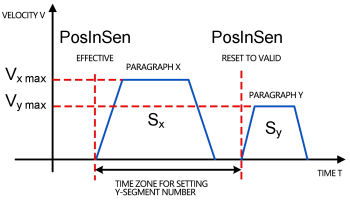
P08-20	Soft limit setting	25ns	0～2	0	With immediate effect
	0-Disable soft limit 1-Enable soft limit immediately after power-on 2-Enable soft limit after origin reset				
P08-21	Maximum value of soft limit	Instruction unit	-2147483648~ 2147483648	2147483648	With immediate effect
	Positive overshoot threshold				
P08-23	Minimum soft limit	Instruction unit	-2147483648~ 2147483648	- 2147483648	With immediate effect
	Negative overshoot threshold				
P08-25	Enable brake protection detection	-	0 ～ 1	0	With immediate effect
	Set the value to 0 to disable the brake protection detection function. Set the value to 1 to enable the brake protection detection function.				
P08-26	Soft limit setting	%	0~300.0	30.0	With immediate effect
	When P0D-21 equals 1, the system performs Z-axis gravity load identification. Upon successful identification, the detected value is written to P08-26, which can also be manually set.				
P08-27	Select location setting unit	-	0 ～ 1	0	With immediate effect
	For positions P01-19, P01-20, and P08-05, select whether the unit is encoder pulse units or input command units.				

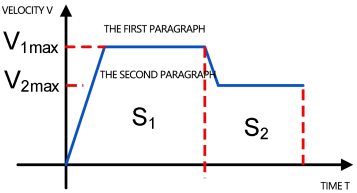
Set value	Explain
0	Encoder pulse unit
1	Instruction unit

P08-41	Enable the control of under-voltage alarm	-	0～1	0	With immediate effect
	0-Enable control under-voltage alarm; 1-Disable control alarm Er022				

7.9 P09 Multi-Segment Position Function Parameters

Number P□□-□□	Parameter name	Unit	Set range	Windows default	Effective method
P09-00	Multi-stage position running mode	-	0～3	1	With immediate effect

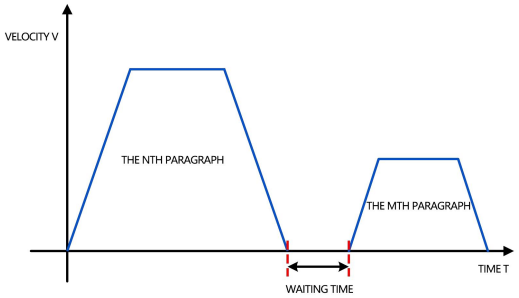
Set value	Run mode	Remarks	Running waveform
0	Single run stop	Stop after one round Auto-increment paragraph numbering The multi-segment position enable is active at the level, and a wait time can be set between segments.	 V1max and V2max: The maximum running speeds of the first and second segments S1, S2: The first and second segments of displacement;
1	Run in loop	Run in loop mode. The starting segment number after the first round is 1. Auto-increment paragraph numbering The multi-segment position enable is active for the signal level.	
2	DI switch operation	The segment number updates to maintain continuous operation. The segment number is determined by the DI terminal logic. The interval between segments is controlled by the host computer's command delay. Multi-segment position enable is valid for sequential changes.	 x, y: Commas. For the logical relationship between the commas and DI terminals, refer to P09-01. Sx, Sy: Displacement at the x-th and y-th segments;

	3	Sequential operation	Runs for 1 round and then stops It can run in a loop, with the starting segment number after the first round being P09-03, and the segment number will automatically increment and switch. No waiting time between segments. Multi-segment enable is active.	

P09-01	End point sequence number	—	1～16	1	With immediate effect
	Set the number of end segments for the displacement command				
P09-02	Position instruction type	—	0～1	0	With immediate effect
	0-Relative position command 1-Absolute position command				
P09-03	Start sequence number	—	0～16	0	With immediate effect
	0 : Do not run in a loop. Run the starting segment of 1-16 sequentially.				
P09-04	Pause and resume with remaining capacity processing	—	0～1	0	With immediate effect
	The following three modes are valid except DI mode: 0-run the remaining segment; 1-run again from the starting segment.				
P09-05	Hourly basis	—	0～1	0	With immediate effect

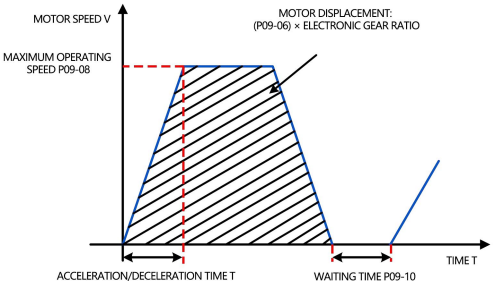
When using the multi-stage position function, set the units for acceleration/deceleration time and wait time. Acceleration/deceleration time: the time it takes for the servo motor to accelerate from 0rpm to 1000 rpm.

Set value	Wait time unit	Remarks
0	ms	
1	s	



Wait time: The interval between the end of one instruction and the start of the next.

In P09-00=3 (sequential mode), P09-05 is invalid, and there is no waiting time between segments. In P09-00=2 (DI switching mode), P09-05 is invalid, and the interval between segments is determined solely by the delay time of the host computer's instruction.

P09-06	First paragraph move	Instruction unit	-1073741824 ~1073741824	10000	With immediate effect
	Move the first segment of the multi-segment position (command unit).				
P09-08	Maximum operating speed for the first displacement unit	rpm	0～6000	200	With immediate effect
	Maximum operating speed of the first segment in multi-segment positioning. The maximum operating speed refers to the motor's constant-speed running speed when it is not in acceleration or deceleration. If the displacement of the first segment (P09-06) is too small, the motor's actual speed will be lower than P09-08.				
P09-09	1st segment displacement acceleration time	ms(s)	0～65535	10	With immediate effect
	The time from 0rpm to 1000rpm of the first motor in the multi-stage position. Actual time to accelerate to P09-08 (the maximum operating speed of the first segment): $t=\frac{(\mathbf{P09-08})\times(\mathbf{P09-09})}{\mathbf{1000}}$				
P09-10	Wait time after the first displacement	ms(s)	0～10000	10	With immediate effect
	The wait time before the next displacement is executed after the first displacement in the multi-segment position is completed.  				
P09-11	Paragraph 2: Moving displacement	Command unit	-1073741824 ~1073741824	10000	With immediate effect
P09-13	Maximum	rpm	0～6000	200	With immediate effect

	operating speed at the second displacement level				
P09-14	2nd segment displacement acceleration time	ms(s)	0～65535	10	With immediate effect
P09-15	Wait time after the second displacement	ms(s)	0～10000	10	With immediate effect
P09-16	Paragraph 3: Move the displacement	Instruction unit	-1073741824 ~1073741824	10000	With immediate effect

P09-18	Maximum operating speed at the 3rd displacement position	rpm	0～6000	200	With immediate effect
P09-19	3rd segment displacement acceleration time	ms(s)	0～65535	10	With immediate effect
P09-20	Wait time after the 3rd displacement	ms(s)	0～10000	10	With immediate effect
P09-21	Paragraph 4: Move the displacement	Instruction unit	-1073741824 ~1073741824	10000	With immediate effect
P09-23	4th position maximum operating speed	rpm	0～6000	200	With immediate effect
P09-24	4th segment displacement acceleration time	ms(s)	0～65535	10	With immediate effect
P09-25	Wait time after the 4th displacement	ms(s)	0～10000	10	With immediate effect
P09-26	Paragraph 5: Move the displacement	Instruction unit	-1073741824 ~1073741824	10000	With immediate effect
P09-28	Maximum operating speed at the 5th displacement level	rpm	0～6000	200	With immediate effect
P09-29	5th segment displacement acceleration time	ms(s)	0～65535	10	With immediate effect
P09-30	Wait time after the 5th displacement	ms(s)	0～10000	10	With immediate effect
P09-31	Paragraph 6: Mobile displacement	Instruction unit	-1073741824 ~1073741824	10000	With immediate effect
P09-33	6th position maximum operating speed	rpm	0～6000	200	With immediate effect
P09-34	6th segment displacement acceleration time	ms(s)	0～65535	10	With immediate effect
P09-35	Wait time after the 6th displacement	ms(s)	0～10000	10	With immediate effect
P09-36	Paragraph 7: Mobile displacement	Instruction unit	-1073741824 ~1073741824	10000	With immediate effect
P09-38	7th position maximum operating speed	rpm	0～6000	200	With immediate effect

P09-39	7th segment displacement acceleration-deceleration time	ms(s)	0～65535	10	With immediate effect
P09-40	Wait time after the 7th displacement	ms(s)	0～10000	10	With immediate effect
P09-41	Paragraph 8: Mobile displacement	Instruction unit	-1073741824 ~1073741824	10000	With immediate effect
P09-43	Maximum operating speed at the 8th displacement level	rpm	0～6000	200	With immediate effect
P09-44	8th segment displacement acceleration-deceleration time	ms(s)	0～65535	10	With immediate effect
P09-45	Wait time after the 8th displacement	ms(s)	0～10000	10	With immediate effect
P09-46	Paragraph 9: Mobile displacement	Instruction unit	-1073741824 ~1073741824	10000	With immediate effect

P09-48	9th position maximum operating speed	rpm	0～6000	200	With immediate effect
P09-49	9th segment displacement acceleration-deceleration time	ms(s)	0～65535	10	With immediate effect
P09-50	Wait time after the 9 th displacement	ms(s)	0～10000	10	With immediate effect
P09-51	Paragraph 10: Mobile displacement	Instruction unit	-1073741824 ~1073741824	10000	With immediate effect
P09-53	10th position maximum operating speed	rpm	0～6000	200	With immediate effect
P09-54	10th displacement acceleration-deceleration time	ms(s)	0～65535	10	With immediate effect
P09-55	Wait time after the 10 th displacement	ms(s)	0～10000	10	With immediate effect
P09-56	Paragraph 11: Mobile displacement	Instruction unit	-1073741824 ~1073741824	10000	With immediate effect
P09-58	Maximum operating speed at displacement level 11	rpm	0～6000	200	With immediate effect
P09-59	11th displacement acceleration-deceleration time	ms(s)	0～65535	10	With immediate effect
P09-60	Wait time after the 11 th displacement	ms(s)	0～10000	10	With immediate effect
P09-61	Paragraph 12: Move the displacement	Instruction unit	-1073741824 ~1073741824	10000	With immediate effect
P09-63	Maximum operating speed at displacement level 12	rpm	0～6000	200	With immediate effect
P09-64	12th displacement acceleration-deceleration time	ms(s)	0～65535	10	With immediate effect

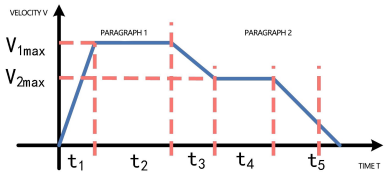
P09-65	Wait time after the 12 th displacement	ms(s)	0～10000	10	With immediate effect
P09-66	Paragraph 13: Move the displacement	Instruction unit	-1073741824 ~1073741824	10000	With immediate effect
P09-68	13th position maximum operating speed	rpm	0～6000	200	With immediate effect
P09-69	13th displacement acceleration-deceleration time	ms(s)	0～65535	10	With immediate effect
P09-70	Wait time after the 13 th displacement	ms(s)	0～10000	10	With immediate effect
P09-71	Paragraph 14: Move the displacement	Instruction unit	-1073741824 ~1073741824	10000	With immediate effect
P09-73	Maximum operating speed at displacement level 14	rpm	0～6000	200	With immediate effect
P09-74	14th displacement acceleration-deceleration time	ms(s)	0～65535	10	With immediate effect
P09-75	Wait time after the 14 th displacement	ms(s)	0～10000	10	With immediate effect
P09-76	Paragraph 15: Move the displacement	Instruction unit	-1073741824 ~1073741824	10000	With immediate effect
P09-78	Maximum operating speed at displacement level 15	rpm	0～6000	200	With immediate effect

P09-79	15th displacement acceleration-deceleration time	ms(s)	0～65535	10	With immediate effect
P09-80	Wait time after the 15 th displacement	ms(s)	0～10000	10	With immediate effect
P09-81	Paragraph 16: Move the displacement	Instruction unit	-1073741824 ~1073741824	10000	With immediate effect
P09-83	Maximum operating speed at displacement level 16	rpm	0～6000	200	With immediate effect
P09-84	16th displacement acceleration-deceleration time	ms(s)	0～65535	10	With immediate effect
P09-85	Wait time after the 16 th displacement	ms(s)	0～10000	10	With immediate effect

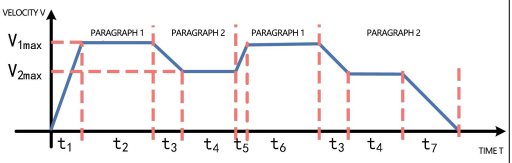
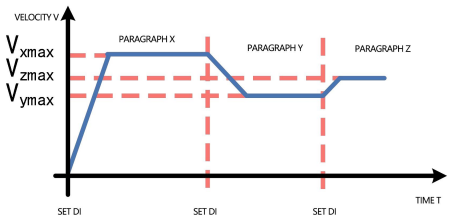
7.10 P0A Group Multi-Segment Velocity Parameters

Number P□□-□□	Parameter name	Unit	Set range	Windows default	Effective method
P0A-00	Multistage speed command mode	—	0～2	1	With immediate effect

When operating in speed control mode with multi-speed commands (P02-02=5, P02-00= 1/2/3), configure the multi-speed command execution mode:

Set value	Run mode	Remarks	Running waveform
0	Single run stop	Run one round and then stop; Auto-increment paragraph numbers.	 V_{1max} 、 V_{2max}: the instruction speed of the first and second segments; t_1: the actual acceleration and deceleration time of the first paragraph; t_3 、 t_5: the acceleration and deceleration

			time of the second time.	

1	Run in loop	Run in loop, The starting segment number is 1 for each round; the segment number automatically increments and switches; servo enable has If the effect persists, it will continue. Keep the loop running.	 V_{1max} 、V_{2max}: maximum operating speed in the first and second stages.
2	Switch via external DI	The servo can operate continuously when enabled; the segment number is determined by the logic of the DI terminal. The running time of each segment speed instruction is only determined by the time interval of the segment number switch. The FunIN.5 (DI-RSEL) enables directional switching of speed commands.	 x, y: Commas. For the logical relationship between commas and DI terminals, refer to POA-02. VX,Vy: speed instructions for the x-th and y-th segments; The segment number determined by DI remains unchanged, and the speed instruction for that segment continues to run regardless of the instruction execution time.

During the execution of each speed command, the servo enable must remain active. Otherwise, the drive will immediately shut down in the OFF mode as configured in P 00-18. When a speed command reaches its set value, both the speed and the FunOUT.19: V-Arr signal must be valid.

P0A-01	Select runtime unit	—	0 ～1	0	With immediate effect
	Multistage speed running time unit				

Set value	Unit selection
0	sec (seconds)
1	min (minute)

	Speed command end segment selection	—	1～16	16	With immed-iate effect

P0A-02

Set the total number of speed commands. Different segments can be configured with varying speeds and durations, along with 4 selectable acceleration time groups. When P0A-00 = 2, the multi-segment numbers switch automatically in sequence: 1, 2,..., P0A-02.

When P0A-00 equals 2, configure four DIs (either hardware or virtual) as DI functions 6-9 (FunIN.6: CMD1; FunIN.9: CMD4), and control the DI logic via the host computer to enable segment number switching. Each segment number is a 4-bit binary value, with the mapping of CMD1-CMD4 to segment numbers as shown in the table below.

FunIN. 9	FunIN. 8	FunIN. 7	FunIN. 6	Segment number
CMD4	CMD3	CMD2	CMD1	
0	0	0	0	1
0	0	0	1	2
.....				
1	1	1	1	16

P0A-03	Acceleration Time 1	ms	0～65535	10	With immed-iate effect
P0A-04	Reduction Time 1	ms	0～65535	10	With immed-iate effect
P0A-05	Acceleration Time 2	ms	0～65535	50	With immed-iate effect
P0A-06	Reduction Time 2	ms	0～65535	50	With immed-iate effect
P0A-07	Acceleration Time 3	ms	0～65535	100	With immed-iate effect
P0A-08	Reduction Time 3	ms	0～65535	100	With immed-iate effect
P0A-09	Acceleration Time 4	ms	0～65535	150	With immed-iate effect
	Reduction Time 4	ms	0～65535	150	With immed-iate effect

P0A-10

For each multi-stage speed command, four sets of acceleration and deceleration time options are available.

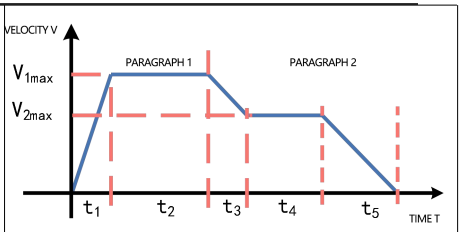
Acceleration time: the time it takes for a servo motor to accelerate from 0rpm to 1000 rpm.

Deceleration time: the time it takes for a servo motor to decelerate uniformly from 1000rpm to 0 rpm.

					With immed-

P0A-11	First speed command	rpm	-6000～6000	0	iate effect
P0A-12	Run time for the first instruction	s(min)	0 ～ 6553.5	5.0	With immediate effect
P0A-13	First acceleration/deceleration time	--	0 ～ 4	0	With immediate effect

Set value	Acceleration and deceleration time	Remarks
0	Zero plus acceleration time	Acceleration time: 0 Delay time: 0
1	Acceleration and deceleration time 1	Acceleration time: P0A-03 Reduction time: P0A-04
2	Acceleration and deceleration time 2	Acceleration time: P0A-05 Reduction time: P0A-06
3	Acceleration and deceleration time 3	Acceleration time: P0A-07 Reduction time: P0A-08
4	Acceleration and deceleration time 4	Acceleration time: P0A-09 Reduction time: P0A-10



V1max and V2max: the first and second segments of the instruction speed

t1: The actual acceleration and deceleration time of the first segment

t3 and t5: the acceleration and deceleration time in the second time period

Running time of a segment: The variable speed time from the previous speed command to this segment, plus the constant speed running time of this segment.

For example, if the first segment in the diagram runs for t1+t2 and the second for t3+t4, the driver will skip the speed command for that segment and proceed to the next one.

$t_1 = \frac{V_1}{1000} \times$ Acceleration time for this speed segment$t_3 = \frac{|V_2 - V_1|}{1000} \times$Acceleration time set in paragraph 2

P0A-14	Paragraph 2 speed instruction	rpm	-6000～6000	100	With immediate effect
P0A-15	Run time for the second instruction	s(min)	0 ～ 6553.5	5.0	With immediate effect
P0A-16	2nd acceleration/deceleration time	--	0 ～ 4	0	With immediate effect
P0A-17	Paragraph 3 speed instruction	rpm	-6000～6000	300	With immediate effect
P0A-18	Run time for the third instruction	s(min)	0 ～ 6553.5	5.0	With immediate effect
P0A-19	3rd acceleration/deceleration time	--	0 ～ 4	0	With immediate effect
P0A-20	Paragraph 4 speed instruction	rpm	-6000～6000	500	With immediate effect
P0A-21	Run time for the fourth instruction	s(min)	0 ～ 6553.5	5.0	With immediate effect
P0A-22	4th acceleration/deceleration time	--	0 ～ 4	0	With immediate effect
P0A-23	Paragraph 5 speed instruction	rpm	-6000～6000	700	With immediate effect
P0A-24	Run time for the 5th ins-	s(min)	0 ～ 6553.5	5.0	With immed-

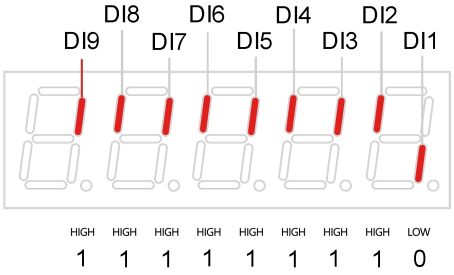
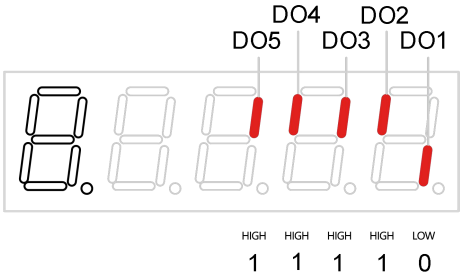
	truction				iate effect
P0A-25	5th acceleration/deceleration time	--	0 ～ 4	0	With immediate effect
P0A-26	Paragraph 6 speed instruction	rpm	-6000～6000	900	With immediate effect
P0A-27	Run time for the 6th instruction	s(min)	0 ～ 6553.5	5.0	With immediate effect
P0A-28	6th acceleration/deceleration time	--	0 ～ 4	0	With immediate effect
P0A-29	Paragraph 7 speed instruction	rpm	-6000～6000	600	With immediate effect
P0A-30	Run time for the 7th instruction	s(min)	0 ～ 6553.5	5.0	With immediate effect
P0A-31	7th acceleration/deceleration time	--	0 ～ 4	0	With immediate effect
P0A-32	Paragraph 8 speed instruction	rpm	-6000～6000	300	With immediate effect
P0A-33	Run time for the 8th instruction	s(min)	0 ～ 6553.5	5.0	With immediate effect

P0A-34	8th acceleration/deceleration time	--	0 ~ 4	0	With immediate effect
P0A-35	Paragraph 9 speed instruction	rpm	-6000~6000	100	With immediate effect
P0A-36	Run time for the 9th instruction	s(min)	0 ~ 6553.5	5.0	With immediate effect
P0A-37	9th acceleration/deceleration time	--	0 ~ 4	0	With immediate effect
P0A-38	Paragraph 10 speed instruction	rpm	-6000~6000	-100	With immediate effect
P0A-39	Run time for the 10th instruction	s(min)	0 ~ 6553.5	5.0	With immediate effect
P0A-40	10th acceleration/deceleration time	--	0 ~ 4	0	With immediate effect
P0A-41	Paragraph 11 speed instruction	rpm	-6000~6000	-300	With immediate effect
P0A-42	Run time for the 11th instruction	s(min)	0 ~ 6553.5	5.0	With immediate effect
P0A-43	11th acceleration/deceleration time	--	0 ~ 4	0	With immediate effect
P0A-44	Paragraph 12 speed instruction	rpm	-6000~6000	-500	With immediate effect
P0A-45	Run time for the 12th instruction	s(min)	0 ~ 6553.5	5.0	With immediate effect
P0A-46	12th acceleration/deceleration time	--	0 ~ 4	0	With immediate effect
P0A-47	Paragraph 13 speed instruction	rpm	-6000~6000	-700	With immediate effect
P0A-48	Run time for the 13th instruction	s(min)	0 ~ 6553.5	5.0	With immediate effect
P0A-49	13th acceleration/deceleration time	--	0 ~ 4	0	With immediate effect
P0A-50	Paragraph 14 speed instruction	rpm	-6000~6000	-900	With immediate effect
P0A-51	Run time for the 14th instruction	s(min)	0 ~ 6553.5	5.0	With immediate effect
P0A-52	14th acceleration/deceleration time	--	0 ~ 4	0	With immediate effect
P0A-53	Paragraph 15 speed instruction	rpm	-6000~6000	-600	With immediate effect
P0A-54	Run time for the 15th instruction	s(min)	0 ~ 6553.5	5.0	With immediate effect
P0A-55	15th acceleration/deceleration time	--	0 ~ 4	0	With immediate effect
	Paragraph 16 speed ins-				With immed-

P0A-56	truction	rpm	-6000～6000	-300	iate effect
P0A-57	Run time for the 16th instruction	s(min)	0 ～ 6553.5	5.0	With immed-iate effect
P0A-58	16th acceleration/decel-eration time	--	0 ～ 4	0	With immed-iate effect

7.11 P0 B Group Monitoring Parameters

Number P □□-□□	Parameter name	Unit	Set range	Windows default	Effective method
P0B-00	Motor speed feedback	rpm	—	—	—
	The motor speed is displayed in real time with rounded values, showing a precision of 1 rpm.				
P0B-01	Velocity instruction	rpm	—	—	—
	Display the motor's current speed in real time with an accuracy of 1rpm				

P0B-02	Internal torque command (relative to rated torque)	%	—	—	—
	Displays the percentage of the current torque relative to the rated torque, with an accuracy of 0.1%.				
P0B-03	Input signal (DI signal) monitoring	—	—	—	—
	Displays the current level status of 9 hardware DI terminals (unfiltered). Display method: The upper half of the digital tube lights up for high level (represented by "1"); the lower half lights up for low level (represented by "0"). For example, when DI1 is set to low level and DI2 to high level, the binary code generated is "111111110". The Jieni Drive Debugging Platform software reads the current decimal value of P0B-03 as 510. 			
P0B-04	Output signal (DO signal) monitoring	—	—	—	—
	Display the current level status of 5 DO terminals (unfiltered). Display method: Using DO1 terminal as low level and DO2~DO5 terminals as high level (example: corresponding binary code "11110"), the Ganico Drive Debugging Platform software can read the current decimal value of P0B-04 as 30. 			
P0B-05	Encoder position deviation counter (32-bit decimal display)	Encoder unit	—	—	—

	Display position deviation in real time as an instruction unit				
P0B-07	Feedback pulse counter (32-bit decimal display)	Encoder unit	-	-	—
	Display real-time cumulative location feedback				
P0B-09	Input command pulse counter (32-bit decimal display)	Instruction unit	—	—	—
	Display the total number of input command pulses in real time				

P0B-15	Mechanical angle (number of pulses from the origin)	Encoder unit	·	·	—
	Display the motor shaft angle in real time				
P0B-16	Electrical angle	—	—	—	—
	Display electrical angle values in real time				
P0B-17	Enter the position command corresponding to the speed information	rpm	·	·	—
	Display the speed value corresponding to the input position command in real time				
P0B-18	Real-time load factor	%	—	—	—
	Displays the average load torque as a percentage of the motor's rated torque, with an accuracy of 0.1%.100.0% corresponds to 100% of the motor's rated torque.				
P0B-19	AI1 sampling voltage value	v			
	Display the AI1 input voltage in real time with an accuracy of 0.01V				
P0B-20	AI2 sampling voltage value	v	—	—	—
	Display the AI2 input voltage in real time with an accuracy of 0.01V				
P0B-21	Effective value of phase current	A	—	—	—
	Display the RMS value of the phase current in real time with an accuracy of 0.01A.				
P0B-23	Busbar voltage value	V			
	Display the RMS value of the phase current in real time with an accuracy of 1V				
P0B-24	Module temperature value	℃	—	—	—
	Display the module temperature value in real time				
P0B-25	Failure logging	Instruction unit	0～9	—	0
	Select to view the last 10 faults of the servo driver. This function code sets the number of faults to view. Current fault, Previous 1st fault, Previous 2nd fault,..., 9th to 9th previous faults				
P0B-26	Selected number of fault codes	—	—	—	—
P0B-27	Selected fault timestamp	S	—	—	—
P0B-29	Motor speed during the selected fault	rpm	—	—	—
P0B-30	U-phase current of the motor during the selected fault	A	—	—	—

P0B-31	V-phase current of the motor during the selected fault	A	—	—	—

P0B-32	The selected bus voltage during the fault	V	—	—	—
P0B-33	Input terminal status during selected fault	—	—	—	—
P0B-34	Output terminal status during selected fault	—	—	—	—
P0B-35	Position deviation counter	Instruction unit	—	—	—
	In position control mode, the position deviation value is not processed through the electronic gear ratio. This 32-bit function code is displayed as decimal data on the panel.				
P0B-37	Actual motor speed	—	—	—	—
	The actual speed of servo motor is displayed with the precision of 0.1rpm. This function code is 32 bits and displayed as decimal data on the panel. The filter time constant of the speed feedback for display can be set by P08-12.				
P0B-46	Absolute encoder rotation count	1Rev	—	—	—
	Displays the absolute encoder rotation count				
P0B-47	Absolute encoder position within one revolution	Encoder unit	—	—	—
	Display the single-turn position feedback value of the absolute encoder				
P0B-49	Absolute position of absolute encoder (32 bits low)	Encoder unit	—	—	—
	Displays the absolute encoder position feedback value, 32-bit low data				
P0B-51	Absolute position of absolute encoder (32-bit high)	Encoder unit	—	—	—
	Displays the absolute encoder position feedback value, 32-bit high data				

7.12 P0C Group Full Closed-Loop Function Parameters

Number P□□-□□	Parameter name	Unit	Set range	Windows default	Effective method
P0C-00	How to use the external encoder	V	0～1	0	With immediate effect

Set value	How to use the external location sensor	Explain
0	Use the standard direction	During the motor's rotation, the internal encoder pulse feedback counter (P0C-12) and the external encoder pulse feedback counter The feed counter (P0C-14) counts in the same direction.
1	Use in reverse direction	During the motor's rotation, the internal encoder pulse feedback counter (P0C-12) and the external encoder pulse feedback counter The feed counter (P0C-14) counts in the opposite direction.

The error of this parameter setting will lead to the alarm of overspeed, flying car and over current.

Number P□□-□□	Parameter name	Unit	Set range	Windows default	Effective method
P0C-01	Encoder feedback mode	—	0～2	0	With immediate effect

Set value	Encoder feedback mode	Explain
0	Internal encoder feedback	The position feedback signal comes from the encoder built into the servo motor.
1	External encoder feedback	The position feedback signal is generated by the first set of electronic gear ratios in the fully closed-loop external encoder.
2	Switching of Internal and External Encoder Feedback During Electronic Gear Ratio Switching	The DI function 24 (FunIN.24: GEAR_SEL, electronic gear switching) enables closed-loop switching between internal and external positions. When DI function is disabled, the system uses the first set of electronic gear ratios with internal encoder feedback. When enabled, the system uses the second set of electronic gear ratios with external encoder feedback.

Number P□□-□□	Parameter name	Unit	Set range	Windows default	Effective method
P0C-04	The number of feedback pulses from the external encoder after the motor completes one full rotation	External encoder unit	0~1073741824	0	Power outage takes effect

The number of pulses of the external encoder is set when the servo motor rotates one round. The number of pulses of the external encoder is established by the number of pulses of the internal encoder.

When the motor and external encoder (grating scale) are rigidly connected, the following method can also be used for configuration:

1) Rotate the motor manually while monitoring the P0C-12 (internal encoder feedback pulse counter). After the motor completes one full

	rotation (P0C-12 equals the servo motor resolution), count

	Calculate the change value of P0C-14 (external encoder feedback pulse counter), the absolute value of this change value, and use it as the parameter value for P0C-04. 2) Before the motor rotation, the current values of P0C-12 and P0C-14 are X1 and Y1, respectively. After rotation, the current values of P0C-12 and P0 C-14 are X2 and Y2, respectively. Thus: P0C-04 = Servo motor resolution × (Y2 − Y1) / (X2 − X1). The calculated result must be positive; otherwise, press 1 again. When the connection is not rigid, the calculation of this method has some errors. Ensure proper configuration of P0C-04; otherwise, the servo may trigger Er.105 (Excessive Position Deviation in Full Closed Loop) during operation.				
P0C-06	The threshold for excessive position deviation in the fully closed-loop system	External encoder unit	0~1073741824	10000	With immediate effect
	Set the absolute value threshold of position deviation when the fault Er.105 occurs. When P0C-06 equals 0, the servo driver neither triggers the Er.105 fault for excessive full-closed-loop position deviation nor retains the full-closed-loop position deviation.				

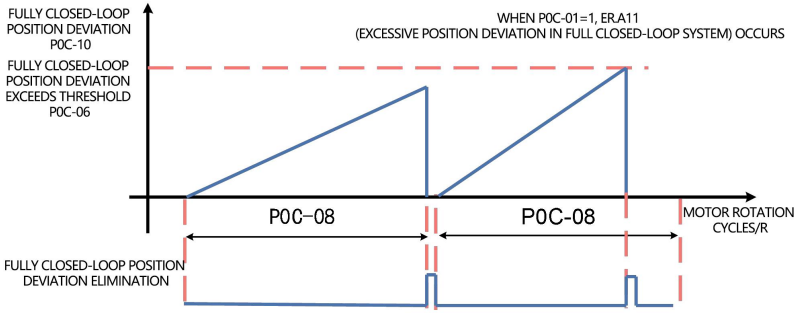
P0C-08	Position offset reset mode	r	0～100	0	With immediate effect

The motor is set to clear the full closed loop position deviation every how many turns of the motor rotation. The number of the motor rotation is reflected by the internal encoder feedback pulse number P0C-12.

The motor rotation count is not reset when the servo is in non-operational state.

For example, when P0C-08 equals 10 and the servo is disabled, the motor completes 5 full rotations. Upon reactivating the servo, the first reset occurs at the 5th rotation. Thereafter, the system resets the full-closed-loop position deviation every 10 rotations.

Set value n	Full closed-loop position deviation clearance settings
0	Clear the position deviation of the whole closed loop.
1~ 100	When the servo motor rotates n circles, the position deviation is always less than P0C-06. When the servo motor rotates n circles, the position deviation and the number of rotation circles are reset from 0.
	When the servo motor rotates n turns, if the position deviation exceeds P0C-06, the system immediately resets the full-closed position deviation. If an external encoder feedback (P0C-01=1 or 2) is used, Er.105 (excessive full-closed position deviation) will occur.



P0C-09	Time CONSTANT OF MIXED VIBRATION INHIBITION FILTER	ms	0～6553.5	0	With immediate effect

When the external encoder feedback (P0C-01=1 or 2) is used, the hybrid vibration suppression time constant is set in the full closed-loop control.

When the transmission mechanism between the full closed loop and the inner loop is not rigid enough, the appropriate time constant can be set to improve the stability of the system, that is, the effect of the inner loop can

	be produced in the transient state, and the effect of the full closed loop can be formed after the steady state.

P0C-10	Position deviation counter	External encoder unit	-1073741824 ~1073741824	0	Show
	Calculate and display the absolute value of position deviation under full closed-loop control. The position deviation of the whole closed loop is equal to the absolute position feedback of the external encoder minus the absolute position feedback of the internal encoder. ◆pay attention to： The 'mixed control pulse deviation' in the Ganico drive debugging platform' s oscilloscope is identical to that in the P0C-10, both displaying the absolute value of the actual full-closed-loop position deviation. When using internal encoder feedback, setting P0C-06=0 or P0C-08=0, the full-closed-loop position deviation counter always reads 0.				
P0C-12	Motor feedback pulse counter	Internal encoder unit	-1073741824 ~1073741824	0	Show
	Count and display the number of encoder feedback pulses (per unit of internal encoder after electronic gear ratio)				
P0C-14	Grating scale feedback pulse counter	External encoder unit	-1073741824 ~1073741824	0	Show
	Count and display the number of encoder feedback pulses (per unit of internal encoder after electronic gear ratio)				

7.13 P0 D Group Auxiliary Function Parameters

Number P□□-□□	Parameter name	Unit	Set range	Windows default	Effective method
P0D-00	Offline inertia identification function	—	—	—	With immediate effect
	In the parameter display mode, switch to the function code "P0D-00", press the "SET" button to start the offline inertia identification, then hold the ↑ or ↓ arrow keys and wait for the motor to rotate until the panel displays the specific inertia multiple.				
P0D-01	JOG trial run function	Filter in	—	—	With immediate effect
	To activate the panel's stop-and-go trial run function, first ensure the current servo is disabled. In parameter display mode, switch to the "P0D-01" function code, press the "SET" button to adjust the stop-and-go speed, then				

	press the "SET" button again. Hold the ↑ or ↓ arrow keys to switch directions.				
P0D-02	Fault reset	—	0～1	0	With immediate effect
	0-Off 1-On				
P0D-03	Software reset	—	0～1	0	With immediate effect

<table>
<tr><td></td><td colspan="5">0-Off 1-On</td></tr>
<tr><td rowspan="2">P0D-04</td><td>Software PI self-tuning</td><td>—</td><td>0～1</td><td>0</td><td>With im-mediate effect</td></tr>
<tr><td colspan="5">0-Off 1-On</td></tr>
<tr><td rowspan="2">P0D-05</td><td>Emergency shut down</td><td>—</td><td>0～1</td><td>0</td><td>With im-mediate effect</td></tr>
<tr><td colspan="5">0-Off 1-On</td></tr>
<tr><td rowspan="2">P0D-07</td><td>Initial Angle Identificat-ion of Encoder</td><td>—</td><td>0～1</td><td>0</td><td>With im-mediate effect</td></tr>
<tr><td colspan="5">0-Off 1-On</td></tr>
<tr><td rowspan="3">P0D-10</td><td>Automatic adjustment of analog channel</td><td>—</td><td>0～3</td><td>0</td><td>With im-mediate effect</td></tr>
<tr><td colspan="5"><table><tr><th>Set value</th><th>Function</th></tr><tr><td>0</td><td>No-operation</td></tr><tr><td>1</td><td>AI1 Adjustment</td></tr><tr><td>2</td><td>Adjust AI2</td></tr></table></td></tr>
<tr><td colspan="5">The driver will automatically adjust the zero drift voltage of the analog channel to improve the detection accuracy of the analog signal.
The adjusted zero drift value will be automatically stored in the corresponding function code (P04-28 or P04-33) of the servo driver.</td></tr>
<tr><td rowspan="2">P0D-16</td><td>DI DO forced input/out-put</td><td>—</td><td>0～3</td><td>0</td><td>With im-mediate effect</td></tr>
<tr><td colspan="5">0-Disable 1-DI and enable DO 2-Enable DO and disable DI 3-Enable both DI and DO</td></tr>
<tr><td rowspan="2">P0D-17</td><td>DI forces the input of a given value</td><td>—</td><td>0～0x01FF</td><td>0x01FF</td><td>With im-mediate effect</td></tr>
<tr><td colspan="5"></td></tr>
<tr><td rowspan="2">P0D-18</td><td>The DO command forces the output of a specified value.</td><td>—</td><td>0～0x01FF</td><td>0</td><td>With im-mediate effect</td></tr>
<tr><td colspan="5">—</td></tr>
<tr><td rowspan="2">P0D-19</td><td>Absolute encoder reset</td><td>—</td><td>0～2</td><td>0</td><td>With im-mediate effect</td></tr>
<tr><td colspan="5">0-Close 1-Reset fault 2-Reset fault and multi-turn data</td></tr>
</table>

7.14 P0 E Group Communication Parameters

Number P□□-□□	Parameter name	Unit	Set range	Windows default	Effective method
P0E-00	MOBUS axis address	—	1～127	1	With immediate effect
	—				
P0E-01	MOBUS Baud rate	Filter in	0～5	5	With immediate effect
	0-2400Kbp/s； 1-4800Kbp/s； 2-9600Kbp/s； 3-19200Kbp/s； 4-38400Kbp/s； 5-57600Kbp/s。				
P0E-04	MODBUS data format	—	0～3	0	With immediate effect
	0-No check, 2 end bits; 1-Parity check, 1 bit of parity; 2-odd parity, 1 bit of end; 3-no check, 1 end bit.				
P0E-05	MODBUS communication write function code update to	—	0～1	1	With immediate effect
	0-Do not update EEPROM; 1-Except for P0B and P0D groups, update EEPROM				
P0E-10	MODBUS error code				With immediate effect
	Standard protocol: 0x0001-Illegal function (command code) 0x0002-Illegal data address 0x0003-Illegal data 0x0004-Slave				
P0E-11	Communication response delay	ms	0～5000	1	With immediate effect
	Accept data and delay response time				
P0E-12	High-low sequence of communication data	—	0～1	1	With immediate effect
	0-16 bits are in front, 16 bits are behind; The lower 16 bits come first, the higher 16 bits come last				

7.15 DI Function Input

Set value	symbol	Name
1	S-ON	Servo enable
	Invalid: Servo motor enable prohibition	The servo motor is powered on and activated.
2	ERR-RST	Alarm reset signal (along the active function)
	Depending on the alarm type, some alarms can resume operation after resetting. This function operates on the active level. When the set terminal is active, it only detects changes on the active level.	
3	GAIN-SEL	Proportional gain switching
	When P05-06=0: Invalid-the speed control loop uses PI control; Valid-the speed control loop uses P control. When P05-06=1: Execute according to the settings of P05-07.	
4	CMD-SEL	Primary secondary switching
	Invalid-The current command is A	Valid-The current running instruction is B
5	DIR-SEL	Multi-speed DI direction switch settings
	Invalid-default instruction direction	Effective-instruction reverse direction
6	MI-SEL1	Switch to 16th run instruction 1
	Select 16-position or speed commands via the DI terminal to execute	
7	MI-SEL2	Switch to 16th run instruction 2
	Select 16-position or speed commands via the DI terminal to execute	
8	MI-SEL3	Switch to 16th run instruction 3
	Select 16-position or speed commands via the DI terminal to execute	
9	MI-SEL4	Switch to 16th run instruction 4
	Select 16-position or speed commands via the DI terminal to execute	
10	MODE-SEL1	Mode Switch 1
	According to the selected control mode (3,4,5), the speed, position and torque are switched.	
11	MODE-SEL2	Mode Switch 2
	According to the selected control mode (6), the switching between speed, position and torque is carried out.	
12	ZERO-SPD	Zero speed limiter function
	Enabled-Enable zero position fixation; Disabled-Disable zero position fixation	

13	INHIBIT	Pulse inhibit
	Valid-prohibit instruction pulse input; Invalid-allow instruction pulse input	
14	P-OT	Positive overrun
	When the mechanical movement exceeds the limit switch, the overtravel protection function is activated: -For forward overtravel, forward drive is prohibited; -For normal range, forward drive is allowed.	

15	N-OT	Negative overshoot
	When the mechanical movement exceeds the limit switch's range, the overtravel protection function activates: negative overtravel prevents reverse drive; normal range allows reverse drive.	
16	P-CL	Forward rotation external torque limit
	Switch the torque limit source based on the P03-06 selection: When P03-06=1, the external torque limit for forward rotation is active; when inactive, the internal torque limit for forward rotation is active. P03-06=3 and the AI limit value is greater than the forward external limit value: valid-the forward external torque limit is valid; invalid-the AI torque limit is valid. P03-06=4: valid-the external torque limit is valid; invalid-the forward internal torque limit is valid.	
17	N-CL	Inverted external torque limit
	Switch the torque limit source based on the P03-06 selection: When P03-06=1, the external torque limit is active during reversal; when inactive, the internal torque limit is active during reversal. P03-06=3 and the AI limit value is less than the reverse external limit value: valid-the reverse external torque limit is valid; invalid-the AI torque limit is valid. P03-06=4: valid-the external torque limit is valid; invalid-the reverse internal torque limit is valid.	
18	P-JOG	Positive point motion
	Valid-Enter the given instruction	Invalid-stop input for running commands
19	N-JOG	Reverse stroking
	Valid-Reverse input according to given instruction	Invalid-stop input for running commands
20	STEP	Position step enable
	Effective execution instruction step	Invalid-the instruction is zero, indicating a position state
21	HX1	Wheel Scale Signal 1
	HX1 valid, HX2 invalid-X10 HX1 invalid, HX2 valid-X100 Other-X1	
22	HX2	Wheel Scale Signal 2
	HX1 valid, HX2 invalid-X10 HX1 invalid, HX2 valid-X100 Other-X1	
23	HX-EN	Wheel enable signal
	Invalid-Select position control according to function code P01-08 Effective-position control by receiving the handwheel pulse signal in position mode	
24	GEAR-SEL	Electronic gear selection

	Invalid-Electronic gear ratio 1	Effective-electron gear ratio 2
25	TOQ-DIR	Reverse torque command
	Invalid-Positive dire-ction	Effective in reverse direction

26	SPD-DIR	Reverse speed command
	Invalid-Positive direction	Effective in reverse direction
27	POS-DIR	Reverse position command
	Invalid-Positive direction	Effective in reverse direction
28	PSEC-EN	Internal multi-stage position enable signal
	Invalid-Ignore internal multi-paragraph instructions	Valid start internal multi-stage instruction
29	XINTFREE	Interrupted fixed-length state
	Invalid-Prohibited Enable	
31	HOME-IN	Origin position signal
	It can serve as either the origin position signal or the deceleration point position signal.	
32	STHOME	Start the origin restoration process
	Start origin regression	
33	XINTINHBIT	Interrupted fixed length prohibition
	Effective forbidden interrupt fixed length	Invalid-allow interrupting the fixed length
34	ESTOP	Emergency shut down
	Valid: After zero-speed shutdown, the position is locked and emergency shutdown is initiated. Invalid: Does not affect the current operating status.	
35	PERR-CLR	Clear positional deviation
	Valid-Clear position deviation	Invalid-No action
36	V-LMTSEL	Internal velocity limiting source
	Valid P03-14 as internal positive/negative speed limit (P03-12=2) Invalid P 03-15 as internal positive/negative speed limit (P03-12=2)	
37	PULSINHBIT	Pulse instruction prohibition
	When the position control mode is active and the position command source is a pulse command (P01-08=0): Invalid-allows pulse command input; Valid-prohibits pulse command input.	

7.16 DO Function Output

Set value	symbol	Name
1	S-RDY	The server is ready
	Valid-Servo ready Invalid-Servo not ready	
2	TGON	Motor rotation output
	When the speed of the servo motor exceeds the speed threshold:	

	Valid-The motor rotation signal is valid. Invalid-The motor rotation signal is invalid.

3	V-ZERO	Zero speed signal
	The output signal when the servo motor stops rotating: Valid-motor speed is zero. Invalid-motor speed is not zero.	
4	V-CMP	Speed is consistent
	The speed control is valid when the absolute value of the difference between the servo motor speed and the speed command is less than the P02-14 speed deviation set value.	
5	COIN	Location set
	When position control is active, the position deviation pulse is valid only if it reaches the completion amplitude P01-19.	
6	NEAR	Close proximity
	During position control, the position deviation pulse reaches the positioning proximity signal amplitude P01-20.	
7	T-LT	Torque limitation
	Effective-limited motor torque	Invalid-Motor torque is not limited
8	V-LT	Speed limit
	Effective-motor speed limited	Invalid-Motor speed is not limited
9	BKOFF	Brake output
	The brake is released, and the motor shaft is free.	Invalid-Brake is restored, motor shaft is locked
10	S-WARN	Warning output
	Warning output signal is active (on)	
11	S-ERR	Fault output
	The status is valid when a fault is detected	
12	ERRO1	Output 3-bit alarm code
	Output 3-bit alarm code	
13	ERRO2	Output 3-bit alarm code
	Output 3-bit alarm code	
14	ERRO3	Output 3-bit alarm code
	Output 3-bit alarm code	
15	XINTCOIN	Interrupted completion of fixed length
	Valid-The long positioning is complete; Invalid-The long positioning is not complete	
16	HOMEATTAIN	Origin return zero output
	Valid-Zero return to origin. Invalid-Zero return to origin.	

17	ELECHOME ATTAIN	Electric return to zero output
	Effective electrical origin return to zero	Invalid-The electrical origin has not reset to zero
18	TOQREACH	Torque arrival output
	The absolute value of the effective torque reaches the set value.	Invalid: The absolute value of the torque is less than the set value
19	V-ARR	Speed to output
	The effective velocity feedback reaches the set value	Invalid-the speed feedback did not reach the set value

20	ANGINTRDY	Angle recognition output
	Effective completion angle identification	Invalid-incomplete angle recognition
21	DB	DB brake output
	Effective-dynamic brake relay open	Invalid-Dynamic brake relay engaged
22	CMDOK	Internal instruction output
	Effective internal instruction completion	Invalid-Internal instruction not completed

8. Fault Diagnosis and Treatment of Drive

Fault and warning classification

Category 1(abbreviated as NO.1) non-recoverable faults: The code starts with ABC letters, such as ErA16 encoder fault; ErB01 no such motor model; ErC01 hardware overcurrent fault.

Type 2(NO.2) recoverable faults: such as Er001 DI function allocation faults.

Category 3(NO.3) is a resettable warning, such as a battery failure in an Er600 encoder.

8.1 List of Servo Alarm Codes, Reasons for Alarms and Their Handling Methods

Alarm code	Alarm name	Cause	Processing method
A01	Parameter error	① Input voltage is abnormal ② Parameter value stored procedure occurred during a momentary power outage ③ The number of parameter writes exceeded the maximum within a specified time. ④ Software updated ⑤ Servo driver malfunction	① Increase the power supply capacity or replace it with a higher-capacity unit ② Write parameters after power-on ③ Change the parameter write method to rewrite ④ Reset related parameters ⑤ Change the drive
A02	Configuration error	① The main chip version is not compatible ② main chip damage	① Update software ② Change the drive
A04	Interrupted exception	① drive failure	① Change the drive
A09	FPGA sampling operation timed out	① MCU communication timeout ② Encoder communication timeout ③ Current sampling timeout ④ High-precision A/D conversion timeout	① Change the drive ② Check the coding cable and the motor. ③ Separate the strong and weak current wiring and replace the driver ④ Use Twisted Pair Shielded Cable/Shorten Cable Length
A11	Program exception	① EEPROM failure	① Restore default values and restart

		② drive failure	② Change the drive
A12	Storage failure	① Cannot write parameters to EEPROM ② Cannot read parameters from EEPROM	Change the drive
A15	Encoder ROM data error	① The drive and motor types do not match ② drive failure	① Replace with compatible drivers and motors, then restart ② Change the drive

A16	Encoder fault	① The encoder has poor line contact. ② drive failure	① Check the encoder line plug. ② Replace the motor encoder ③ Change the drive
B00 ~ B05	Match failure	① The motor or driver number does not exist ② Power rating mismatch	① Reset P06-00 or replace with a compatible motor ② Match product
C01/ C02/ C03	Overcurrent	① enable and command signal synchronization ② The braking resistor is too small or there is a short circuit. ③ abnormal power line ④ Motor malfunction ⑤ coding line aberration ⑥ Driver error ⑦ Input commands too fast	① Enable first, then enter the command ② Replace the brake resistor ③ Replace the power cord ④ Replace the motor ⑤ Change the code line ⑥ Change the drive ⑦ Enter the filter time constant or increase the acceleration and deceleration time
C04/ C05	Short circuit to ground	① abnormal power line ② Motor malfunction ③ Driver error	① Replace the power cord ② Replace the motor ③ Change the drive
C06	Phase sequence error	Sequential drive motors and electric motors do not correspond one to one	Re-adjust the phase sequence wiring
C07	Aerodyne	① The V-W phase sequence wiring is incorrect. ② Error in detecting the initial phase of the motor rotor ③ The encoder model is incorrect or the wiring is wrong. ④ The encoder has wiring errors, aging corrosion, or loose connectors. ⑤ The vertical axis is under excessive gravitational load.	① Connect the wires in the correct U V W phase sequence ② Power on again ③ Replace with compatible drive and motor. Reconfirm P06-00 (motor ID) and encoder wiring. ④ Re-weld, tighten, or replace the encoder cable ⑤ The load of vertical shaft can be reduced, or the rigidity can be increased, or the fault can be shielded without affecting the safety and use.
C08/	Encoder interference	① The coding line is incorrectly connected or loose.	① Check the wiring of the code connector.

C09/ C11		② Z signal is interfered with ③ encoder fault	② Check the cable routing and whether the cable has shielding and is properly grounded ③ Replace the motor

C17/ C18	Encoder DATA ABNORMALITY	① Bus-type incremental encoder cable broken or loose ② Bus type incremental encoder parameter read and write exception	① Check the cables. ② Replace the motor
C20	Motor power line broken	The cable is not properly connected or the wire is broken.	Adjust the wiring or replace the cable
000	Reassignment OF DI FUNCTION	① When assigning DI functions, the same function can be assigned to multiple DI terminals. ② DI function number exceeds the number of DI functions	① Redistribute DI functions ② After system parameter restoration initialization (P 00.04=1), power was recharged.
001	DO function allocation exceeded limit	The DO function number exceeds the DO function limit	The DO function number exceeds the DO function limit
005	Service ON command is invalid	When internal enable is active, the external servo enable signal (S-ON) becomes effective.	Disable DI function 1 (both hardware DI and virtual DI) signals.
007 ~ 009	Main loop input power line phase loss	The B-structure driver has a phase loss in its three-phase power supply input.	① Check the external power supply ② Set parameter P08-02=2 to disable phase loss alarm
012	Overvoltage on main circuit	① overvoltage in main circuit input ②lightning strike ③ Abnormal braking resistor ④ The motor operates with sudden acceleration and deceleration. ⑤ The voltage samp-	① Replace or adjust the power supply ② Change the drive ③ Use an external brake resistor ④ Adjust acceleration and deceleration time ⑤ Change the drive ⑥ Change the drive

		ling value shows an abnormal deviation. ⑥ Driver error	
013	Under voltage in main circuit	① The main circuit input voltage is unstable or experiences a temporary power outage. ② Driver error	① Increase the power supply capacity ② Change the drive
014	D/Q axis current overflow	① If the fault persists after multiple power cycles, the servo drive is faulty.	① Change the drive

015	Overheat of radiator	① The ambient temperature is too high. ② Overload fault reset operation abnormal ③ fan broken ④ Insufficient installation spacing between drives ⑤ Driver error	① Improving the cooling conditions of the drive ② Identify the factors contributing to the overload. ③ Change the driver for you. ④ Adjust spacing ⑤ Change the drive
016/ 017/ 018	Drive overload	① Overloaded ② Driver error ③ Mechanical factors cause motor stalling and vibration.	① Load adjustment ② Change the drive ③ Identifying mechanical factors
019	Electric motor lockout overheat protection	① U V W phase sequence error or phase missing ② The U V W output or encoder is disconnected ③ Mechanical factors lead to motor stalling	① Reconnect the wires or replace the cable with the correct wiring. ② Reconnect the wires correctly or replace the cable ③ Identifying mechanical factors
020	Pulse @-@ impulse injection anomalies	① The input pulse frequency exceeds the set value ② The input pulse is interfered with.	① Reduce the input pulse frequency or increase the set value ② Eliminate interfering factors
021/ 022	Controlled under-voltage	① The power supply is unstable or out of power. ② The drive detector circuit is abnormal.	① Check the quality of the control system. ② Set parameter P08-41=1 to disable this alarm when the input voltage is normal
024	AD sampling overvoltage fault	① The AI channel input voltage is too high ② The AI channel has a wiring error or interference	① Adjust the input voltage ② Check the cable and filter time parameter
025	High precision AD sampling glitch	High-precision AI channel wiring has interference	Use twisted-pair shielded cable to rewire and shorten the line length
026	Overspeed	① phase sequence error ② P08-01 Parameter configuration error ③ instruction error	① phase adjustment ② Reset parameters ③ adjustment instruction ④ Adjust the gain or the mechan-

		④ speed overshoot ⑤ Driver error	ism. ⑤ Change the drive
029	Large positional deviation	① Output phase loss or phase error ② The power or encoding line is broken. ③ mechanical jam ④ parameter problem ⑤ Motor or drive malfunction	① Check for cable-related issues. ② Check for cable-related issues. ③ Identifying mechanical factors ④ Adjust corresponding parameters ⑤ Replace the drive or motor

100	Abnormal brake release	① The motor brake is not open.	① Reconnect the wiring correctly or replace the motor ② Check if the motor brake terminal signal is valid and if the motor brake switch is damaged.
101	Brake not normally opened	① Motor brake malfunctions	① Reconnect the wiring correctly or replace the motor ② Check if the motor brake terminal signal is valid and if the motor brake switch is damaged.
102/ 103/ 104	Electron gear ratio setting out of limit	① The value exceeds the range ② Incorrect order of parameter changes	① Adjust parameters ② Reset or power on again
105	Excessive full @-@ closed @-@ loop position deviation	① Output phase loss or phase error ② The power or encoding line is broken. ③ mechanical jam ④ parameter problem ⑤ Motor or drive malfunction	① Check for cable-related issues. ② Check for cable-related issues. ③ Identifying mechanical factors ④ Adjust corresponding parameters ⑤ Replace the drive or motor
106	Full @-@ closed @-@ loop function Parameter setup error	① In the full closed-loop position mode, the position command originates from the internal position command, but the system employs an inner-outer loop switching mode.	① When using the full closed-loop function and the position command originates from an internal position command, only the external encoder feedback mode is available. Specifically, P0C-01 can only be set to 1.
600	Failure OF THE ENCODER CELL	① No battery connected during power outage ② The battery voltage is too low.	① Set P0D-19=1 to clear the fault ② Replace the battery with one that matches the voltage
603	Encoder @-@ cell warning		
601	Encoder multi-pass count error	Encoder fault	If the fault persists after setting P0D-19=1, replace

			the motor.
602	Encoder @-@ loop @-@ count overflow		Set P0D-19=1 to clear the fault and power on again
604	Alarm FOR OVERHEATING OF ENCODER		① Check the encoder temperature ② Replace the motor encoder
824	AD sampling overvoltage fault	① The AI channel input voltage is too high ② The AI channel has a wiring error or interference	① Adjust the input voltage ② Check the cable and filter time parameter
825	High precision AD sampling glitch	High-precision AI channel wiring has interference	Use twisted-pair shielded cable for rewiring to shorten the line length

901	Frequency pulse infusion Set fault	The encoder pulse count does not meet the range	Adjust parameters
902	Origin regression to zero timeout	① Origin switch failure ② The time limit for finding the origin is too short ③ High-speed search of the speed of the origin switch signal is too small	① Check parameters and wiring ② Adjust parameters ③ Adjust parameters
903	AI Zero Drift	① Connection error or interference ② Driver error	① Check parameters and wiring ② Change the drive
904	DI Emergency Brake Warning	① DI Function 34: Brake, triggered	① Check DI function 34: EmergencyStop Brake and its corresponding settings Is the DI terminal logic enabled
905	Braking OVER-LOAD	① The external brake resistor has poor wiring, is loose, or broken. ② When using the built-in braking resistor, the cable between power terminals P ⊕ and D may be shorted or disconnected. ③ The main circuit input voltage exceeds the specified range. ④ The load's rotational inertia ratio is too high. ⑤ The motor speed is too high and the deceleration process is not completed in the set deceleration time. ⑥ The servo driver or brake resistor has insufficient capacity. ⑦ Driver error	① Replace the resistor or cable. ② Replace the cable ③ Adjust or replace the power supply ④ ⑤⑥ Increase the servo capacity, reduce the load if possible, increase the acceleration and deceleration time, and increase the motor operation cycle. ⑦ Change the drive

906	Excessive external braking resistance	① P00-17 (external brake resistor resistance) is lower than P00-11 (minimum allowable external brake resistor for the driver)	① Set P00-17 parameters correctly
908	Internal CODEC FAILURE	–	Replace the motor

909	OverLOAD WARNING	① Abnormal power or encoding lines ② Overloaded ③ parameter problem ④ mechanical jam ⑤ Driver error	① Check wiring ② Check for cable-related issues. ③ Identifying mechanical factors ④ Adjust corresponding parameters ⑤ Replace the drive or motor
910	Change parameters requires a power cycle	① Changed the function code for changes to take effect after a power cycle	① Power on again
911	Parameter storage is frequent	① frequent and large modifications of function code parameters, and storage in EEPROM (P0E-05= 1)	① Check the operating mode. For parameters not requiring EEPROM storage, set P0E-05 to 0 before the host computer writes.
912	Forward @-@ exceeding @-@ warning	Positive overtravel terminal logic is valid.	Check the running mode, and under the premise of safety, give the negative command or rotate the motor, so that the logic of the "forward over travel switch" terminal becomes invalid.
913	Reverse @-@ echo warning	Reverse overtravel terminal logic is valid.	Check the running mode, and under the premise of safety, give the negative command or rotate the motor, so that the logic of the "reverse overrunning switch" terminal becomes invalid.

pay attention to：

After a failure occurs, follow these steps:

1、 If the servo driver fails, check if the keyboard display is abnormal and if the driver and motor are malfunctioning. If so, contact our technical support.

2、 If no exception occurs, check the fault code displayed on the keyboard and the corresponding fault record parameters. Use all parameters to determine the actual state when the current fault occurred.

2、 Check the table below to see if the corresponding abnormal status exists based on the specific countermeasures.

3、 Troubleshoot or request assistance from relevant personnel;

4、 After confirming the fault is resolved, power off and reset the device to resume operation.

8.2 Servo System Maintenance and Care

Check the running status of the drive and motor regularly, especially the motor cable.

The brake motor is used frequently in the vertical equipment. When the brake torque decreases, the brake motor should be replaced in time to avoid safety accidents.